A multi-theoretical mixed-methods approach to investigating research engagement by university ELT staff

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ABSTRACT

Although participation by EFL teachers in research activity is frequently advocated as desirable, involvement of this kind is often lacking in practice. The purpose of this study was to attempt to investigate possible causes of this situation.

A review of the non-ELT literature on the subject showed that rates of participation in research activity by academics working in higher education institutions are thought to be affected primarily by a combination of three main factors, i.e., environmental variables, personal variables, and feedback processes. Because of their perceived relevance to exploring them, the Theory of Planned Behavior (TpB) and Social Cognitive Theory (SCT) were used as investigative frameworks for the study of such factors within the research site, a Mexican university setting.

The study involved identification and comparison of a number of the perceptions and traits of a group of research active (RA) participants from a variety of non-ELT disciplines within the research setting with those of a number of non-research active (NRA) EFL teachers working in the Faculty of Modern Languages in the same research site.

The overall research design was two-phase and mixed-methods in nature. In the first phase of the study, quantitative data were generated from both sets of participants by the use of a TpB-based questionnaire. The findings indicated that the two groups were differentiated primarily in terms of *self-identity* and perceived *social factors*.

In the second main phase of the study, qualitative data were generated via life story interviews with a selection of the same participants, and analyzed from an SCT perspective. The principal finding was that, in contrast to the NRA subjects, RA

participants as a group experienced a "'Matthew effect' of accumulated SCT factors", whereby earlier success in research engagement increased the potential for later success.

The findings are seen to imply that attempting to increase research engagement by university ELT staff in settings such as the one studied should involve taking into account antecedent factors associated with beliefs affecting research behavior of the kind identified.

ACKNOWLEDGEMENTS

I think it is safe to say that a work of this nature is not accomplished solely by the person whose name appears on it as author. In the case of this thesis, I owe a great debt to a number of people. Firstly, I am indebted to the people of México for funding my studies through the *Secretaría de Educación Pública*, through the office of the *Programa de Mejoramiento del Profesorado* (PROMEP). Without that generous financial support, this project would not have been possible. It would not have been possible either without the release time that the university and my faculty generously provided throughout these (very enjoyable) four years. The support I received from the entities mentioned in this paragraph was beyond anything I could have imagined. I feel very lucky and grateful for the support and the opportunity that has been given me.

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DECLARATION

This thesis has been written by myself, and the work reported in it is my own. It has not been previously submitted for a degree in this or any other institution.

Lancaster University, September, 2008

Nancy Susan Keranen

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GLOSSARY

EFL	English as a foreign language
ELT	English language teaching
FCS	Faculty of Computing Sciences (*Facultad de Ciencias de Computación*)
FML	Faculty of Modern Languages (*Facultad de Lenguas Modernas*)
HB	Hypothetical Bias
NRA	Non-research active
RA	Research active
SCCT	Social Cognitive Career Theory
SCT	Social Cognitive Theory
SDR	Socially Desirable Responding
TpB	Theory of Planned Behavior
Cuerpo Academico	Faculty (department) level research group
Perfil PROMEP	Category of national recognition based on academic production
Padrón de Investigadores	University register of researchers
Secretaría de Educación Pública, SEP	Mexican Ministry of Public Education
Secretaría de Postgrado de Investigación	Faculty based research department
Sociedad Nacional de Investigadores - SNI	National Society of Researchers
Vicerrectoría de Investigación y Estudios de Posgrado	Vice-Rector of Investigation

Chapter 1

Introduction

1.0 Chapter introduction and overview

This thesis is concerned with attempting to identify and analyze the factors affecting academic research productivity. The study subjects were a group of university English as a foreign language (EFL) teachers who were part of a faculty of modern languages (hereafter referred to as the FML) in the Mexican university where I work. The overall aim of the study was to further understanding of academic research productivity by EFL teachers working in higher education in general – why, in other words, is involvement of this kind typically underdeveloped among EFL teachers around the world (see, e.g., Borg, 2007), despite the importance attached to it in the professional literature (e.g., Mann, 2005), by teachers' parent institutions, and so on. As a corollary, it is also hoped that the study will make a contribution to furthering understanding of the factors affecting research productivity in higher education in general.

This chapter introduces the study in overall terms, first of all by explaining the use of the term "research" within it, and then by outlining the study rationale, how the study relates to the wider (i.e., non-English language teaching (ELT)) literature on the topic, and the consequent research questions. It ends with an overview of the remainder of the thesis.

1.1 "Research" defined

Since this study dealt with "research", it is necessary to first of all clarify the sense in which the term is being used. Thus, for the purposes of this study, I define it as that type of activity which is recognized by the *Secretaría de Educación Pública,* SEP (Mexican Ministry of Public Education) when evaluating academics for standards of excellence related to research. Research in this sense involves projects registered with faculty *Cuerpos Academicos* (research groups), funded research projects accepted by the university's *Vicerrectoría de Investigación y Estudios de Posgrado* (Vice-Rector of Investigation and post-graduate studies), published refereed research articles in national and international journals, and published books or chapters that report on research done by the author (*Secretaría de Educación Pública*, 2006).

I selected this definition of "research" because it is the one established and recognized by the university which is the location for this study. It can also be seen as corresponding to international conceptions of academic research in general, i.e., associated with the carrying out and promulgating of original enquiry via "standard" methods of investigation.

1.2 Rationale

The main reasons for undertaking this study were as follows. Firstly, while the public university[1] where I work (and which is the research setting) has always had a strong research tradition, within the past five years it has been actively attempting to promote greater research participation of its teaching staff. The increased interest on the part of the university in this matter is due to its growing awareness of the importance of research as knowledge generation and also as a source of additional revenue for the university. In partial response to this increased interest, the FML has

[1] Located in central Mexico (see also 3.2, ¶1 below).

recently created the *Secretaría de Postgrado de Investigación*[2] (a research department), and there has been increased pressure for long inactive *Cuerpos Academicos* (research groups) within the FML to begin producing actual research projects and related publications.

A second reason for undertaking this study is the observed paucity of research activity among EFL practitioners in general (Borg, 2007), and the lack of published research attempting to understand factors affecting research productivity by EFL teachers in university settings in particular. Evidence for the former on a national level in my situation is provided by a recent study into research activity in teaching and learning of foreign languages in Mexican universities (Ramírez, 2007). Universities from 14 out of the national total of 33 states participated in the study. The results overwhelmingly indicate that research in this area is being done mainly by students at the undergraduate and graduate levels as a compulsory part of their degree programs, as shown in Fig. 1.1 below.

[2]There are two principal types of departments in the university: *escuelas* (schools) and *facultades* (faculties). The first is a department with only an undergraduate program (bachelors' of arts or sciences program). These have a *secretaria academico* (academic secretary), a department in charge of academic functions of the school and a *secretaría administrativo* (administrative secretary), a department in charge of administrative functions of the school. A department is termed a *facultad* (faculty) when it has a graduate (masters' level) or post-graduate (doctoral level) program. Each faculty that has a graduate or post-graduate program also has a *Secretaría de Postgrado de Investigación* (research department). The research department coordinates research associated with the masters' program and research by staff members of the faculty; this includes managing administrative aspects of the *Cuerpos Academicos* (faculty research groups).

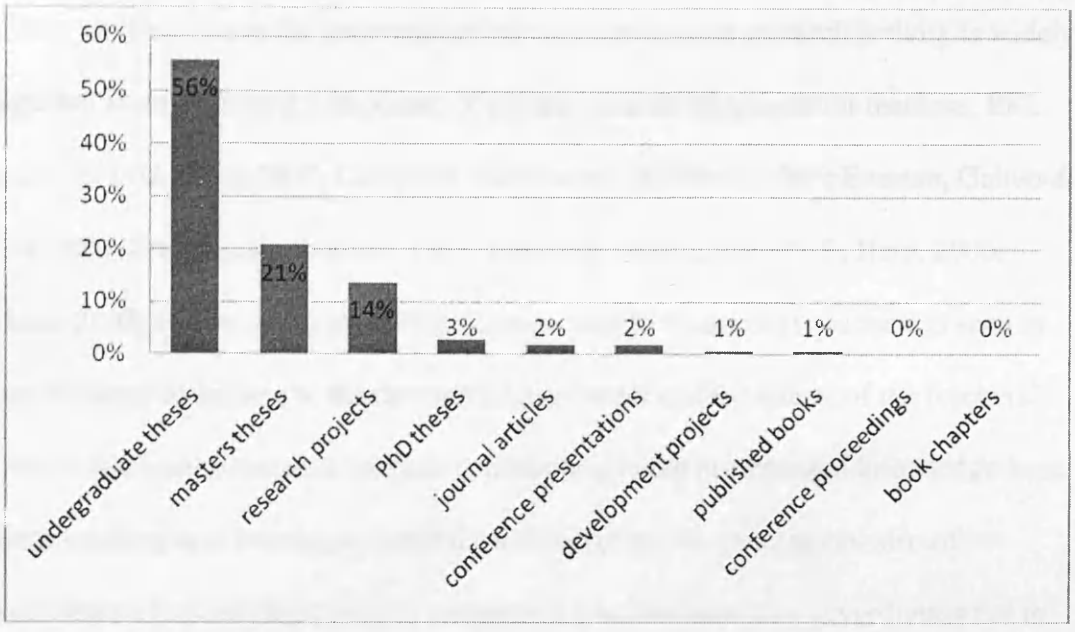

Figure 1.1 Types of research projects in Mexican universities (Ramírez, 2007)
Research projects by students as part of their degree graduation requirements comprise the majority of research in language education, the largest group consisting of undergraduate theses followed by masters' theses.

While it is clear that there are many more students than professors / researchers, the main locus of research productivity reported in this study seems to be skewed towards research done by students. This raises questions about the type of research supervision that is available to students. Questions, for example, related to the quality of student research, thus, are raised if there are few professors actively engaged in research activities. These types of issues, then, lead to concern for the quality of preparation of the next generation of language teachers. Will research activity be part of their professional lives if they are perhaps lacking in their pre-service years adequate research preparation and researcher role models? Understanding academic research productivity in professionals could lead to interventions targeted at encouraging a higher level of research participation among language academic staff (discussed further in 7.2.4 below).

A third reason for undertaking this study is because research activity is widely regarded as an important component of professional development for teachers, EFL and other (viz. Borg, 2007; Campbell, McNamara, & Gilroy, 2004; Everton, Galton & Pell, 2002, Freeman & Johnson, 1998; Gebhard, 1996, Gunn, 2005; Heip, 2006; Mann, 2005; Nunan & Lamb, 1996). Engagement in research by teachers is seen in this literature as leading to the development of better understanding of the teachers' own professional practice, as well as contributing to the professional knowledge-base about teaching and learning in general. It is therefore, for this reason, also of considerable concern to attempt to understand why teachers may nevertheless fail to engage in research activity.

In this connection, I conducted two studies in order to investigate perceived obstacles to the professional development of FML faculty. The first of these (Keranen & Encinas, 2004a) used interviews with the faculty. Analysis of the interviews identified four predominate areas associated with the topic: 1) the way that certain career stages or cycles (e.g., entry stage or experienced teacher) affected perceptions of professional development, 2) a sense of helplessness in respect to their professional development indicated by some teachers, 3) the conceptualization of the ELT profession by the individual as subject to her or his current career stage/cycle, and 4) the effects of collaboration on professional development. The literature reviewed for this study also raised our awareness of the concept of practitioner research as professional development, and led on to the second study which was more focused on ELT practitioners' academic research productivity as one approach to professional development.

This study (Keranen & Encinas, 2004b) was set in a private university in Mexico and involved teachers working in public as well as private universities who

were attending an in-service teacher training course on research methods. The focus of the study was on how the course affected the teachers' participation in research related to their professional development. We wanted to see *if, when* and *how* these teachers would change their opinions towards research participation as they progressed through the course. Data regarding the processes and attitudes that participants experienced as the course progressed over the year of its length were collected through interviews, diaries, online group discussions, and analysis of stages of reporting on a research project in the form of a final thesis (the overall output expected of the teachers taking the course). This study identified the following main factors affected the teachers' research processes and attitudes:

- literacy issues (having to function in a second language -- in this case English) and literacy issues in the first language (Spanish);
- issues of time for research activity, relating to both family as well as work obligations;
- research training issues and academic disciplines, i.e., some academic disciplines were perceived to have a stronger focus on training and preparation related to research participation, while the participants in our study saw themselves as not coming from a discipline with a tradition of preparation for research participation (Becher & Trowler, 2001; Colbeck, 1998).

In overall terms, both of these studies gave me the beginnings of insights into some of the possible reasons for lack of participation in research activity by faculty in settings such as the FML, and motivated me to undertake the larger study which is the focus of this thesis.

A fourth reason for undertaking this study is associated with an attempt to widen the scope of applied linguistics in the area in question by linking it more directly to studies of research activity by teachers which have been conducted outside the ELT field. Within applied linguistics, the literature on research productivity by ELT personnel has been characterized historically and primarily by a series of

exhortations to teachers to participate in research activity, mainly in the form of practitioner research (see, e.g., Edge & Richards, 1993; Freeman & Johnson, 1998; Gebhard, 1996; Nunan & Lamb, 1996; Richards & Lockhart, 1996; Schachter & Gass, 1996). More recently, however, there have been a handful of studies, chiefly by Borg (e.g., Borg 2007), concerned mostly with surveying to what extent ELT practitioners in various kinds of institutions claim to involve themselves in research activity, what conceptions they have of what counts as "research" and so on. Research of the latter kind has been very useful in documenting in a *descriptive* manner the nature of the current situation, and has shown (*inter alia*) the relatively widespread tendency for ELT personnel, even those working in tertiary level institutions, to *not* participate in research activity, the exhortations in the literature just referred to notwithstanding (cf. Burns, 2005).

What is largely missing in this literature, however, are studies which endeavor to go beyond descriptions of the current situation to begin to approach an understanding of the lack of participation in research activity on the part of ELT personnel. For further insight into this aspect, I have therefore felt it necessary to look at the literature on the topic that lies beyond ELT, and attempt to relate it to the world of ELT. This has been a further major reason for conducting the kind of study this thesis is concerned with.

1.3 The wider literature

The wider literature, from beyond applied linguistics, shows the issue of university teachers' involvement (or lack of it) in research activity it to be a complex matter in terms of the range of variables involved (see, e.g., Barnett, 1992; Breen & Lindsay, 1999; Brew, 1999; Campbell, McNamara & Gilroy, 2004; Coate, Barnett &

Williams, 2001; Jenkins, 2000; Neumann, 1992; Ramsden & Moses, 1992; Schacter & Gass, 1996; Schön, 1983; 1987; Vidal & Quintanilla, 2000; Williams, 2003).

By far the majority of subjects of these research productivity studies have been faculty members in the 'hard' sciences (e.g. physics and mathematics). A few studies have involved comparisons across disciplines (e.g. Blackburn, et al., 1991; Dundar & Lewis, 1998; Ramsden, 1994; Teodorescu, 2000). Many have been correlational, attempting to identify factors that are associated with research productivity (as comprehensively reviewed in Williams, 2003). Some studies have approached research productivity from a theoretical perspective in order to explain causation (e.g. Blackburn, et al., 1991; Bayer & Dutton, 1977; Dundar & Lewis, 1998; Ramsden, 1994; Bland, et al., 2002; 2005; Tien & Blackburn, 1996).

However, almost all such studies from the past three decades have acknowledged that research productivity is associated with three major groupings of variables: *environmental* factors, *personal* or *individual* factors, and *feedback* processes. The first group is concerned with variables related to the *research environment*, i.e., the institutional and other variables that are seen to influence the researcher within and outside of the context where the research activity occurs – see *inter alia* Blackburn, et al., 1991; Bland, et al., 2002; Dundar & Lewis, 1998; Lee, 2004; Porter & Umbach, 2000; Rey-Rocha, et al., 2007. The most common environmental variables identified and studied in the research productivity literature include, for example, variables related to graduate school (research socialization), prestige of department or institution, collegiality, collaboration, and research groups (please see Appendix A for further details). Some research productivity studies claim that environmental variables are the most important determiners of research productivity (e.g. Bland, et al., 2002; 2005; Dundar & Lewis, 1998; Smeby & Try,

2005). Any research productivity studies looking at environmental factors such as prestige of department or institution, collegiality, collaboration, and research groups should probably consider their relative influence on research productivity in the light of postmodernist interpretations, i.e., that the interaction between the individual and her or his environment is a matter of ongoing interpretation, based on individual characteristics and personal histories, and subject to dynamic and negotiated processes involving all the parties concerned (Grbich, 1998).

The second main set of variables identified in the literature on research productivity are those relating to the *characteristics of the individual researcher*, i.e., variables related to personality, demographic background, gender, age, and so on (see *inter alia* Barjak, 2006; Blackburn, et al., 1978; Burke & James, 2005; Fox, 1983; Grbich, 1998; Smeby & Try, 2005). In contradiction to claims that environmental variables are the most important determiners of research productivity, Teodorescu (2000) reviews six studies on factors contributing to research productivity (Wanner, Lewis, & Gregorio, 1981; Finkelstein, 1984; Fox, 1985; Creswell, 1985; Waworuntu, 1986; McGee & Ford, 1987 as cited in Teodorescu, 2000) and concludes the studies unanimously indicate that individual class variables "tend to weigh more in predicting productivity than institutional influences" (Teodorescu, 2000, p. 204).

Individual variables of research productivity tend to fall into two distinct categories: i) psychological characteristics, e.g., cognitive and emotional characteristics, perceptive styles, personality traits, biographical background, and ii) demographic characteristics, e.g., age, gender, and race and ethnicity (also see Appendix B).

Fox (1983) identifies two principal criticisms of studies of research productivity in terms of individual psychological factors. Firstly, as she notes (Fox, ibid, p. 288),

the subjects of many of the studies have been scientists, and "scientists are a highly trained and rigorously selected élite." Therefore, she argues, all scientists must possess a certain degree of intelligence, talent, and ability related to their work. Thus, studies looking only at individual characteristics cannot fully explain the observed variability in research productivity among such a population. In other words, according to this view, variation in research productivity cannot be a product of only psychological characteristics. Secondly, she argues that personality traits and creativity are also social products. The effects of institutional and social contexts must therefore also be included in any account of the psychology of the individual researcher.

Studies that look at demographic characteristics of research productivity (see Appendix B) have also been seen as containing shortcomings. The most common criticism is related to the research design. Many studies examining demographic variables are cross-sectional and therefore are unable to account for other cohort effects related to the passing of time (Levin & Stephan, 1991). Gonzales-Brambila and Veloso (2007) also note that published studies of research productivity of this kind vary from one another in terms of methodologies, sample sizes, length of the studies, and in their identified limitations. This lack of uniformity makes it difficult to identify any consistent set of variables that contribute to or explain research productivity in terms of demographic characteristics. Gonzales-Brambila and Veloso (2007) also report that most of the published studies on research productivity of this type occurred before the 1990's, and therefore do not take into account the vast changes in the "pressure to publish" and the vast increase in the number of journals that has occurred in the past 20 years. They also claim that all of the published studies of this nature have been conducted in developed nations rather than in

developing countries. It has not been established whether those same variables are seen to be associated with research productivity in developing nations.

The third main group of variables identified in this literature is concerned with *feedback processes*, i.e., processes that tend to sustain research productivity or reward research productivity - see Fox's (1983) oft-cited review of research productivity studies. Two main feedback processes are distinguished, *viz.*, "cumulative advantage theory" and "reinforcement theory". The former proposes that early research productivity leads to later research productivity. In other words, academics who achieve an early and high level of research productivity can later acquire the time and resources needed to continue on in the same vein (Fox, 1983). However, a shortcoming of the "cumulative advantage theory" is that it does not take into consideration elements of inequality among young academics. Differences in "talent, ability, and motivation" as well as promotion policies, allocation of resources, and reward systems make cumulative advantage difficult to test. For example, if resources are awarded based on merit, then research and advancement of knowledge by those in receipt of the resources will most likely proceed apace. If, however, resources are allocated based on factors other than research productivity or scholarly activity, then the pattern of progress is likely to be less straightforward (Fox, 1983, p. 296).

"Reinforcement theory" is based on behaviorism (Skinner, 1938), which (*inter alia*) hypothesizes that behavior that is rewarded continues while behavior that is not rewarded ceases. Several studies have attempted to explain research productivity based on this theory, i.e., seeking to understand the motivating effects of rewards on faculty research productivity (e.g., Tien & Blackburn, 1999; Tien, 2000; Tien, 2007). A criticism of reinforcement theory is that it is hard to demonstrate its effect (Fox,

1983). Because of the complex social factors surrounding research productivity, it is difficult to tease apart what factors are reinforcing behavior and what factors are inhibiting it. The promise of various forms of pecuniary rewards for engaging in a particular behavior also ignores any motivational factors based on intrinsic elements within the psychology of the individual researcher. There are also, of course, the well-established general limitations of behaviorism as a model of behavior and learning (see, e.g., Chomsky, 1959).

1.4 Research focus

Despite the large numbers of studies of the kind that have been reviewed, thus, uncertainty remains about the relative influence of individual versus environmental variables on engagement in research productivity (Burke & James, 2005), as well as the role played by feedback processes (Huber, 2002). Nevertheless, in overall terms, the above review also indicates that, while no one set of explanations is likely to be adequate on its own, if further light is to be thrown on academic research productivity, it will occur via research based on taking into account the influences of a combination of environmental as well as individual variables, and the way in which they may be moderated by the effects of feedback processes (Ramsden, 1994).

This said, however, it should also be pointed out at this stage that, among the potential individual variables at play, the personal beliefs, conceptions, and definitions in the minds of teachers of what constitutes research are, of course, constructs which can and have been considered when attempting to understand research engagement. Thus, there is an extant (albeit limited) body of research on teachers' conceptualization of "research", both from outside ELT (e.g., Barker, 2005; Gilley, 2006; Reis-Jorge, 2007) and within it (e.g., Borg, 2007; Brown, 1992). To

have attempted to take into account this aspect in a study of this kind would therefore no doubt have been valuable.

However, as will be seen in the following three chapters, in order to be able to deploy an investigative framework for the study which would meet the twin criteria of i) managing to take into account how the main variables affecting research productivity were seen to be configured in overall terms on the basis of the literature just reviewed, and ii), at the same time, in order to try to confine the study to manageable proportions in relation to the time, space and other resources available for it, it was felt that, regrettably, the issue of teachers' personal definitions of research could not also be readily included. This is because, as will be seen, the nature of the research framework which was developed in order to attempt to capture data about and throw light on the configuration of the three main variable groups identified above involved the use, of necessity, of the official characterization of research prevailing in the study situation (see section 1.1, p. 1 above, and Appendix U, Main Study Questionnaire).[3]

With this qualification, thus, the research this thesis is concerned with attempted to investigate research productivity in the research setting in question in terms of the overall perspective outlined above. The main questions[4] it set out to answer were:

RQ 1: What seem to be the main personal variables affecting the research productivity of the subjects?
RQ 2: What appear to be the primary environmental variables also of influence?
RQ 3: In what ways can feedback processes also be seen to affect the matter?

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[3] However, the way in which personal constructs of what "research" constitutes can be used as the basis for the design of possible interventions aimed at influencing research engagement is explored in section 7.2.4.3 below.

[4] The research questions are expressed here as originally conceived but went through a slight transformation process as the study progressed. The refinement of the questions is documented throughout the thesis (see also 7.1 below).

It was hoped that the answers to these questions would help to throw useful light on factors affecting research participation by EFL teachers in settings of the kind used for the investigation by bringing to bear the findings of research from outside the ELT field, thus helping to close the "explanation gap" identified earlier as characterizing current ELT conceptualizations of the problem.

1.5 Thesis structure

The structure of the remainder of this thesis is as follows. Chapter 2 is concerned with forming a theoretical model leading to the choice of the research methodology. Chapter 3 describes the details of the pilot study research design, in terms of choice of research setting, participants, research instruments, procedures, data analyses approaches, pilot study results, and the identification of the relationship between the pilot study and the main study. Chapter 4 presents the details of the main study research design, the participants, instruments, procedures, and data analyses approaches. In the following two chapters (5 and 6), the research data analyses are presented and discussed, firstly with respect to the quantitative data findings (Chapter 5) and secondly in terms of the qualitative ones (Chapter 6). Finally, Chapter 7 summarizes and discusses the results of the research as a whole, and explicates the contribution of the study to understanding the research behavior of ELT faculty working in settings of the kind the research focuses on and to the development of further research on the topic in general. It also discusses the limitations of the research and proposes areas for further enquiry.

Chapter 2

Towards a Framework for Investigation

2.0 Chapter introduction and overview

The overall aim of this chapter is to present the framework for attempting to understand academic research productivity which was used in this study. The following section (2.1) therefore describes in broad terms the two principal underlying theories on which the model for understanding research productivity used in this thesis was based. The following sections (2.2 and 2.3) explicate the two theories in detail and summarize research findings in the domains of each of the theories that are relevant to the tenability of the overall model. Thus, the chapter is constructed in a spiral-like form, with section 2.1 painting the choice of theoretical foundations broadly, and the second iteration of the spiral (sections 2.2 and 2.3) adding detail to the broad descriptions of the first. The chapter concludes by outlining the overall

methodological approach adopted in order to attempt to mobilize the model formulated.

2.1 Model construction

As presented in the previous chapter (1.3 above), nearly a century of research on academic research productivity has identified a confusing number of variables that potentially contribute to high levels of engagement in this activity (see Appendixes A-C). It is difficult to determine which variables should be included in any proposed theoretical model attempting to aid understanding of academic research productivity. However, despite the evident complexity of this issue, almost all of the identified variables can be classified into three broad categories: *environmental factors, personal factors*, and *feedback processes* (Fox, 1983).

Thus, with this in mind and based on studies associated with academic research productivity presented in the previous chapter, an elementary putative causal model can be constructed. Based on the existing literature (reviewed in 1.3 above) and as proposed in Fig. 2.1 below *research behavior* is the dependent variable. The independent variables that are seen to affect the behavior are classified into the categories: *environmental factors, personal factors* and *feedback processes.*

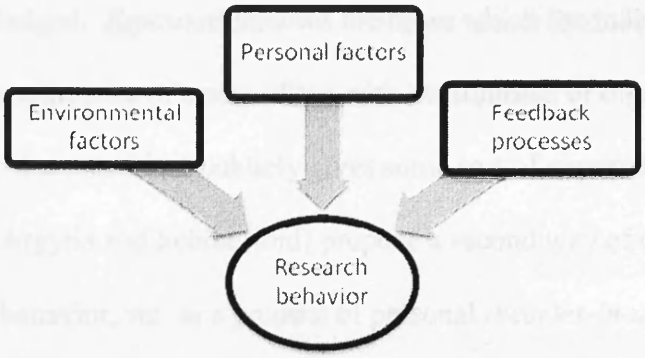

Figure 2.1 Initial research behavior model
Three classes of factors that influence research behavior identified in the academic research productivity literature

The question remains however: *which* of the vast numbers of variables identified in the literature should be tested in the research behavior model. This is where the value of building on existing theory becomes evident. Since research productivity is *behavioral* in nature, theories related to behavior should be enlisted to help guide selection of variables most likely to contribute to an accurate research model of the domain under study. Based on academic research productivity literature, as presented above, three broad categories of variables have been generally accepted as contributing to academics' research productivity.

Thus, a starting point for selecting a theory to guide model construction would be the identification of theories that accommodate variables that can exist within those broadly defined categories (Fig. 2.1 above). As explained throughout the remainder of this chapter two theories (theory of planned behavior and social cognitive theory) were chosen primarily because both possess a vast amount of empirical validation in human behavior studies and because they accommodate the variables seen to affect academic research productivity.

Before going further into the topic of model construction, however, the work of Argyris and Schön (1974, p. 5) in terms of attempting to throw light on human

behavior via their distinction between "espoused theories" versus "theories-in-action" should be acknowledged. *Espoused theories* are those which the individual publically adheres to. They are theories of action allied with institutional or organizational behaviors to which the individual publicly gives some sort of expression of loyalty. At the same time, Argyris and Schön (ibid) propose a second way of conceptualizing sources of human behavior, *viz*: as a product of personal *theories-in-action* – constructs which appear to inform the ways in which individuals actually operate in practice. Individual theories-in-action, they argue, can be similar or in opposition to espoused theories. Furthermore, as they also point out, an individual might or might not be aware of the correspondence or lack of it between the two constructs.

However, on the basis of literature of the kind summarized in 1.3 above, rather than exploring the potential differences and similarities between research subjects' espoused theories and theories in action, there was felt to be, in the first instance, a prima facie case for exploring similarities and differences between their espoused theories. Furthermore, because the scope of the study did not permit both this *and* an investigation of possible differences and similarities between the two kinds of theories to be undertaken, it was therefore decided that the focus would be confined to an exploration of espoused theories only. Nevertheless, it needs to be acknowledged that a further study, involving both kinds of theories, would be valuable.

To return, then, to the first of the two theoretical frameworks mentioned earlier. The theory of planned behavior (TpB) (Ajzen, 2005) posits that human (volitional) behavior[5] is directly influenced by behavioral intentions which are in turn influenced by a combination of three variables. One of those variables is environmental in nature (*salient beliefs related to social factors associated with the behavior*) and two are

[5] All references to "behavior" in this thesis refer to human volitional behavior.

personal (*attitudes toward the behavior* and *control beliefs associated with the behavior*) (explained in detail in 2.2 below). The processes of interaction within and between the TpB variables are a function of behavioral evaluations based in part on feedback processes (see 2.2.2 below).

However, the TpB model does not directly take into account antecedent factors to the three TpB variables. These antecedent factors are understood to influence the behavior indirectly through their affects on the three model predictor variables. Thus, the TpB variables "are assumed to mediate the effects of background factors on intentions and actions" (Ajzen, 2005, p. 134). These antecedent factors when included in any model attempting to understand behavior can help identify the possible origins of the values associated with the TpB variables. At the same time, since the TpB variables are posited as the most "proximal antecedents of the behavior" it is also possible to assess the influence of a given background factor on the target behavior by analyzing its effects on the TpB variables (Ajzen, 2005, p. 135).

With this information the research model presented above in Fig. 2.1 can be refined as represented in Fig. 2.2 below.

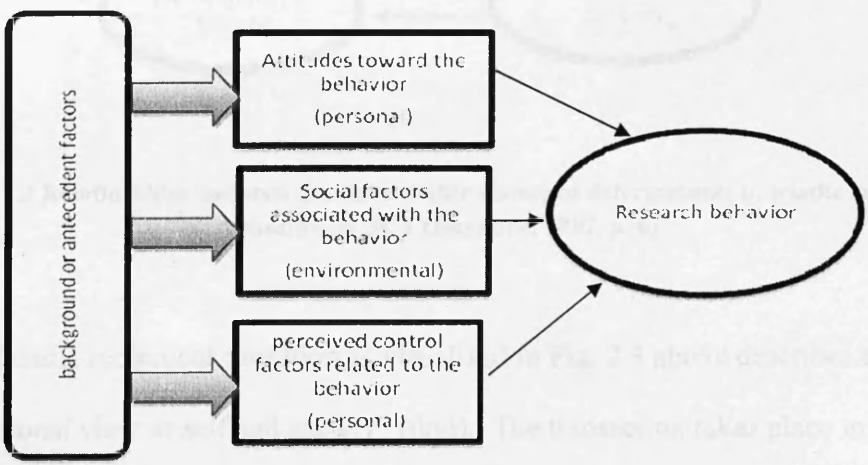

Figure 2.2 Refined research model with antecedent and TpB variables
Background factors as antecedent variables moderated by the TpB variables influencing research behavior

However, since the background or antecedent factors are outside the TpB model and may contain any number and combination of potential factors, another theoretical framework needs to be added to the academic research productivity model thus far constructed to help guide the selection of factors to be included. Keeping in mind the three broad categories of variables identified in the academic research productivity literature (i.e., environmental factors, personal factors, and feedback processes), any additional explanatory theory must accommodate those factors.

Social cognitive theory (SCT) (Bandura, 1986) posits that behavior can be explained as the result of the interaction between environmental and personal factors. Bandura's (1997, p. 6) model of this "triadic reciprocal causation" explains the interactional nature of environmental and personal factors and the behavior in question. His model of behavior is reproduced below in Fig. 2.3.

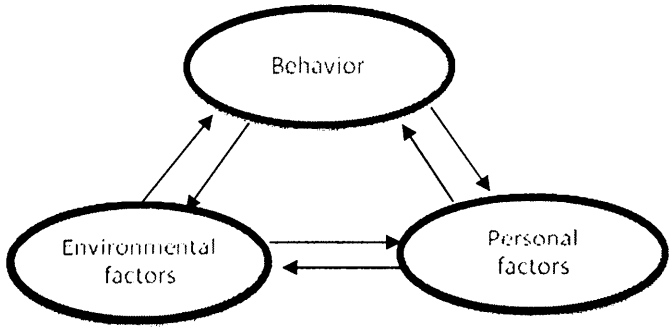

Figure 2.3 Relationships between the three major classes of determinants in triadic reciprocal causation of SCT (Bandura, 1997, p. 6)

Triadic reciprocal causation as visualized in Fig. 2.3 above describes a "transactional view of self and society" (ibid). The transaction takes place in the interaction of the classes of behavioral determinants expressed in the figure above. Environmental factors within this framework include family influence, role models,

social relationships, social supports and barriers (Heinze, 2007) and fortuitous encounters with influential[6] persons or groups (Bandura, 1982). Personal factors within the model fall into the broad categories of cognitive, affective, and biological events (Bandura, 1997). Feedback processes are represented in the transactional relationships between the classes of determinants in the SCT model (environment, personal factors, and behavior). The addition of "feedforward" processes expands the feedback concept to accommodate "forethought." Humans are not only responsive to negative or positive behavioral feedback but are also able to anticipate behavioral outcomes through the mechanism of "forethought" (Bandura, 1997, p. 35; Lent, et al., 1994).

With the addition of specific variables to the SCT behavioral determinants, it is possible to put forward a basic multi-theoretical model for investigating engagement in research activity (Fig. 2.4 below).

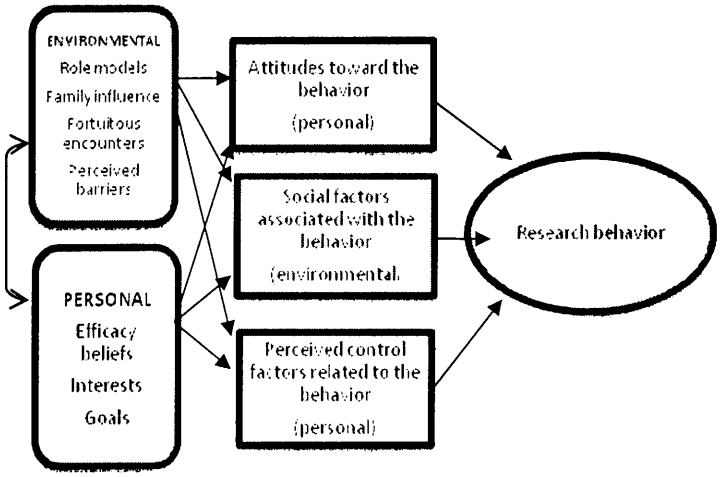

Figure 2.4 Proposed multi-theoretical model of academic research productivity
SCT determinants of behavior as background variables to TpB variables

In Fig. 2.4 above SCT environmental determinants of behavior (i.e., role models, family influences, and fortuitous encounters, perceived barriers) are seen to

[6] "Influential" in the sense of having influence on an individual's behavior.

influence salient beliefs of attitudes toward the behavior, normative beliefs, and control beliefs related to academic research productivity. Likewise SCT personal determinants of behavior (i.e., efficacy beliefs, interests, goals) are seen to influence the same salient beliefs. Feedback and feedforward processes are not represented in the model; however, they are seen as processes that determine the strength of behavioral assessments (intentions to engage in the behavior). These processes move omni-directionally between the determinants and influence the relative strength of given relationships between the determinants at given times. In other words, the strength of the relative influences between the variables in the model has neither temporal nor behavioral stability (Bandura, 1997, p. 6).

This section presented a general conception of the multi-theoretical research model constructed for this study. The following two principal sections (2.2 and 2.3) will correspondingly describe the TpB and SCT in greater detail and provide empirical research results from the literature (relevant to this study) in each theory domain to establish the theoretical research model's tenability.

2.2 Theory of planned behavior as a theory-based approach to understanding academic research productivity

Ajzen's theory of planned behavior (TpB) attempts to understand individual and environmental characteristics and their relationships with a specific behavior by proposing that they can be understood through a model of the inter-relationships between beliefs, attitudes, and actions (Kennedy & Kennedy, 1996). The TpB comes from the area of social psychology and "has been thoroughly researched and supported" (Florin, Karri, & Rossiter, 2007, p. 19) as an effective model for understanding the effects of attitude on intention and behavior (Armitage & Conner,

2001, p. 489). Studies about human behavior using TpB have been used to predict as well as to understand behavior in a large number of areas. According to Francis, Johnson, Eccles, Grimshaw, and Kaner (2004b), from 1986 to 2004 there have been over 800 studies in the area of psychology and medicine in which TpB has been used as the research methodology. The studies have been used to understand intervention programs designed to change behavior and in studies that intend to identify specific beliefs of professionals that lead to particular behaviors.

While there seem to be no published studies using the TpB to attempt to understand academic research productivity, a limited number of TpB studies in the vocational field have generally supported the TpB model in explaining factors related to career choice and career or professional development, and a number of studies utilizing TpB have investigated behavioral intentions of teachers. Because of the apparent gap in the TpB literature related to the present study, in the words of Lent, Brown, and Hackett (1994, p. 80) "to help balance the competing objectives of parsimony and completeness", only the general area of the TpB studies within career or vocational fields and education will be presented in what follows.

The TpB model has been empirically tested in the area of vocational or career choice and development. A number of these studies have been reviewed in Arnold et al. (2006). TpB studies have looked at managers intentions to undertake further training (Norman & Bonnett, 1995); individuals intentions to pursue certain careers (Giles & Rea, 1999; Vincent, Peplau, & Hill, 1998); job searching intentions (Van Hooft, et al., 2004); career exploration behavior (Millar & Shevlin, 2003); and career intentions of Dutch naval officers (Van Breukelen, et al., 2004). All of these studies "supported the core elements of the TpB" but with varying levels of influence of the three predictor variables on the outcome variable (Arnold, et al., 2006, p. 375).

A number of TpB studies have investigated teacher behavior in educational settings (Zint, 2002). In the area of general primary and secondary education TpB has been tested empirically to understanding teachers' intentions to implement HIV/AIDS education (Burak, 1992; 1994); incorporate various approaches in the teaching of science (Chen, 1988; Gorman-Smith, 1993; Haney 1994 & Haney et al., 1996; Koballa, 1986; 1989; Lumpe, et al. 1998a; Middlestadt et al., 1999; Zint, 2002); student motivation (Jesus & Abreu, 1994); use investigative teaching methods (Crawley, 1988; 1990); work with colleagues (Desouza, 1993); use cooperative learning (Lumpe, et al., 1998b); teach mildly handicapped students (Wishnick, 1989); computer usage intentions (Smarkola, 2008); teaching physical education (Martin & Kulinna, 2004). A database search[7] of TpB studies involving academic staff in the tertiary level did not reveal any current research.

Kennedy, C. and Kennedy, J. (1996) and Kennedy, D. (1996) appear to be the only studies using TpB to understand foreign language teacher behavior. Both studies investigated the relationship between beliefs, attitudes and actions, and examined reasons for teachers' failure to implement change in their behavior in the classroom. Examples from the former study are presented below (2.2.1.4).

The latter study (Kennedy, D., 1996) empirically tested the TpB model with four foreign language teachers in China. He looked at the implementation of pairwork into a traditional (teacher-centered) English language classroom. Teacher A's unwillingness to implement pairwork was identified as a outcome of his negative attitudes toward this classroom practice, his perceived beliefs about his colleagues' negative attitudes toward pairwork, and his personal beliefs concerning his ability to successfully integrate pair work into his classroom.

[7] EBSCO, ERIC, British Education Index, Social Sciences Citation Index

Teacher B likewise was influenced by her beliefs and attitudes; however, she held positive attitudes toward pairwork and was eager to implement this approach in her classroom. She perceived positive support for this change from her school (social factors), but she felt that including pairwork in her classes would cause her to lose control of the class. In other words, she doubted her ability to control the behavior, and thus no change in her teaching practice was implemented.

Teacher C displayed positive attitudes toward inclusion of pairwork into his language classes, perceived support from his department, and expressed no limiting control factors. He added a pairwork component to his class and perceived a positive outcome. Thus, his attitudes were reinforced and change was implemented.

Teacher D expressed all the same salient beliefs regarding the use of pairwork as Teacher C, but when she tried it, she discovered that the communicative ability of her students did not change, and the noise level in her class led to discipline problems. Thus, she evaluated the overall pairwork outcome negatively and did not implement the change in her practice.

Because of the complexity of change implementation, teacher educators must be aware of the influences of trainees' personally held beliefs related to their attitudes toward the change behavior, their perceptions of social pressures (facilitating and debilitating) and their beliefs about their ability to control the target behavior. All three factors need to be regarded as an integrated system for understanding behavior (Kennedy, D., 1986).

The following section explains the TpB system for understanding and explaining behavior. The overall theory model (Fig. 2.5 below) is described followed by individual explanations of the TpB variables (sections 2.2.1.1 through 2.2.1.3).

2.2.1 The TpB system

The main elements in the theory and the relationships between them are as shown in Fig. 2.5 below. Thus, as can be seen, the TpB identifies *intention* as the direct antecedent of a person's engagement in a behavior. The nature of the person's intention is determined, in turn, by exploring the interrelationships between three main variables, namely: *attitude toward the behavior, subjective norm,* and *perceived behavioral control.*

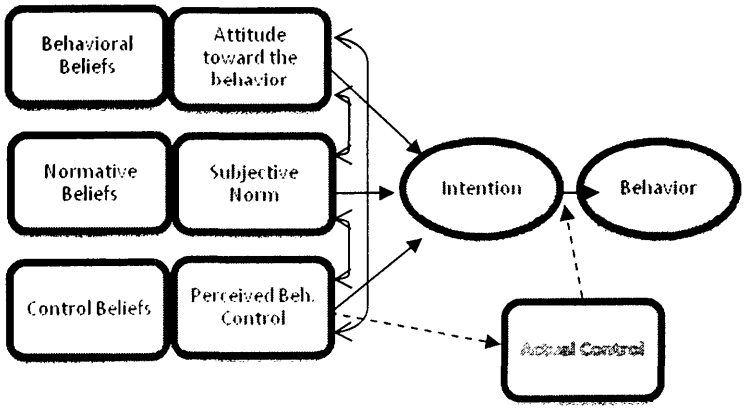

Figure 2.5 Theory of planned behavior model (Ajzen, 2006)
Intention to engage in a behavior is regarded as the direct antecedent to the actual behavior. Intention is the result of evaluations based on behavioral attitudes, perceived social and control factors. "Actual control" can moderate the effects of intention on behavior.

2.2.1.1 Behavioral beliefs, normative beliefs and control beliefs

The three factors represented on the left of Fig. 2.5 above (*behavioral beliefs, normative beliefs,* and *control beliefs*) represent various kinds of salient or accessible beliefs an individual holds about a particular behavior within a specific timeframe. These variables are interrelated with each other (as represented by the arrows), so that any one of them is therefore seen to affect the existence or strength of the others. For example, an individual might hold the belief that doing research is something positive, but if he or she feels no or little social pressure (*normative beliefs*) to do research, then

the level of the belief related to the performance of the behavior is predicted to be weak. Likewise, if the individual feels that doing research is in some way beyond her or his control, this belief will affect the overall attitude toward engagement in this behavior. These first level beliefs are elicited by *directly* asking individuals to report their salient beliefs regarding an object or behavior (Armitage & Connor, 2001).

2.2.1.2 Attitude toward the behavior, subjective norm, and perceived behavioral control

In the middle column in the main part of Fig. 2.5 above, the three main variables of *attitude toward the behavior, subjective norm,* and *perceived behavioral control* are shown. These result from the application of Fishbein and Ajzen's "expectancy-value" model[8] (Ajzen & Fishbein, 1980), whereby each one is a product of: i) the corresponding type of underlying belief represented in the left-hand column and ii) the strength of that belief.

Thus, with respect to the two top-most variables (*behavioral beliefs* and *attitudes towards the behavior*), as Armitage and Conner (2001, p. 474) explain, "each behavioral belief links a given behaviour to a certain outcome [i.e., if I do this action, this will result] or to some other attribute, such as the cost incurred in performing the behaviour." *Attitude toward the behavior* is thus the result of the strength of the associations and the particular salient beliefs held about the behavior, the *behavioral beliefs*. In other words, "the subjective value of a given outcome affects the attitude in direct proportion to the strength of the belief" (Armitage& Connor, 2001, p. 474). Individuals generally hold more than one behavioral belief and each one has its corresponding strength (Ajzen, 2006).

[8] The expectancy-value model is further explained in its relation to the research methodology in section 3.5 below.

Moving on to the two variables in the middle row in the main part of Fig. 2.5 above, (*normative beliefs* and *subjective norm)*, a similar picture occurs. Salient *normative beliefs* - a result of perceptions about whether the individuals or groups with "whom the individual is motivated to comply" would approve or disapprove of the behavior in question (Armitage & Connor, 2001, p. 474) - are seen to influence an individual's beliefs regarding a behavior. *Normative beliefs* are weighted by the extent to which the individual feels social pressure to comply (*motivation to comply)* with the beliefs of those important individuals or groups. The *subjective norm,* accordingly, is formed by the combination of strength of all the salient *normative beliefs* and the motivation the individual feels to comply with the perceived beliefs of those important others.

In the case of academic research behavior these sources of perceived behavioral approval or disapproval can be institutions such as the university, funding agencies, institutional or governmental evaluation entities, faculties (or departments), administrative personnel such as directors and department coordinators, colleagues and peers, friends, and family members. However, the beliefs held by the individual may not actually be the beliefs held by that important person or persons. It is what the individual *thinks* the other person believes.

For example, there are two important people in John's life, his wife and the director of his university department. John believes that his wife resents the time that he dedicates to doing research. He believes that she thinks that it is taking valuable time away from his obligations as a father. On the other hand, John believes that the director of his department is very eager for him to do research. These two beliefs are John's *normative beliefs* with respect to the behavior in question. John feels a strong

compulsion to conform to what he perceives as the wishes of both his wife and the director of his department. This is his *motivation to comply.*

The level of his motivation to comply is weighted by the importance he attaches to his beliefs regarding the beliefs of those people important to him. This is assessed in the TpB questionnaire (explained further in 3.5.2 below) on a seven point bi-polar scale (-3 | -2 | -1 | 0 | +1 | +2 | +3). In this case he might evaluate his beliefs related to his wife and his academic research productivity as "-2" (prefer that I did not do research) and his director a "+3" (really cares that I do research). On a scale from 1 to 7 of the degree of importance he assigns to those two people, his wife and the director would both receive a 7 (he generally wants to do what he thinks they want him to do)[9].

To simplify the relationship for this illustration, the value of the independent variable *subjective norm* (SN) in John's case would be: (-3x7) + (3x7) = -21+21= SN=0. The importance of this number is determined by establishing the lowest possible SN (-42) and the highest possible SN (+42). John's score can now be analyzed using various statistical procedures depending on study research questions or hypotheses (discussed in 3.6 below, also see Appendix N for a detailed presentation of TpB statistical analysis).

Finally, the two variables at the bottom of the main part of the model - *control beliefs* and *perceived behavioral control* - once again operate in a similar manner. *Control beliefs* represent the individual's salient beliefs related to how much control he or she feels he or she has or does not have regarding his or her performance ability with respect to a behavior. *Perceived behavioral control* is the product of those salient *control beliefs* and the power of those factors to influence the individual's

[9] The choice of scales is discussed in detail in Appendix CC

confidence about his or her ability to control performance of the behavior (Ajzen, 2002).

Attitude towards the behavior, subjective norm, and *perceived behavioral control* are measured *indirectly*, by asking people to generate their salient beliefs about the behavior. These elicited beliefs are then formed into a questionnaire which is administered and then statistically analyzed to produce an attitude score for the individuals in question towards the particular behavior (described in detail in sections 3.3-3.6 below) (Francis, *et al.*, 2004b). According to the theory, the higher this score, the higher the probability that an individual will engage in the behavior in question. Any of the three variables affecting *intention* and therefore behavior (*attitude towards the behavior, subjective norm,* or *perceived behavioral control)* can be "facilitating or obstructing" (Kennedy & Kennedy, 1996, p. 357). An examination of any of these variables and their effect on the outcome variable, *intention,* can illuminate which of the three or which combination of them is facilitating or obstructing behavior.

2.2.1.3 Intention, actual behavioral control, and behavior

Moving on to the remaining parts of Fig. 2.5 above, and as has already been explained, *intention* - the "indication of a person's readiness to perform a given behavior" (Ajzen, n.d., *TpB Diagram*) - is "jointly influenced" by: 1) attitudes towards doing the behavior, 2) the identification and weights of importance of individuals or groups who might care about the person doing the behavior (*subjective norms*), and 3) *perceived behavioral control* (Lu, Lai, & Cheng, 2007, p. 845).

The *actual behavioral control* component of Fig. 2.5 (above) "refers to the extent to which a person has the skills, resources, and other prerequisites needed to perform a given behavior" (Ajzen, n.d., *TpB Diagram*). As the model shows

intention, perceived behavioral control (as indicated by the dotted line) and *actual behavioral control* are regarded in the theory as being the direct precursors or antecedents to any given behavior. In other words, the successful performance of a given behavior depends not only on having a positive intention but also on a certain amount of perceived and actual personal control regarding the behavior. To the extent that the *perceived behavioral control* is an accurate indicator of actual control, it can "serve as a proxy of actual control and can be used for the prediction of behavior" (Ajzen, n.d., *TpB Diagram*).

2.2.1.4 Two examples of TpB

To illustrate the interplay of these variables, Kennedy and Kennedy (1996) provide two examples. In the first example, a survey of the UK public's attitudes towards recycling garbage (Mintel as cited in Kennedy and Kennedy, 1996, p. 351) revealed that attitudes towards this behavior were very positive. 94% of the UK adults in the study indicated that they thought recycling is important. However, over half (64%) reported that they did not recycle their garbage. Based only on their positive attitudes about recycling, it might be concluded that the majority of the people in the study would be actively recycling their waste. However, it seems that there are other factors besides a positive attitude regarding a behavior that have a strong effect on engaging in the behavior or otherwise. In this case, these included "lack of convenient collection points ... no space to store paper, glass and metal in separate containers ... no time or could not be bothered" to recycle their waste (Kennedy & Kennedy, 1996, p. 352). As the authors observe, U.K. residents may actually have very positive attitudes towards recycling, but there may be other factors (such as the ones mentioned above) that have "intervened between their attitudes and their intention to carry out" recycling behavior (Kennedy & Kennedy, 1996, p. 354).

In the same paper, Kennedy and Kennedy give an example of attitudes and behavior related to English language teaching. They cite a study investigating a teacher's attitudes regarding error correction in the foreign language classroom, which were reported as follows:

- Errors are a part of learning and cannot be avoided.
- Student errors should be corrected but not over-corrected.
- There are appropriate times to correct errors.
- They should not be corrected during production unless the error effects communication. And,
- grammatical errors are not considered a significant problem especially if communication is the focus of the language production instance.

However, when the teacher's actual classroom behavior was observed, there was an apparent mismatch between her attitudes and her actual error correction behavior. Based on a transcript of the teacher's discourse (cited in Kennedy & Kennedy, 1996, p. 353) in a part of the lesson described by the teacher as a "relax and 'warm-up'" section where typically the focus is on communication rather than accuracy, the teacher engaged in very active error correction. As shown in the transcript, the student's conversation was comprehensible; however, the teacher corrected the student in eight out of nine lines of teacher turns.

As Kennedy and Kennedy (1996) point out, this indicates, in keeping with the TpB, that expressed attitudes and actual behavior may not be closely matched. They explain this by proposing several possibilities. One is that when people are asked about their attitudes towards a behavior, they often say what they think they should say or what they think they are expected to say. Their subsequent actions then will often not match these fabricated attitudes. Or an answer might honestly reflect the person's attitude but just not be related to their actual behavior.

Similar to the recycling example above, in the case of the teacher, it seems that the teacher had an awareness of the importance and the intricacies of dealing with errors and also an understanding of appropriate times and strategies of correcting errors as expressed in her stated attitudes towards error correction behavior. But when it came to her actual practice, her stated attitudes did not match her actual behavior. As Kennedy and Kennedy (1996) detect, relying on statements of attitude alone may not be sufficient in explaining why people do or do not do things.

In explaining the discrepancy between the teacher's attitudes and actions the authors suggest that the teacher is not completely convinced the beliefs she expressed about error correction are efficacious in helping students overcome errors. They further suggest that the teacher interrupts students' production because that is the only strategy she knows related to error correction. They conclude, the teacher "perceived that it is easier to continue using a strategy she is comfortable with (immediate error correction), since in this way she can control and feel as ease with the class" (Kennedy & Kennedy, 1996, p. 358).

In other words, as the examples indicate, from the TpB perspective, in order to understand behavior, it is more appropriate to focus on intention than attitude, since "statements of intention are more informative and predictive of likely behaviour than attitudes alone" (Kennedy & Kennedy, 1996, p. 354). Intentions, as has been illustrated, can be seen as a product of underlying beliefs related not only to *attitude towards the behavior,* but also the influence of *subjective norms* and *perceptions of behavioral control.*

Likewise, in the context of this current study, language teaching faculty members in general express positive attitudes towards research, but as has been explained, in many cases, their attitudes do not match their actual behavior.

Therefore, theories utilized to examine academic research productivity in this setting should factor in variables that encompass more than just attitudes, and according to the basic research model thus constructed, should include broad categories of behavioral determinants which fall into environmental (*subjective norms*), personal (*attitudes toward the behavior* and *perceived behavioral control*), and feedback processes *(expectancy-value theory)*.

However, as previously explained (see 2.1 above) the TpB does not directly account for antecedent factors to the TpB variables. Thus social cognitive theory (SCT), for reasons explained previously (2.1, ¶6), has been chosen to shed further light on behavioral factors seen to influence and be mediated by the TpB variables. The following section adds detail to the initial presentation of the SCT behavior model (2.1, ¶9 above).

2.3 Social Cognitive Theory

SCT provides a broad theoretical framework for understanding behavior which has been validated as a model of behavior across a wide number of domains (Bandura, 1997). SCT has an existing, however limited, record of successful application in studies examining research activity as related to academic and career development. The literature cited in research databases[10] for the subject types "education", "linguistics" and "psychology" using search terms "social cognitive theory" and "research self-efficacy", "research engagement", "research activity", "research productivity", and "research interest" revealed less than 20 published studies in this area. All of the studies retrieved are limited to undergraduate and graduate students

[10] Databases for "education": EBSCO, ERIC, British Education index and Social Sciences Citation Index.
Databases for "linguistics" in addition to the above: Linguistics and Language Behavior Abstracts, MLA International Bibliography, Web of Science
Databases for "psychology" in addition to the above: Medline, PsycArticles, PsycINFO, Science Citation Index, ScienceDirect

with the exception of one (Bard, et al., 2000) which includes research self-efficacy and outcome expectations among rehabilitation counseling faculty. Almost all the retrieved studies attempt to understand research behavior in the various domains of psychology (e.g., applied psychology, counseling psychology, clinical psychology). One study (Bard, et al., 2000) is in the field of rehabilitation counseling, and two (Bakken, et al., 2006; Mullikin, et al., 2007) examined research self-efficacy beliefs of women and minorities in a physician clinical research training program.

To understand how SCT can be enlisted to help understand research behavior among ELT academic faculty the following discussion presents further detail about the SCT behavioral model and includes empirical evidence substantiating the theory in academic and career development.

Many theories of human behavior depict behavior as being controlled by either environmental or personal factors thus proposing a unidirectional causation between those factors and the target behavior (Wood & Bandura, 1989). SCT differs in the depiction of the three classes of determinants (i.e. environmental, personal and actual behavior) in that they function bi-directionally as co-determinants working together to influence a given behavior (see Fig. 2.3 above). The bi-directionality of the SCT model implies that people both create and are created by their environments (Wood & Bandura, 1989).

For example, a particular behavior chosen by an individual will lead to other actions that are related to a given behavior; a person chooses to engage in research behavior which leads to a variety of research related behaviors (e.g., association with other researchers, reading, writing, planning and execution of research studies and so on). Personal factors will affect which behaviors people choose to engage in and are related to interests, cognitive abilities, and affective factors. For example, if a person

has no interest in engaging in research behavior, it is unlikely that he or she will knowingly make academic or career related choices that involve or lead to research behavior.

Environmental factors are external events that affect behavior and personal factors. Role models, friends and family influence, access to resources, and other social factors can lead an individual to engage in certain behaviors. The environment is also influenced by personal factors (e.g., efficacy beliefs, interests, goal formation, and abilities) and this can lead the individual to seek out certain environments and the associated behaviors (Heinze, 2007). The relative influences between the determinants and the specific environmental and personal factors within the broad classes of determinants will vary depending on the behavioral circumstances (Bandura, 1997).

In the following sections the SCT model environmental and personal class determinants are teased apart and factors within them explicated as they relate to the present study. However, it should be kept in mind that behavior, environmental, and personal factors function as a system; thus, the explications below are only for illustrative purposes and not to suggest that any one factor works without influencing or being influenced by factors in the other class determinants.

2.3.1 SCT environmental class determinants

The environmental factors identified in the proposed research model (see Fig. 2.4 above) have been selected because studies have validated their causal roles in the SCT model (as will be explained in the following paragraphs). Many studies have examined the strength of the variables related to career choice and development. Since academic research productivity is generally considered to be a contributory

factor to academic career development (see 1.4 above), studies in this area have been selected to help substantiate the research model thus far constructed.

Social cognitive career theory (SCCT) (Lent, et al., 1994) is grounded in SCT, but is specifically constructed to understand the processes of achievement (or various levels of) in the area of academic and career pursuits (Lent, et al., 2000). SCCT holds that environmental variables affect academic and career choice through three primary phases or paths of influence: 1) formation of academic and career interests (childhood), 2) selection and pursuit of career-relevant choices (adolescence), and 3) performance and persistence in academic and career related endeavors (adulthood) (Lent, et al., 2001).

Each phase contains elements that either provide support or a barrier to development depending on the individual's assessment of the elements. Criteria for assessments are broadly based on a person's outcome expectations (forethought), perceived self-efficacy expectations, vicarious learning experiences, and past behavioral experiences (ibid).

In the childhood phase, environments provide a variety of learning opportunities each subject to sustaining (supports) or impeding (barriers) factors. Through experiences and outcome assessments these learning opportunities help children form self-efficacy beliefs in their abilities related to career-relevant activities. During the second phase, environmental factors such as economic conditions enabling or deterring pursuit of academic studies or socio-cultural factors overriding personal ambitions can directly influence an individual's active phase of academic or career choice options. The same factors (environmental supports or barriers) are seen to moderate academic and career performance in the third phase (Lent, et al., 2001).

Thus, within the SCCT framework career "supports" are seen as "environmental variables that can facilitate the formation and pursuit of" career choices (Lent, et al., 2000, p. 42). "Barriers" comprise a complicated variable that can be generally defined as negative environmental factors that impede academic and career pursuits (ibid). However, despite being classified as "environmental" supports and barriers are still affected by and affect behavioral and personal factors.

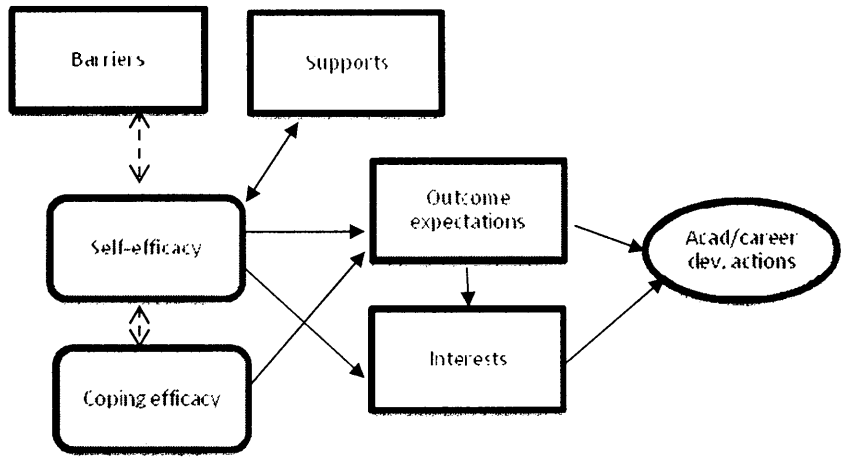

Figure 2.6 Barriers (impeding) and supports (promoting) academic and career development (from Lent, et al., 2001)
Barriers are negatively correlated with efficacy beliefs (dotted line). The influence of one factor on another flows bi-directionally between efficacy beliefs and perceived barriers and supports. Efficacy beliefs are also seen to affect behavioral outcome evaluations and therefore interests related to academic and career development related actions

The constructs in the barriers and supports model (Fig. 2.6 above) interact with each other to facilitate or impede to varying degrees academic and career development. Self-efficacy evaluations will either contribute to or lessen the perceived contribution of supports and barriers. Similarly, perceived supports and barriers contribute to levels of self-efficacy. For example, if an individual perceives support from family and friends in pursuing academic or career goals, self-efficacy evaluations will tend to be positive (other factors controlled for) thus contributing to

carrying out the action. Likewise, if an individual possesses strong self-efficacy evaluations but does not perceive family or friends' support, that person will tend to look for support from other sources, i.e., role models, colleagues, supervisors and so on. In this sense, self-efficacy beliefs are seen to be positively correlated with perceived supports. Barriers are not direct opposites or mirror images of supports but are regarded as negatively correlated with self-efficacy beliefs. In a similar manner, as illustrated with supports, the power of one construct will affect the level of influence of the other on a given action (Lent, et al., 2001).

Coping efficacy (Fig. 2.6 above) refers to the perceived level of confidence held in one's ability to cope with barriers. Self-efficacy and coping efficacy are generally regarded as conceptually distinct (Lindley, 2005). The former describes an individual's self evaluated ability to perform an action while the latter refers to confidence in the ability to overcome obstacles. Both constructs are thought to be domain-specific as well as global (ibid).

Outcome expectations (Fig. 2.6 above) and self-efficacy are jointly and individually predictive of interests. Thus, an individual will have an interest in an action if he or she predicts positive outcomes from engagement in the activity and for which he or she feels a certain amount of performance efficacy. Conversely, a person might feel efficacious about engaging in an action but assess negative or null outcomes and certain barriers associated with the action. Personal assessments of her or his ability to cope with the barriers will factor into the final decision to engage in the action or not.

As demonstrated in the above discussion, it is not always possible to disentangle the three classes of determinants for explication purposes because of the interrelatedness of the concepts. However, in the following section three

environmental factors have been selected for examination principally for their relevance to this study (i.e., role models, family influences, and fortuitous encounters) and because research (as explained below) has widely verified their roles in academic and career choice actions. While all three can be either a support or a barrier to development, only studies exemplifying the variable as a support are presented. Factors construed in the literature solely as barriers to development are presented after the support factors (2.3.1.4 below).

2.3.1.1 Role models

A role model is traditionally defined as a person whose life has influenced another person in some way (Quimby & DeSantis, 2006). These influential persons are generally identified as a "parent, teacher, mentor, or supervisor" (Gibson, 2004, p. 135). However, according to Gibson (ibid) the term "role model" used in studies is loosely defined and therefore difficult to examine. Recent research on career development and role models has developed a more precise definition of role models as "active, cognitive constructions devised by individuals to construct their ideal or 'possible' selves based on their own developing needs and goals" (ibid).

Thus, "role model" consists of two theoretical constructs. One, the idea that people tend to identify themselves with others who appeal to them in some way, and two, the concept of "modeling" i.e., the psychological "matching of cognitive skills and patterns of behavior between a person and an observing individual" (Gibson, 2004, p. 135).

A number of studies have established that identification with role models is an essential part of individual development (Karunanayake & Nauta, 2004). The role model construct has been studied particularly in relation to career selection and development. In a study of 2722 British adolescents, Flouri and Buchanan (2002)

found that role models were positively related to career development and career plans when other factors (age, gender, family, and socioeconomic status) were controlled for. The researchers used a questionnaire (32% response rate) delivered to school children between the ages of 14 and 18. However, the influence of role models in this study was assessed by only one dichotomous questionnaire item (asking whether they had ever been inspired by anyone to do a job that they had done). Role model strengths indicated in this study must therefore be viewed cautiously in the light of this limitation.

In a study of role models and women's career choices, Quimby and DeSantis (2000) examined the influences of self-efficacy and role models in a sample of 368 female undergraduates (between the ages of 18 and 25) from a United States Mid-Atlantic university. Respondents completed an online survey which measured self-efficacy across several personality types and role model influence. A multiple regression technique was used to determine the relative contributions of self-efficacy and role models to career choice. Overall results indicated that both self-efficacy and role models make a statistically significant contribution, but that role models have a greater influence on career selection.

Similar results were reported in a study of 405 college students attending a southeastern United States university (Perrone, et al., 2002, p. 109). In their survey study demographic information, identification of a role model, role-model supportiveness, role-model relationship quality, and career decidedness data were collected. Their results indicated that "role-model supportiveness and role-model relationship quality" made a statistically significant contribution to the career decidedness of participants (Analysis of Variance) (ibid).

A number of studies have looked at questions of role models and race (Karunanayake & Nauta, 2004) in career choice and development. Karunanayake and Nauta (2004) tested theories that postulate the influence of role models from specific races on individuals from the same ethnicities and whether persons from racial minorities detected fewer role models than majority racial groups. The study was carried out in a midwestern United States university (N=220). Their inquiry asked participants a variety of questions (via questionnaire) specifically about role models in their lives. Their findings indicated that the respondents tended to have role models from their own races and that respondents from both majority and minority races did not differ in their reported number of role models ($\bar{X} = 4$) or in the perceived positive influence of role models.

Studies presented in this section propose that the role model construct is influential in academic and career development. However two factors should be kept in mind: 1) Role models can be construed as either a support or a barrier (generally retrospectively) to career development, and 2) the role model construct works as a component in the SCT system. In other words, factors within the SCT determinants will influence (and be influenced by) the relative value of a given role model on academic and career development. The same two factors hold true for the support construct presented in the following section, family influences.

2.3.1.2 Family influences

Roe's (1957) speculative theory of the links between early childhood experience and vocational interests represented one of the first attempts to link family variables with academic and career development (Hagen, 1960). Since then several other models of family influence in children's academic and career development have

emerged, i.e. Holland (1985), Super (1990) and Eccles (1993). In their comprehensive literature review of family contextual variables Whiston and Keller (2004, p. 559) found that career choice factors can be classified into two broad family variable categories. Parents' educational and occupational backgrounds and socioeconomic factors fall into the broader category of "family structural variables" while family relationships, parental aspirations, and family support and encouragement factors are classified into the category of "family process variables." The latter category has been empirically shown to have a stronger influence on career development than the former (ibid).

Empirical evidence has generally supported the primacy of parents in shaping children's academic and career choices. Studies confirming this relationship have examined *inter alia*: parental encouragement and academic success (e.g., Ferry, et al., 2000; Flouri, 2002; Leal-Muniz & Constantine, 2005); individual roles of mothers and fathers in shaping career choices (e.g., Chung, Baskin, & Case, 1999; Guerra, A. L. & Braungart-Ricker, J. M., 1999; Turner, Steward, & Lapan, 2004); parents' beliefs and values and children's occupational aspirations (e.g., Jodl, et al., 2001; Liu, 1998); family and career development and learning disabled young adults (e.g., Lindstrom, et al., 2007); family connectedness (e.g., Berrios-Allison; 2005); systemic family variables and career indecision (e.g., Lopez & Sujin, 2006; Santos & Coimbra, 2000); family career choice influence and minority groups (e.g., Chung, Baskin, & Case, 1999; Fisher & Padmawidjaja, 1999; Liu, 1998; Mau, Domnick, & Ellsworth, 1995; Murry & Mosidi, 1993; Rivera, et al., 2005).

Again it is worth noting that family influences (like other constructs presented) can be supporting or debilitating in relation to academic and career development.

However, the force of the influence of family factors will be weighted with respect to other factors within the SCT class determinants.

It is this characteristic that differentiates SCT from traditional (Modernist) conceptions of human development. According to deterministic epistemologies development follows linear, clear, and progressive paths and is comprised of stable and measurable, and thus knowable, traits (Guindon & Hanna, 2002). Postmodernism challenges this "trait-factor" approach and suggests that development is non-linear and subject to social and local contexts as well as subjective interpretation of life events. As suggested by Vondracek, Lerner, and Schulenberg (1983, p. 182) life development is open to "deflection and/or enhancement" depending on events and interpretations of those events. Those deflection or enhancement processes are often the result of encounters involving random, but life altering, chance. The following section presents the potential role that chance has in career and life path development.

2.3.1.3 Chance encounters

A neglected feature in SCT or SCCT models is the effect on development as a result of chance encounters, an "unintended meeting of persons [or previously unknown symbolic objects] unfamiliar to each other" (Bandura, 1982, p. 748). While chance encounters can clearly be a barrier to development, this factor is discussed here in overall terms as a support.

A few authors have recognized the role of chance in career development (*inter alia,* Bandura, 1982; 1998; Cabral & Salomone, 1990; Díaz de Chumaciero, 2004; Guindon & Hanna, 2004; Mitchell, Levin, & Krumboltz, 1999; Scott & Hatalla, 1990; Williams, et al., 1998). However, chance does not seem to appear in SCT or SCCT studies of career development.

Nevertheless, few people will deny the influence of chance events that have shaped their lives. Such encounters go along the lines of this example from Cabral and Solomone (1990, p. 5):

> A new graduate student in chemistry, having a mediocre undergraduate record, was asked to take competency exams for course advisement; [sic] and placement. Finally recognizing his limited skills and interests, he dropped out of chemistry and (as a non-matriculated student) enrolled in psychology courses. Subsequently, while pondering summer employment options, he read a hallway bulletin board at the university and applied for a psychometrist job at a local veterans' hospital. His application was given to a consultant at the hospital (a professor at the university) who contacted the student and invited him to apply to the graduate program in counseling. Subsequently, the student worked in his field, secured a doctoral degree and became a tenured full professor.

Similarly, Bandura (1982, p. 748) cites the events that caused one of his colleagues to choose an academic career in psychology. While studying in the university his friend had to choose between two course elective options: two courses in philosophy or one in psychology. He chose what seemed less taxing, the single course, despite his dislike of the subject, a result of his "contact with instructors unburdened by infectious enthusiasm" (ibid). However, as a result of course over-enrollment, an additional class was opened and was led by an inspiring and talented instructor. Because of this chain of events: elective class requirements, his choice of what seemed the easier class, the over-enrollment, and faculty selection, this person's career path was set on a course that it would not have taken otherwise.

Sometimes a life path is changed as the result of fortuitous contact with symbolic objects rather than other persons. Bandura (ibid) retells Nobel winner Herbert Brown's explanation of how he chose to research in the little studied field of boron hydrides. During the Depression years (United States) as a graduation gift, Brown's girlfriend chose a book from the university bookstore because it was the least expensive book. The title was *The Hydrides of Boron and Silicon.* As Bandura

observes, had the girlfriend not made her choice based on economic reasons, Brown's career path would have undoubtedly gone in a different direction.

Chance encounters as in these examples happen all the time. The effects they produce on people's lives vary from life changing, only slight effect, to no effect. In explaining the intensity of the effect of chance on lives, much of the literature on chance encounters cites Pasteur's comment (however, related to scientific discovery) that chance favors the prepared (e.g., Díaz de Chumaciero, 2004). Along similar lines, Bandura (1982) presents a heuristic for predicting the impact of chance encounters on life paths.

In the model, Bandura (1982) proposes, similar to SCT, that personal determinants operate through reciprocal processes in tandem with environmental determinants. Personal determinants include factors that are classified as "entry skills", "emotional ties", and "values and personal standards." For a chance encounter (either fortunate or unfortunate) to have an effect, a person needs to have at least some of the personal attributes (i.e., personality, cognitive, affective factors) to maintain continued contact. This same cohort of personal attributes will also determine the environments in which an individual will move thus increasing the intensity of chance encounters within those environments. For example, a young person interested in astronomy may volunteer to restore and maintain a university telescope with a group of similarly interested peers. Through their involvement in that environment they will come in contact with significant and influential people involved in astronomy or space sciences inside the university and no doubt outside as well. Depending on other factors, that exposure to the larger environment may have life changing effects on the individuals involved.

Emotional ties also contribute to life changing effects of chance encounters. People will form lasting relationships if they like each other. Extending the example above, if the young person possesses qualities deemed "unlikeable" by others in the astronomy milieu, lasting bonds are unlikely to be formed thus reducing the chances of life path changing affects from that particular association.

Similarly, chance encounters are more likely to leave permanent marks if the participants possess similar values and personal standards. Studies of atypical life paths of impoverished children show that well formed educational values instilled from parents or caretakers promote positive educational and intellectual effects from teachers and like minded peers (e.g., Usinger, 2005). These associations further imbed the individual within the environments likely to promote academic success. Conversely, children with inadequately established educational values tend to be less likely to follow such predictable life paths (Bandura, 1982).

As has already been implied in the above discussion of personal determinants, environmental determinants also play a role in the influence a chance encounters will have on life change. If the environmental milieu rewards individuals sufficiently, they will be more likely to remain in the particular environment and be changed by the association. The symbolic systems employed within the environment will also work to strengthen membership (and therefore lasting life path affects) of the members. Similarly the "openness" or "closedness" of a milieu will determine the amount of life path effect on the individual. More open milieus will permit members contact with other environments and ideologies thus affecting life path trajectories. The more closed a milieu is the more direct affect it will have on the individual member and the ideologies they form (which further tend to affect life paths) (Bandura, 1982).

Thus, in Bandura's heuristic, the above factors are seen to mediate the effects of chance encounters on life paths. Like all determinate classes in the SCT model the factors presented above both influence and are influenced through their interaction processes. Knowing these factors and their relative influences on actions can help illuminate reasons underlying academic and career choices individuals make throughout their lives.

This section has presented several SCT factors deemed "supports" within the environmental class determinants (see Fig. 2.6 above). The following section presents a discussion of those factors construed as "barriers" in the SCT model.

2.3.1.4 Barriers to academic and career development

The barrier construct was initially recognized and studied in relation to career paths and career development of women. These studies were prompted by the apparent discrepancy between women's notable abilities and their actual lower achievement (in relation to their apparent abilities) or underachievement (Swanson & Tokar, 1991). Since the early women's studies, the construct has been systematically researched and verified in a number of domains (Albert & Luzzo, 1999) and has included studies with minority and majority groups (Lent, et al., 2000). Within those broader groups (i.e., women, minority groups, majority groups) the viability of the barrier construct on academic and career development has been investigated in children (e.g., Creed, et al., 2007; Hill, Ramirez, & Dumka, 2003) adolescents (e.g., Kenney, et al., 2003), and college students (e.g., Leal-Muniz & Constantine, 2005; Lindley, 2005; Luzzo, 1995; Rivera, et al., 2007).

Although deemed a simplification of the barrier construct (Swanson & Tokar, 1991), barrier literature generally distinguishes between internal and external

perceived barriers. The barrier construct as further developed by Lent, et al. (2000) shows that similar to the determinants in the SCT and SCCT models, the complex barrier construct involves interactions between personal (internal) and environmental (external or contextual) factors.

In Lent, et al.'s (2000) model of antecedents and consequences of perceived barriers (Fig. 2.7 below) "proximal" outcome evaluations (i.e., assessments of perceived supports and barriers in a near temporal dimension) are seen as more influential on actions than "distal" perceived outcome evaluations. For example, an individual might evaluate distal outcomes in pursuing a career in medicine. Assuming that the individual is genuinely considering[11] a career in medicine those evaluations will tend to be more positive than negative thus contributing to the overall effort expended to achieve academic and career goals. Thus, the person might envision positive outcomes such as personal prestige, respect, the ability to help others, pleasing his or her parents, and probably something along the lines of earning a good salary. However, proximal outcome evaluations would include more practical or immediate assessments of supports and barriers (proposed in the following paragraph) that could have a more direct affect on reinforcing or obstructing goals and actions.

Perceived barriers to academic and career development indicated in the literature are *inter alia.:* socio-economic status, gender and ethnic discrimination, parental influences, lack of skills and ability, lack of educational opportunities (Creed, et al., 2007); cultural values and career myths (e.g., that certain careers are 'male careers' or 'female careers') (Leal-Muniz & Constantine, 2005); family responsibilities, child care responsibilities, financial resources, and academic skills

[11] As opposed to someone just toying with the idea or musing on the possibilities of entering the medical field.

(Luzzo, 1995); lack of efficacy building experiences, lack of coping efficacy (Lent, et al., 2003; Albert & Luzzo, 1999). However, again, it is important to keep in mind that barriers can be construed in many levels of influence, from no influence to completely debilitating. Personal and environmental factors work as a system to determine the relative intensity or influence of a perceived barrier. In some cases barriers can be perceived as challenges by the individual, thus converting them to a facilitative factor.

Thus, in the model presented below (Fig. 2.7) antecedents to proximal perceived barriers (a result of negative proximal outcome evaluations) are seen to be coping efficacy, personal barrier experiences, and vicarious barrier experiences, the former being a personal determinant, the latter two being environmental determinants.

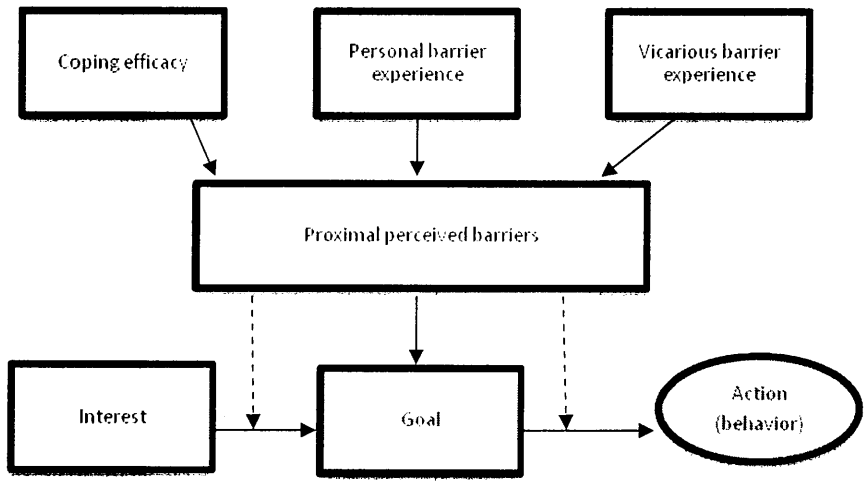

Figure 2.7 Antecedents and consequences of barriers (by Lent, et al., 2000, p. 46)
Personal and environmental factors influence assessments of proximal barriers. Perceived barriers directly influence goal formation and moderate the effects of interests and goals (dotted lines) on action (behavior).

Perceived barriers in turn are seen to moderate (weaken) the effects of interests on goal formation and goals on actual behavior, and to directly affect goal formation. Thus, for any given action, a person will assess their ability to cope with any perceived barrier(s). That assessment of coping efficacy and potential barriers will

include information gained from similar or relevant behavior experience as well as information learned from observing or knowledge of someone else's barrier experiences in the same behavioral domain. The results of that cohort of assessments (perceived barriers) will accordingly influence the level of interest, goal formation and subsequent engagement in the behavior.

This section (2.3.1) has attempted to tease apart elements in the SCT class of environmental determinants for the purposes of explanation and research model substantiation. As discussed above (2.3) what distinguishes SCT from other human behavior theories is the interconnectedness (bi-directional interaction) of the factors within the class determinants as well as the broader class determinants. Thus, to understand the components of the SCT model it is necessary to artificially pull them apart and examine each individually (as much as possible). This is not to suggest that any of the factors within the SCT model can or should be studied in isolation from other factors within the determinant classes. With this in mind, the following section discusses the processes within the SCT personal class determinants.

2.3.2 SCT personal class determinants

SCT personal determinants are broadly classified as a cohort of self-regulatory and self-reflective processes encompassing cognitive, motivational and affective components (Heinze, 2007). All of these work within the broader concept of human agency, i.e., the extent to which people exercise control over their lives. Theoretically "agency" has been generally conceptualized in three perspectives: autonomous agency, mechanical agency, or emergent interactive agency (Bandura, 1997). The concept that humans have complete control over their actions has few serious proponents. Mechanical agency is generally associated with behaviorism and other

theories that see action as solely the result of external events with any internal events being only epiphenomenal expressions of the external events (Bandura, 1989).

SCT posits that action is the result of emergent interactive agency, which regards humans as neither fully autonomous in their actions nor merely puppets reacting to their environments. Agency is a product of SCT's reciprocal causation model (see Fig. 2.3 above), i.e., action, cognitive, affective, and other personal factors and environmental factors working interactively as partial "products of self-generated factors" (Bandura, 1989, p. 1175).

A core concept within SCT and the principal mechanism in agency according to the theory are beliefs in personal efficacy, a measurable latent variable that indicates the extent to which an individual believes he or she can influence the outcome of a particular action. Efficacy beliefs influence what actions people choose to pursue, the intensity they chose to apply to that pursuit, the time they will dedicate to the pursuit, their level of resiliency in the face of obstacles, whether their thoughts will help or hinder the pursuit, and ultimately the extent of the accomplishment they manage to achieve (Bandura, 1997, p. 3).

Efficacy beliefs impinge on action through cognitive processes, motivational processes and affective processes (Bandura, 1989). Cognitive processes can either help or hinder action. They regulate behavior through the processes of evaluating potential outcomes of the behavior (through forethought) and goal cognizing. In other words, before engaging in a given action a person will imagine, through the processes of forethought, what the possible outcomes of the action will be and weigh those outcomes against her or his perceived ability to carry out the actions necessary to achieve the outcomes (goals). An individual's ability to do this involves cognitive abilities related to management of uncertainty factors and situational ambiguities. To

do this a person must have enough knowledge of the situation to be able to hypothesize events and potential intervening events and their relation to potential outcomes. The higher the goal the more complex the cognitive processes needed to realize the goal. Thus individuals who are successful analytical thinkers and problem-solvers and who have a high level of efficacy beliefs in their cognitive abilities will be more successful in realizing their goals than those who are inconsistent in their analytical thinking processes and besieged by self-doubts (Bandura, 1989).

Self-efficacy beliefs also influence action through motivational processes associated with a given behavior. This is expressed in the amount of effort and time an individual will invest in the pursuit of a goal. The stronger the efficacy beliefs the more an individual will persist in goal attainment and the less influence setbacks and failures will have on goal attainment (Bandura, 1989). Supporting this view, Bandura (ibid) cites examples of exemplary high achievers who attained distinction as a result of exceptional self-efficacy beliefs and resilience to sometimes overwhelming adversity and rejections.

Likewise, as discussed above, coping-efficacy beliefs will affect how much influence emotional factors leverage against goal attainment. Individuals who feel that they are able to control potential threats to their goals are more likely to persist in goal attainment. If a person feels that he or she will crumble and surrender with the first indication of threat, persistence in goal attainment will be less in comparison to someone who perceives a higher level coping efficacy (Bandura, 1989).

Efficacy beliefs can be developed throughout life spans although clearly the earlier efficacy beliefs are instilled or developed the more influence they will have on life paths. Efficacy beliefs are thought to emerge from four principal sources: mastery

experiences, modeling, social persuasion, and judgments of physiological states (Wood & Bandura, 1989, p. 362).

Mastery experiences build self-efficacy assessments through successful performance actions. These successes strengthen self-efficacy assessments while failures weaken them. However, early and effortless successes can also debilitate self-efficacy beliefs by undermining a person's resiliency to setbacks and failures. People must experience failure and learn to deal with obstacles to build resiliency. Thus self-efficacy and resiliency work together to support goal achievement (Wood & Bandura, 1989).

Another source of self-efficacy beliefs is through vicarious observation of behavioral models. Skillfully constructed and applied models provide strategies for managing the action in question. Models also provide a social aspect in which the individual can assess their capabilities in comparison with others' performance successes or failures, i.e., an observed performance failure might weaken efficacy beliefs (Wood & Bandura, 1989).

The third source of self-efficacy beliefs comes from types of encouragement from others (social persuasion). If significant others within an individual's social environment provide realistic support and encouragement, the individual will be more likely to have beliefs in their own performance efficacy. Equally, if significant others provide inflated encouragement leading to unattainable goals or no encouragement, performance efficacy beliefs will be destabilized (Wood & Bandura, 1989).

Finally self-efficacy beliefs are thought to develop from assessments of "physiological states", emotional as well as somatic abilities. As part of the assessment to engage in an action persons assess their coping efficacy in relation to the action's perceived barriers. Likewise actual physical abilities are assessed before

engaging in an action that involves any measure of physical strength or agility (Wood & Bandura, 1989, p. 365).

The self-efficacy concept as been referred to as the "glue" that binds the entire SCT model together (Heinze, 2007). Admittedly self-efficacy is a vital construct in SCT but because of the nature of SCT's "triadic reciprocal causation" (Fig. 2.3 above), it is difficult (if not completely inaccurate) to assign primacy to any one SCT component. To do so would be to deny the distinctive interactive or systemic nature of the SCT model. However, studies too numerous to mention have verified the influence of the self-efficacy construct across a wide spectrum of behavioral domains. Nevertheless, it is my belief that the self-efficacy construct alone is not sufficient in explaining behavioral choices but needs to be regarded as part of a system, influencing and being influenced by (strengthened or weakened) by other personal and environmental factors.

This present study incorporated qualitative inquiry in examining SCT determinants as they contributed to research behavior in the population in question. Quantitative data can provide valuable insights and information but often fails when trying to examine the interwoven social (personal and environmental) complexities and subtleties characteristic of a particular research situation. Some of the advantages of qualitative inquiry over more fixed approaches (quantitative studies) are summed up by Miles & Huberman (1994, p. 1) when they explain that data resulting from qualitative inquiry are...

> a source of ... rich descriptions and explanations of processes in identifiable local contexts. With quantitative data one can preserve chronological flow, see precisely which events led to which consequences, and derive fruitful explanations.

These are precisely the outcomes that were anticipated with the present study data associated with SCT components.

The majority of studies attempting to explain behavior from the SCT perspective have utilized quantitative methods (see 2.4 below). A number of studies have approached this topic via qualitative inquiry approaches. Four such studies are reviewed below (section 2.4).

2.4 Study methodological approaches

As outlined in Fig. 2.4 above, in this study the TpB was employed to identify the research engagement beliefs regarded as the direct antecedents to research behavior. The TpB instrument design and the procedures for data collection, data scoring and analysis are described in detail in the following chapter (Ch. 3). SCT and SCCT were also selected as primary heuristics, in order to guide interpretation of background factors related to research engagement and the beliefs expressed via the use of the TpB (see Fig. 2.4 above).

By far the majority of studies utilizing SCT and SCCT to understand behavior have used what is traditionally referred to as quantitative research methods (i.e., utilizing various scales and instruments to collect data which are then analyzed using descriptive and inferential statistical techniques). For example, in Lindley's (2005) SCCT study of perceived career barriers of university students, four measurement scales where used: the *Perceptions of Barriers Scale, Coping with Barriers Scale, Occupational Self-Efficacy Beliefs Scale,* and the *Occupational Outcome Expectations Scale.* A series of statistical tests were then applied to analyze data collected via the scales.

A few SCT and SCCT career studies have used interviews and qualitative data handing methods as the primary research approach (e.g., Adams, et al., 2005; Hill, et al., 2003; Lent, et al., 2002; Wang, et al., 2007). In their own words, Lent, et al. (2002, p. 62) justify their use of qualitative methods explaining that ...

> ... they offer a flexible approach to elaborating preexisting theory (Lee, Mitchell, & Sablynski, 1999) and to examining events and experiences that decision makers themselves view as having been pivotal to their career choice selection and implementation (e.g., Blustein, Phillips, Jobin-Davis, Finkelberg, & Roarke, 1997; Richie, Fassinger, Prosser, & Robinson, 1997; Williams et al.,1998).

Undoubtedly these and similar reasons guided the choice of qualitative inquiry in the following examples.

Adams, et al. (2005) interviewed eight Latino gay and lesbian students to examine career development barriers related to their minority status (i.e., discrimination, identity issues, and within group prejudice). Two researchers conducted open-ended, semi-structured interviews to elicit the youths' experiences with discrimination, career plans, identity issues, and career development processes. Each interview lasted approximate 1.5 hours. As a secondary data source a focus group interview was conducted with the participants to explore issues revealed in the individual interviews. Interview data were transcribed and analyzed using coding and categorization procedures. The categories were presented to the focus group participants, further refined by participants, then coded and categorized again, then analyzed in the light of several guiding theories including SCCT.

Hill, et al., (2003) examined perceived barriers, career aspirations, and family support factors among low-income minority children (N=31) living in the United States. Six trained interviewers from similar ethnic backgrounds conducted semi-structured interviews with the participants. 112 codes and definitions were developed from the pilot interview results to guide analysis of the main study interview data. 12 coders were utilized to code and categorize the data using a qualitative data analysis software program.

Lent, et al. (2002) used qualitative methods to understand college students' (N=31) career choice factors, perceived career supports and barriers, and coping

strategies used to overcome perceived barriers. The researchers used structured interviews with the intention of confirming or adding to the list of career choice determinants and to provide content for psychometric measurements that would lead to further SCCT theory testing. Interviews were conducted by teams of university faculty members and graduate students. Each interview lasted from 10 to 20 minutes. Interviews were analyzed by a coding and categorization procedure. Each research team independently developed data categories. Then the teams were put together to discuss common themes found in the data.

In their descriptive qualitative study Wang, et al. (2007), examined four Chinese doctoral students' entry into academic careers in United States universities. The researchers were the participants in the study. Retrospective narrative accounts, interviews and focus group methodologies were used. The narrative reports reflected on aspects of job search and acquisition processes, adaptation to cultural and social differences, and lessons learned from these career path processes. A survey instrument was formed from their narrative accounts and a focus group component was added to further discuss emergent themes from the narrative accounts and the surveys. Grounded theory method was used to analyze the data from the three sources. The themes were then analyzed in light of SCCT career development determinants.

As these four studies exemplify, qualitative research methods can be utilized in examining SCT factors in relation to academic and career development.

Thus, the main part of the study this thesis is concerned with, as will be described in Ch. 5 below, was of a mixed-methods sequential explanatory design (Creswell & Plano Clark, 2007). The design consisted of two distinct phases: a quantitative one followed by a qualitative one. In the first phase, quantitative data

were collected and analyzed. Qualitative data were collected in the second phase to help explain or expand on the quantitative results obtained in the first phase. Thus, the second phase built on the first. The two phases were connected in the interpretative stage of the study (see Fig. 4.1 below). The main study research design is discussed further in 4.1 below.

2.5 Chapter conclusion

The purpose of this chapter has been to construct a multi-theoretical framework for guiding understanding of academic research productivity in this research setting. The background theories used were the theory of planned behavior (TpB) and social cognitive theory (SCT). The two theories were chosen because they both posit that volitional behavior is a result of the interaction between environmental and personal factors. The interactional nature of the relationships between the two factor classes is seen as "outcome expectations" in the TpB and "feedback" and "feedforward" processes in SCT. Environmental and personal factors, and feedback processes have been identified in the academic research productivity literature as forming three broad classes of variables seen to be associated with research engagement among academic staff working in higher education institutions.

A mixed-method two-phased explanatory design was then proposed as the methodological approach for understanding the topic under investigation. The first phase involved the collection and analysis of quantitative data collected via questionnaires. The second phase involved the collection and analysis of qualitative data via life story interviews intended to provide further explanation of first phase data.

The following chapter presents the research methodology and results associated with the pilot phase of the study. In so doing, it also provides a description of the construction of the TpB questionnaire used as the data collection instrument in the first phase of the main study. The chapter concludes with a description of the relationship between the pilot study and the main study.

Chapter 3

Pilot Study

3.0 Chapter introduction and overview

The previous chapter presented a review of the two major theoretical frameworks supporting this study -the theory of planned behavior (TpB) and social

cognitive theory (SCT) - and the rationale for their choice. The influence of these frameworks on the methodological design of the study was also discussed.

This chapter provides details of the design of the research pilot study and results. The principal aim of the pilot study was to test the efficacy of the TpB as a means of throwing further light on academic research productivity in the research setting. In overall terms, as will be seen, the pilot study results (presented in 3.7 below) indicated that the application of the TpB could help illuminate understanding of factors related to academic research productivity in the setting in question.

This chapter illustrates the research processes involved in the use of the TpB by presenting a detailed description of the TpB questionnaire design, construction, and analysis methods (sections 3.3 – 3.6 below) that were employed. The results of the pilot study are presented in section 3.7 below. In addition, since these results indicated a need to also attempt to identify factors antecedent to the beliefs expressed in response to the TpB questionnaire, the piloting of the qualitative component (see 2.1 above) which was therefore also included in the main study research design is reported as well, in 3.8 below. The chapter ends with an overall summary of the refinements made to the main study as a result of findings from the pilot study.

3.1 Pilot Study Research Questions

The research questions addressed in the pilot study presented[12] below were divided into questions related to "direct" measurement as well as "indirect" measurement of data gathered by the TpB questionnaire. Direct questions are more or less generic in that they ask for participants' beliefs about whether engaging in a particular behavior is harmful or beneficial, pleasant or unpleasant, good or bad and so

[12] The pilot study research questions were distinct from the main study research questions indicated in 1.4 above because the aims of the pilot study were slightly different from those of the main study (as discussed in this section).

on. Indirect measures are specific to each research situation and therefore must be constructed for each research situation. These two different types of measurement (i.e., direct and indirect) are further discussed in Section 3.3.1 below.

For direct measures

RQ1 Is there a significant difference between the direct scores for intention, behavioral beliefs, normative beliefs, and control beliefs for faculty members identified as research active and non-research active?

For indirect measures

RQ2 Is there a significant difference between the indirect scores for attitude toward the behavior, subjective norms, and perceived behavioral control for faculty members identified as research active and not research active?

Pilot study questions RQ3 through RQ6 below referred to the TpB model presented in the previous chapter (see Fig. 2.5 above). Pilot study RQs 3 and 5 sought to establish the extent of the variance in the dependent variable *intention,* the independent or predictor (Francis, *et al.,* 2004a) variables[13] were able to explain as a group or block of variables. RQ4 and RQ6 sought to identify the *individual* (rather than as a group or block) contribution of each of the three variables associated with the direct measurements and each of the three variables associated with the indirect measurements. In other words, they sought to establish which predictor variable made the most unique contribution to the variance in the outcome variable *Intention.*

For direct measures:

RQ3 How much of the variance in intention can be explained by the following set of variables: behavioral beliefs, normative beliefs, and control beliefs?

RQ4 Which of these variables is the better predictor of intention?

For indirect measures:

RQ5 How much of the variance in intention can be explained by the following set of variables: attitude toward the behavior, subjective norm, and perceived behavioral control?

RQ6 Which of these variables is the better predictor of intention?

[13] Direct measures: behavioral beliefs, normative beliefs, and control beliefs,
Indirect measures: attitude toward the behavior, subjective norm, and perceived behavioral control.

According to the TpB, the analysis of the factors represented in these research questions will reveal the relationships between the variables (attitudes, subjective norm, and perceived behavioral control) and thus indicate the amount of variance in intention in carrying out the behavior under investigation, which is regarded in the TpB model as the proximal predictor of behavior (Arnold, *et al.,* 2006). Although in this current study the overall intention was to attempt to understand some of the factors affecting rather than predict behavior, the analysis of the associations of the variables, according to the TpB, also revealed which of the variables was responsible for the most variance in intention. From this, TpB factors responsible for this variance could be identified and used as a potential explanation for engaging in the behavior in question or not.

3.2 Population and sample

The research location[14] (see 1.2 above) for this study was chosen primarily because of accessibility to a suitable research population both in terms of ELT staff and highly productive academic researchers. The university is a prominent public PhD granting institution which has a strong commitment to research. It has many nationally recognized researchers as faculty members, thus providing an adequate sample of research active participants. The site housed a modern languages faculty with ELT staff who, in general, while holding identical positions to their research active counterparts in other faculties of the same university, nevertheless had a low record of academic research productivity.

The pilot study participants were selected via a convenience sample (as defined in Creswell, 2003, p. 156, i.e., respondents were chosen based on their availability) of 44 faculty members of a public university in central Mexico.

[14] A research degree granting public university located in south-central Mexico

Faculty affiliation	N	Percentage
Faculty of modern languages (FML)	27	61.4
Faculty of computing sciences (FCS)	17	38.6
Total	44	100.0

Table 3.1 Pilot Study questionnaire participant faculty affiliations
61.4% percent of the pilot study sample was from the FML, while 38.6% of the sample was from the FCS

Twenty-seven of the subjects were drawn from the Faculty of Modern Languages (FML) and seventeen from the Faculty of Computer Sciences (FCS) (see Table 3.1 above).

Research active or Non-research active	N	Percentage
Faculty of modern languages		
Research active	2	7.4
Non-research active	25	92.6
Total	27	100.0
Faculty of computing sciences		
Research active	17	100.0
Non-research active	0	0.0
Total	17	100.0

Table 3.2 Pilot study RA and NRA participants divided by faculty affiliation

They represented research active faculty members (RA) and non-research active (NRA) (see Table 3.2 above). All of the FCS participants were RA. Of the participants from the FML 25 (92.6%) were classified NRA.

The standards used for defining research active participants were based on their memberships in one or more of the following categories: a member of the university research group (*Padrón de Investigadores),* designated as a professor with a desirable profile (*Perfil PROMEP)* as established by the Mexican Ministry of Public Education (*Secretaría de Educación Pública,* SEP) when evaluating academics for standards of excellence related to research. Research in this sense involves projects registered with the faculty's established research groups (*cuerpos academicos),* research projects accepted by the university's vice-rector of investigation (funded

projects), and published refereed research articles in national and international journals, and published books or chapters that report on research done by the author (*¿Qué es el* PROMEP? n.d.)[15]. I selected this set of standards as defining *research* in terms of the study because it is already established and recognized by the university as the guiding conception of academic research activity in this research location.

Twenty-three of the pilot study research participants were male and 21were female. Eighteen participants from the FML and three from the FCS were female (Table 3.2 below).

Gender	N	Percentage
Faculty of modern languages		
Female	18	66.7
Male	9	33.3
Total	27	100.0
Faculty of computing sciences		
Female	3	17.6
Male	14	82.4
Total	17	100.0

Table 3.3 Pilot study participant gender divided by faculty affiliation

Participant educational level is described in Table 3.4 below. 88.2% per cent of the FCS participants had research degrees (Ph.D.). Of the FML participants, 55.6% had master's degrees and 12% had undergraduate degrees.

Educational Level	N	Percentage
Faculty of modern languages		
Master's	15	55.8
Bachelor's	12	44.4
Total	27	100.0
Faculty of computing sciences		
Ph.D.	15	88.2
Master's	2	11.8
Total	17	100.0

Table 3.4 Pilot study participant education levels

[15] *What is the PROMEP?*

All of the FCS participants were full-time tenured faculty members (see Table 3.5 below). Almost half (48.1%) of the FML participants were full-time tenured faculty members.

Employment status	N	Percentage
Faculty of modern languages		
Full-time tenured	13	48.1
Full-time non-tenured	5	18.5
Part-time tenured	2	7.4
Part-time non-tenured	7	25.9
Total	27	100.0
Faculty of computing sciences		
Full-time tenured	17	100.0
Total	17	100.0

Table 3.5 Pilot study participant employment status

Years working in higher education for FML participants ranged from 1 to 33 years with a mean of 13.42 years (see Table 3.6 below). Years working in higher education for FCS participants ranged from 1 to 35 years with a mean of 19.27 years. Table 3.6 below also presents the number of classroom hours per week for FML and FCS participants. FML participants had a mean number of classroom hours per week of 16.85 hours. FCS participants had a mean number of classroom hours per week of 12.65.

	N	Range	Minimum	Maximum	Mean
Faculty of modern languages					
Years working in higher education	26	32	1	33	13.42
Classroom hours per week	27	28	6	34	16.85
Valid N (listwise)	26				
Faculty of computing sciences					
Years working in higher education	15	34	1	33	19.27
Classroom hours per week	17	25	0	25	12.65
Valid N (listwise)	15				

Table 3.6 Pilot study participants' years teaching in higher education and classroom hours per week

3.2.1 Procedure

In the FCC the pilot study questionnaire was distributed and collected by an FCC faculty member. As described above (3.2, ¶2), the sample was a convenience sample. FCC participants were chosen based on their known levels of academic research productivity and their willingness to complete the questionnaire.

Questionnaires were distributed and collected by a masters' student in the FML. She chose the participants based on availability and willingness to participate.

Issues of confidentiality and anonymity were explained to each participant by the two staff members distributing the questionnaires (i.e., the questionnaire is anonymous, is being used for a study related to research activity only, and would be assessed on a group rather than individual level).

The following section describes the design of the two principal instruments used in the pilot study, i.e. the elicitation instrument and the TpB questionnaire. Construction, design, and scoring procedures associated with the pilot study TpB questionnaire described in this section also apply to the main study TpB questionnaire.

3.3 Instrument design

This pilot project used two instruments: an elicitation instrument, described in 3.5 below and a pilot questionnaire developed from the participant responses to the elicitation instrument, described in Table 3.7 below.

The constructs in the TpB are measured based on a questionnaire that is constructed specifically for each study using the theory as a guiding framework. Ajzen (2006, p. 4) specifies that different items are required "for different behaviors and different research populations" because each research situation is different. So instead of adopting or adapting an existing instrument, a new TpB questionnaire must

be constructed for each specific research situation (see Table 3.7 below). The construction of an appropriate questionnaire as opposed to the use of an existing questionnaire is an important component in a TpB study.

The construction of a TpB questionnaire involves eight phases. Some of these are "short but important tasks, with others involving a long process of empirical investigation" (Francis *et al.*, 2004a, p. 10). The steps are presented in Table 3.7 below.

1	Define the research population and decide how to best select a sample from it
2	Define the behavior in question. Use this definition to form a general statement for the beginning of the questionnaire (*e.g.* Each item in this section refers to your doing research related to your profession in the next one to two years.)
3	Decide how to measure intentions and the direct measurements of the three constructs.
4	Elicit the most frequently perceived advantages and disadvantages of performing the behavior
5	Elicit the most important people or groups who would approve or disapprove of the participant engaging in the behavior under study
6	Elicit the perceived barriers or facilitating factors which could make it easier or more difficult to perform the behavior under study
7	Construct the TpB questionnaire based on the elicitations in a pilot version
8	Pilot test and make changes if necessary[16]

Table 3.7 Steps in the construction of a TpB questionnaire
(adapted from Francis *et al.*, 2004a, p. 10).

As described in Table 3.7 above the design and construction of a TpB questionnaire involves several stages. The first stage entails the identification of the research population and sample selection. Next the behavior in question is defined (Step 2). This is followed by the application of an elicitation instrument which accomplishes the functions expressed in Steps 4 through 6 above. Finally the

[16] The pilot study reported in this document represents this stage of the process.

questionnaire is constructed based on the results of Steps 4 through 6 and the questionnaire is piloted.

The questionnaire contains two different kinds of measurements: *direct* and *indirect* (see 3.1 above). The distinctions between these two types of measurements and the justification for the inclusion of both in the questionnaire are presented in the following section.

3.3.1 *Direct* and *indirect* measures of predictor variables

In a TpB study, the variables (intentions, behavioral beliefs, normative beliefs, and control beliefs, as described in 2.2 above) are measured *directly*, by asking participants to report their overall attitude regarding the behavior under investigation. The variables attitude toward the behavior, subjective norm, and perceived behavioral control are measured *indirectly* by asking participants to report their "specific behavioural beliefs and outcome evaluations" vis-à-vis the behavior in question (Francis, *et al.*, 2004a, p. 9).

Direct measurement questions are more or less generic in that they ask for the participants' beliefs about whether engaging in a particular behavior is harmful or beneficial, pleasant or unpleasant, good or bad and so on (see Appendix E for the pilot study questionnaire). These scales assume that people are able to access their beliefs and accurately report them and can be used for a number of studies just by changing the type of behavior in question (Francis, *et al.*, 2004b).

Indirect measures are specific to each research situation. An elicitation study must first be done to determine the items in the indirect measures sections of the TpB questionnaire. This elicitation study asks participants to express their salient beliefs related to: 1) advantages and disadvantages of engaging in the behavior in question, 2) individuals or groups who might approve or disapprove engagement in the behavior,

and 3) factors that the individual believes may impede or facilitate her or his performance of the behavior. The TpB questionnaire is constructed from those responses (see Appendix D for the elicitation instrument and the participants' responses).

These indirect measurements are comprised of items about

> ... [the] likelihood that a belief itself is true, and also questions about the desirability – or undesirability – of the outcome described. By weighting (multiplying) perceived likelihood by a number representing outcome desirability, an estimate can be made of the size of the contribution of a specific belief to global attitude, relative to the size of the contributions of other beliefs (Francis, *et al.*, 2004b, p. 46).

Unlike direct measurements, indirect measurements do not assume that people can access and report their beliefs; they do however, operate under the following assumptions:

1. that people can accurately report their beliefs in a probabilistic way and report relative weighting of those beliefs,
2. that attitudes are composed of a rational combination of those weighted probabilities,
3. and that the items are developed with sufficient content validity that they correlate with the direct measurements

(Francis, *et al.*, 2004b, p. 46-47).

In other words, the direct and indirect measurements function under different assumptions about the ability of participants to access and report their beliefs and about the "cognitive structures and processes that underlie these variables." Based on these measurement characteristics, it is recommended that both direct and indirect measurements be used in the TpB questionnaire (Francis, *et al.*, 2004b, p. 46).

3.4 Direct Measures

The internal consistencies of the direct scales used in this pilot study were measured using Cronbach's alpha. Cronbach's alpha is a measure of internal

consistency (a reliability coefficient) that is used for scales that have more than two possibilities, as there are in the scales of direct measures. Also known as the alpha coefficient or coefficient alpha, the measurement ranges from 0 to 1.0. A measurement from 0.6 upwards (some of the literature recommends 0.7, depending on the number of items) is generally considered to indicate that the scales are measuring the same thing (Francis, *et al,* 2004a; Mitchell & Jolley, 2001; Vogt, 1999). Measures of internal consistency were calculated using SPSS statistical software version 13 (see Appendix I). Alpha coefficients for each of the direct scales (intention, behavioral beliefs, normative beliefs, and control beliefs) are reported correspondingly in each of the following scale descriptions. Scale construct validity was measured using a differential-groups validity procedure (Brown, 2001). (Please see Appendix N, section N.1 for a full description of this measure.)

3.4.1 Intentions

In this context *intentions* refer to the participant's direct expression of his or her subjective assessment of the probability of his or her engaging in the behavior under study. *Intention* was assessed with a three-item scale similar to that used in many TpB studies (e.g., Aminzadeh, et al., 1999; Bamburg, et al., 2003; Brown & Rhodes, 2006). The following items are examples from the pilot study questionnaire designed to measure *intention* (please see Appendix E for the full instrument).

1) I expect to engage in research in my area within the next 1-2 years. *Strongly disagree 1 2 3 4 5 6 7 Strongly agree*
2) I want to engage in research in my area within the next 1-2 years. *Strongly disagree 1 2 3 4 5 6 7 Strongly agree*
3) I intend to engage in research in my area within the next 1-2 years. *Strongly disagree 1 2 3 4 5 6 7 Strongly agree*

Table 3.8 Direct Measurement of Intention (from the pilot questionnaire Appendix E)

The alpha coefficient for this scale (*intention*) was 0.726.

3.4.2 Behavioral Beliefs

Direct measurement of behavioral beliefs uses evaluative (good-bad) bipolar adjectives. A stem which defines the behavior was followed by four pairs of adjectives (see Table 3.9 below). The adjectives should be *instrumental* (asking for views about whether the behavior in question is regarded as achieving something) as well as *experiential* in nature (asking for opinions about how it feels to perform the behavior) (Ajzen 2006; Francis *et al.*, 2004a).

Francis *et al.* (2004a) recommend mixing the scales so that the positive and negative endpoints are not always on the right or left in order to prevent automatic responding to the scale items. However, in the pilot study I found that mixing the endpoints, especially in the following item (Table 3.9 below), confused respondents and complicated scoring. I was present when three of the pilot questionnaires were completed (at three different instances). All three participants expressed some degree of confusion with the mixed endpoints. After scoring some questionnaires, I changed the endpoints to all negative on the left and all positive on the right as shown in Table 3.9 below. The rest of the pilot questionnaires were administered without mixed endpoints.

With mixed endpoints		
My doing research in my area in the next 1-2 years is		
	Worthless	*1 2 3 4 5 6 7 Rewarding*
	Good	*1 2 3 4 5 6 7 Bad*
	Fulfilling	*1 2 3 4 5 6 7 Will make no difference*
	Unpleasant	*1 2 3 4 5 6 7 Pleasant*
With unmixed endpoints		
My doing research in my area in the next 1-2 years is		
	Worthless	*1 2 3 4 5 6 7 Rewarding*
	Bad	*1 2 3 4 5 6 7 Good*
	Will make no difference	*1 2 3 4 5 6 7 Fulfilling*
	Unpleasant	*1 2 3 4 5 6 7 Pleasant*

Table 3.9 Direct measurement of Behavioral Beliefs (from the pilot questionnaire Appendix E) With mixed (top section) and unmixed endpoints (bottom section)

The alpha coefficient for this scale (*Behavioral beliefs*) was 0.810.

3.4.3 Normative Beliefs

Direct measurement of normative beliefs involves items that ask participants to report their beliefs regarding the opinions of those whose views matter to them. Francis, *et al.* (2004a) recommend using as a minimum three questions related to this measurement. More questions could be used but overall questionnaire length needs to be considered. These items were constructed in the pilot questionnaire as follows:

1. *Most people who are important to me think that* *I should 1 2 3 4 5 6 7 should not* *do research in my area in the next 1-2 years.*
2. *It is expected of me that I do research in my area in the next 1-2 years.* *Strongly disagree 1 2 3 4 5 6 7 Strongly agree*
3. *I feel under some social pressure from my peers and the university to do research in my area in the next 1-2 years.* *Strongly disagree 1 2 3 4 5 6 7 Strongly agree*

Table 3.10 Direct items – subjective norms (from the pilot questionnaire Appendix E)

The alpha coefficient for this scale (*normative beliefs*) was 0.721.

3.4.4 Control Beliefs

Perceived behavioral control represents the extent to which participants believe they have control over the performance of the behavior in question, and how confident they feel about doing or not doing the behavior. Constructs of self-efficacy and controllability are the components within perceived behavioral control (Ajzen, 2006; Francis, *et al.*, 2004a).

Direct measurement includes participants' perceptions of their self-efficacy related to the behavior *and* their beliefs related to the extent to which they believe they

can control their performing the behavior. *Self-efficacy* beliefs are examined by asking participants to indicate:

1) how difficult it is for them to perform the behavior and

2) how confident they are that they could do it.

Controllability is assessed by asking participants

1) if performing the behavior is under their control, and

2) if there are factors that are beyond their control related to the performance of the behavior (Francis, *et al.*, 2005a).

Table 3.13 below illustrates the direct question items used in the pilot questionnaire.

Self Efficacy (difficulty) *For me to engage in research in the next 1-2 years is* *Difficult 1 2 3 4 5 6 7 Easy.*
Self-Efficacy (confidence) *I am confident that I could engage in research in the next 1-2 years if I wanted to.* *Strongly agree 1 2 3 4 5 6 7 Strongly disagree*
Control (under control) *The decision to engage in research in the next 1-2 years is completely my choice.* *Strongly disagree 1 2 3 4 5 6 7 Strongly agree*
Control (beyond control) *Whether I engage in research in the next 1-2 years is not entirely up to me.* *Strongly disagree 1 2 3 4 5 6 7 Strongly agree*

Table 3.11 Direct items – Perceived behavioral control (from the pilot questionnaire Appendix E)

The alpha coefficient for this scale (*control beliefs*)was 0.656.

3.4.5 Scoring procedures for direct measures

The various scale items of direct measurement are scored by calculating the mean scale scores of intention, behavioral beliefs, normative beliefs and control beliefs. The higher the mean score for each scale the higher the probability is that the person intends to carry out the behavior in question, of course assuming that the scale

is scored with "7" as the positive value and any reversed endpoints are corrected for scoring (Ajzen, 2006; Francis, *et al.*, 2004a).

3.5 Indirect Measures

The construction of the indirect measurement questionnaire items consists of three steps (Fig. 3.1 below) (see 3.3.1 above for rationale for using direct as well as indirect measurement).

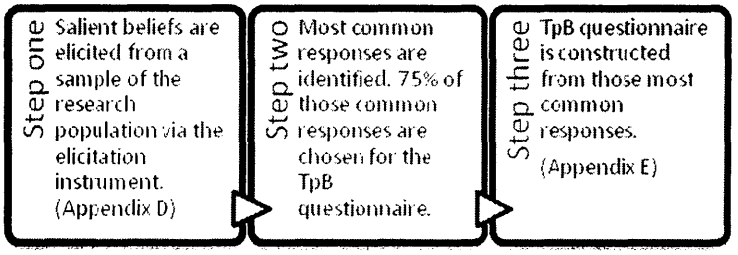

Figure 3.1TpB Questionnaire construction steps – indirect measurement
Step one an elicitation instrument is given to a sample of the research population. Step two, most common responses are selected. Step three the questionnaire is constructed from the most common responses.

The first step involves eliciting participants' salient beliefs related to the behavior under investigation (the elicitation instrument and participant responses can be found in Appendix D. If modal (group) beliefs are used, as in the case of this current study, the most common elicited beliefs from the participants need to be selected from the first step (75% is recommended) and then used as items in the questionnaire (Francis, *et al.*, 2005a).

3.5.1 Attitudes Toward the Behavior

The attitude variable has two components: 1) the person's beliefs about the consequences of performing the behavior (for example from this pilot study: Doing research in the next 1-2 years will maintain my membership in the *Sociedad Nacional de Investigadores, SNI)* and 2) their positive or negative judgments about those consequences (for example: Maintaining my membership in the SNI is desirable or

undesirable). This two component equation is described as the *expectancy-value model*, as illustrated in the following paragraph (Ajzen, 2001).

Questionnaire items are related i) to the strength of the beliefs (the degree to which the belief exists) and ii) the evaluations of the outcomes of the behavior (expectancy – value model). According to the expectancy-value model, in the process of belief formation regarding an object, we also evaluate (i.e., assign certain attributes to) that item that we have formed the belief about. The overall attitude towards the object is a product of the attributes (expectancy) we have subjectively assigned to it and the strength of those attributes (value) (Ajzen, 2001). This function is represented in the TpB as illustrated in Table 3.10 below.

(expectancy) *Doing research related to my profession in the next 1-2 years will allow me to contribute something to my professional context.* *Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely*
(value) *Contributing something to my professional context is:* *Extremely undesirable : -3 : -2 : -1 : 0 : +1 :+ 2 :+ 3 : Extremely desirable*

Table 3.12 Indirect items -- attitudes (from the pilot questionnaire Appendix E)

In the two sample questions (Table 3.12 above), the first relates to the strength (expectancy) aspect and the second is related to the outcome evaluation (value) side. Each belief strength has its corresponding outcome evaluation.

3.5.2 Subjective Norm

Subjective norms reflect the individual's belief related to the social pressure that she or he feels to perform or not perform the behavior under investigation.

Subjective norms are measured indirectly using the same procedure (i.e., constructed from the elicitation instrument) as with the other two constructs, attitudes and perceived behavioral control (see Fig. 3.1 above for indirect item questionnaire construction). The items should consist of *injunctive norms* (items referring to what the important people think the participant *should* do) and/or *descriptive norms* (items referring to what those important people *actually* do, though, of course, based on the subject's interpretation of this behavior) (Francis *et al.*, 2004a).

Questionnaire items reflect the *strength* of normative beliefs which are weighted by the corresponding beliefs related to the participants' *motivation to comply* with those beliefs of others (Francis, *et al.*, 2005a) (see Table 3.13 below).

(injunctive norms – strength of belief) *1. The university (as an entity) thinks that I* *Should not -3 :-2 :-1 : 0 : +1 : +2 : +3 : should* *do research related to my profession in the next 1-2 years.*
(injunctive norms – strength of belief) *2. Colleagues who do not do research would* *Disapprove -3 :-2 :-1 : 0 : +1 : +2 : +3 : Approve* *of my doing research related to my profession in the next 1-2 years.*
(descriptive norms – strength of belief) *3. Other professors in my faculty* *Do -3 :-2 :-1 : 0 : +1 : +2 : +3 Do not* *regularly engage in research.*
(motivation to comply paired with item 1) *4. How much do you care that the university thinks you should engage in research.* *Not at all : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much*

Table 3.13 Indirect items – Subjective Norms (from the pilot questionnaire Appendix E)

The first two items in Table 3.13 above are intended to elicit views about *injunctive* norms. Item 3 is *descriptive* (see the previous paragraph). The fourth item is an example of *motivation to comply* (explained in the previous paragraph). There would be a corresponding motivation to comply for each of the *strength of normative belief* items (items 1, 2, and 3 in Table 3.13 above) -- however, these have been

omitted from this table in the interests of space and keeping the table small enough to easily read.

3.5.3 Perceived Behavioral Control

The construction of this section of the questionnaire follows the same elicitation procedure and resulting TpB questionnaire item construction as described above (see Fig. 3.1 above). Sample questionnaire items related to control beliefs and the power of those factors to influence the performance of the behavior follow (see Table 3.14 below). In the examples, the first represents *behavioral control belief* and the second the *control belief power*:

(Behavioral control belief) *Knowing how to properly do research in my area is a main factor in my doing research in the next 1-2 years.* *Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree*
(Control belief power) *Knowing how to properly do research in my area would make my doing research in the next 1-2 years* *Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.*

Table 3.14 Indirect items – Perceived Behavioral Control (from the pilot questionnaire Appendix B)

3.5.4 Scoring procedures for indirect measures

Each belief score (b) is multiplied by its corresponding outcome evaluation (e). All of these products are then added to arrive at an overall attitude score (A). This formula- the *expectancy-value formulation*- is as follows:

$$A_B \propto \sum b_i e_i$$

(Ajzen, 2006)

The strength of the attitude score is evaluated based on the possible range of total scores.

(7 x ±3) x number of items = the range of possible scores.

(Francis, *et al.*, 2004a)

The scoring procedure is the same for the other two constructs in the indirect measures: subjective norm (SN $\propto\sum n_i m_i$) and perceived behavioral control (PBC $\propto\sum c_i p_i$) (Ajzen, 2006; Francis, *et al.*, 2004a).

3.6 Pilot Study Statistical Analysis Procedures

The independent-sample *t*-test was used to answer RQs 1 and 2 (Pallant, 2005). The variables involved are the continuous variables of *direct* measurements of intention, behavioral beliefs, normative beliefs, and control beliefs and the continuous variables of the *indirect* measurements of attitude toward the behavior, subjective norms, and perceived behavioral control, both compared to the categorical dependent variable - in this case research active (RA) or non-research active (NRA).

The next four research questions (RQ3, RQ4, RQ5, RQ6) of this pilot study refer to the analysis of the TpB questionnaire. A multiple regression procedure is recommended in the TpB literature for this analysis (Ajzen, 2006; Francis, *et al.*, 2004a). In this case, standard multiple regression technique was used to know how much variance in the dependent variable *intention* the independent or predictor (Francis, *et al.*, 2004a) variables related to the direct and indirect measures are able to explain as a group or block of variables. The standard multiple regression procedure will also indicate how much "unique variance in the dependent variable each of the independent variables" can explain (Pallant, 2005, p. 141).

The following section reports the results of the pilot study questionnaire analysis.

3.7 Pilot Study Results – Introduction and overview

This section will present only summaries of the results of the data analysis related to the pilot study described in this chapter. Detailed results can be examined in Appendix N. This results section is divided into two principal sections. The first summarizes the results of the statistical tests (independent sample *t*-test) applied to the questionnaire data. The objective of these tests was to compare RA and NRA groups (section 3.7.1 below). The second section (3.7.2) summarizes the results of the statistical test to compare relationships between the TpB variables.

An alpha level of (<.05) was used for all statistical tests. Statistical software SPSS ver. 13 was used for all analyses.

3.7.1 Results (RQ1 and RQ2 – see 3.1 above)

Independent sample *t*-tests of the pilot study questionnaire data showed statistically significant differences between the two groups (RA and NRA) in all four direct measurement scales (i.e., *intention, behavioral beliefs, normative beliefs,* and *control beliefs)* (RQ1) (see Appendix N, section N.1.1, Table N.1). According to the TpB it would be expected that RA participants would have higher scores related to these variables. Higher scores indicate a higher probability of engaging in the behavior in question. It seems that the data did support this expectation, although, of course, within the limitations associated with this pilot study (i.e., sample selection and normal distributions of data) (see 3.7.1.1 below).

RQ2 seeks to identify if there were any significant differences in scores in the three variables of indirect measures - *attitude toward the behavior, subjective norm,*

and *perceived behavioral control* - between RA and NRA participants. Statistically significant differences were found for scales measuring *attitude toward the behavior* and *subjective norm* variables (see Appendix N, section N.1.2, Table N.2). This finding is of course subject to the limitations associated with this pilot study (i.e., sample selection and normal distributions of data) (see 3.7.1.1 below).

The findings of the scores and analyses of the differences between RA and NRA participants seemed to support the thrust of the TpB, in that higher scores indicate a higher probability of the subject engaging in the behavior.

3.7.1.1 Limitations of analyses to compare groups

There are certain issues related to using the independent-samples *t*-test with these data. The data violated two assumptions associated with the procedure. The *t*-test assumes that the scores come from a random sample of the research population. As described in Section 3.1.4 above, the sample for this pilot project was defined as a convenience sample rather than a random sample.

The other assumption that was violated was that of normal distribution (Table 3.15 below). The scores on some of the scales from this pilot study did not represent a normal distribution. However, with large enough samples (30+) "the violation of this assumption should not cause any major problems" in the analysis of the results of the *t*-tests (pilot study sample N=44) (Pallant, 2005, p. 198).

Table 3.15 below shows the results of the Kolmogorov-Smirnov test of normality on the direct measures. In the column marked "Sig." a non-significant result (>.05) indicates normality (Field, 2005; Pallant, 2005). Scales measuring control beliefs (TCB) and normative beliefs (p=.200) (TNB) indicated normal distributions (p=.200).

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TINT	.288	44	.000	.757	44	.000
TBB	.206	43	.000	.850	43	.000
TCB	.087	44	.200*	.981	44	.687
TNB	.109	44	.200*	.958	44	.113

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

TINT	Mean scale scores of intention
TBB	Mean scale scores of behavioral beliefs
TCB	Mean scale scores of control beliefs
TNB	Mean scale scores of normative beliefs

Table 3.15 Pilot study tests of normality direct measures
Scales measuring *intention* and *behavioral beliefs* lacked normal data distributions (Sig.<.05). Scales measuring *control beliefs* and *normative beliefs* indicated normal distributions (Sig. >.05).

Table 3.16 below shows the results of the Kolmogorov-Smirnov test of normality on the indirect measures. In the column marked "Sig." a non-significant result (>.05) indicates normality (Field, 2005; Pallant, 2005). Scales measuring subjective norms (WSN) and perceived behavioral control (p=.159) (WPBC) indicated normal distributions (p=.116).

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
WATT	.147	44	.019	.946	44	.039
WSN	.118	42	.159	.948	42	.054
WPBC	.120	44	.116	.952	44	.066

a. Lilliefors Significance Correction

WATT	Total scale scores of attitude towards the behavior
WSN	Total scale scores of subjective norm
WPBC	Total scale scores of perceived behavioral control

Table 3.16 Pilot study tests of normality indirect measures
Scales measuring *attitudes toward the behavior* lacked normal data distributions (Sig.<.05). Scales measuring *subjective norm* and *perceived behavioral control* indicated normal distributions (Sig. >.05).

To understand the relationships between the predictor variables (associated with *direct* and *indirect* measurements) and the outcome variable, *intention* (as described in 2.2.1 and Fig. 2.5 above), further statistical analyses were called for.

The following section presents the results of the standard multiple regression technique used with the pilot study questionnaire data and in connection with attempting to answer RQs 3 – 6. Ideally with statistically significant differences between the RA and NRA groups as reported above, the multiple regression technique should have been done separately with each group (e.g., Everson, 2007). However this would have reduced the sample size for each analysis (RA n=19; NRA n=25) below the limitations for a multiple regression procedure calculated at 15 participants per independent variable (i.e., 45 participants). Thus, for the analysis of the relationship among variables both groups were included in the same analysis (see the discussion on multiple regression assumptions for the pilot test in Appendix N, section N.2).

3.7.2 Results (RQ3 through RQ6 – see 3.1 above)

The statistical technique recommended in Francis, *et al.* (2004a) and used in much of the TpB literature (e.g., Brown & Rhodes, 2006; Caruana, et al., 2005; Everson, et al., 2007; Fang, 2006; Florin, et al., 2007; Herbert, et al., 2006; Huang & Chuang, 2007; Lautenschlager & Smith, 2007; Mahon, et al., 2005) for analysis of TpB questionnaires is one of the multiple regression techniques. In this case standard multiple regression was chosen to measure the variance in the dependent (outcome) variable explained or predicted by the set of the three independent (predictor) variables (for *direct* and *indirect* measurements) and also how much variance in the outcome variable each one of those three variables is able to explain individually.

While prediction of the outcome variable was not the principal goal of this pilot study, the regression technique indicated as a set the extent of the variables' influence on the outcome variable and more importantly which of the variables individually influenced the outcome variable the most. With this information, through the interpretative framework of the TpB, an explanation of academic research productivity in this context could potentially be built.

3.7.2.1 Results of the analysis of the direct measures

The results of the standard multiple regression analysis provided the answers to RQ3 and RQ4. The model which included the predictor variables: *behavioral beliefs, normative beliefs,* and *control beliefs* explained 63.4% (p = .000) of the variance in the outcome variable, *intention* (RQ3). Of the three variables, *behavioral beliefs* made the largest contribution (β=.608 or 36.9%)(p=.000) (RQ4) (see Appendix N, section N.2.2 for the full presentation of the analysis).

3.7.2.2 Results of the analysis of the indirect measures

The results of the analysis provided the answers to RQ5 and RQ6. The model which included the predictor variables: *attitude toward the behavior, subjective norm,* and *perceived behavioral control* explained 22.5% (p=.005) of the variance in the outcome variable, *intention* (RQ5). Of the three variables, *subjective norm* made the largest contribution (β=.361 or 13%) (p=.012) (RQ6) (see Appendix N, section N.2.3.4 for the full presentation of the analysis).

3.7.3 Section conclusion

This section presented the results of the analysis of the data collected in the pilot study and the answers to the research questions they provided. RQs 1 and 2 were related to identifying differences between research active and non-research active

subjects as well as establishing a certain level of construct validity (see Appendix N, section N.1). Scores of research active and non-research active did show differences in line with what the TpB model predicts. However, there were differing levels of statistical significance (see 3.7.1 (RQ1 & RQ2) above) among the variables involved in each set of measures.

RQs 3-6 were answered through a standard multiple regression technique (3.7.2 above). The data conformed to most of the assumptions of regression techniques except those related to sample selection (i.e., a convenience sample rather than a random sample) and data distribution (see Appendix N sections N.2.1 and N.2.2).

In light of these results, the most potentially interesting finding was related to RQs 4 and 6, which sought to identify the single predictor variable that made the most unique contribution on the outcome variable. In the case of the direct measurements (RQ4), that variable was shown to be *behavioral beliefs* (3.7.2.1 above). In the case of the indirect measurements (RQ6) *subjective norm* was indicated as the single predictor variable that made the most unique contribution to the outcome variable (3.7.2.2 above). Such an outcome indicates that, according to these results, through the lens of the TpB, the research sample (both FCS and FML) appeared to be predominately influenced by their attitudes toward research as a behavior and social factors as opposed to being influenced by control factors (see 2.2.1 above).

Thus, in concrete terms, this pilot study finding might indicate a starting point, for example, for any intervention attempts aimed at changing or enhancing academic research productivity. The two variables, *behavioral beliefs* and *subjective norm,* seen to have contributed the most to the outcome variable, *intention* (to engage in the

behavior), could provide a general thematic focus on which an intervention could be built.

However, as mentioned throughout this chapter, there are a number of limitations to this pilot study that constrain the strength of any conclusions. Probably the most that can be said is that the TpB model is probably accurate when used in this context. Certainly the model needed to be tested in more optimal research conditions, which was the intention of the main study as described in the next chapter.

As described in the introduction to this chapter above, the aim of the pilot study was to gauge the efficacy of the TpB in this research setting. However, as presented in 2.1 above, the TpB model does not directly take into account antecedent factors to the three TpB variables. These antecedent factors when included in any causal model attempting to throw further light on behavior can help identify the possible origins of the values associated with the TpB variables. With this in mind, a qualitative element was added to the main study design. The following section reports the piloting of the qualitative design for the main study (cf. 2.4 above).

3.8 Pilot study – qualitative addition

The theory of planned behavior (TpB) can identify factors (within the theory framework, see 2.2 above) that influence participants' research behavior. However, the theory does not account for "background factors" that influence the beliefs accessed in the TpB questionnaire. According to Ajzen (2005, p. 134) there are a "vast number of potentially relevant background factors" that can affect a given belief. Without the interpretative guidance of a theory, it is difficult if not impossible to know which background factors should be considered in specific research situations. The choice of theory to guide data collection and interpretation depends on the research

questions or hypotheses. For reasons established in the previous chapter (2.3), social cognitive theory (SCT) was chosen as the framework for understanding the antecedent factors to the beliefs revealed through the application of the TpB.

3.8.1 Method

As discussed previously (2.4 above) a few SCT and social cognitive career theory (SCCT) career studies have used interviews and qualitative data handing methods as the primary research approach (e.g., Adams, et al., 2005; Hill, et al., 2003; Lent, et al., 2002; Wang, et al., 2007). In this study, a life story interview method (Lieblich, et al., 1998) was selected to draw out factors from participants' lives falling within the SCT class determinants.

The epistemological stance associated with the interpretation of the life story interviews was that expressed in Lieblich, et al., (1998, p. 7) viz. the stories people tell about themselves within their worlds reveal their constructed identities. As the authors say, we "know or discover ourselves, and reveal ourselves to others, by the stories we tell" (ibid). Narrated life stories are neither complete and accurate historical accounts nor are they entirely invented fictions. Rather for the purposes of this study they were regarded as consisting of a core of facts related to life events but were inevitably embellished, interpreted, retold, and construed from the vantage point of the present. This feature of retrospective accounts was not regarded as a disadvantage or criticism but rather another source of data. In other words, how people retrospectively reconstruct their lives can also reveal additional facets of those lives.

The following two sections present the pilot study interview participants and the interview protocol used. The same protocol was used for the main study

interviews because piloting did not indicate any need for significant protocol revisions (see 4.5.2 below).

3.8.2 Participants

For the pilot life story interviews, two colleagues[17] were chosen to participate. Both participants were considered research active according to the criteria established for this study (see 3.2 above). Both were full professors in the same university. Katherine (pseudonym) had twenty-five years working in higher education, a *perfil PROMEP* (national recognition for research activity), a member of the university research department, and the leader of a faculty research group (see 3.2 above). Benjamin (pseudonym) had approximately 20 years of working in higher education. He had the same research active indications as Katherine but additionally had been a member of the *Sociedad Nacional de Investigadores* (National Society of Researchers) for the past 11 years. These two participants were chosen because of their research activity, contrasting specialisms, and availability.

3.8.3 Interview protocol

Both participants were interviewed individually. Katherine's interview was approximately four hours long, conducted in English, and Benjamin's was approximately two hours in duration, conducted primarily in Spanish. Interview

[17] The two interview participants were also personal friends of mine. Certain advantages and disadvantages are noted in choosing friends as interview participants. The advantages were that I was able to test out the interview method without feeling that I was imposing or experimenting on the participants. They were fully aware that the interviews were pilot interviews, so there was an element of learning involving my role in the interview. They also felt free to provide interview feedback which became useful for the main study interviews. After conducting the main study interviews, I can say that possibly the only disadvantage associated with the pilot study interviews, and just one in particular, because of our friendship, I found that many times, we deviated from the original purpose of the interview. This had the effect of extending the approximate two hour interview into four hours, which created much more data to transcribe and to comb through for study related data.

language choice was decided principally on language preferences of the participants. Both participants were aware that the interviews were pilot interviews, but would most likely be also used in the main study. Both were informed that their interviews would be confidential and that their identities would not to be disclosed.

Life story interview protocol was adapted from Lieblich et al. (1998) because the procedure was shown to be flexible in terms of analysis, provided an intuitively appealing protocol as explained in the remainder of the paragraph, and has been empirically tested in a number of studies (ibid). At the beginning of the interview, both participants were given a sheet of paper and instructed to write the years of their lives starting with "1" and the year of their birth (see Appendix FF for a sample interview sheet). After that step, participants were asked to identify "chapters" of their lives and to assign a chapter title to each. Then each participant was asked to talk about any significant memories or events associated with each chapter, to describe themselves at that time, to identify the significant other people in that chapter, and how that chapter led to the next chapter. While these were the minimum instructions, the interaction between the interviewer (me) and the participant went beyond these four functions. This tended to yield very rich and detailed information regarding the lives, development, and personalities of the two participants.

3.8.4 Pilot study interview aims and associated results

The principal purpose of the pilot interviews was to test the interview method in terms of protocol, technique, and respondent reactions to the interview genre, life story. The results of the pilot study interviews indicated that the life story was a feasible approach for eliciting background factors to the TpB data. The results helped me gauge length of time needed for the interviews and the possible approaches I should take with the participants. While the interviews were long, it was noted that the

interview experience of the participants was positive, i.e., the experience was regarded as enjoyable and enlightening rather than tiresome or invasive.

The remainder of this chapter will describe the overall relationship between the pilot study and the main study.

3.9 Relationship between pilot study and main study

The pilot study indicated that the TpB has the potential to provide a conceptual framework for approaching additional understanding of academic research productivity in this context. However, the pilot study helped to refine the main study questionnaire. This was because the data handling associated with the pilot study provided lessons for carrying out the main study statistical procedures and redirecting the main study research questions and therefore modifying the focus of the research methodology, as explained in the following chapter. Also, the pilot interviews established the feasibility of using life story interviews to supplement the TpB data in the main study. These factors are discussed in the following sections.

3.9.1 Changes to the main study questionnaire

Several design elements were refined in the main study questionnaire as a result of the pilot study. These changes to the main study questionnaire (see Appendix U – English, Appendix V – Spanish for the revised main study versions of the questionnaire) were as follows:

"Unstructured" versus "structured" questionnaire format. Francis *et al.* (2004a) recommend using an unstructured TpB questionnaire format. This means that after the TpB questionnaire is designed, questionnaire items are randomly mixed. I did this with the pilot TpB questionnaire by putting the questions in a table format and then using the word-processor "sort" command to put the items in random order.

Unstructured versus structured TpB questionnaire formats were studied by Armitage and Conner (1999). They found differences in the predictor variables' contribution to the outcome variable depending on the TpB questionnaire structure; however, they report that none of the differences were statistically significant. I nevertheless feel that the unstructured questionnaire format affected the face validity of the pilot questionnaire. When the pilot instrument was administered, some of the participants commented that they thought that some of the items were repeated. Some of the indirect measures did look very similar.

In the structured questionnaire format, as used in the main study, all of the variables were measured in distinct scales grouped together (see Appendix U). All the indirect measures which are composite items (see 3.5 above) were presented with the first composite element followed by the second. This tended to avoid the impression that the items were repeated because the items appeared together making it clear that they were actually different items (cf. unstructured pilot questionnaire in Appendix F and structured main study questionnaire in Appendix U).

Questionnaire scale guides. To further reduce issues with face validity, each of the scales within the questionnaire was labeled in the main study questionnaire. For the direct measurements this consisted of a title to the particular scale (e.g., ***SECTION 2*** – *[Identity Factors]*, ***SECTION 3*** – *[Intentions]*). For the indirect measurement scales, scale titles and brief scale descriptions were provided (e.g., ***SECTION 4 – Indirect measures:*** *The items in the following three sections consist of two parts. One part measures the existence of the belief that you hold and the second part measures the strength of that belief. It may look like the items are repeating, but they are actually*

measuring different aspects of the same belief. [Indirect measures – attitudes toward the behavior – behavioral beliefs]) (see Appendix U).

Scale end-points. The reversed endpoints[18] in some of the pilot questionnaire items caused confusion for some participants and also made analysis slightly more complicated (see 3.4.2 above). Although the TpB literature offers some justification for reversing endpoints (e.g. Ajzen, 2006; Francis *et al.* 2004a), I feel that in the case of the pilot study, the reversed endpoints may have affected instrument face validity. Thus, reversed endpoints were omitted in the main study questionnaire.

Self-identity variable. Some studies have suggested that the subjective norm construct may not be robust enough to represent the complexity of the self in society, and therefore propose the addition of a self-identity variable to the TpB model - see, e.g., Armitage & Conner, 1999; Fekadu & Kraft, 2001; Hagger, Anderson, Kyriakaki, & Darkings, 2007; Hagger & Chatzisarantis, 2006; Johnson, White, & Norman, 2004; Pierro, Mannetti & Livi, 2003; Shaw & Shiu, 2002; Sparks & Guthrie, 1998; Sparks & Shepherd, 1992. All of these studies have shown self-identity, as an additional predictor variable in the TpB model, to be an independent predictor of intention.

Self-identity is comprised of different "relatively stable" self-images which range from personal representations to representations of the self in social roles (Hagger, *et al.*, 2007, p. 357). In Armitage and Conner's (1999, p. 262) definition, "self-identity is held to represent the extent to which individuals perceive themselves as fulfilling a particular societal role." Hagger, *et al.*, (2007, p. 357) suggest that self-identity elements may provide a tendency or a disposition to act in a particular way

[18] The majority of the endpoints for the pilot study questionnaire were configured with left side being negative and right side positive, i.e. *Strongly disagree 1 2 3 4 5 6 7 Strongly agree.* Following Ajzen (2006) and Francis, *et al.*, (2004a), some of the endpoints were reversed, i.e. *Strongly agree 1 2 3 4 5 6 7 Strongly disagree.* This is recommended to prevent automatic answering by study participants.

which, nevertheless, could be superseded by certain situational factors (this might be where control variables would come into play to account for some of those possible situational factors[19]). They conclude that self-identity factors would be expected to have a "pervasive influence on intention and behavior in a number of domains" (Hagger, *et al.,* 2007, p. 357). In the light of these views, thus, I added a self-identity scale to the main study questionnaire as an additional predictor variable (see Appendix U, Section 2).

Questionnaire language. The pilot study questionnaire was in English because both groups of respondents could manage the questionnaire in that language. However, for the main study with the wider range of participants, all of the documents were translated from the original English to Spanish by a native speaker of Spanish. After translation, all documents were checked by three other native speakers of Spanish, piloted and minor language changes made. Finally the questionnaire was back-translated into the original English by a native speaker of English to establish equivalence with the original version (Francis, et al., 2004a).

Cover letter. A cover letter was included with the main study questionnaire. The letter briefly summarized the background elements of the study, and described the focus and purpose of the current study. A slightly different version of the letter was used for RA and NRA participants (see Appendix O (RA) and Appendix Q (NRA) for the two versions in English, Appendix P (RA) and Appendix R (NRA) for the Spanish language versions). The RA participants' letter explained why they were selected for the study and explained that the study would compare RA and NRA faculty members.

[19] Self-identity factors might be favorable towards doing research, i.e. an individual may see herself as a researcher, but may at the same time feel constrained by perceived control factors, such as the perception that there are no resources available to do research.

The NRA letter omitted this explanation because it could possibly be offensive to the NRA participants if they knew they were being compared to their RA colleagues.

"Research" defined. After the questionnaire instructions a paragraph was included that defined "research" for the purposes of the study so that participants could respond accordingly (see Appendix U).

Recognition of research activity. For purposes of further classifying RA and NRA participants, a group of items was added to the background variables section of the main study questionnaire (Appendix U).

A.	*Do you have a Perfil PROMEP?*	*Yes / No*
B.	*Are you a member of the SNI?*	*Yes / No*
C.	*Do you belong to the university register of researchers?*	*Yes / No*
D.	*Do you belong to a faculty research group?*	*Yes / No*

This proved to be a worthwhile addition because I was able to identify participants who were members of the SNI for the interview portion of the study (only RA participants who were members of the SNI were selected for the interviews, ensuring their high level of research activity). I was also able to identify two participants from a faculty other than the FML whom I classified as NRA based on their lack of recognition from or membership in any of these elements.

Negatively worded scale items. The pilot questionnaire contained items that refer to *not* doing research (see Appendix E). Francis, *et al.* (2003, p. 62) say that items that refer to *not* doing a particular behavior require a separate TpB questionnaire. As they say, "...the direction of the definition should be consistent throughout the questionnaire." Those negatively worded items were therefore omitted in the main study questionnaire.

Research or teaching orientation. Several studies on academic research productivity have indicated that a faculty member's orientation to research or teaching is a variable in their engagement or lack of engagement in research activity (e.g., Bailey, 1999; Blackburn, et al., 1991; Ramsden, 1994; Zainab, 1999). To see if this element has any relation to the participants in this study the following item was added to the main study questionnaire:

Would you describe your professional orientation as: (please indicate which orientation dominates)
ORIENTED TOWARD TEACHING
ORIENTED TOWARD RESEARCH
BOTH

Academic research productivity and promotion. To partially address factors related to feedback processes (see 1.3 above) and to further assess participants' opinions regarding research activity, the following item was added to the main study questionnaire:

How much do you think that research activity should be considered as a criterion for promotion?

Research productivity should NOT be a factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Research productivity should be a factor

Participant remuneration (as an addition to the main study questionnaire, not a result of the pilot study). Following the practices of many research studies (e.g., Burke & James, 2005), a three prize ($15, $25 and $50 U.S. dollars) raffle for an online gift certificate from Amazon.com was added to the main study questionnaire, but only for the RA participants because of the different deadlines for turning in the questionnaires for the two groups (RA and NRA). NRA participants participated in a raffle of books (ELT and other titles).

Burke and James (2005, p. 115) state that recent research has indicated that in the case of participant remuneration, "it does not take much [money] to motivate people to participate." However, in this research context I found the remuneration to

be ineffective and possibly offensive to participants. A number of them indicated either through emails or comments on returned questionnaires that the raffle was not required as motivation to participate. The three winners of the gift certificates had to be reminded to use them and I am not sure whether they actually did. Only one participant from the FML took advantage of the free books. I have no explanation for this reaction nor do I feel it is productive pursuing an explanation (although I have asked a few colleagues and friends who could not adequately explain it). I can only conclude that offering remuneration for participation in studies of this nature in this context is possibly not appropriate, perhaps for cultural reasons.

Interview participants and study results. Finally a section was added as part of the cover letter (Appendix O English, Appendix P Spanish) that invited participants to be part of the qualitative portion of the study:

> [ ] *I would be willing to participate in the qualitative portion of this research project in the form of an interview done at my convenience in a location that I designate.*

And to indicate if they wanted to receive the results of the study:

> [ ] *I wish to be informed of the results of this research project. Please send the results to*:

Pilot study life story interviews and main study life story interviews. Possibly the most important results of the pilot study interviews were that I was able to test out the interview protocol, and I was able to see that the interviews, in spite of the length, would be something enjoyable for the participants rather than an imposition (see 3.8.4 above). This knowledge gave me the courage to approach potential respondents and invite them to participate and to actually carry out the interviews. If I had felt that the interviews were viewed by the participants as disagreeable, a waste of time, or in any conceivable manner an imposition, I would not have been able to conduct them.

The interview procedure generated promising data, which was of a quality which resulted in the findings being folded in with the main study findings as reported in Ch. 6.

3.10 Conclusion

This chapter has presented the research methodology and results associated with the pilot study portion of this project. The pilot study participants and instrument application procedures were described followed by the procedure used to construct both the pilot and main study TpB questionnaires. This was followed by an analysis of the responses to the pilot study questionnaire. A qualitative element, life story interviews, was added to the pilot study (and main study) as a means of attempting to throw light on factors antecedent to the quantitative results anticipated in the main study. The rationale, and protocol for and administration of the pilot study life story interview were also reviewed. The chapter ended with a description of the ways in which lessons learned from the pilot study influenced the main study design.

The following chapter describes the main study research design, participants, and procedures. It also describes the methods of analysis used for the quantitative and qualitative portions of the main study.

Chapter 4

Main Study Methodology

4.0 Chapter introduction and overview

The previous chapter described the methodology and results associated with the research pilot study and ended with a presentation of changes to the main study research methodology. This chapter describes the research methodology associated with the main study, designed in light of the lessons gained from the pilot study. The chapter is divided into four principal sections: overall research design (including main study research hypotheses and refinements to main study research questions), main study participants, and then, in turn, firstly quantitative and secondly qualitative data handing procedures. Issues concerning reliability, validity, and ethical issues are discussed within the quantitative and qualitative data handling sections.

4.1 Main study overall research design

This study aimed to understand factors affecting levels of research engagement in faculty of modern languages (FML) academic staff in the area of English language teaching (ELT) working in a research oriented institution (see 3.2 above).

A multi-theoretical model for enquiring into factors affecting research behavior was constructed in Chapter 2 (see Fig. 2.4 above) in an attempt to provide a framework for the investigation. As was explained, the factors contributing to research behavior proposed in this conceptual model can be explored in a single population displaying a single characteristic (e.g., research engagement), but those factors lack explanatory power without an understanding of what distinguishes those from the same research population with this characteristic from those who do not display it. For that reason one of the principal components of this study, in the light of the theory of planned behavior (TpB) and social cognitive theory (SCT), is a comparison of the characteristics of research active (RA) and non-research active (NRA) participants (see 2.5 above).

As the previous chapter has shown, in addition to a concern for generating quantitative data via the application of TpB, qualitative data via life story interviews, informed by an SCT perspective, were also generated in order to identify potential background factors relevant to TpB data and ultimately to research activity of the participants (cf. section 3.8 above). The overall structure of the resulting main study research design is shown in Fig. 4.1 below.

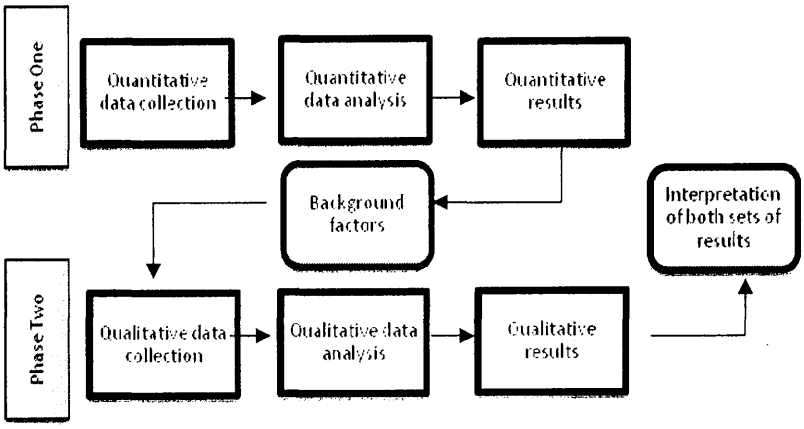

Figure 4.1 Main study two-phased mixed-method explanatory design
(based on Creswell & Plano Clark, 2007, p. 63)
In Phase One, quantitative interpretative approaches were used within the TpB framework. In Phase Two, qualitative approaches were used within the SCT framework and used to further explore statistically significant differences found in the first phase analysis. Both data sets are examined and interpreted in the discussion stage of the study.

A two-phase, mixed-methods design was used in which qualitative data were collected after the quantitative phase with the intention of shedding light on the quantitative data in more depth. In the first phase of the study, TpB questionnaire data were collected from research participants (see 4.3.1 below) to explore TpB-related factors with respect to research activity. In the second phase, life story interviews were used to explore the role of SCT behavioral determinants (see 2.3 above) in the overall formation of RA and NRA academic staff research engagement in the research location (see 1.2 above).

The underlying rationale for the two-phase, mixed-method design of this study was that quantitative data and their analysis would provide an overall picture of attitudes and social and control factors regarded as determinate factors influencing intention to engage in research activity. The qualitative data and their ensuing analysis was expected to supplement those results by exploring participants' academic and career development in much more depth (Creswell & Plano Clark, 2007).

Thus, reflecting the main study mixed-methods design (Fig. 4.1 above), the guiding hypotheses and research questions were refined[20] as follows:

For Phase One analysis:

> *H1. Group scores on the direct measures scales of Intention, Identity, Behavioral Beliefs, Normative Beliefs, and Control Beliefs in the TpB questionnaire administered will be significantly higher in RA than NRA participants.*
>
> *H2. Group scores on the indirect measures scales of Attitudes Toward the Behavior, Subjective Norm, and Perceived Behavioral Control in the same questionnaire will be significantly higher in RA than NRA participants.*

For Phase Two analysis:

> *RQ1. In what ways do SCT environmental class determinants seem to have played a part in participants' academic and career development?*
>
> *RQ2. In what ways do SCT personal class determinants seem to have played a part in participants' academic and career development?*

The following section describes the participants associated with both phases of the main study research design.

4.2 Main study research sample

This section describes the research sample associated with the main study. The section is divided into two parts. The first (4.2.1 below) describes the participants associated with the questionnaire ("Phase One") portion of the study. This is followed by a description of the participants associated with the interview ("Phase Two") portion of the study (4.2.2 below) (research population data are provided, when available, in 5.1 below).

---

[20] Refined from those presented in 1.4 above: RQ 1: What seem to be the main personal variables affecting the research productivity of the subjects? RQ 2: What appear to be the primary environmental variables also of influence? RQ 3: In what ways can feedback processes also be seen to affect the matter?

4.2.1 Research sample – questionnaire

Since the aims of this study were to attempt to compare and then illuminate factors affecting academic research productivity in this population, both RA and NRA faculty members needed to be identified as research participants. As explained above, setting up a basis for potential comparison and contrasts was done in order to increase the likelihood of producing more useful findings than by only investigating either an RA or an NRA sample. Since there were not enough research active participants in the FML to make a meaningful sample, a stratified random sample[21] (Oliver, 2004) of research active participants was chosen from faculty members from the entire university (see 3.2 above).

RA participants were identified from a list of faculty members who submitted research projects to the university research department for funding in the year 2007. Only the lead researchers in a submitted project were selected to participate in the study because others involved in projects were not identified. These participants were sent the TpB questionnaire either through personal contact, contact with their individual faculty's research department director, or were emailed the questionnaire package (see 3.9.1 above). Table 4.1 below presents the questionnaire package form of distribution, number distributed, faculties involved, and number returned for RA participants.

[21] Defined for the purposes of this study as a random sample drawn from a stratum of RA academic staff within the research population.

	Faculties involved	Form of distribution	Number distributed	Number returned	Response rate
1	School of Arts	1	2	0	0%
2	School of Biology	1	8	5	63%
3	School of communication sciences	3	1	0	0%
4	School of agricultural and hydraulic engineering	3	8	3	38%
5	School of veterinary medicine and zoology	3	4	0	0%
6	Faculty of administration	3	1	1	100%
7	Faculty of architecture	3	1	1	100%
8	Faculty of computing sciences	1	13	8	62%
9	Faculty of electronic sciences	2	11	0	0%
10	Faculty of physics and mathematics	2	33	12	36%
11	Faculty of chemical science	3	14	0	0%
12	Faculty of public accounting	3	1	0	0%
13	Faculty of law and social sciences	3	2	1	50%
14	Faculty of economics	2	5	3	60%
15	Faculty of dentistry	3	3	1	33%
16	Faculty of philosophy and letters	2/3	6	2	33%
17	Faculty of engineering	1/3	4	2	50%
18	Faculty of chemical engineering	2	9	0	0%
19	Faculty of modern languages	1	3	3	100%
20	Faculty of medicine	3	2	1	50%
21	Faculty of psychology	1	4	4	100%
	TOTALS		135	47	35%

Key: Form of distribution		
1=personal contact	2=through individual faculty's research department director	3=emailed

Table 4.1 Research active questionnaire distribution
Showing from left to right the faculties receiving questionnaires, form of distribution, number distributed and returned, and the return rate.

The general configuration of the resulting set of RA subjects (N=47) consisted of participants from the schools of biology (n= 5) and agricultural and hydraulic engineering(n=3), and from the faculties of administration (n=1), architecture (n=1), computing sciences (n=8)[22], physics and mathematics (n=12), law and social sciences (n=1), economics (n=3), dentistry (n=1), philosophy and letters (n=2), engineering (n=2), modern languages (n=3), medicine (n=1), and psychology (n=4).

[22] After analysis of the participant background factors, two participants from the computing sciences faculty were classified as NRA. They are included in the sample number in this paragraph for simplification of explanation; however, in Tables 4.2 through 4.10 below these two participants are included in the NRA sample.

All 34 faculty members from the FML, comprising the NRA sample, with graduate level degrees (master's) were given questionnaire packages. Twenty responded (58.8%). The participants for this study from the FML were restricted to only those holding graduate degrees because they are the only ones who have the possibility of gaining any external benefits for doing research as the government and the university will only recognize those with such qualifications as eligible for the benefits of research participation (other than intrinsic benefits, e.g. personal satisfaction, personal and professional growth, and so on). Those external benefits are 1) being a member of a formal research group *(cuerpos academicos)* and therefore having access to funding for research projects, 2) being eligible for a national level professional rating (*Perfil PROMEP),* which is a source of professional recognition and prestige as well as monetary benefits in the form of scholarships and research funding, and 3) eligibility for membership in the register of university researchers (*Padrón de Investigadores).* Membership in this group provides monetary benefits such as funding for research projects and travel funding for participation in national and international conferences as well as professional recognition and prestige. The reason that this study is restricted to only staff members who are eligible for these benefits is that I believe these should be sufficient to motivate engagement in research and publication.

The following section describes the main study interview participants. The two pilot study participants (see 3.8.2 above) have been included in the main study group.

4.2.2 Research sample – Interview

Faculty members who indicated on the questionnaire that they would be willing to participate in further data collection via interviews provided the sample for the

qualitative portion of the study (see Main Study Cover Letter, Appendix O). Of the 47 RA questionnaire participants, 25 indicated that they would be amenable to follow-up interviews. Of those 25, 16 were selected[23] because of their affiliation in the *Sociedad Nacional de Investigadores* (National Society of Researchers)[24] thus ensuring that they were exceptionally research productive. Of those 16, eight agreed to participate in the interviews, plus two RA from the FML (see footnote 22) making a total of 10 RA interview participants. The second sample of participants (NRA) was selected in the same manner as the first (i.e., through indication on the questionnaire cover letter).

Table 4.2 below describes the interview participants. The table indicates the faculty of the participant, the gender and average age, and which participants were members of the SNI. RA participants represent seven different university faculties. NRA participants were all from the FML.

[23] With the exception of two FML academic staff members classified as RA

[24] The National Society of Researchers is a Mexican government organization established in 1984 to enhance research productivity through incentives to productive researchers. To belong to the society, researchers apply to the program. Eligibility is determined by peer evaluation. Benefits of the program include prestige and workload and pecuniary compensations (Gonzalez-Brambila & Veloso, 2007).

	FACULTY		SNI*	
		RESEARCH ACTIVE		
1	Computing Sciences		Y	
2	Economics		Y	
3	Economics	**48.7 Average age (mean)**	Y	
4	Economics		Y	
5	Mathematics	**70% Male**	Y	
6	Medicine	**30%Female**	Y	
7	Modern Languages			N
8	Modern Languages			N
9	Physics		Y	
10	Psychology		Y	
		NON-RESEARCH ACTIVE		
11	Modern Languages		N	
12	Modern Languages	**51.2 Average age (mean)**	N	
13	Modern Languages		N	
14	Modern Languages	**60% Male**	N	
15	Modern Languages	**40% Female**	N	
		BOTH GROUPS		
67%Male / 33%Female		**49.53 Average age (mean)**	**SNI = 53%Y/47%N**	

**Sociedad Nacional de Investigadores* (National Society of Researchers)

Table 4.2 Interview participants (*N*=15)
RA (*n*=10), NRA (*n*=5)

The nature of the interview participant selection process does raise questions regarding the overall interpretation of the results. All the interview participants in a sense were "self-selected" in that they agreed to participate or not. In the light of this characteristic, it should be kept in mind that the results will be a reflection of this process and may therefore be skewed in the sense that those who wanted to talk about their lives were the ones who did. However, it is impossible to strictly control for this feature since all research participants were voluntary participants.

The following sections, 4.3 and 4.4, describe the data handing procedures. The former presents procedures associated with the survey/Phase 1 portion of the study, the latter with the interview/Phase 2 portion.

4.3 Data handling Phase 1 – questionnaire

This section describes the various data handling issues related to the questionnaire portion of the study beginning with the reliability and validity measurements of the various scales used in the questionnaire. This section is followed by a description of the design, data collection procedures, and the statistical techniques used to analyze the data.

4.3.1 Scale reliability and validity measures

The internal consistencies of the direct scales used in this part of the main study were measured using Cronbach's alpha as used in the pilot study instrument (see 3.4 above). Cronbach's alpha is a measure of internal consistency (a reliability coefficient) that is used for scales that have more than two possibilities, as there are in the scales of direct measures. For the purposes of this study and based on advice in the literature (e.g., Francis, *et al,* 2004a; Mitchell & Jolley, 2001; Vogt, 1999) a measurement from 0.6 upwards was considered to indicate that each scale is measuring the same construct. The alpha coefficient is reported for each of the five direct measurement scales (*intention, identity, behavioral beliefs, normative beliefs*, and *control beliefs*). Measures of internal consistency were calculated using SPSS statistical software version 13. For all the direct scales they were as follows (Table 4.3 below) (see Appendix W):

Scale (construct)	*Number of items*	*Cronbach's Alpha*
Intention	*3*	0.943
Identity	*4*	0.854
Behavioral beliefs	*4*	0.939
Normative beliefs	*4*	0.747
Control beliefs	*4*	0.557

Table 4.3 Scale reliability – direct measures

As recommended in Francis, et al. (2004a, p.30) a series of bivariate correlations were carried out (Pearson product-moment correlation and non-parametric Spearman's rho) between the direct and indirect measures of the same construct to confirm the internal consistency of the indirect measures (Berg, et al., 2000)[25]. There was a strong positive correlation between the variables *normative beliefs* and *subjective norm* [r=.900, n=64, p<.0005] (Spearman's rho). There was a medium positive correlation between *behavioral beliefs* and *attitude toward the behavior* [r=.402, n=65, p<.001] (Pearson) and with *control beliefs and perceived behavioral control* [r=.384, n=67, p<.001] (Spearman's rho) (Pallant, 2005) (see Appendix Y). This confirmed that the direct and the indirect scales were both measuring the same construct.

As with the pilot study scales (see Appendix N, section N.1), the main study scale validity was measured using a differential-groups validity measure (Brown, 2001). As Brown (2001, p. 181) explains, differential-groups validity is one of three construct validity experiments used to ensure that a research instrument is measuring the construct it claims to measure. Differential-groups validity studies use two groups of participants. One group has the construct being measured (in the case of this study members of this group have evidence of academic research productivity and are described as the research active group) and the other group lacks evidence of that construct (described in this study as non-research active).

The performance of each group on whatever instrument being tested (in the case of this main study the TpB questionnaire) is then compared. According to the TpB, persons most likely to engage in the behavior in question would score higher in

[25] Bivarate correlations were not carried out on the Pilot Study indirect measures, but correlations between the direct and indirect predictor variables and the outcome variable were included in the results of the standard multiple regression procedure (see Appendix N, sections N.2.1.2 and N.2.3.2)

the various scales of the TpB questionnaire than those less likely to engage in the behavior. As reported in Appendix Z (measurement of means, and as results of the Mann-Whitney test, see 5.1.2 below), in all of the scales research active subjects (who obviously engage in the behavior in question) as a whole scored higher than non-research active. As a result this can be taken as evidence for the construct validity of the TpB questionnaire used in this study.

4.3.2 Instrument design: TpB questionnaire

The instrument design basically consisted of eight steps (see Table 3.7 above) which involved identifying the behavior in question and the research population, and then applying an elicitation instrument (steps 4-6, Table 3.7) the responses to which provided the items within the six principal scales of the questionnaire. In the case of this study the main study questionnaire was constructed in the pilot stage then revised based on pilot study results (see 3.9 above). For details on the questionnaire design, construction and scoring procedures of the pilot study and main study questionnaire, the reader is referred back to sections 3.3 through 3.6 above for a comprehensive description of these processes.

4.3.3 Procedure

The questionnaire was delivered to faculty members as a packet of materials as described earlier in section 3.9.1. Briefly, the packet included:

- Cover letter addressed by name to each specific faculty member explaining background to the study, the nature of the actual study itself, and confidentiality factors (RA: Appendix O – English, Appendix P – Spanish, NRA: Appendix Q – English, Appendix R –Spanish).
- Questionnaire instructions with sample questionnaire items (Appendix S – English, Appendix T -- Spanish)
- The five page TpB questionnaire (Appendix U – English, Appendix V -- Spanish).

All of the documents were translated from the original English to Spanish by a native speaker of Spanish. After translation, all documents were checked by three other native speakers of Spanish, piloted and minor language changes made. The instrument was then back-translated to English by a native speaker of English to further check for translation inconsistencies before being distributed to participants.

Access to participants was gained in several ways with the research active (RA) participants. After identifying participants from projects submitted for funding to the university research department (see 4.2.1 above), three principal means were employed to deliver the instrument to the researchers: 1) delivery through faculty research department directors, 2) delivered personally, or 3) delivered through email (see Table 4.1 above).

Faculties in this university did not have facilities for contacting faculty members (such as mailboxes) so academic staff had to be located through the faculty research department head if the faculty had a masters program[26]. This was successful in five of the faculties contacted (Economics, Physics and Mathematics, Electronics, Computing Sciences, and Chemical Engineering). Three of the five faculties returned questionnaires. Multiple attempts were made via telephone calls and emails to get questionnaires back from the other two, but were unsuccessful.

Questionnaires were hand-delivered to individual academic staff members in the faculties of Fine Arts, Biology, Administration, Architecture, Chemical Science, Law and Social Science, Philosophy and Letters, and Psychology. This involved physically going to the faculties and attempting to find the participants on the participants' list. It took several weeks to deliver all the questionnaire packets.

[26] Academic departments with only undergraduate programs, called *Escuelas* (schools), do not have individual research departments.

For those faculty members that were impossible to locate and for participants in the faculties of Agro-hydraulics and Veterinary Sciences / Zoology which are far out of the city, email addresses for all of the researchers were obtained from the university research department. 57 emails were sent with the questionnaire package documents as attachments. Of the 57 questionnaires delivered via email, 11 completed questionnaires were returned. Non-respondents were sent a reminder email two weeks after the initial email was sent. The reminders did not result in any additional returned questionnaires.

4.3.4 Quantitative data analysis

In keeping with the TpB model (Fig. 2.5 above) two overall predictions were made regarding the direct and indirect measurements of the TpB variables (as presented in 4.1 above):

> *H1. Group scores on the direct measures scales of Intention, Identity, Behavioral Beliefs, Normative Beliefs, and Control Beliefs in the TpB questionnaire administered will be significantly higher in RA than NRA participants.*
>
> *H2. Group scores on the indirect measures scales of Attitudes Toward the Behavior, Subjective Norm, and Perceived Behavioral Control in the same questionnaire will be significantly higher in RA than NRA participants.*

Two statistical tests are appropriate for comparing groups with data characteristics found in this study: the independent-sample *t*-test (parametric) and the Mann-Whitney *U* test (non-parametric).

Because of the lack of normal distributions of the data (see Appendix L – direct measurements and Appendix M – indirect measurements) the Mann-Whitney test was used to compare RA and NRA groups. The variables involved are the continuous variables of direct measurements of *intention, behavioral beliefs, normative beliefs, identity beliefs,* and *control beliefs* and the continuous variables of

the indirect measurements of *attitude toward the behavior, subjective norm,* and *perceived behavioral control* both compared to the categorical dependent variable - in this case research active (RA) or non-research active (NRA). Effect size was calculated to determine the magnitude of the differences found in the tests. To measure effect size the equation: $r = \frac{z}{\sqrt{N}}$ was used, where *r= effect size, Z= the Z score provided by SPSS,* and *N=the sample size* (Field, 2005) using Cohen's guidelines of: small effect size = 0.0 to .20, medium effect size = .20 to .50, and large effect size = .50 and above (Salkind, 2004). The results of these tests are presented in section 5.1.2 below.

As discussed in 5.1.2 below and presented in Appendix X, main study data distributions prevented statistical procedures which would allow exploration of relationships between variables (e.g., multiple regression).

The sections above have presented the main study methodology as guided by lessons learned from the pilot study (see 3.9 above). The above represents the methodology used in the first phase of the main study research design (see Fig. 4.1 above). The following presents main study methodology associated with the second phase of the main study design.

4.4 Data handling Phase 2 – interviews

This section presents the main study research methodology associated with the second phase of its design. Life story interview protocol is described first followed by qualitative data analysis procedures used and validity issues.

4.4.1 Interview protocol and procedure

The main study life story interview protocol was the same as for the pilot study interview procedure (see 3.8.3 and 3.9.1, final section, above) since the overall results

of the pilot study interviews indicated that no major changes in the interview protocol were needed. Briefly, as a reminder, following the life story interview protocol in Lieblich et al. (1998), all participants were given a standard sheet of paper which was divided into two numbered columns starting with zero and ending in most instances around 60, approximately[27] 30 numbers per column, representing years of life (see Appendix FF for sample participant completed interview form and Appendix GG for the corresponding interview transcript). Informants were asked to fill in information related to anything that seemed important to them in any order they chose. They talked about the periods of their lives, important people, their personalities and reactions to events as they filled out the years. Questions were asked only for the purposes of following up in more detail certain comments and to encourage informants to think about their lives and experiences as those events related to their personal and career development. The SCT interpretative framework, categories, analysis codes, and analysis procedures were developed after the interviews had been conducted to ensure that no leading or biased questions would be asked or that the participants would be inadvertently led in any response direction.

For the main study interview, RA and NRA participants who indicated on the questionnaire that they would be willing to participate in the interviews were contacted by phone or email to arrange times for the interviews. All of the interviews were conducted in a location and time convenient for the participant. Two of the interviews were one hour in duration, but the rest were two hours or longer. Twelve of the interviews were conducted in Spanish, three were in English. All of the interviews were digitally recorded and life story year sheets were kept as interview records. Permission was granted from each participant to record the interviews and all

[27] The numbers are approximate because the sheets of paper were hand numbered sometimes by the researcher and sometimes by the participant depending on individual circumstances.

participants were assured of the anonymity and confidentiality of the interview data. All of the participants seemed to enjoy the interview experience, and a few recommended other colleagues as possible interview participants.

4.4.2 Qualitative data analysis

Data collected from the narrative interviews was analyzed using qualitative data analysis software Atlas.ti ver. 5.2. As described in 2.4 above, background or antecedent factors to the first phase data (see Fig. 4.1 above) were interpreted using the SCT as the theoretical framework. Thus, the life story interviews were coded in a deductive manner using SCT determinants as free codes created before interview analysis. The interview analysis was carried out in a series of seven stages.

Stage One. The first stage involved setting up the 'Hermeneutic Unit', a virtual location within the software program that houses all the data relevant to the project. As part of the analysis set-up interview transcripts and audio files were assigned as primary documents.

Stage Two. 27 'free' codes (unattached to data) were created based on SCT determinants and attached in the first coding of the interview transcripts (see Table 4.4 below). After the initial coding was completed, the codes were arranged into conceptual families based on SCT class determinants (explained in 2.3 above). Initial codes and families are presented in Table 4.4 below.

ENVIRONMENTAL CLASS DETERMINANTS	PERSONAL CLASS DETERMINANTS	DEMOGRAPHIC CHARACTERISTICS
Academic formation	Coping efficacy	Family size
Barrier experience	Goal attainment (motivation)	Father employment
Chance encounters	Goal cognizing	Mother employment
Family as a barrier	Interest	Family relocation (moves)
Family as a support	Judgments of physiological states	Partners
Role models – barrier	Mastery experiences	Parents educational level
Role models -- support	Outcome expectation	Public school
Social influence – barrier	Self-efficacy	
Social influence – support		
Symbolic models		
Vicarious barrier experiences		

Table 4.4 Interview data initial codes and code families

Codes were initially sorted into three code families: environmental (12 codes) and personal (8 codes) SCT determinants and demographic characteristics (7 codes).

Stage Three. The data were gone through a second time and memos containing reflections and thinking regarding the coded quotations were added. In this stage 817 memos were attached to coded text.

Stage Four. Data and codes were reviewed a third time and codes were combined into smaller and more precise code sets (see Table 4.5 below). In the environmental class determinants, it became apparent that it would be impossible to know with any kind of certainty whether *family, role modes,* or *social influence* could be construed as barriers. Some events may initially appear as a barrier, then in light of the action taken by the individual be interpreted as supporting development. For example, one respondent (Benjamin, see further presentation in 6.2 below) reported that his father adamantly objected to his entering the university. The father insisted that the respondent find some kind of employment and contribute to the family support. This may at first appear as a barrier imposed by a family member; however, because of the long adversarial relationship between the respondent and his father, the prohibition against university study only made him more determined to enter the university. So in effect this barrier was a support. Therefore, the distinction between barrier and

support for *family, role modes,* and *social influence* was eliminated. Individual occurrences of the respective codes were evaluated based on their perceived contribution to academic and/or career development and the decision was made to keep the coded data or eliminate one or ones. In the end only *Vicarious Barrier Experiences* was eliminated because there were not enough interview data to support it.

In the personal class determinants the following codes were merged because they seemed to be essentially indicating the same characteristic: *mastery* merged into *goal attainment*, *outcome expectations* merged into *goal cognizing, social influence factors* merged into *role models,* and *self-efficacy* merged into *judgments of physiological states*. Demographic characteristics remained the same and were used in the analysis primarily as an aid in establishing socio-economic status in the childhood stage and in illuminating the other two class determinants.

ENVIRONMENTAL CLASS DETERMINANTS	PERSONAL CLASS DETERMINANTS	DEMOGRAPHIC CHARACTERISTICS
Academic formation	Coping efficacy	Family size
Barrier experience	Goal attainment (motivation)	Father employment
Chance encounters	Goal cognizing	Mother employment
Family factors	Interest	Family relocation (moves)
Role models factors	Judgments of physiological states	Partners
Symbolic models		Parents educational level
		Public school

Table 4.5 Second revised interview codes
Codes were sorted into three code families, environmental (6 codes), personal (5 codes), and demographic characteristics (7). Demographic characteristics were only used to establish the socio-economic status of the participants (see 6.2.1.4 below).

Stage Five. Primary documents and memos were arranged into conceptual families.

Stage Six. 42 conceptual networks ('network views') which form the basis of the analysis were constructed. Each participant had three networks, one each for childhood, adolescence, and adulthood. Memos which were attached to coded text

were linked in each network view into the two SCT classes, environmental and personal (a participant individual network view can be seen in Appendix KK).

Stage seven. From the products of stage six, a typology of cases (Wengraf, 2002) was constructed (see Appendix HH in table form without data, Appendix II with data). Formal aspects of cases based on SCT determinants (discussed in 2.3 above) were defined then analyzed for frequencies and combination patterns with the overall aim of answering RQs 1 and 2[28]. The typology is explained in more detail in 6.1 below.

4.4.3 Validity of qualitative data interpretations

For the purposes of this study "validity" in relation to this portion of the analysis is defined as the "ability of the researcher to draw meaningful and accurate conclusions from all of the data in the study – the accuracy in which researchers draw inductive and deductive conclusions from a study" (Creswell & Plano Clark, 2007, p. 146). In this instance checking the *accuracy* of the interviews was the principal means used to assess validity. Creswell and Plano Clark (2007) present a review of the three most common methods for assessing data and results validity of qualitative data: member checking, triangulation, and peer reviewing. In the case of this study, the first two methods were used, i.e., member checking and triangulation with the phase one data similar to validation techniques used in several SCT qualitative studies (i.e., Adams, et al., 2005; Hill, et al., 2004 (mixed-method study using qualitative-quantitative data triangulation); Wang, et al., 2007).

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[28] *RQ1. In what ways do SCT environmental class determinants seem to have played a part in participants' academic and career development?*
RQ2. In what ways do SCT personal class determinants seem to have played a part in participants' academic and career development?

The principal form of data validation in this study was accomplished through member checking. This involved asking participants to confirm their classifications into the SCT typology (in Appendix II). Six of the RA participants (60%) were available for this purpose and expressed overall agreement with the classification. The three of the five (60%) NRA participants available likewise confirmed the accuracy of the interview inferences via the typology. Four of the RA participants and two of the NRA participants were not available, but it can be reasonably assumed that the inferences made from the interview data were for the most part accurate and represented the lives of the participants as they were recounted in the interviews based on the responses obtained from the member checks.

While clearly not ideal, and not regarded as the principal form of inference quality checking (validity), data triangulation was accomplished through the association of the interview data with the overall results of the quantitative data analysis. Quantitative data analysis results indicated overall statistically significant differences in beliefs and attitudes toward research engagement between the RA and NRA participants. The interview data was included in the research model to shed further light on the findings of the quantitative data analysis (as visualized in Fig. 4.1 above). It could be assumed that differences on a group level between the two groups would also be manifest in the interview data. As presented in Chapter 6, the interview data do show marked differences in academic and career path development on a between-group level.

However, as mentioned in the previous paragraph, member checking was seen as the primary method of validity checking associated with the interview data.

4.5 Chapter conclusion

The purpose of this chapter was to present the overall main study design strategy (Fig. 4.1 above) and to describe the research methodologies used in each of the study's two phases. The method description included participants and participant selection, data collection procedures, and data handling procedures used including analyses methods for both the quantitative and qualitative data.

In the following two chapters, the results of, firstly, the quantitative (Phase One) and then, secondly, the qualitative (Phase Two) data analyses are presented.

Chapter 5

Main Study Quantitative Data

5.0 Chapter introduction and overview

This chapter presents the results of the first phase (quantitative data) part of the main study (see 4.1 above). The chapter is arranged in three principal sections: first, descriptive data comparing characteristics of the research active (RA) and non-research active (NRA) groups (5.1), second, participants' research orientations and opinions (5.2), and third, hypotheses testing results (5.3).

5.1 Descriptive comparison of RA and NRA groups

This section presents descriptive data associated with the main study participants. The overall purpose is to provide additional data that support the RA and

NRA comparison and contrast that is built up further in the later sections (see 4.1 above). Population descriptions, where data were available, are also presented with each description.

Although population descriptions are provided, factors related to response bias are potentially more strongly associated with RA and NRA sample characteristics than the wider research location population. As explained in 4.2.1 above, main study participants were not randomly selected from the general university academic staff population. RA participants were selected from a stratum of research active staff members. NRA participants were selected from staff of the faculty of modern languages (FML). However, the wider university academic staff population characteristics are also presented in what follows, when available[29], along with the main study sample characteristics, in order to situate the research sample with respect to the wider research site population.

The following tables (5.1 through 5.6) provide main study participant descriptive data additional to the broad description provided in 4.2 above. The variables presented in this section - years working in higher education (age), workload (time), gender, educational level, employment status, and professional orientation - were chosen for inclusion in the main study questionnaire because the academic research productivity literature indicated that they were influential factors in understanding research engagement among academics working in universities (see 1.3 above, and as discussed in each section below).

[29] No single source contained all the population statistics. Sources used are cited in footnotes.

5.1.1 RA and NRA classifications

Table 5.1 below presents the number and percentages of main study questionnaire participants who were classified RA or NRA[30].

Group	N	Percent
Research active	45	67.2
Non-research active	22	32.8

Table 5.1 Research active Non-research active participants

67.2% of the main study participants were classified as RA. This statistic is not representative of the university population. While specific population data regarding research engagement as defined in this study are not available, it can be inferred from statistics reporting university academic staff possessing a *perfil PROMEP* (see 5.2 below) and membership in the National Society of Researchers (SNI) that approximately 25% of the research site population could potentially be classified as RA (data were available from the year 2005) and 15% (as of 2005) could definitely be classified as RA based on membership in the SNI. When comparing the main study sample with the overall population, it should be kept in mind that the differences do not represent a response bias, but rather represent the nature of the study and the sample selection processes as discussed above (5.1, ¶2).

[30] The standards used for defining research active participants were based on their memberships in one or more of the following categories: a member of the university research group (*Padrón de Investigadores),* designated as a professor with a desirable profile (*Perfil PROMEP)* as established by the Mexican Ministry of Public Education (*Secretaría de Educación Pública,* SEP) when evaluating academics for standards of excellence related to research. Research in this sense involves projects registered with the faculty's established research groups (*cuerpos academicos),* research projects accepted by the university's vice-rector of investigation (funded projects), and published refereed research articles in national and international journals, and published books or chapters that report on research done by the author (*¿Qué es el* PROMEP? n.d.)[30].

5.1.2 Employment Statistics

Table 5.2 (below) shows the years teaching, years teaching in higher education, and class hours per week of the main study participants.

	N	Minimum	Maximum	Mean	Std. Deviation
Years teaching	66	4	35	18.08	8.964
Years in higher education	66	1	36	16.48	9.078
Class hours per week	65	4	36	14.55	6.692
Valid N (listwise)	64				

Table 5.2a Combined years teaching, years teaching in higher education, and class hours per week

The second table in this pair presents these variables divided into RA and NRA participants.

Research Active	N	Minimum	Maximum	Mean	Std. Deviation
Years teaching	44	4	35	17.66	9.388
Years in higher education	44	1	36	17.05	9.321
Class hours per week	43	4	30	12.98	5.792
Valid N (listwise)	42				
Non-Research Active	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Years teaching	22	8	30	18.91	7.237
Years in higher education	22	2	29	15.36	8.671
Class hours per week	22	6	36	17.64	7.371
Valid N (listwise)	22				

Table 5.2b Years teaching, years teaching in higher education, class hours per week

RA participants had slightly more years working in higher education (17.05 years) than NRA participants (15.36). RA participants reported fewer classroom hours per week (12.98) than NRA participants (17.54). University population data for this statistic were not available.

5.1.2.1 Observations on the findings (age and time)

Age. This variable has been studied extensively in the academic research productivity literature. Several studies reviewed in Fox's (1983) influential critical review paper indicate that age is negatively correlated with academic research productivity, i.e., research productivity declines as the age of the researcher advances. However, in

general, results indicated in the research productivity literature on age and productivity have been inconclusive (Zainab, 1999). This is primarily due to differences in age measurements used in the studies. The various types of age correlates used in studies are chronological age (e.g. Clemente, 1973; Cole, 1979), years since doctorate award (e.g. Allison & Stewart, 1974; Bayer & Dutton, 1977), and years in professional experience (e.g. Creswell, Patterson & Barnes, 1984 as cited in Zainab, 1999).

In the case of this study, the age variable was indicated by years in professional experience, which makes the assumption that years of teaching generally correlate with chronological age. The decision to base the age variable on years in teaching was made because people are sometimes not comfortable reporting their chronological age on data collection instruments. Thus, age was not included in the TpB questionnaire.

There was no significant difference between years working in higher education (Table 5.2 above) for RA (M=17.05, SD=9.321) and NRA (M=15.36, SD=8.671, eta squared=.007, i.e., the magnitude of difference was very small[31]) as measured with an independent samples t-test. Thus, it can be concluded with a certain level of confidence that, with this sample, age was not associated with academic research productivity (see Appendix EE, Table group EE.1).

This finding is corroborated with findings from Gonzalez-Brambila and Veloso (2007, p. 1050) who analyzed the determinants of academic research productivity in Mexican researchers. They found that age is not associated with "any slowdown in publication activity" in their research sample (N=14,328) of highly productive

[31] Effect size measured by eta squared under Cohen's guidelines of .01 small effect, .06 medium effect, and .14 large effect (Pallant, 2005).

researchers. In fact, they found that researchers "at age 65 are as productive as those at 43."

Workload (time). A variable often cited as negatively associated with academic research productivity is the amount of time a researcher has available to carry out research (e.g., Borg, 2007; Burke & James 2005; Jungnickel, 1997). Likewise, with the current study (see Table 5.2 above) the results of an independent samples t-test comparing classroom hours found a significant difference (p=.007) between RA (M=12.98, SD=5.792) and NRA (M=17.64, SD=7.371, eta squared=.05). It might thus be concluded that time dedicated to teaching (classroom hours) might be one factor that impeded academic research productivity in this sample (see Appendix EE, Table group EE.2).

5.1.3 Gender

Table 5.3 below shows the breakdown of gender of the participants. Overall 56.7% of the participants were males which is consistent with university wide distribution of academic staff.

Gender	N	Percent
Female	29	43.3
Male	38	56.7
Total	67	100.0

Table 5.3a Combined gender

Categorized by group, 62.2% of the RA participants were males. 45.5% of the NRA group were males (Table 5.3b below).

Group	Gender	N	Percent
Research active	Female	17	37.8
	Male	28	62.2
	Total	45	100.0
Non-research active	Female	12	54.5
	Male	10	45.5
	Total	22	100.0

Table 5.3b Gender per group

5.1.3.1 Observations on the findings (gender)

This variable, like the age variable, has shown different levels of association with academic research productivity in the literature. Many studies have indicated a gender disparity between women and men in rates of research publications (Fox, 2005, p. 131). However, a number of studies have indicated that there is no relationship between gender and academic research productivity (e.g., Ferrer & Katerndahl, 2002; Perry, et al., 2000; Sax, et al., 2002; Stack, 2002). Gonzalez-Brambila and Veloso's (2007) study of academic research productivity in Mexican scientists found that there was no significant gender difference in academic research productivity for their sample (N=14,328).

Similarly, main study results reported above (Table 5.3) indicated no association between gender and academic research productivity. A chi-square test for independence was conducted using categorical variables RA/NRA and Male/Female[32]. The proportion of research active males was not significantly different from research active females (χ^2 (1) = 1.078, p=.299, effect size using Cramer's V = .159 (small), p=*ns*) (see Appendix EE, Table group EE.3).

5.1.4 Educational Level

The participants were almost evenly divided between those with Ph.D. and masters' degrees (53% and 47% respectively). However, there were no NRA

[32] Yates' Correction for Continuity was used to compensate for the 2 by 2 table (Pallant, 2005).

participants with a doctoral degree. Population statistics available for the year 2003[33] indicated that 17% of academic staff had doctoral degrees, and 33% had masters.

Educational level	N	Percent
Research active		
Ph.D.	36	80.0
Master's	9	20.0
Total	45	100.0
Non-research active		
Ph.D.	0	0.0
Master's	22	100.0

Table 5.4 Participant's educational levels per group

5.1.4.1 Observations on the findings (educational level)

Not unexpectedly, academic research productivity literature clearly indicates that educational level and academic research productivity are highly positively associated (e.g., Burke & James, 2005; Ferrer & Katerndahl, 2002; Stack, 2002). The same holds true for the current sample. A chi-square test for independence was conducted using categorical variables RA/NRA and educational level (see Table 5.4 above). There was a significant association between the educational level and research activity (χ^2 (1) = 34.889, p=.000, effect size using Cramer's V= .753 (large), p=.000). Thus, it might be safely concluded that education level in this sample was positively related to research engagement, i.e., the higher the educational level, the higher the academic research productivity (see Appendix EE, Table group EE.4).

5.1.5 Employment Status

Descriptive data from the year 2000[34] related to the overall research population indicated that the university undergraduate level had 2126 academic staff members. 1199 (56%) were full-time, 381 (18%) were half-time and 546 (26%) were paid only for class hours taught. There were 717 postgraduate level academic staff members,

[33] http://www.anuies.mx/servicios/p_anuies/publicaciones/confluencia/120/3.html
[34] http://www.anuies.mx/servicios/d_estrategicos/afiliadas/168.html

607 (85%) full-time, 59 (8%) part-time and 51 (7%) were paid only for class hours taught.

Most of the main study participants (77.3%) were tenured and employed full-time in the university. Within the groups, 82.2% of the RA participants were tenured, full-time, and 63.6% of the NRA participants were tenured, full-time.

Employment status	N	Percent
Research active		
Full-time tenured	37	82.2
Full-time non-tenured	7	15.9
Total	44	97.8
Missing	1	2.2
Total	45	100.0
Non-research active		
Full-time tenured	14	63.6
Full-time non-tenured	5	22.7
Part-time tenured	1	4.5
Part-time non-tenured	2	9.1
Total	22	100.0

Table 5.5 Participants' employment status per group

5.1.5.1 Observations on the findings (employment status)

Academic research productivity studies tend to agree that tenured faculty members are more productive than non-tenured (e.g., Ferrer & Katerndahl, 2002; Wood, 1990). Lack of tenure is seen to put pressure on academics to publish or their positions might be in peril. Research is a creative process that does not fare well when the researcher is under some kind of performance duress (Wood, 1990). In the present study, however, there seemed to be no association between full-time tenured and full-time non-tenured and research activity (χ^2 (1) = .379, p=.538, effect size using Cramer's V= .122 (small), p=*ns*) (see Appendix EE, Table group EE.5).

5.1.6 Professional orientation

As presented in section 3.9 above, several studies on academic research productivity have indicated that a faculty member's orientation to research or teaching

is a variable in their engagement or lack of engagement in research activity (e.g., Bailey, 1999; Blackburn, et al., 1991; Ramsden, 1994; Zainab, 1999). To see if this element has any relation to the participants in this study this factor was added to the main study questionnaire (see Appendix U)[35].

Professional orientation	N	Percent
Research active		
Teaching	7	15.6
Research	32	71.1
Both	6	13.3
Total	45	100.0
Non-research active		
Teaching	15	68.2
Research	5	22.7
Both	2	9.1
Total	22	100.0

Table 5.6 Group academic orientation: teaching, research or both

Not surprisingly, RA participants indicated that they are more oriented toward research (71%) than teaching (15.6%). A few (13.3%) indicated that they are equally oriented toward both activities. NRA participants expressed an orientation to teaching (68.2%) over research (22.7%). Nine percent indicated an equal orientation toward both activities.

5.1.6.1 Observations on the findings (research or teaching orientation)

According to the orientations expressed by the participants as presented above, the data do seem to support findings from other studies that indicate that orientation to research or teaching is a variable in academics' engagement or lack of engagement in research activity (e.g., Bailey, 1999; Blackburn, et al., 1991; Perry, et al., 2000; Ramsden, 1994; Zainab, 1999). These studies have shown that respondents who report an interest in research over teaching are significantly more research productive than

[35] Would you describe your professional orientation as: (please indicate which orientation dominates)
ORIENTED TOWARD TEACHING
ORIENTED TOWARD RESEARCH
BOTH

their counterparts who report an interest in teaching over research. In many instances academic research productivity is seen to come at the expense of teaching proficiency, i.e., it is regarded as not possible to attend to both activities with any kind of equal levels of productivity (Perry, et al., 2000).

Results of chi-square analysis indicated a significant association between a research orientation and academic research productivity in this sample (χ^2 (2) = 18.949, p=.000, effect size using Cramer's V= .532 (medium), p=.000) (see Appendix EE, Table group EE.6).

Thus far, factors that were indicated as having an association with academic research productivity in this sample were the variables related to *time* (as measured by classroom hours), *educational level*, and *professional orientation.* Factors that seemed to have no association with academic research productivity were *age, gender* and *employment status.* At this point, a picture is beginning to emerge related to academic research productivity and this sample. With the findings presented above, an elementary associative model can be formed (Fig. 5.1 below).

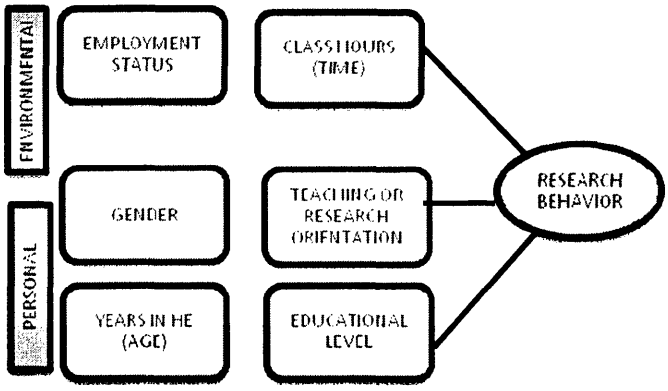

Figure 5.1 Main study variables found to be associated with research behavior (does not imply causality). *Time, a research or teaching orientation*, and *educational level* seemed to be associated with research behavior. *Employment status, gender* and *age* did not appear to be associated with research behavior.

Clearly, the above figure only begins to touch on the issues and factors associated with research engagement. The remainder of the chapter adds to the beginnings of the explanation thus far constructed.

The purpose of the following section is to establish the participants' overall attitudes towards research participation. To accomplish this, two principal sources of data are presented. The first data sources are presented to orient the main study sample within the larger population with regard to affiliation in national merit based research organizations (PROMEP and SNI, explained below) and in the *Padrón de Investigadores* (the university register of researchers), and the voluntary membership in *cuerpos academicos* (faculty level research groups). The second data source contains the results of two questionnaire items related to the participants' beliefs regarding two factors: whether they felt research activity is a professional obligation, and whether academic research productivity should be considered in matters of job promotion. The findings presented in this section also act as a supplement to the results presented in the section that follows (5.3).

5.2 Research indicators

Perfil PROMEP, SNI, and Padrón de Investigadores. As reported in this source[36], in 2005 the university had 1713 full-time professors. Of those, 476 (28%) had the *perfil* PROMEP (i.e., had received national recognition from the *Secretaría de Educación Pública* (Ministry of Education) and *Instituciones de Educación Superior* (public institutions of higher education) based on academic performance and research activity (*¿Qué es el PROMEP?*[37] , n.d.). 252 (15%) were members of the *Sociedad Nacional de Investigadores* (SNI) (National Society of Researchers).

[36] http://www.universia.net.mx/index.php/news_user/layout/set/print/content/view/full/30764
[37] *What is the PROMEP?*

Of the research sample 95.6% of the RA and 18.2% (four participants) of the NRA participants possessed a *perfil PROMEP,* and 55.6% of the RA participants were affiliated with the SNI. No NRA participants were members of the SNI. All of the RA participants and none of the NRA were affiliated with the university's *Padrón de Investigadores* (official register of university researchers). Membership in these three registers is based principally on peer evaluations of academic research productivity.

Cuerpo Academico. Unlike the above variables (*Perfil PROMEP, SNI,* and *Padrón de Investigadores)* membership in a *cuerpo academico* is not research merit-based. In other words, membership is not based on any demonstrated level of research activity or production. Membership is based on an academic staff member's desire to belong to a research group. The staff member must also hold a graduate degree (masters'), and be employed full-time.

However, research groups are subject to external evaluation. They are rated by the university research department as either "in formation", "in consolidation" or "consolidated". A research group with the first rating has no demonstrated level of academic research productivity; a group in the second level has demonstrated academic research productivity but is still missing fulfilling some evaluation criteria, and a research group in the last level (consolidated) meets the evaluation criteria for a fully functioning research group. From the same source cited above[38] in 2005 the university had 153 *cuerpos academicos* (faculty research groups). 1071 (63%) university academic staff members were affiliated with a research group. 13 research groups were consolidated; 22 were in the process of consolidation (in consolidation),

[38] http://www.universia.net.mx/index.php/news_user/layout/set/print/content/view/full/30764

and 118 were in formation. All of the research groups in the FML are "in formation"[39].

With respect to the main study sample predictably, 97.8% of the RA sample indicated that they belonged to a faculty research group. Surprisingly, 81.8% of the NRA participants indicated that they belonged to a faculty research group. While participants were not asked specifically *why* they were affiliated with a faculty research group, it might be assumed that it was because they wanted to engage in research activities.

Two final questionnaire items in this section provided findings that were unexpected on the part of the NRA participants but that add to the overall interpretation of attitudes toward research engagement. Participants were asked in the questionnaire to indicate if they felt that research activity was part of their job as an academic working in this university[40] and asked to indicate the degree to which they thought research activity should be considered as an evaluative factor in job promotion decisions[41] (Ramsden, 1992). Responses to the former item indicated that RA (97.8%) and NRA (95.5%) believed that research activity is a professional obligation, and to the latter both RA (76%) and NRA (73%) believed that research activity should be considered in promotion evaluations.

It seems interesting that for the three factors just presented, RA and NRA participants indicated that research activity should be part of what they do in their professional capacities. RA participants clearly acted (and continue to act

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[39] The status of research groups from other faculties is not relevant for the purposes of this study because other RA determining factors have been used to classify RA participants (see 3.2 above).

[40] Do you believe that engagement in research is part of your job at the university? Yes / No

[41] How much do you think that research activity should be considered as a criterion for promotion?
Research productivity should NOT be a factor | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *Research productivity should be a factor*

presumably) in accordance with this conviction; however, it still remains unclear why NRA seemed to hold this belief but did not act on it.

In order to shed more light on this matter the following section addresses the issue from the TpB perspective. The purpose of the following section is to determine if there were significant differences between the RA and NRA groups in relation the TpB variables: intention to engage in research, identity as a researcher, attitudes, social factors, and control factors as expressed beliefs of the participants (see 2.2 above).

5.3 Hypothesis testing results

Data from the main study TpB questionnaire were analyzed quantitatively using SPSS ver. 13. Tests were used to compare the research active (RA) and non-research active (NRA) groups rather than to compare relationships between variables. A standard multiple regression technique was used in the pilot study to examine relationships between variables. However, pilot study data violated the multiple regression assumption of normal distributions (as discussed in Appendix N sections N.2.1 and N.2.2)[42]. Data from the main study also lacked normal distributions (described in Appendix X) so parametric tests for relationships between variables were not appropriate. Instead only non-parametric tests were used.

Lack of normal distributions does not necessarily imply any fault with the data or the data collection instrument, but rather represents general characteristics of the underlying constructs being measured (Pallant, 2005, p. 58). For example, a scale measuring overall optimism in a non-psychopathological sample would display more negatively skewed data because, on the whole, average people tend be optimistic. However, the lack of a normally distributed dependent variable prevents statistical

[42] See Appendix J (direct) and K (indirect) for PS data histograms and probability plots

procedures to examine relationships between variables such as multiple regression techniques because such techniques assume normal data distributions (see Appendix X for a discussion of main study data distributions, Appendixes L and M for main study data histograms and plots).

Two predictions were expressed regarding the differences in questionnaire scale scores (when assessed on a group level) between RA and NRA participants. The predictions were based on the premises of the TpB model of human volitional behavior (briefly reviewed in 5.3.1 below) and were expressed in the form of two research hypotheses (section 4.3.4 above):

> *H1. Group scores on the direct measures scales of Intention, Identity, Behavioral Beliefs, Normative Beliefs, and Control Beliefs in the TpB questionnaire administered will be significantly higher in RA than NRA participants.*
>
> *H2. Group scores on the indirect measures scales of Attitudes Toward the Behavior, Subjective Norm, and Perceived Behavioral Control in the same questionnaire will be significantly higher in RA than NRA participants.*

The results of the Mann-Whitney test (see 4.3.4 above) supported both these hypotheses except for the variables related to control factors (control beliefs and perceived behavioral control). These results are discussed in the following section.

5.3.1 The theory of planned behavior and the results

As was explained in section 2.2 above, the theory of planned behavior (TpB – Ajzen, 2005) posits that human volitional behavior is essentially the product of three predictive factors: attitudes toward the behavior, social factors influencing engagement in the behavior, and control factors related to the behavior (see Fig. 2.5 above). In the TpB model, these beliefs related to the behavior are weighted with the person's evaluation of the cognized outcomes of the action. All these factors act interactively to exert various levels of influence on an individual's intention to engage

in the behavior. In the TpB model, intention to engage in the behavior is regarded as the direct antecedent to the actual behavior.

As explained in 3.3.1 above, the questionnaire used to assess the TpB factors in this sample consisted of two types of measurements, direct and indirect. Each of the measurements encompassed different assumptions about participants' abilities when reporting their beliefs. Direct scales elicited respondents' beliefs in a more general manner than the indirect scales and assumed that respondents' were able to report their personally held beliefs accurately. Indirect scales were specific to the research context, and therefore the scales were constructed for this specific context. Indirect scales operate under three principal assumptions (see 3.3.1 for a more in-depth explanation):

1. that people can accurately report their beliefs in a probabilistic way and report relative weighting of those beliefs,
2. that attitudes are composed of a rational combination of those weighted probabilities,
3. and that the items are developed with sufficient content validity that they correlate with the direct measurements

(Francis, *et al.*,. 2004b, p. 46-47).

The following two sections present the results from the direct and indirect measurements. All results presented in this section are summarized in Table 5.7 below. Tables and figures of calculations of raw scores are provided in Appendix Z. SPSS data regarding Mann-Whitney U tests are reported in Appendix AA for direct measurements and Appendix BB for indirect measurement.

5.3.2 Direct measurements results and observations

Intention to engage in the behavior. As mentioned in the first paragraph of this section, in the TpB model, *intention* is regarded as the direct antecedent to

engagement in the behavior under study. The ability of expressed intentions to predict behavior has been empirically proven in studies too numerous to report here (Ajzen, 2005). The consensus of the literature on the topic is that expressed intentions are accurate indicators of proximal action. In other words, it is probably accurate to assume that in the case of volitional behavior, people will do what they intend to do, and will not do what they do not intend to do (barring any factors that may intervene between the expression of intention and engagement in the actual behavior).

Intention to engage in research within the next five years on the part of the subjects was measured on a three item unipolar Likert-type scale (α=.943) (all direct measurements scales are described in detail in 3.4 above). The intention scale had a possible score range from 3 (no intention to engage in research) to 21 (high probability of research engagement). RA participants' scores on this scale ranged from 12 to 21 (M=20.55, SD=1.532). NRA participants scores ranged from 8 to 21 (M=19.14, SD=3.427). RA and NRA participants differed significantly in their expressed intentions to engage in research (RA *Mean rank* = 36.17, NRA *Mean rank* = 28.16, U = 366.500, p = .014, r =-.28, medium effect size using Cohen's guidelines).

Although the two groups differed significantly in their expressed intention, both of the mean scores indicated an overall intention to engage in research.

Self-identity variable. A number of studies have indicated that self-identity, as an additional predictor variable in the TpB model, is an independent predictor of intention (e.g., Armitage& Conner, 1999; Fekadu & Kraft, 2001; Hagger, Anderson, Kyriakaki, & Darkings, 2007; Hagger & Chatzisarantis, 2006; Johnson, White, & Norman, 2004; Pierro, Mannetti & Livi, 2003; Shaw & Shiu, 2002; Sparks & Guthrie, 1998; Sparks & Shepherd, 1992). Self-identity is composed of different "relatively

stable" self-images which range from personal representations to representations of the self in social roles and is regarded as having a "pervasive influence on intention and behavior in a number of domains" (Hagger, *et al.,* 2007, p. 357).

Self-identity was measured on a four item unipolar Likert-type scale (α=.854) (all direct measurements scales are described in detail in 3.4 above). The self-identity scale had a possible score range from 4 (no expressed identity as a researcher) to 28 (highly self-identified as a researcher). RA participants' scores on this scale ranged from 15 to 28 (M=26.56, SD=2.630). NRA participants scores ranged from 10 to 28 (M=22.00, SD=5.052). RA and NRA participants differed significantly in their expressed identity as researchers (RA *Mean rank* = 39.88, NRA *Mean rank* = 19.55, U = 177.000, p = .000, r =-.54, large effect size using Cohen's guidelines).

In light of these results, self-identity as a researcher seemed to be a possible factor contributing to an explanation of research engagement in this sample. In other words, the RA participants indicated a higher self-identification with their conception of an academic researcher than NRA participants. However, considering the high mean of the NRA responses to the scale items (M=22.00), it does begin to raise questions related to issues of reporting accuracy in self-report instruments. In other words, it does not seem consistent that a person who does not engage in research activity (in any measurable sense) would identify him or herself as a researcher. The issues of socially desirable responding (Paulhus, 2002) and hypothetical bias (Ajzen, et al., 2004) will be raised further on (5.4.1 and 5.4.2 below) and discussed in the light of the results thus far presented and of those that remain to be presented.

Behavioral beliefs. Behavioral beliefs are salient beliefs accessed and reported by participants regarding research engagement. They indicate attitudes toward engagement in the behavior under study.

Behavioral beliefs were measured on a four item semantic differential scale (α=.939) (all direct measurements scales are described in detail in 3.4 above). The scale had a possible score range from 4 (negative attitudes) to 28 (positive attitudes). RA participants' scores on this scale ranged from 18 to 28 (M=27.00, SD=1.929). NRA participants scores ranged from 8 to 28 (M=23.90, SD=5.594). RA and NRA participants differed significantly in their expressed attitudes toward research (RA *Mean rank* = 35.85, NRA *Mean rank* = 27.02, U = 336.500, p = .024, r =-.23, medium effect size using Cohen's guidelines).

While the two groups differed in the degree of their expressed attitudes toward engaging in research, both groups overall expressed positive attitudes toward this behavior.

Normative beliefs. Normative beliefs are those beliefs held by an individual regarding social factors and the behavior in question (see 2.2.1.2 above). These factors include opinions regarding the beliefs of important persons or groups in the respondent's social sphere. A person is more likely to engage in a certain behavior if she or he perceives social approval or support for that behavior, and more likely not to engage in the behavior if she or he perceives from influential others that the action is of very little or no importance, or negative perceptions or disapproval.

Normative beliefs were measured on a four item unipolar Likert-type scale (α=.747) (all direct measurements scales are described in detail in 3.4 above). This scale had a possible score range from 4 (no expressed social pressure to engage in research) to 28 (beliefs in social factors related to research engagement). RA participants' scores on this scale ranged from 12 to 28 (M=24.19, SD=4.188). NRA participants scores ranged from 10 to 28 (M=22.32, SD=4.476). RA and NRA participants differed significantly in their expressed normative beliefs (RA *Mean rank*

= 36.12, NRA *Mean rank* =26.91, $U = 592.000$, $p = .030$, $r = -.24$, medium effect size using Cohen's guidelines).

As with the other results presented in this section, RA mean scale scores were greater than NRA mean scores. These results are consistent with the TpB, which in this case, would predict that people who engage in research would score higher than those who do not. While there has been a statistically significant difference in the scores between RA and NRA up to this point, both sets of mean scores indicate overall positive beliefs regarding research engagement.

Control beliefs. This variable refers to the accessible beliefs respondents hold related to the level of control they perceive over their research engagement. In other words, how much of this action is within their control or out of their control. This variable includes the constructs of self-efficacy and locus of control (see 3.4.4 above).

Control beliefs were measured on a four item[43] unipolar Likert-type scale (α=.557) (all direct measurements scales are described in detail in 3.4 above). This scale had a possible score range from 4 (impeding control factors) to 28 (no impeding control factors). RA participants' scores on this scale ranged from 11 to 28 (M=21.12, SD=4.871). NRA participants scores ranged from 14 to 28 (M=20.45, SD=3.826). There was no significant difference between RA and NRA scores for this scale (RA *Mean rank* = 34.16, NRA *Mean rank* = 30.73, $U = 423.000$, $p = ns$, $r = -.08$, very small effect size using Cohen's guidelines).

The lack of significant differences between these two groups might be attributable to the lack of research experience on the part of the NRA group. It would

[43] One scale item was removed to improve scale consistency using SPSS feature "scale if item deleted". This program feature provides an alpha level for the entire scale related to each item in the scale. Removing scale item three from the analysis improved the scale reliability (α) from .543 to .557.

be expected that NRA participants would identify and anticipate more proximal impeding control factors affecting research engagement than RA participants (indicated by a wider gap in scale scores). However, it might be difficult for NRA participants to conceptualize potential control barriers to carrying out research when there is little or no personal experience on which to base those beliefs. This assumption is supported by Sheeran and Orbell's (1996, p. 283) findings that respondents who have more knowledge of the behavior under investigation will have more accurate cognitions regarding factors associated with the behavior than those with less experience with the behavior.

Summary of direct measures. This section provided the findings associated with the direct measurements of beliefs associated with the TpB model, as summarized in Fig. 5.2 below. Scores were reported as means and mean ranks from the Mann –Whitney U tests used to establish significant differences between RA and NRA groups. Four of the five variables displayed statistically significant differences between the RA and NRA groups (*intention, self-identity, behavioral beliefs*, and *normative beliefs*). While RA mean scores were higher for the variable *control beliefs*, the difference was not significant. Of the five variables, differences between RA and NRA groups were most notable in the variable *self-identity*. The results presented in this section are consistent with the TpB, which predicts that persons more likely to engage in the behavior under study would score higher than those less likely to engage in the behavior.

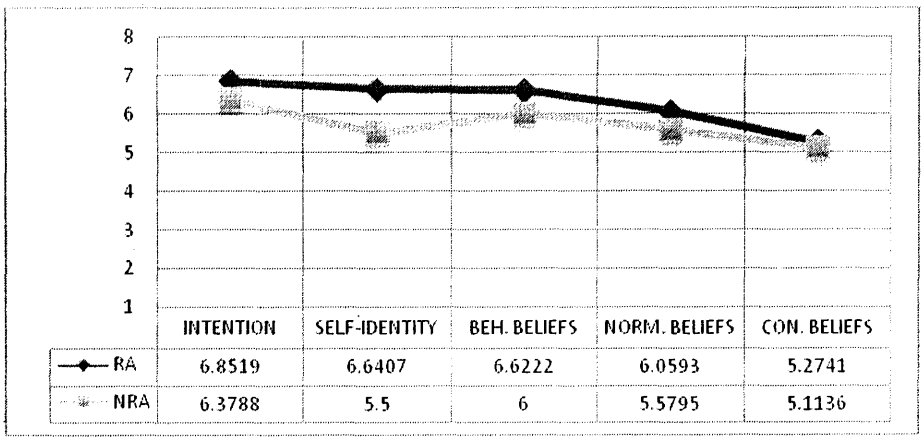


Figure 5.2 Direct measurements scale item means (possible score range 1 to 7)
Scores were significantly different between RA and NRA in all scales except control beliefs. The greatest difference between RA and NRA appeared in the self-identity scale. Overall beliefs expressed by both groups on all scales were high indicating positive beliefs and attitudes toward research engagement.

The following section presents the results of the indirect measures of the variables attitude toward the behavior, subjective norm, and perceived behavioral control.

5.3.3 Indirect measurements results and observations

As explained in detail in section 3.3.1 above and as also briefly reviewed in 5.3.1 above, indirect measurement scales consist of two-part composite items. The first part involves an assessment of the level of presence of the belief, measured on a seven-point unipolar or bipolar scale (see Appendix CC, section CC.2 for a discussion of the rationale behind scale choice). The second part measures the perceived weight (importance) of the first composite measured on a seven-point unipolar or bipolar scale (the opposite scale from that used for the first composite part, and as explained in detail in Appendix CC, section CC.2).

The constructs underlying the three variables below are the same as the three last variables reported above (i.e., behavioral beliefs = attitudes toward the behavior, normative beliefs = subjective norm, and control beliefs = perceived behavioral

control). The difference in variable names differentiates the variables based on questionnaire item construction and measurement (see 3.3.1 above). Mean scores and statistical differences (as measured by the Mann-Whitney U test) are reported below for each of the three indirect measures variables.

Attitude toward the behavior. Attitudes toward the behavior were measured on a 12 item two-part composite scale. Six first part (of the composite score) items were measured on a seven-point unipolar Likert-type scale [r=.402, n=65, p<.001] (Pearson)[44], and six second part items were measured on a seven-point bipolar Likert-type scale (all indirect measurements scales are described in detail in 3.5 above). The composite scale had a possible score range of -126 (negative attitudes toward research) to +126 (positive attitudes toward research). RA participants' scores on this scale ranged from 42 to 126 (M=101.21, SD=22.236). NRA participants scores ranged from 30 to 126 (M=84.27, SD=29.504). RA and NRA scores differed significantly on this scale (RA *Mean rank* = 36.92, NRA *Mean rank* = 25.34, U = 304.500, p = .009, r =-.29, medium effect size using Cohen's guidelines).

Subjective norm. Subjective norm was measured on an eight item two-part composite scale. Four first part items were measured on a seven-point bipolar Likert-type scale [r=.900, n=64, p<.0005] (Spearman's rho) (all indirect measurements scales are described in detail in 3.5 above), and four second part items were measured on a seven-point unipolar Likert-type scale. The composite scale had a possible score range of -84 (no reported social pressure) to +84 (reported social pressure to engage in research). RA participants' scores on this scale ranged from -8 to 84 (M=46.33, SD=24.980). NRA participants scores ranged from -27 to 84 (M=32.36, SD=27.310).

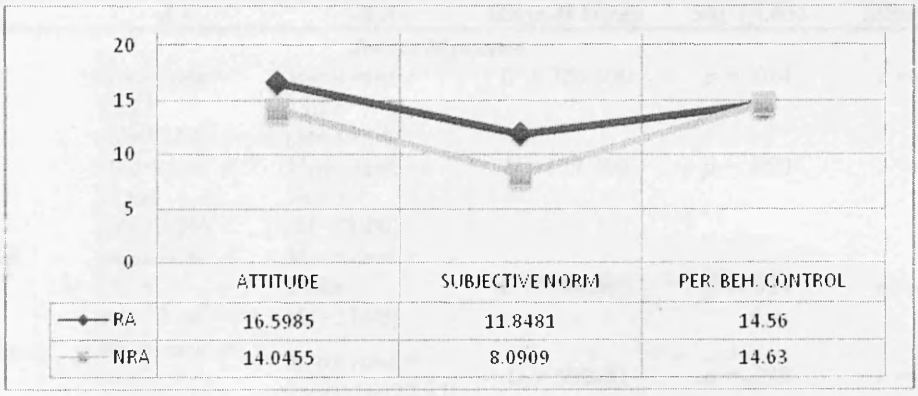
[44] Scale reliability for the indirect measures was measured through bivariate correlation with the corresponding direct measures scale as recommended in Francis, et al. (2004a, p.30) and as used in TpB studies (e.g., Berg, et al., 2000) (see 4.3.1 above).

RA and NRA scores differed significantly on this scale (RA *Mean rank* = 35.67, NRA *Mean rank* =26.45, $U = 329.000$, $p = .030$, $r = -.24$, medium effect size using Cohen's guidelines).

Perceived behavioral control. Perceived behavioral control was measured on a 10 item two-part composite scale. Five first part items were measured on a seven-point unipolar Likert-type scale [$r=.384$, $n=67$, $p<.001$] (Spearman's rho) (all indirect measurements scales are described in detail in 3.5 above) and five second part items were measured on a seven-point bipolar Likert-type scale. This scale had a possible score range of -105 (reported impeding control factors) to +105 (no reported impeding control factors). RA participants' scores on this scale ranged from 0 to 105 ($M=72.8$, $SD=26.49$). NRA participants scores ranged from 9 to 105 ($M=73.1364$, $SD=25.45$). RA and NRA scores indicated no significant difference on this scale (RA *Mean rank* = 33.97, NRA *Mean rank* =34.07, $U = 493.500$, $p = ns$, $r = -.08$, very small effect size using Cohen's guidelines).

Summary indirect measures. This section provided the findings associated with the indirect measurements of beliefs associated with the TpB model. Scores were reported as means and mean ranks from the Mann–Whitney U tests used to establish significant differences between RA and NRA groups, as shown in Fig. 5.3 below. Two of the three variables displayed statistically significant differences between the RA and NRA groups (attitudes toward the behavior and subjective norm). Of the three variables, differences between RA and NRA groups were most notable in the variable subjective norm. RA participants had a low score of -3, while NRA participants had a low score of -27. This finding taken together with the differences in

scale mean scores (RA *M*=46.33 / NRA *M*=32.36) may indicate that NRA participants perceived less social pressure to engage in research than RA participants.



	ATTITUDE	SUBJECTIVE NORM	PER. BEH. CONTROL
RA	16.5985	11.8481	14.56
NRA	14.0455	8.0909	14.63

Figure 5.3 Indirect measurements scale item means (possible score range -21 to +21) RA scores were higher in the attitudes and subjective norm scales, and essentially equal for perceived behavioral control. The greatest difference in scores between RA and NRA subjects occurred in the subjective norm scale.

Overall the results presented in this section are consistent with the TpB framework. The theory predicts that persons more likely to engage in the behavior under study would score higher than those less likely to engage in the behavior. This appears to be true with this data with the exception of perceived behavioral control. Mean scores for this variable indicated that both RA and NRA subjects perceived essentially very few impediments to their engagement in research. This finding was consistent with the result reported for the counterpart variable, control beliefs, in the direct measurements (see section 5.3.2 above). The same explanation can be proposed for this as in the case of the direct measurements, i.e., that it might be difficult for NRA participants to conceptualize potential control barriers to carrying out research when there is little or no personal experience-based evidence on which to formulate those beliefs (Sheeran & Orbell, 1996).

The results presented in this part of the chapter as a whole are summarized in the following table:

Scale	RA	NRA	Mann-Whitney	Sig. *(<.05)*	Effect size
		Direct Measures			
Intention	*Mean rank* = 36.17 (*M*=20.55)	*Mean rank*= 28.16 (*M*=19.14)	*U* = 366.500	*p* = .014	*r* =-.28
Identity	*Mean rank* = 39.88 (*M*=26.56)	*Mean rank* = 19.55 (*M*=22.00)	*U* =177.000	*p* = .000	*r* =-.54
Behavioral beliefs	*Mean rank* = 35.85 (*M*=27.00)	*Mean rank* = 27.02 (*M*=23.90)	*U* = 336.500	*p* = .024	*r* = -.23
Normative beliefs	*Mean rank* = 36.12 (*M*=24.19)	*Mean rank* = 26.91(*M*=22.32)	*U* = 592.00	*p* = .030	*r* = -.24
Control beliefs	*Mean rank* = 34.16 (*M*=21.12)	*Mean rank* = 30.73 (*M*=20.45)	*U* = 423.000	*ns*	*r* = -.08
		Indirect Measures			
Attitude toward the behavior	*Mean rank* = 36.92 (*M*=101.21)	*Mean rank* = 25.34 (*M*=84.27)	*U* = 304.500	*p* = .009	*r* = -.29
Subjective norm	*Mean rank* = 35.67 (*M*=46.33)	*Mean rank* = 26.45 (*M*=32.36)	*U* = 329.000	*p* = .030	*r* = -.24
Perceived behavioral control	*Mean rank* = 33.97 (*M*=72.8)	*Mean rank* = 34.07 (*M*=73.14)	*U* =493.500	*ns*	*r* = -.08

Table 5.7 Results of comparison of groups (Mann-Whitney test)
Effect size calculation (see 4.3.4 above) small effect = 0.0-.20, medium effect=.20 -.50, large effect=.50+

(see Appendix AA direct measures, Appendix BB indirect measures)

5.4 Chapter summary and observations of findings

The purpose of this chapter was to present and discuss the results of the first phase of the main study (see Fig. 4.1 above). Data reported in this section were of a quantitative nature. Statistical tests used were the independent sample t-test, chi-square test for independence, and the Mann-Whitney U test. Cronbach's Alpha,

Pearson correlation and Spearman's rank order correlation were used to establish scale reliability (see 4.3.1 above).

Demographic results were presented and discussed in 5.1 above. It was observed that for this sample the environmental variable *time* (as measured by classroom hours per week) and the personal variables of *educational level* and *orientation toward research* were associated with research engagement and productivity. Personal variables of *gender, age* (as measured by years working in higher education), and the environmental variable *employment status* did not seem to be associated with research engagement and productivity in this sample.

Section 5.2 presented and discussed questionnaire results related to research activity indicators. Predictably, RA respondents were affiliated with national and institutional merit based research organizations. Surprisingly, a high percentage (81.8%) of NRA indicated that they were members of faculty-level research groups. RA and NRA groups both strongly agreed that research activity was a part of their professional obligation and that academic research productivity factors should be taken into consideration in promotion decisions.

Section 5.3 presented results that led to confirmation of two hypotheses expressed about the RA and NRA groups (see section 5.3 above)[45]. The predictions were supported by the results with the exception of the control variable. The RA group scored higher on the *control beliefs* variable, but the difference was not statistically significant. The RA and the NRA groups' scores on the *perceived behavioral control* variable were essentially equal. The confirmation of the

[45] *H1. Group scores on the direct measures scales of Intention, Identity, Behavioral Beliefs, Normative Beliefs, and Control Beliefs in the TpB questionnaire administered will be significantly higher in RA than NRA participants.*
H2. Group scores on the indirect measures scales of Attitudes Toward the Behavior, Subjective Norm, and Perceived Behavioral Control in the same questionnaire will be significantly higher in RA than NRA participants.

hypotheses supported the principal thrust of the TpB, i.e., respondents who are more likely to engage in the behavior will score higher than those less likely to engage in the behavior under study. This finding indicates that the TpB is a viable framework for exploring factors affecting research engagement in this setting.

Thus, from the results described in 5.3 above it might be reasonably extrapolated in very broad terms that research engagement in this sample is more associated with *self-identity* as a researcher and perceptions of *social approval factors*. These, together with the other factors identified above (see Fig. 5.1) as having an association with research engagement, i.e., *time, educational level,* and *professional orientation,* can be combined to form the following associative model of research engagement for the research sample.

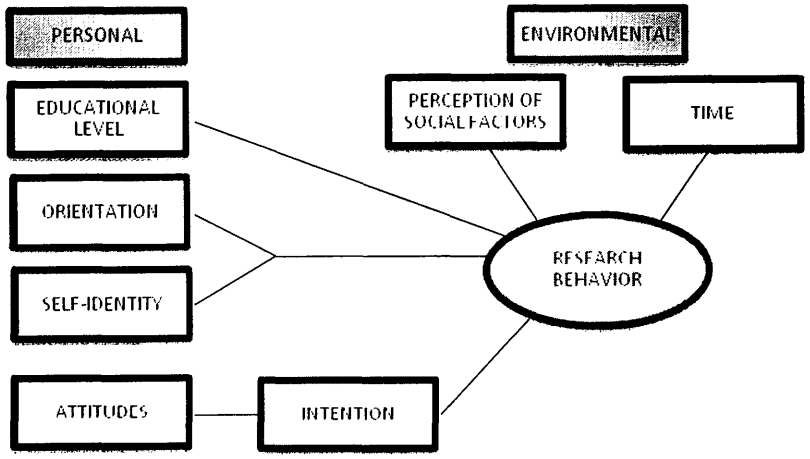


Figure 5.4 Associations between personal and environmental factors and research behavior (does not imply causality)

Personal factors are listed by level of the magnitude of difference between RA and NRA groups. **Educational level** displayed the largest difference between the groups. **Orientation to research or teaching** and **self-identity** follow and are shown as joined because an association between the two constructs is assumed (presumably an orientation to research and self-identity as a researcher would both be present in a cognized representation of the self). TpB variables of **attitudes toward the behavior** and **intentions** to engage in the behavior are represented as linked concepts. Attitudes influence intentions to engage in the behavior. **Environmental factors** seen as having a possible association with research behavior are the TpB **social factors** and **time** as measured by classroom hours.

While the results support the TpB model, some of the findings associated with the NRA group seem somewhat anomalous. Membership in a faculty research group (*cuerpos academicos),* the view that research is a professional obligation, support for academic research productivity as a factor in promotion decisions, intention to engage in research, and self-identity as a researcher are all variables that seem to display an NRA value closer to RA values than expected. In other words, it seems somewhat irregular that a group with no measurable levels of academic research productivity would overwhelmingly be members of faculty level research groups (which also have no measurable level of academic research productivity). It seems somewhat inconsistent that a person who does not engage in research would admit that that activity is a professional obligation. In a sense the person is confessing that they are not fulfilling part of their professional duties. Along the same lines, it also seems counter-intuitive that a person who does not engage in research would feel that research engagement should be part of promotion decisions. Perhaps the most inconsistent finding of all is that related to self-identity as a researcher. NRA participants as a group indicated a surprising level of self-identification as researchers.

In a similar manner, it could also be claimed that all of the TpB variables displayed NRA values which were to some extent higher than anticipated.

There are two factors found in the literature on self-report instruments and on the TpB related to the mismatch between the expected and the actual results in this part of the study. These are, respectively, socially desirable responding (SDR) (Paulhus, 2002) and hypothetical bias (HB) (Ajzen et al., 2004). Empirical investigation of the possible effects of these constructs on the results reported in this chapter was beyond the scope of the present study and not deemed essential. The

overall results were within expected bounds and supported the TpB model. Nevertheless, in what follows a brief discussion of SDR and HB is provided as a possible explanation for the slightly anomalous results highlighted above.

5.4.1 Socially desirable responding

SDR is defined by Paulhus (2002, p. 50) as a type of self-report response bias that represents a "tendency to give overly positive self-descriptions." Assessment psychologists have for the most part agreed that SDR is a "meaningful construct" (ibid). SDR could cause participants to misrepresent their beliefs in response to perceived social pressure to engage in the behavior in question.

In the case of this study, there is a possibility that, because of the socially sensitive nature of the topic (academic research productivity), respondents might have felt under pressure to respond in ways that would present themselves in a positive manner. As indicated by the number of NRA respondents reporting membership in a research group (5.2, ¶3 above), the agreement with the notion of research as a professional obligation, and academic research productivity as an evaluation factor in promotion decisions (5.2, ¶4 above), there seems to be an undercurrent of social responsibility related to the topic of academic research productivity that many faculty members in this setting may feel.

The possible effects of SDR could be identified by using a method similar to Armitage and Conner's (1999) TpB study of food choice in which items from a shortened (20 item) version of the *Marlowe-Crowne Social Desirability Scale* were included in the TpB questionnaire. Armitage and Conner (1999) used a regression technique to compare prediction of intention and behavior between high socially desirable responders, i.e., those more likely to present themselves in a more favorable light and low socially desirable responders, i.e., those less likely. They found that

with high socially desirable responders, attitude and self-identity were "significant predictors of intention," while with low socially desirable responders "attitude alone was the only significant predictor of intention" (Armitage & Conner, 1999, p. 267).

The results of the present study, in relation to attitudes and self-identity as a researcher, seem to be similar to those indicated in Armitage and Conner (1999). In other words, while relationships between the variables were not tested, overall score values were; NRA mean scores did not differ from RA participants' scores to the extent that might be expected if SDR, to some degree, was not acting as a moderating factor.

However, despite their findings, Armitage and Conner claim that SDR does not have a moderating effect on the TpB components. However, it is possible that the moderating effect of SDR is domain-dependent (Mick, 1996). In other words in some domains, such as health, e.g., assessing eating habits; reporting substance abuse; condom use; or areas of jurisprudence, e.g., self-reporting of various behaviors such as parking infraction payment, obeying other minor laws, e.g. revealing total purchases when passing through customs inspections, SDR might have an effect in some and not in others, depending on the social value placed on engaging or not in a particular behavior. Because of the possible social acceptance elements related to academic research productivity (i.e., almost everyone working in a research degree-granting institution of higher education realizes that academic research productivity and teaching are dual mandates of academic staff), I see SDR as a possible moderating effect in this domain (discussed further in 7.2.2 below).

5.4.2 Hypothetical bias

"It is a common observation that people often fail to act in accordance with their stated intentions" (Ajzen, et al., 2004, p. 1108). Although NRA participants in this

study stated strong intentions to engage in research within the next five years, there is little evidence on which to base that prediction. This, along with the other discrepancies in NRA responses thus far noted, could raise questions about the trustworthiness of self-report data in this study. As explained above in 5.4, ¶6, these deviations from the expected are not regarded as sufficient to warrant investigation, but they are still inconsistencies that might beg a little explanation.

In an attempt to account for discrepancies of this kind, Ajzen, et al. (2004) conducted an experiment using the TpB and 'contingent valuation', a marketing strategy used to test the monetary value of goods which are not yet available on the market - in other words, a strategy used to determine the price people would be willing to pay for a product. In this study, university students (N=160) were asked if they would be willing to contribute $8 (US dollars) to a scholarship fund. The researchers confirmed their hypothesis that people would indicate more willingness to contribute to the fund if the contribution was posed as a hypothetical rather than a real condition. In other words, when the behavior under study is more hypothetical than real and especially if it carries a certain level of social value, responses to questionnaire items could be inflated to a certain degree.

In the case of this study, RA respondents, as established researchers, would tend to regard the questionnaire items as real rather than hypothetical. On the other hand, NRA participants would tend to regard at least some of the questionnaire items as hypothetical since research engagement is not currently part of their professional lives. The findings reported above indicated that NRA respondents believed research should be part of their professional lives; therefore, some responses associated with that belief could be overestimated based on the perception that research engagement referred to in the questionnaire is more hypothetical in the sense of "in a perfect

world" or "I would if I had more time" or "I'm really going to start researching (someday)". Thus, hypothetical bias is proposed along with SDR as possible moderating variables in data associated with NRA participants.

5.5 Chapter conclusion

The statistical results presented and discussed in the current chapter have begun to construct an understanding of the factors associated with academic research productivity in this research sample. The data presented and analyzed in the following chapter refine and shed further light on the data presented in this chapter, by exploring participants' views from a more in-depth, qualitative perspective.

Chapter 6

Main Study Qualitative Data

6.0 Chapter introduction and overview

As described in 4.1 above, the design of the main study was a mixed-methods sequential one (Creswell & Plano Clark, 2007). It consisted of two distinct phases, a quantitative one followed by a qualitative one. In the first phase, the quantitative data which has been presented and analyzed in the previous chapter were collected. In this chapter, the main features of the qualitative data which were collected in order to help build on the quantitative results obtained in the first phase, are presented and analyzed from the perspective of SCT.

In order to generate data for this phase of the study, life story interviews were conducted with 10 research active (RA) participants and five non-research active participants (NRA) (see 4.2.2 above for specific interview sample selection process and description). The data were analyzed using Atlas.ti, ver. 5.2. This involved a series of seven stages (see 4.4.2 above for a full explanation) as follows:

1. Analysis software setup
2. Initial coding

3. Code annotation via "memos"
4. Code reduction and refinement
5. Analysis documents arranged into conceptual families
6. Construction of conceptual networks
7. Typology of cases formed for analyses

Details of "typology of cases" just referred to are provided in section 6.1 below.

It should be emphasized at this point that the aim of this study was not, of course, to evaluate the research sample. No value judgment was implied when referring to participants as RA or NRA. The overall aim of the study was to attempt to understand the factors appearing to affect research engagement, or lack thereof, among the two groups of participants, by comparing and contrasting their characteristics by means of the two main theoretical frameworks that were deployed.

With this in mind, section 6.1 below begins with a general comparison of RA and NRA interview participants' data, in terms of selected SCT variables. The SCT variables are arranged in the three-stage career developmental framework of social cognitive career theory (SCCT, explained in what follows; also see 2.3.2, ¶2-4 above). Then, in section 6.2, a more detailed examination of the SCT variables and their observed occurrences as interpreted from the life story interviews is undertaken, leading to possible answers to RQs 1 and 2[46].

6.1 Life story interviews – broad analysis

As explained in 2.3.2 above, social cognitive career theory (SCCT) is based on SCT, but offers an additional heuristic for specifically understanding career path development. SCCT posits that environmental and personal variables in the SCT framework affect academic and career choice and development through three primary phases or paths of influence: i) formation of academic and career interests (childhood,

[46] *RQ1. In what ways do SCT environmental class determinants seem to have played a part in participants' academic and career development?*
RQ2. In what ways do SCT personal class determinants seem to have played a part in participants' academic and career development?

ages approximately 0-11), ii) selection and pursuit of career-relevant choices (adolescence, ages approximately 12-17), and iii) performance and persistence in academic and career related endeavors (adulthood, ages approximately 18+) (Lent, et al., 2001).

Using the SCCT developmental framework to build a general picture of the career development of the participants, a typology of participant academic career path development was constructed (see Appendix HH). The typology consists of 21 rubrics, i.e., categories, based on SCT variables (see Table 6.2 below) divided into the three stages of career development proposed by Lent, et al., (2001).

The 15 participants (cases) were categorized into the typology based on the interview analysis procedures as follows (also see 6.0, ¶2 above, and detailed explanation in 4.4.2 above). Using the SCT as the interpretative framework, the life story interviews were coded in a deductive manner using SCT determinants as 'free codes' (unattached to interview data) created before interview analysis. This was followed by subsequent code reduction and refinement (i.e., **stage** four in ¶ 3 above; also see 4.4.2, ¶5 above for a full explanation of the data analysis procedure). Table 6.1 below shows the final codes used.

ENVIRONMENTAL CLASS DETERMINANTS	PERSONAL CLASS DETERMINANTS	DEMOGRAPHIC CHARACTERISTICS
Career and Academic formation	Coping efficacy	Family size
Barrier experience	Goal attainment (motivation)	Father employment
Chance encounters	Goal cognizing	Mother employment
Family factors	Interest	Family relocation (moves)
Role models factors	Judgments of physiological states	Partners
Symbolic models		Parents educational level
		Public school

Table 6.1 Final qualitative data analysis codes based on SCT determinant class factors
Codes were sorted into three code families, environmental (6 codes), personal (5 codes), and demographic characteristics (7 codes). Demographic characteristics were only used to establish the socio-economic status of the participants (see 6.2.1.4 below).

The codes were then arranged in a typology of cases (based on Poirer, Clapier-Valladone, & Ratbaut, as cited in Wengraf, 2001, p. 356), in order to construct a means to identify and examine patterns in the participant data. The rubrics (lettered categories) are shown in Table 6.2 below.

CHILDHOOD		ADOLESCENCE		ADULTHOOD	
RUBRIC	DESCRIPTION	RUBRIC	DESCRIPTION	RUBRIC	DESCRIPTION
A	SOCIO-ECONOMIC FAMILY STATUS	E	CAREER INTEREST (current career)	L	CURRENT CAREER INTEREST (adult onset)
B	EARLY CAREER INTEREST	EE	ACADEMIC INTEREST	LL	ACADEMIC INTEREST (adult onset)
BB	ACADEMIC INTEREST	F	ROLE MODELS	M	ROLE MODELS
C	EARLY ROLE MODELS	G	PHYSIOLOGICAL JUDGMENTS (EFFICACY)	N	PHYSIOLOGICAL JUDGMENTS (EFFICACY)
D	PHYSIOLOGICAL JUDGMENTS (EFFICACY)	H	CAREER GOAL COGNIZING	O	CAREER GOAL COGNIZING
		I	EFFICACY BUILDING EXPERIENCES	P	EFFICACY BUILDING EXPERIENCES
		J	CHANCE	Q	CHANCE
		K	PERCEIVED BARRIERS AND COPING EFFICACY	R	PERCEIVED BARRIERS AND COPING EFFICACY

Table 6.2 Typology of cases – classification rubrics and descriptions
The rubrics were divided into the three phases of career path development according to SCCT, Childhood, Adolescence, and Adulthood. Each of the SCT variables used in the study is represented by letters. Letters A-D were used to classify participants characteristics in the childhood phase, E- K for the adolescent phase, and L-R for the adult phase.

Table 6.3 below shows the sub-division of each of the broader rubrics (SCT categories) represented in Table 6.2 above. Each of the rubrics was sub-divided into specific codes (e.g., A1, A2, A3, A4, and so on). Individual participant network views were created (i.e., **stage six** in ¶ 3 above; also see 4.4.2, ¶7 above for a full explanation of the data analysis procedure), and used to classify each of the participants into the appropriate code within each of the rubrics[47]. This classification process was accomplished by creating a new network view, the typology network view, in the data analysis software. Appendix HH is a table version of the typology

[47] Network views of the coded interviews are too large to be included in the text of the thesis; however, one can be viewed in Appendix KK.

network view created for analysis purposes and to illustrate the typology of cases without data. Appendix II shows the typology in the network view (created with the data analysis software) with participant pseudonyms. Table 6.3 below provides a view of the "Childhood" section of the typology excerpted from the full table view in Appendix HH.

CHILDHOOD (0-11) Formation of academic and career interests				
RUBRIC A	RUBRIC B	RUBRIC BB	RUBRIC C	RUBRIC D
SOCIO ECONOMIC FAMILY STATUS	EARY CAREER INTERESTS	ACADEMIC INTERESTS	EARLY CAREER ROLE MODELS	PHYSIOLOGICAL JUDGMENTS (efficacy beliefs)
A1 Extreme poverty	B1 Specific career interest	BB1 General academic interest	C1 Family	D1 Cognitive
A2 Poor - unskilled			C2 Teachers	D2 Somatic
A3 Poor – semi skilled				
A4 Lower middle class – skilled				
A5 Middle class – professional	B5 No career interest indicated	BB5 No academic interest indicated	C5 None indicated	D5 None indicated
A6 Upper middle class - professional				

Table 6.3 Childhood section of the typology (see Appendix HH for the full typology)
Based on the coding and analysis procedures carried out using the qualitative analysis software, cases were classified into rubrics to build a general picture of the career path development of participants. For example, in the childhood section pictured in this table an individual could be classified:
A2, B1, BB1, C2, D5
if the participant came from a socio-economic background classified as "poor-unskilled" (**A2**), indicated an early career interest (**B1**), an early interest in academics (**BB1**), a teacher(s) as a role model (**C2**), and did not indicate any physiological judgments related to perceived personal cognitive or somatic features (**D5**).
RA and NRA participants were classified together into the same typology (see, for example, Table 6.4 below).

From the typology the following general view of career path development was constructed by comparing frequencies of code combination patterns (Fig.6.1 below). To construct the following figure, participants' codes from the typology were entered into a spreadsheet program (Microsoft Office Excel 2007, see Appendix JJ). For example, an RA participant was classified into the following codes from the typology of cases:

A1-B5-BB5-C2-D5-E1-EE2-F3-G2-H1-I1-J1-K2-L1-LL1-M1-N1-O1-P1-Q1-R1

Code frequency means were then established for RA and NRA participants and compared as shown in Fig. 6.1 below. For the purposes of constructing Fig. 6.1 the rubric 'role models' was analyzed as '1' for the identification of a role model and '5' for no career role model indicated. For analysis purposes reported in the following sections a distinction is made between *family role models* and *teacher role models.* Rubrics A, J, K, Q, and R (see Table 6.2 above) were omitted from the analysis displayed in Fig. 6.1 because they are not amenable to numerical comparison but are included in the following discussion sections (see 4.4.3 above for measures taken to ensure interview data validity).

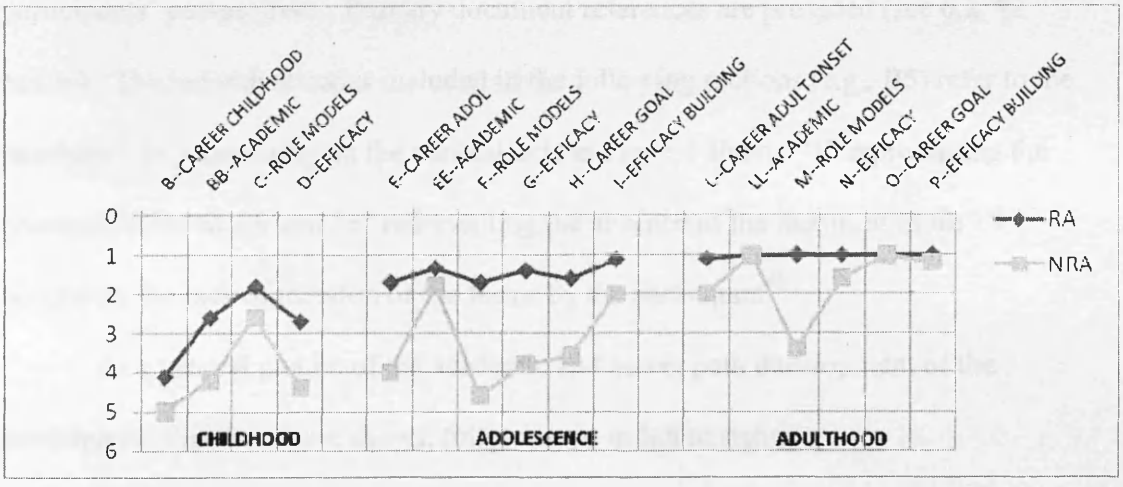


Figure 6.1 General career path development RA and NRA

This figure presents a general view of career paths of interview participants (RA=black line, NRA=grey line) presented in three stages (Lent, et al., 2001): childhood (rubrics B, BB, C, D); adolescence (rubrics E, EE, F, G, H, I); and adulthood (rubrics L, LL, M, N, O, P). The rubrics are represented in the horizontal axis. The observations of the factors are represented on the vertical axis (1= the presence of the factor, 5= representing the absence of the factor as indicated by the participants). Only the SCT variables that lend themselves to numerical comparison are presented in this figure. The lines do not indicate any sort of progression over time within the specific stages; they only show a comparison between RA and NRA in the specific rubrics (SCT categories).

The figure indicates that RA participants' career paths, with respect to the variables indicated in the figure, stabilized sooner in life than NRA.

The SCT factors indicated in all the discussions below are explained in detail in section 2.3 (above) of the literature review. Some of the factors are briefly reviewed below in appropriate sections. However, for complete details the reader is asked to kindly refer back to section 2.3 (above) to resolve any questions regarding theoretical aspects of the determinants.

The remainder of this section presents only an overview of the participants related to the findings visualized in Fig. 6.1 above, and presented in the same order: Childhood, Adolescence, and Adulthood. No references to the interview primary documents are included in this overview in the interest of keeping the presentation as simple as possible. In the following section, **6.2 Life story interviews –detailed analysis**, the observations presented in this section (6.1) are detailed from individual participants' perspectives. Primary document references are provided (see 6.2, ¶2 below). The individual codes included in the following sections (e.g., **B5**) refer to the numbers 1 to 5 appearing on the vertical axis in Fig. 6.1 above: "1" representing the presence of the factor and "5" representing the absence of the factor, or more accurately the lack of mention of the factor by the participant[48].

As a general picture of the academic and career path development of the participants, Fig. 6.1 above shows, following from left to right:

The Childhood Phase (B – D) (refer to Fig. 6.1 above)

Specific career interest (B). Most participants did not indicate any early career interest specifically related to their current career **(B5)**.

Academic interest (BB). Six of the 10 RA and one of the five NRA participants indicated an early interest in academics, in other words, an interest in schoolwork, learning, and other factors associated with formal education **(BB1)**.

[48] As mentioned in 4.4.1 above, the SCT interpretative framework, codes and interview procedures were developed after the interviews had been conducted to prevent any inadvertent "leading" of participant responses by the interviewer.

The remainder of the participants (4 RA and 4 NRA) did not specifically express an interest in academics or a lack of interest **(BB5).**

(discussed further in 6.2.2.1 below).

Role Models (C). As discussed in more detail below (6.2.1.1) in the childhood stage, eight of the 15 participants (13 RA and 2 NRA) indicated that they were influenced by general academic role models from their families. These were either parents, siblings, or distant family: cousins, grandparents and so on **(C1).**

Two participants (1 RA and 1 NRA) indicated teachers as influential role models **(C2),** and five participants (3 RA and 2 NRA) did not identify any role models for the childhood stage **(C5).**

Physiological Judgments (Efficacy) (D). Five participants, all RA, indicated positive efficacy beliefs in their academic abilities **(D1).**

Two participants (1 RA and 1 NRA) indicated assessments of somatic efficacy **(D2)** which had an influence on their academic and career development (see 6.2.1.4, **Childhood,** ¶3 below).

Seven participants (3 RA and 4 NRA) did not indicate any physiological judgments in the childhood stage **(D5).**

The Adolescent Phase (E – I) (refer to Fig. 6.1 above)

Specific career interest (E). By adolescence, 9 of the 10 RA participants had identified and had begun pursuing their current careers **(E1).**

One RA and the five NRAs had identified other career paths and were pursuing those **(E4)** (see 6.2.2.1 below).

Academic interest (EE). Seven of the 15 participants had indicated academic interest emerging in the childhood stage **(EE1).** (Those who had indicated academic interest in the childhood stage were coded EE1 and those who developed an academic interest in adolescence were coded EE2.)

Seven of the participants reported academic interests emerging in the adolescent phase **(EE2).**

One NRA (discussed further in 6.2.2.1 below) did not indicate academic interest in the adolescent stage **(EE5).**

Role Models (F). Two participants indicated specific current career related family role models (RA) **(F1).**

However, most of the role models that were indicated in this phase by the participants were non- family ones **(F2)** (coded as "1" for the purposes of Fig. 6.1).

One RA and one NRA indicated career role models related to other careers **(F3)**.

Three NRA participants did not identify any career role models in the adolescent stage **(F5).**

(Discussed further in 6.2.1.1 below)

Physiological Judgments (Efficacy) (G). 13 of the 15 participants indicated positive efficacy beliefs in their cognitive abilities at this stage **(G1).**

Two did not indicate the presence of any such assessments (NRA) **(G5).**

(Discussed further in 6.2.2.2 below)

Goal cognizing related to career development (H). Eight RA and one NRA participant indicated career goal cognizing directly related to their current career at this stage **(H1)**. Two RA and one NRA participant indicated career goal cognizing related a career other than their current one **(H2)**.

Three NRA did not indicate career goal cognizing **(H5)**.

Career efficacy building experiences (I). Nine participants (seven RA and two NRA) indicated career building efficacy experiences directly related to their current careers **(I1).**

Three participants (RA) indicated career building efficacy experiences unrelated to their current careers **(I2).**

Three NRA participants indicated no career building efficacy (rubric I) experiences during adolescence **(I5)**.

(Discussed further in 6.2.1.3 below)

The Adulthood Phase (L – P) (refer to Fig. 6.1 above)

Specific career interest (L). Current career interest emerging adulthood was reported by seven participants (2 RA and 5 (all) NRA) **(L1)**.

Academic interest (LL). All indicated an interest in academics **(LL1)**.

Role Models (M). All of the participants **(M1)** with the exception of one RA and two NRA **(M5)** indicated career related role models that influenced positively their career path development and pursuit.

(See 6.2.1.1 below)

Physiological Judgments (Efficacy) (N). All of the participants with the exception of two NRA had indicated positive assessments of their academic abilities (efficacy beliefs) in **adolescence (N1)**.

The two NRA participants indicated academic efficacy beliefs **(N2)** related to their career pursuits emerging in adulthood (see 6.2.1.3, **Adulthood,** ¶1 below).

Goal cognizing related to career development (O). All of the participants indicated current career goal cognizing at this stage **(O1)**.

Career efficacy building experiences (P). All with the exception of one NRA indicated that they experienced efficacy building experiences related to their career pursuits **(P1)**.

The NRA participant indicated efficacy building experiences related to another career (other than his current one) **(P2).** This participant is discussed further in 6.2.1.3, **Adulthood,** ¶1 below.

To sum up: In very general overall terms, Fig. 6.1 above gives a picture of career path development of the two groups of participants. The two groups seem somewhat different in respect to *early academic interest* emerging in childhood, *current career path identification*, identified *current career role models, efficacy building experiences* and *current career goal cognizing* in adolescence. This might point to, with respect to the RA participants, an indication of earlier career stabilization than the NRA participants as a group. By the adulthood stage the two groups indicated more similarities than differences as classified in the SCT factors.

Earlier career stabilization is regarded in the academic research productivity literature as associated with higher and sustained levels of research activity, a process that can be conceptualized in terms of "cumulative advantage theory" (see 1.3, ¶8 above). Cumulative advantage theory proposes, *inter alia*, that early academic research productivity leads to later academic research productivity. In other words, academics who achieve an early and high level of academic research productivity can later acquire the time and resources needed to continue on in the same vein (Fox,

1983). While actual academic research productivity (e.g., number of publications per year) was not directly assessed in this study, a high level of productivity is implicit in the designation research active (RA) based on the criteria used to select the RA participants (see 4.2 above).

The above analysis of the data on which Fig. 6.1 above is based represents a broad picture of the overall explanation being sought of research engagement or lack of it in context of this study. As such, it has provided a broad overview of the content, analysis approach, and observations made with the life story interviews. The purpose of the presentation was to familiarize the reader with the group of subjects in general terms, with the intention of building a frame for the more specific information presented in the following section. The following section, thus, presents the data reported above, included in Fig. 6.1, and additionally presents the observations of the SCT factors less amenable to quantification, and their observed occurrences as interpreted from the life story interviews leading to the answers to the research questions.

6.2 Life story interviews – detailed analysis

As reviewed in 2.3 above, those SCT variables thought to be most influential in academic and career path development based on the literature on the topic were used as an interpretative framework for the life story interviews protocol. The expanded discussion of the ensuing data which follows is divided according to the two principal SCT determinant classes: environmental factors (6.2.1) and personal factors (6.2.2). Each of these sections is further subdivided into the individual factors as they emerged in the three main stages of career path development (childhood, adolescence, and adulthood). To cite Lent, Brown, and Hackett (1994, p. 80) again, to strike a balance between the competing forces of parsimony and completeness, only selected

anecdotes and episodes from the reported lives of the participants that exemplify the results within the class determinants are provided. While it is not entirely possible to maintain complete objectivity in anecdote and episode selection, steps were taken with the data as a whole to ensure the accounts provided by the participants and as interpreted by me are, as far as possible, trustworthy, credible, and accurately represent the perceptions of the individual's life (please see 4.4.3 above for a full discussion of measures taken with the interview data to ensure these kinds of validity). The selected excerpts attempt to show a variety of examples from the interview data illustrating the SCT variables as observed in the data.

For purposes of maintaining participant anonymity, pseudonyms followed by either 'R' for RA or 'N' for NRA are used in the following sections, e.g., Jonathan (R). Direct quotation is only used in instances where the participant's actual utterance adds an element of understanding or individual 'color' to the account. Paraphrase is used in the majority of instances. This presentation strategy was chosen in the interest of keeping the overall chapter within length limitations. Citations for quotations and paraphrased examples are formed using the following code format: P (source document) / L (line number) where a text transcription is the primary document, e.g., P5/L0074, or P (source document) / T (time-quotation segment start) where the actual audio file was used as the primary document, e.g., P7/T0:01:22.34. This coding scheme is constructed from the qualitative analysis software used, Atlas.ti, ver. 5.2.

It should also be noted that the results are presented in terms of the two discreet classifications just referred to (environmental and personal determinants) only for explanatory purposes, and do not imply any necessary independence of the determinants. A central tenet of SCT and the factor that differentiates it from other theories of human behavior is the notion of 'triadic reciprocal causation' (see Fig. 2.3

above and accompanying discussion in section 2.1, ¶10). This feature of SCT describes the interactional nature of environmental and personal factors associated with the behavior in question. Factors within each determinant class are seen to exert influence on and are influenced by other determinant factors in a complex web of systemic interactions. Thus, the artificial separation of factors in the discussion below is only for explanatory purposes (as will become evident, in some instances it was not possible to separate factors for expository purposes. In such cases, the factors involved are presented together).

6.2.1 Environmental determinants

Based on the literature presented in 2.3.1.0 above, the environmental factors *career role models, family influences*, *efficacy building experiences, perceived barriers and coping efficacy*[49], and *chance encounters* were selected for analysis in the research sample. They were selected principally for their relevance to this study and because research (as reviewed in 2.3.1.0 above) has widely verified the roles of these factors in academic and career choice actions. *Chance encounters* is discussed separately in section 6.2.3 below.

6.2.1.1 Role models

For the purposes of this study the role model factor is conceptualized as consisting of the idea that people tend to identify themselves with others who appeal to them in some way, and based on the concept of 'modeling', that people tend to match their cognitive skills and behaviors with perceived role models (Gibson, 2004, p. 135). As reviewed in 2.3.1.1 above, a number of studies have established that

[49] *Coping efficacy* is a personal determinant, but because of the close conceptual ties with *barriers* it is presented with the *barriers* (environmental) construct.

identification with role models is an essential part of individual development (Karunanayake & Nauta, 2004).

In the case of the present study what is immediately notable is that RA participants indicated more and earlier career related role models than NRA participants.

Childhood. For the childhood phase, nine of the 15 RA participants indicated career and academic role models. The majority of the role models were family members (immediate and more distant family, e.g., cousins, grandparents). Hoshi (R) reinforced several times during the interview that by adolescence she knew she wanted to be a teacher because of her parents, who are both teachers (P6/T2:03:35.78). She was just not sure about what discipline she wanted to enter (P6/T1:03:59.69).

The father of Pavel (R) and his older brothers were all very socially active, belonging to unions, attending strikes and similar social actions intended to reform society in some way (P13/T0:00:39.78). He said this may have originated in part from their grandfather who was an officer in the Mexican Army during the 1910 Revolution (P13/T0:33:03.29). Another source was the family's lower socio-economic status. They saw activism as a way out of poverty and what they regarded as exploitive working conditions for themselves and for others in similar conditions (P13/T0:18:07.77). Pavel's entire career path has been strongly related to social reform and other matters of social change.

One RA participant and one NRA participant indicated teachers as role models in the childhood stage. Jonathan (R) said that before having a particular primary school teacher, he had no interest in school and had planned to quit after the primary

level[50] (P7/T0:01:22.34). In the fifth level of primary school he had a teacher who inspired his love of academics. He said that up to that point he had no interest in school or studying and basically only did it because he was supposed to. This teacher was the first to pay any attention to the students. Jonathan said that before that because of the backgrounds of the students (*de recursos muy bajos,* i.e., very disadvantaged) the previous teachers had treated them as if they were all delinquents. Jonathan reported that for the first time, he had a high level of interaction with a teacher and that it was apparent that this teacher really cared about the learning outcomes of the students. He identified this teacher as a pivotal person in his life whom he very much identified himself with (P7/T0:05:30.18).

Reginald (N) credits his primary teachers in a religious school for inspiring his love of literature at an early age (P17/T0:47:45.96). Teaching literature was in fact his chosen career, not language teaching (P17/T0:18:24.49). This feature is repeated in all of the NRA participants. Teaching languages was not their initial career choice. The implications of this are discussed further in the final chapter.

Adolescence. By this stage, participants had specifically identified academic and career role models with the exception of three NRA participants, Miles, Christine, and Janice. While family role models dominated in the childhood stage, in the adolescent stage most of the role models identified were teachers. Three of the participants, Malcolm (R), Harry (N), and Reginald (N) indicated role models associated with other careers (other than their selected present career).

[50] It was quite common at the time for males from lower economic classes to quit school after the final level of primary school, approximately age 11, and start working. For females from lower socio-economic classes it was customary, if they went to school at all, to go no further than the first few years of primary school.

Two of the RA participants, Jonathan and Leonard, indicated 'symbolic' role models (Jonathan, a book, *Cazador de Microbes*[51], and Leonard, a *Readers' Digest* article on medical pathology) that they specifically identified as crucial factors in their subsequent career development and persistence. In other words, they indicated that their careers would have taken other paths had they not fortuitously come in contact with these sources (Jonathan --P7/T0:20:32.34, Leonard --P10/T0:07:40.38). The element of chance encounters on life path trajectories is discussed further below (6.2.3).

Adulthood. By adulthood, specifically the university years, many of the participants had identified current career role models. Two of the NRA participants, Christine and Harry[52], found role models associated with English language teaching (Christine – P15/T0:14:59.41). Both of the role models were teachers in ELT training programs.

Many of the RA participants identified role models that helped them refine and direct their academic and career path pursuit in their university years. Benjamin (R) had been very successful in his preparatory physics classes, but when it came time to choose a university major, he was influenced by a boy who he said he identified himself with (P5/L1441). He told how when the boys were waiting in line to register for university study, they were just chatting and in the case of Benjamin not really thinking of the task at hand, university major selection. When they got to the head of the line, the other boy said "electronics" so Benjamin, in spite of his earlier intentions to enter physics in the university, impulsively said electronics also (P5/L1471-1475). After a year in electronics he was unchallenged and unhappy. He changed his major to physics. However, at his point in his development, he said that he was not thinking

[51] *The Hunter of Microbes*

[52] When I went over the interview data with Harry for validity purposes, he clarified that he had a very influential role model as an adult related to his ELT education.

of physics teaching or research as a career. He said that he was not even thinking of getting a degree. He was apparently not visualizing any eventual goal achievement (*career goal cognizing*). He said that he chose physics only because he enjoyed studying the area (P5/L1509). In fact in the same interview segment, he described that when he was in the seventh semester (of eight semesters) of his undergraduate studies, there was an economic crisis in the country. He had to abandon his university studies (Jonathan (R) reported that he was also had to quit his university studies for the same crisis, see 6.2.1.4 below) to start working because at this time, he was married and had a child. He took a job selling blankets, t-shirts, and other things from house to house.

He said that as he was happily going about selling things, he met one of his former professors. The man was surprised to see him working as a peddler and asked him what happened. Benjamin explained, and the professor invited him to come to his house in the evenings to study and to help him finish his university courses. He said that he and the professor would talk, drink coffee, and work through equations together. He went every night and in six months he passed the exams for the seventh and eighth semesters and then started working on his thesis (P5/L1516-1538).

As discussed further in 6.2.3 below a chance encounter such as this has life changing consequences because of the presence of factors that contribute to the significance of the encounter, i.e., cognitive, personality, and emotional factors that are compatible with the other individual or group; emotional ties; and shared values (Bandura, 1982) (see 2.3.1.3 above for a full discussion).

This same affinity between individual and role model is evident in the following three instances.

While studying his undergraduate major in biology, Leonard (R), reported that as a result of asking his professor many questions during his micro-biology course, he

was invited to a course given by a doctor in cellular biology. This course was for academic staff not students, but Leonard was invited by his professor because of his obvious interest in the area. Leonard said that this doctor provided the image of a researcher (role model) and he identified this as an influential factor in his subsequent development as a medical researcher (P10/T0:35:03.39).

Beverly (R) expressed how from the preparatory level through their university education and into their professorships this affinity between people in her group (of like-minded peers) had contributed to her academic and career path development. Beginning in preparatory and inspired by their teachers, her group was held together by their mutual "*afinidad, afinidad por amistad, por política, por la concepción del mundo, por teórica*" ("affinity in their friendship, in their political beliefs, for their conception of the world, and their theoretical approaches to their discipline") (P11/T0:19:19.29). As newly hired academic staff, their mutual affinities led them to identify role models whom she identified as *"gurus"* and "*vacas sagradas*"[53]in the field of economics in Latin America. Her group's identification with these researchers (from the Universidad Nacional Autónoma de México (UNAM)) further bolstered their affinities, and as Beverly identified, contributed to their overall success as academics and researchers (P11/T0:17:13.59).

Hoshi (R) identified her parents, both teachers, as career role models from childhood (see 6.2.1.1, **Childhood,** ¶1 above). When she finally decided on language teaching as her career path, she identified researchers in her masters program as her role models. She said that most of the professors in her applied linguistics masters program were members of the SNI (national society of researchers); they all had postgraduate degrees; they were all doing research and publishing papers, going to

[53] 'Sacred cows', but not used in the pejorative sense

conferences, and so on. Hoshi said specifically in the interview that she wanted to be like them (P6/T1:52:10.9).

Studies reviewed in 2.3.1.1 above clearly indicate the influence of identification with role models in academic and career path development (viz., Flouri & Buchanan, 2002; Karunanayake & Nauta, 2004; Perrone, et al., 2002; Quimby & DeSantis, 2000). In the cases of the RA participants reviewed above (and those not specifically reviewed but factored into Fig. 6.1 above) with the exception of Benjamin, *researchers* in their career areas were viewed as positive and influential role models. This indicates that the SCT variable of role models was most likely an influential factor in the development of the RA participants.

6.2.1.2 Family influences

Empirical evidence has generally supported the primacy of parents in shaping children's academic and career choices (see 2.3.1.2 above). Whiston and Keller (2004, p. 559) found that career choice factors can be classified into two broad family variable categories. Parents' educational and occupational backgrounds and socioeconomic factors fall into the broader category of "family structural variables" while family relationships, parental aspirations, and family support and encouragement factors are classified into the category of "family process variables." The latter category has been empirically shown to have a stronger influence on career development than the former (ibid).

Childhood. Likewise with the present data, the latter category above, "family process variables", seems to have had a stronger influence on academic and career path development than the former defined above "family structural variables". All of the participants, with the exception of three, indicated that their parents saw education as

a way out of poverty for their children (participant socio-economic status is addressed below, 6.2.1.4). Many of the participants specifically identified the involvement of their mothers in their academic development. Harry (N), Reginald (N), Hoshi (R), Beverly (R), Christine (N), and Katherine (R) specifically identified their mothers as the primary movers in their academic development.

One family influence account exemplifies the level of involvement indicated by many of the participants. Beverly's (R) father, in his early years of practice, was a medical doctor in an impoverished southern Mexican state. He often let his family accompany him on calls and to help out in his clinic. Beverly recounted how her[54] father would let her, at a very early age, help with medical patients by doing routine medical visit tests such as measuring blood pressure, height and weight, temperature, and so on. As she grew older and more experienced, Beverly was allowed to assist in minor surgeries and more complicated medical procedures (P11/T0:33:38.33). In her adolescence years, she thought she needed to follow the family career path, medicine, and started to prepare academically for that profession. Her parents noticed that that vocation did not seem to suit their daughter, so they encouraged her to follow her own intuition in choosing a career (P11/T0:46:08.55). So, the parents offered not only career building support but also were wise enough not to impose their career path wishes on their child.

[54] Beverly also told how her parents ignored social norms of the time and place by encouraging her to participate in career building activities from the earliest age. She commented on a cultural practice of that location at the time which gives an indication of the low value placed on female children. As she told it, in that particular region when a child is about to be born, all the friends and relatives of the father converge on the birth location with a marimba set (a percussive musical instrument common in celebrations). When the child is born, someone runs out and tells the assemblage the sex of the child. If it is a boy, there is much celebration and music playing. If it is a girl, the marimba is packed up and everyone leaves (P11/T1:02:23:81). This anecdote coupled with the defiance by her parents of the cultural norms in the upbringing of their children exemplifies the level of family involvement that Beverly identified as a contributing factor to her subsequent renown as an eminent researcher in the university.

Adolescence. Along these lines of parental involvement in children's academic and career path development, there were two contrasting examples of parents' opinions regarding career paths of their children, Jean Luc (R) and Christine (N). In the national context where the research took place in middle to late adolescence (14 to 16 years old), children begin to choose academic fields related to their chosen careers. This involves entering a vocational school or a preparatory school. In this example, Jean Luc (R) after identifying his career choice in childhood (after a class visit to an astronomical observatory, discussed further in 6.2.3 below) continued his academic pursuit to become an astronomer. His parents told him that 'scientists' are mentally unstable and that he would never have any money (P2/L223). However, they did not present any barriers to his career path pursuit. Now he is a distinguished researcher in the area of astrophysics (however, there is no causal relationship implied).

In contrast, Christine (N) during the adolescent stage had a strong aspiration to enter the field of psychology (P16/T1:20:18.52). Her mother objected saying that psychologists "would do nothing and would make money"[55] (P16/T1:20:32.40). Christine said that her mother had a great deal of influence over her, so she was convinced that that was not the career path to pursue. In this instance, Christine did ascribe a causal affect between her mother's opinion and her choice not to pursue a career in psychology. After several other career attempts, Christine finally ended up teaching English for 16 years without any university study. Later, after a career crisis, she decided that a university degree was essential if she wanted to continue working as an English teacher, so she earned her undergraduate degree at age 51 and is now completing graduate study at age 58.

[55] Christine, Hoshi, Katherine, and Miles' interviews were in English. The rest were in Spanish.

Christine's career path trajectory exemplified many of the career paths of the NRA participants. All of them expressed an initial desire to enter another career but for one reason or another were unable to pursue that career path. They essentially ended up teaching English because they had some level of proficiency in the English language. Harry (N) said that he chose English language teaching (ELT) initially because he knew he could get a job as a language teacher without a university degree. He said that he used to see his older sister staying up all night studying for her medical degree and said that that kind of academic dedication did not appeal to him at the time (P18/T0:31:08.07). Later in his adult life he studied the ELT undergraduate and graduate degrees for job permanency factors.

However, it should be noted that all of the participants, as mentioned at the beginning of this section, went beyond what might have been expected of them considering their socio-economic backgrounds (see 6.2.1.4 below). Much of their success appears to have been a result of family influence factors, specifically the beliefs of the parents that education and a profession would improve the lives of their children.

6.2.1.3 Efficacy building experiences

According to SCT, positive experiences related to a given action experienced by the individual help to build efficacy beliefs which thus contribute to sustained performance or pursuit of the action (see 2.3.2, ¶8 above). Nine participants (seven RA: Jean Luc, Benjamin, Leonard, Beverly, Pavel, Jonathan, and Wesley, and two NRA: Janice and Harry) indicated academic and career building efficacy experiences that were directly related to their current careers.

Adolescence. Benjamin (R) was plagued by family problems from childhood. Family violence and abuse, alcoholism, and poverty were factors that led him to a find a sort of refuge in academic pursuits. He recounted how he became very conflicted about gender roles when he was a child. His father would habitually use excessive corporal punishments and was frequently verbally abusive. Benjamin said that his father would not even use Benjamin's proper name. The father always used identifiers such as "*hijo de la chingada*"[56] in addressing his son (P5/L0610). However, his mother was the "*polo opuesto*", ("the opposite pole") from the father. Benjamin said that his father beat him and his mother cured or soothed him (P5/L0605). Despite the aggressive male behavioral model his father provided, Benjamin identified himself with his mother's non-violent model. In school he could not bring himself to engage in fighting and other kinds of violence that his male peers engaged in. This inability caused him what he referred to as 'personality problems' (P5/L0597).

As a way of coping with these issues Benjamin found a sort of refuge in academics during his adolescent years. To fully appreciate what happened during this time, the story must be framed by his earlier childhood school experience. When he started primary school, the government implemented a kind of experiment in which girls and boys would receive their instruction separately. However, in his particular level there was not enough space in the boys' class, so seven of the smallest boys were selected to join the girls' class. Benjamin was part of that group (P5/L0571).

Benjamin told how the boys' classes were very 'militarized'. The teacher was very strict and would not tolerate any kind of misbehavior. The boys would be punished by having to march like soldiers (P5/L0555-0563). In contrast the girls' classes were very nice and polite. The teacher was very nurturing. The students

[56] "*Hijo de la chingada*" can be roughly translated as 'son of a bitch'. Translated literally it means 'son of a raped woman'.

would sit and talk nicely and eat store-bought 'Hostess' pastries. Benjamin said that he liked this very much and that he learned the female behavioral norms that were being taught and reinforced in the girls' class (P5/L0577-0583).

However, everything changed dramatically when he left primary and entered secondary school. His secondary school was just across the street from the primary school, but it was a military school for boys. He said he did not have a choice in schools because his mother had lost his birth certificate and that was the only school near their house that would accept him without the certificate (P5/L0806). At the new school he said that he did not feel compelled to engage in any of the aggressive activities of the other boys, but that that did not cause any problems because at this point in his life he started to academically surpass all the other boys. It is not possible to determine if his intellectual development was nurtured as a coping device for his lack of aggressiveness, or whether it was a natural developmental progression, but it did allow him to cope with his differences in areas of aggressiveness from his peers and allowed him, as he observed, to achieve a certain amount of prestige and respect from them (P5/L0844).

His academic self-efficacy beliefs were strengthened by his academic successes which in turn led him to pursue more academic challenges in his university years. He stated that the one constant source of satisfaction throughout his life has been his academic superiority (P5/L0863). Along these lines, at one point in the interview, Benjamin stated that he chose physics as his area of study because he wanted to study what people regarded as the most difficult discipline (P5/L1404).

Wesley (R) was one participant who seemed to have an uncharacteristically smooth academic and career path development. Of course it was not without barriers and problems, but compared to some other participants, it appeared relatively smooth.

In regard to efficacy building experiences directly related to his chosen career, mathematics, he said that he had a very early interest in scientific fields because of the influence of his brothers and because the family always had books around in the house and the children were encouraged to read and talk about topics that interested them (P1/L075). As he indicated, because of this presence of books and intellectual atmosphere found in his early home life, his academic efficacy beliefs were built and reinforced from an early age.

Additionally, he identified a teacher in secondary school who significantly aided him in developing his mathematic skills which, he said, contributed to his pursuit of a career in mathematics. Wesley recounted how he would study his mathematics book and not understand anything, and then come to class and listen to the teacher's explanation and then see the problem clearly. The teacher had a way of making the complicated look simple.

It was also apparent to Wesley that the teacher derived great enjoyment from his profession (P1/L093). Wesley said from early in his career pursuit he knew that there were very few jobs in mathematics that did not involve teaching, so it was his intention from the beginning of his career path that he would teach as well as research. He credited this first notable teacher as being a discipline as well as career role model who also contributed greatly to his academic and career efficacy assessments (P1/311).

Adulthood. All of the NRA participants experienced career related efficacy building experiences in adulthood. Miles (N), however, reported having most of his academic and career path efficacy building experiences in adulthood (rather than in earlier stages). He said that he had a great desire to learn many things when he was a child but, he reported, his mother would not let him explore or go places (P14/T0:29:55.94).

The family lived in a dangerous neighborhood and Miles said that the community somehow discovered that the family was descended from people of the Jewish race. His family was apparently fairly constantly persecuted because of this (P14/T0:38:05.12). Because of this situation, he reported getting into many fights in the neighborhood and at school (P14/T0:32:33.66). At one point he said that it was his intention to drop out after finishing secondary school (P14/T0:18:33.34) and to start working, and in fact he did this and spent nine years working in a factory (P14:T0:45:15.29).

He indicated, however, that factory work made him feel empty and as a response he felt the need find some meaning in his life (P14/T0:46:04.00). In his search for meaning he started practicing yoga, meditating, and became a vegetarian. At one time when he was about 25 years old, he decided to leave everything and walk to the coast helping people along the way. He took nothing with him except a blanket and some salt. He even went barefoot. While he was unsuccessful in achieving his goal of walking to the coast, he reported having efficacy building experiences as a result of his quest for meaning in his life. He felt happy because he said he came to know himself; he overcame his fear of darkness; he lived alone and did not depend on anyone and so on. It was after that experience that he decided to change his life path. He began by learning languages (P14/T0:59:38.55).

When Miles was about 30 years old, at the urging of some of his friends and acquaintances in the language school, he studied the preparatory school. He reported that he surprised himself with his academic success. He finished the preparatory in one instead of the usual two years, and then went on to study law. He finished his law studies in four years rather than the customary five years (P14/T1:10:13.62). These academic successes provided academic efficacy building experiences. However, after

working in law for a short time, he decided he did not like it, and began teaching French in the university language school. Eventually someone convinced him to join the ELT staff (P14/1:14:02.28).

As reported in this section, success strengthens self-efficacy assessments, and according to SCT, failures weaken them. However, early and effortless successes can also debilitate self-efficacy beliefs by undermining a person's resiliency to setbacks and failures. People generally need to experience a certain amount of failure and learn to cope with obstacles to build resiliency. Thus, positive self-efficacy beliefs and resiliency work together to support goal achievement (Wood & Bandura, 1989).

The following section follows this idea of resiliency building through difficulties experienced in academic and career path development of the participants.

6.2.1.4 Perceived barriers and coping efficacy

Perceived barriers to academic and career development indicated in the literature are *inter alia.:* socio-economic status, gender and ethnic discrimination, parental influences, lack of skills and ability, lack of educational opportunities (Creed, et al., 2007); cultural values and career myths (i.e., views that some careers are gender appropriate, or are only for people from specific ethnic groups and so on) (Leal-Muniz & Constantine, 2005); family responsibilities, child care responsibilities, financial resources, and academic skills (Luzzo, 1995).

The intensity of perceived barriers is also influenced by a lack of efficacy building experiences and a lack of coping efficacy beliefs, which will affect how much influence emotional factors leverage against goal attainment. In other words, individuals who feel that they are able to control potential threats to their goals are more likely to persist in goal attainment (Lent, et al., 2003; Albert & Luzzo, 1999).

Depending on factors such as exposure to efficacy building experiences and development of positive coping efficacy beliefs and resiliency, barriers could be construed in many levels of influence, from a behavioral support to no influence to completely debilitating. Personal and environmental factors work as a system to determine the relative intensity or influence of a perceived barrier. In some cases barriers can be perceived as challenges by the individual, thus converting them to a facilitative (support) factor.

Another notable feature of this research sample is the socio-economic status of most of the participants, measured by parental educational level and occupational status (Hill, et al., 2004). For purposes of classification, Rubric A of the constructed typology indicates the six levels of observed socio-economic levels of the interview participants (as represented in Table 6.2 above). The rubric was divided into the following classifications:

RUBRIC A	SOCIO- ECONOMIC FAMILY STATUS	A1 Extreme poverty	A2 Poor - unskilled	A3 Poor – semi skilled	A4 Poor/lower middle class – skilled	A5 Middle class – professional	A6 Upper middle class - professional
		Jonathan (R), Malcolm (R), Leonard (R)	Pavel (R), Reginald (N) Benjamin (R)	Harry (N)	Wesley (R), Jean Luc (R), Christine(N), Janice (N), Miles (N)	Hoshi (R), Beverly (R)	Katherine (R)

Table 6.4 Interview participants' socio-economic status
Socio-economic categories were constructed from the interviews and later verified by participants (see 4.4.3 above). The skill levels were established based on the data participants provided about the primary income producer, either father or mother.

The examples selected for the childhood phase below exemplify some of the experiences of the three participants from extreme poverty who managed through resiliency and high levels of coping efficacy to attain eminence in their fields.

Childhood. Three of the RA participants, Jonathan, Malcolm, and Leonard, came from backgrounds of extreme poverty. Jonathan told how he, at the age of seven, worked after school selling "*paletas*"("frozen ice pops") in the summer and "*semillas*" ("pumpkin seeds") in other seasons (P7/T0:08:16.21). He also made money by carrying water. His *barrio* (a neighborhood in Mexico City) did not have running water or sewage facilities. So he made a very small amount of money hauling water in buckets for residents, also at this same age (P7/T0:08:56.78). Like other participants, his barrio was filled with every sort of delinquency, violence, and substance abuse (P7/T0:05:49.80).

Malcolm (R) from the extreme poverty background was also from a barrio in Mexico City with basically the same characteristics as the one described in the previous paragraph. There were very few, if any, opportunities for children from these sorts of neighborhoods (P12/T0:06:36.22). According Malcolm, the teachers in the schools treated all the children as delinquents and basically not worthy of any effort (P12/T0:21:44.63) (Jonathan also made a similar statement about his teachers, P7/T0:05:30.18). This attitude on the part of the teachers was one reason why Malcolm said he had absolutely no academic interests and had no intention of going past the primary level (P12/T0:21:44.63). At the age of 10, Malcolm's 16 year old brother was murdered in the street (P12/T0:06:36.22). He said that his parents "died" along with their eldest son (P12:T0:16:17.41).

Malcolm (R) was one of the two participants who indicated a physiological judgment related to somatic characteristics which, in his case contributed directly to his academic development. He reported that when he was young, he was very thin and weak. While he initially indicated no academic interest, he was at the same time assessing his physical abilities to survive on the street. He realized that physically he

could not survive, so he decided that he should rely more on his cognitive abilities (P12/T0:31:35.02). Fortunately, at about the same time (late childhood period / early adolescent period) he had a teacher who was very demanding about schoolwork. The teacher's disciplinary techniques may seem questionable now, but his tactics of punishing and ridiculing students who did not do their lessons motivated Malcolm to study his lessons to avoid the negative consequences (P12/T0:23:36.15).

Adolescence. As a means of coping with their environments, many of the participants indicated strategies that they employed that helped insulate themselves from the dangers in their surroundings. In the case of the Malcolm (R) reported directly above, he said that he stayed in his house reading because he judged the street to be too dangerous for him. In Jonathan's (R) case (Childhood section, ¶1 directly above), he formed a club in his neighborhood to give himself and other adolescents a safe place to socialize. He initially envisioned his group as a "cultural" group, but none of his peers were particularly interested in that, so it became more of a social place for adolescents to get off the streets and away from alcohol[57] (P7/T0:12:10.72). Jonathan went on to form many academic groups throughout his academic and career path development.

Participation in groups and group formation as, *inter alia,* a coping strategy is another characteristic that all of the RA participants credit with their academic and career success. All of them said that they currently belong to successful research groups, and without collaboration between group members, they perhaps would not have been as successful in their academic and career pursuits. While NRA members talked about informal groups of friends, none reported belonging to groups which they

[57] Jonathan did however mention because of the social focus of the group in combination with the age of the members (adolescents) many boys would drink alcohol before coming to the club in attempt to make it easier to socialize with the girls (P7/T0:15:51.25).

specifically mentioned as contributing to their specific career path development. Janice (N) and Miles (N) talked about belonging to social groups that they regarded as having contributed to their academic development in the adulthood stage.

Adulthood. Beverly (R) (also discussed above in 6.2.1.2, ¶1-2) mentions that just as she was finishing her doctoral studies, her sister unexpectedly died leaving her three children in her care (P11/T0:04:38.62). This tragedy caused her to abandon her doctoral studies (P11/T0:07:08.36). Beverly echoes the RA participants' recognition of the immense role that group membership plays in their lives in coping with barriers. Her research group helped her cope with the sudden loss of her sister and her subsequent deep depression. Her colleagues continued with their ongoing research projects and made sure that she was able to seamlessly reenter the projects when she was emotionally able to (P11/T0:04:38.62). A few years later Beverly started another doctoral program which she was able to complete (P11/T0:07:32.43).

Family responsibilities are stereotypically seen as potential barriers to research activity (e.g., Fox, 2005). However, as an additional support that contributes to Beverly's overall coping efficacy is her family. She said that her family forms a unified support web that she credited with her career success and the career success of all of her siblings and their collective ongoing career successes. According to Beverly, when any of the siblings needs someone to watch their children or to help in some way there is always someone there to help (P11/T0:11:44.57). This kind of support is essential for highly productive researchers (Fox, 2005, Sax, et al., 2002). In contrast, Janice (N) said that one of the reasons that she did not engage in research was because she had a young child who needed all her attention. While not directly addressed, it might be possible that Janice did not have the support system that Beverly had.

Jonathan (R) told about his group that he formed during his university years that he said was fundamental in his development as a researcher. Like Benjamin (R) mentioned above (6.2.1.1, **Adulthood,** ¶2), he had to quit his university studies because of the economic crisis of the 1980s. He started peddling clothing from house to house (P7/T0:35:31.14). He said that this barrier did not derail his goal of university study. He saw it as something that he just had to get through and that eventually he would back on track. He credited that attitude to a high level of coping efficacy. The clothes selling job was actually seen as a positive factor in his life. He enjoyed it because he came to know many people and he made enough money to support his family (P7/T0:36:18.30).

When he finally returned to his undergraduate studies he was in his 30s. Because of his age, he was put in the "*vespertino*" ("afternoon") group with the other older students who were there because they generally worked in the mornings and then went to the university at night. Younger students were generally put in the "*matutino*" ("morning") classes. So he said that it was very "good luck" that he was put with the more mature students because they were very much interested in their studies and were very competitive in a way that they inspired each other to study and to really get involved in their education (P7/T0:23:30.80). Eventually with some of these classmates he formed a group dedicated to their field of study. The group produced publications, held seminars; they contacted researchers in their field, and were involved in curriculum changes in their own programs of study. The group, with varying numbers of members, was active all through his university and post-graduate years and is still active today (P7/T0:1:03:15.01).

All of the participants identified barriers to their development to one degree or another. In referring to the researchers she knows, Beverly credited their, and her

persistence in the face of barriers and problems in part to a *"gusanito adentro"* ("a little worm within") that drives them to excel (P11/T1:16:42.66). Leonard (R) called it *"las ganas a seguir adelante"* ("the desire to improve themselves and to progress") (P10/T0:45:45.40). This "something inside" is the focus of the SCT personal class determinants which are presented in the following section.

6.2.2 Personal determinants

As discussed in 2.3 above, SCT personal determinants are broadly classified as a cohort of self-regulatory and self-reflective processes encompassing cognitive, motivational and affective components (Bandura, 1989). SCT posits that action is the result of emergent interactive agency. Agency is a product of SCT's reciprocal causation model (see Fig. 2.3 above), i.e., action, cognitive, affective, and other personal factors and environmental factors working interactively as partial products of self-generated factors (Bandura, 1989, p. 1175).

This section discusses the personal factors in light of the interview findings. Four principal factors were part of the interview analysis: *interest, physiological judgments, career goal cognizing,* and *goal attainment.* As mentioned above (6.2, ¶3 above) and demonstrated in the discussion thus far, because of the reciprocal interactivity of the SCT factors, it is not always possible to pull apart the SCT factors and discuss them separately. Evidence of *career goal cognizing* is implicit in sections above on *role models* (6.2.1.1) and *family influences* (6.2.1.2), and *goal attainment* is particularly evident in the section above on *efficacy building experiences* (6.2.1.3). *Physiological judgments* are intertwined into parts of *barriers and coping efficacy* (6.2.1.4 above). With this in mind, *interest* is discussed below and the role of *career goal cognizing* in career development is briefly reviewed in the interest of chapter length and avoidance of repetition of factors presented above.

6.2.2.1 Interest

Personal factors will affect which behaviors people choose to engage in and are related to, *inter alia,* interests, cognitive abilities, and affective factors. For example, if a person has no interest in engaging in research behavior, it is unlikely that he or she will make conscious academic or career related choices that involve or lead to research behavior. Cognitive ability is a difficult and controversial area to investigate and was seen as not feasible to include as a factor in this study. Affective factors are also not directly addressed in this study but in many cases certain factors of this kind can be inferred from the interview data and in many cases are directly associated with academic and career related interests, which are the focus of this section.

Childhood. Leonard (R) and Jean Luc (R) were the only participants who reported a specific career related interest from a very early age. In the case of Leonard he did not know where the interest came from. He had no friends, relatives or siblings that he credits with contributing to his interest, but from an early age he said that when he had the opportunity, he would go to the country and examine life in ponds, rivers and lakes (P9/T0:00:13.75). He went on to study biology and is now a medical researcher. Of course there were many intervening factors that aided in his academic and career path pursuit, but clearly there was an interest in living things from an early age.

As reported below (6.2.3, ¶3), Jean Luc (R) was another participant who indicated a very influential interest emerging in late childhood with his school trip to the astronomical observatory. However, most of the participants did not indicate any specifically career related interests in the childhood stage.

Six participants reported emerging academic interest (interest in school and academic matters) in late childhood, Benjamin (R), Beverly (R), Reginald (N), Pavel

(R), Jean Luc (R), and Wesley (R). As discussed in the role models section above (6.2.1.1) many credited their early academic interest to family and teacher role models. Benjamin (R) recalled that as a small boy he was just tall enough to see over the edge of the table where his cousins were doing their school work. He looked at them with awe and wonder before being shooed away by an adult and told not to bother the cousins because they were "studying", a sort of magical word to the young boy (P5/L0879). He reported that this image of the cousins studying and the adults protecting the cousins from interruptions made an impression that studying and academic matters were attractive and valued behaviors, and also that it was a kind of behavior that certain people engaged in (P5/L0885).

Jean Luc (R) credited his love of reading to being punished as a child in primary school. He reported that he was not very sociable as a child and that caused him to be punished for things that he did to other children (P2/L099). Most of his punishment involved not being permitted to go to recess with the other children and having to stay inside and read or do some kind of school work (P2/107). He directly credited this punishment to his academic development that soon progressed beyond the level of his peers, an increase in his vocabulary, and his enduring love of reading. He said that the more he read, the more he wanted to read (P2/L111).

Adolescence. In the national context where the research took place, it appears that almost anyone who intends to enter into a profession has assessed their career interests and is pursuing the career path at least by late adolescence (17 years old or so) if not earlier. This is the case reported by eight of the 15 participants (all RA), Benjamin, Jean Luc, Pavel, Wesley, Jonathan, Hoshi, Beverly, and Leonard. Seven participants reported interest and career pursuit in careers other than their present one, all of the

NRA: Miles, Janice, Reginald, Harry and Christine, and two of the RA: Katherine and Malcolm.

Almost all of the participants indicated what many of them considered an interest in reading which was beyond that of their peers. Most of them credited this reading habit to relatives who gave them books (e.g., Hoshi); parents' and/or siblings interest in reading and books (e.g., Hoshi, Wesley, Katherine, Harry, Janice, Pavel); and/or a love of reading inspired by teachers and professors (e.g., Leonard, Malcolm, Reginald).

Malcolm (R) credited his interest in reading anything he could get his hands on as a factor contributing to his positive efficacy assessments regarding his academic abilities. He said that he could begin to notice that he knew more than his peers and that it was a result of his reading habits (P12/T0:32:23.89). He specifically credited a teacher for his initial academic development and his voracious reading habit (P12/T0:32:23.89).

Hoshi (R) mentioned that a friend from secondary school influenced her reading habits. The friend would bring books to Hoshi and tell her about the book and what was so interesting and about the authors and so on. This inspired her to read more (P6/T0:46:24.55).

Wesley (R) told how his family always had books around the house on a variety of topics (P1/L075), and that his aunt was a woman that impressed him from an early age. She was a book editor and he said that her house was always filled with books. He enjoyed visiting her as a child and adolescent (P1/L334,347).

Adulthood. By adulthood, of course, all of the participants had either previously identified their current career path or embarked on it as an adult. Essentially all of the

participants had identified an interest in academic matters in the adolescent stage, with the exception of Miles (N) discussed above (6.2.1.3, **Adulthood** section). Many of his academic and career path choices were delayed until his 30s because of other life circumstances discussed above (6.2.1.3).

6.2.2.2 Goal cognizing

The theory of planned behavior (TpB) and social cognitive theory (SCT) both posit that before engaging in any sort of behavior, humans assess their ability to engage in and complete the action. In other words, before engaging in a given action a person will imagine, through the processes of forethought, what the possible outcomes of the action will be and weigh those outcomes against her or his perceived ability to carry out the actions necessary to achieve the outcomes (goals). This type of cognition is usually characterized by both distal and more proximal evaluations (see the full discussion of this factor in 2.3.2 and 2.3.1.4 above). For example, when evaluating career options, a person might imagine positive distal outcomes of success, personal satisfaction, prestige, and challenge among other outcomes. However, more proximal evaluations might tend to incorporate more realistic assessments of positive outcomes and also potential barriers, i.e., is there enough money for university, is there sufficient time, do I possess the cognitive and affective resources to cope with the potential academic demands, and so on.

As explained in 2.3.2, ¶4 above, an individual's ability to make somewhat accurate (or at least not wildly inaccurate) outcome evaluations or to cognize goals involves cognitive abilities related to management of uncertainty factors and situational ambiguities. To do this a person must have enough knowledge of the situation to be able to hypothesize events and potential intervening events and their relation to potential outcomes. The higher the goal the more complex the cognitive

processes needed to realize the goal. Thus individuals who are successful analytical thinkers and problem-solvers and who have a high level of efficacy beliefs in their cognitive abilities will be more successful in realizing their goals than those who are inconsistent in their analytical thinking processes and besieged by self-doubts (Bandura, 1989).

By the adolescent stage, eight of the 15 participants had indicated goal cognizing related to their current careers (Jean Luc (R), Hoshi (R), Leonard (R), Beverly (R), Pavel (R), Harry (N), Jonathan (R), Wesley (R)). Three indicated career goal cognizing related to other career paths (Malcolm (R), Reginald (N), Katherine (R)), and three did not indicate career goal cognizing in the adolescent stage (Miles (N), Christine (N), Janice (N)). It is probably safe to conclude, then, that the majority of the participants had engaged in fairly accurate career goal cognizing associated with their current career in the adolescent stage. To do so, they must have either been lucky in their outcome assessments, (and) or that they, to some extent, possessed sufficient analytical abilities and positive efficacy beliefs to accurately predict career goal attainment.

Illustrating this factor Jean Luc (R) said:

> *La diferencia eso es, a lo mejor es un poco romántica pero yo creo que el secreto de una carrera exitosa digamos el plan de vida exitoso en el sentido de satisfecho y frustrado o insatisfecho es esa introspección, yo que quiero y ya al saber veo como es lo que quiero, en el caso este digamos de la investigación científica es yo quiero saber algo, no se en algún área del conocimiento humano y luego ya la otra es una cosa de consecuencia de la otra, pero es primero identificar si tengo esa sed de conocimiento esa necesidad de estar averiguando cosa, pues ya esta la mayor parte de la carrera ganada.* (P2/L279) .
>
> The difference is, perhaps this is a little romantic, but I believe the secret to a successful career, or a successful life in the sense of whether it is satisfying or frustrating or unsatisfying is this introspection. What I want and knowing what I want. Scientific investigation is 'I want to know something'. I don't know what area of human knowledge this is or what is a consequence of what, but first is to identify if you have this thirst to know things, this necessity to find things out, but then the major part of the career is won/achieved.

The 'introspection' that Jean Luc mentions as the center of career success can be thought of as being an example of what TpB calls *outcome evaluations* and SCT refers to as *goal cognizing* or *forethought.* Engaging in goal cognizing, as mentioned in ¶2 of this section, is *partially* a product of cognitive abilities. However, "cognitive abilities" is a somewhat vague conceptualization of more specific factors which might come into play when persons try to assess behavioral outcomes.

Interestingly, a more focused explanation may lie in the literature on chance encounters (the topic of the following section). Chance events permeate our daily lives. These events can have significant life path changing effects, affect a minor life path deflection, or have no discernable effect. The impact of the chance effect appears to be related to the individual's ability to assess the potential outcomes of the event. Some will use an event as a "catalyst for change", another person will recognize the event, but decide not to act on it, and another person will "not even recognize that [an] event has occurred" (Cabral & Solomone, 1990, p. 11).

What this concept means as supported in the literature is discussed further below after the presentation of observed occurrences of chance encounters and their outcomes found in the interviews.

6.2.3 Chance encounters

A somewhat neglected feature in social cognitive theory (SCT) and social cognitive career theory (SCCT) models is the effect on development as a result of chance encounters, an "unintended meeting of persons [or previously unknown symbolic objects] unfamiliar to each other" (Bandura, 1982, p. 748).

A number of interesting chance events directly supporting career paths were reported by the participants. None of the participants identified chance events in the

childhood phase, but several mentioned events on the border between childhood and adolescence (11-12 years old).

Adolescence. One of the most notable was the chance event reported by Jean Luc (R). The first thing he wrote on his interview form (see Appendix FF and accompanying transcript in Appendix GG) was regarding a school trip to the astronomical observatory near his school at the age of 12. He said that seeing the moons of Jupiter and the rings of Saturn through the observatory telescope set him permanently and single-mindedly on his chosen career course. "*Me incline por dedicarme esto de la astronomía y ya todo lo demás es consecuencia de eso.*" ("From this experience, I dedicated myself to astronomy and everything else after that is a result of this [observatory visit]") (P2/L009).

However, it could be argued that sooner or later, there might have been other opportunities/incidents which the individual's personality and abilities would have interacted with to result in a similar turn of events. From this point of view, chance might not seem to be as life-changing as it might appear at first sight, and single chance events are usually not evocative of change in themselves. In other words, besides the chance event(s), there are other predispositions and/or situations that will lead the individual to recognize and accept or reject the influence of the chance event.

This is illustrated with Leonard (R) and an example of a chance encounter that he recounted as a catalyst in focusing his life/career path. One of the first things Leonard indicated on his interview format was his early interest in biology. From the age of about 8 to approximately 15, he reported that on every opportunity he had, he would escape to the countryside to examine life in ponds and rivers (P10/T0:00:13.75). At the age of 11 he started working (not uncommon). During secondary school, he worked from 6am to 5pm and then attended school from 5pm to

10pm (P10/T0:03:15.40). He said that two elements caused him to assess his situation: 1) he was tired of being mediocre, a part of the masses, and of not excelling, and 2) because of the extreme difficulty of his work situation he began to reflect on his life path (P10/T0:03:35.15).

Two chance events became life changing because of the above reflection and his natural interest in biology and had the overall effected of solidifying his career path. At the age of approximately 15 Leonard read a popular magazine (*Readers' Digest*) article on medical pathology and about the career of a pathologist (P10/T0:07:40.38). He cited that as a turning point in his life. Around the same time he had a preparatory biology teacher who invited him to work with him in a university hospital medical pathology laboratory (P10/T0:06:38.45). He also said that the above with the help of excellent teachers and professors who gave him confidence in his academic abilities (efficacy) contributed to his success and a medical researcher (P10:T0:02:39.97).

As a side note, Leonard was one of the three participants who did not indicate family influence on his academic and career path development. He came from a socio-economic background of extreme poverty. His father died when he was three years old. His mother had to go to work, and subsequently remarried and had three more children. Of all the siblings and of all the extended family, he was the only one with any sort of formal education (not to mention achieved renown as a researcher). He described himself as a "*bicho raro*", ("a rare bug") (P10/T0:33:33.28).

Another notable series of chance events led Harry (N) to English language teaching. At the age of 11, because of a series of events, this participant was chosen to be a "*recoge bolas*", ("a ball returner") in the 1970 World Cup Series that was held in Mexico City. This event made him aware for the first time of the wider world and

the multitude of languages spoken. As a naturally outgoing person, this realization of other peoples and their languages inspired his desire to learn a foreign language (P18/T0:16:27.11). Because of Mexico's proximity to the United States, English was (and remains) one of the most commonly taught foreign languages in this country. He said that after his World Cup experience, he began to notice "English language lessons" printed in the local newspaper. As a young adolescent, he would cut out the lessons and study them on his own (P18/T0:28:31.11).

One year during high school some students from the United States came to his school as exchange students. Harry and his friend knew English better than their peers, so they could communicate with the exchange students, whom he described as very 'cool girls'. Being favorites of the 'cool girls' elevated his social status among his peers, a desirable outcome for almost every teen male. When the girls left, he maintained a correspondence with them for some time, and credited that correspondence with his further interest and development in the English language (P18/T0:21:05.38).

In this study, Harry was classified as coming from a poor, semi-skilled background (see Table 6.4 above). When he was very young, the family lived in a "*vecindad*", a sort of building with many families sharing communal facilities. He said there were no shower facilities and that there were eight toilets to be shared with approximately 20 people.

He identified English language learning as a social status enhancer which became a means to socially equalize himself with his school peers (P18/T0:15:08.93). This positive feature of language learning was repeated in Harry's life one summer during this adolescence period. During this time, he won a scholarship to a private English language school. The school's student body was generally comprised of

upper middle and upper class students. When Harry entered the school, he quickly discovered that his English language proficiency was far beyond his other classmates. His classmates began to look up to him and seek him out as a source of language knowledge. His language knowledge coupled with his outgoing and generally cheerful personality made him a sort of star in that school, which he indicated, was a very desirable outcome. This experience reinforced the social leveling process English language learning and proficiency provided in his life (P18/T0:18:18.75).

It is easy to see the effects of chance events in life paths by considering, in this case, what would have happened if at age 11, Harry had not been selected to be a *recoge bolas* in the World Cup. Of course, any number of things could and would have happened, but viewed retrospectively, a series of chance events can be seen as directly contributing to the career path development of individuals.

Adulthood. Harry went on to teach English as a young adult in the state's system of middle schools. Because of his English language proficiency (among other factors), he was elected to be a candidate for the directorship of the statewide department in charge of middle school language programs. However, he explained, in the end he was not selected for the position because the selection committee thought he "looked too young" (P18/T0:40:22.95). In this case, the subjective opinion of the selection committee created a chance event that could be regarded as obstructing his career path development.

After such an obstructing event, sometimes, usually after many years, we can look back and see that what we initially interpreted as an obstructing chance event, in the end turned out to be a facilitating chance event. A case that exemplifies this is that of Hoshi (R) who was awarded a teaching assistanceship at a United States public

university (P6/T1:23:09.75). Hoshi was teaching Spanish language classes as well as auditing classes in a graduate program. Since she was part of the teaching staff, she was invited to attend academic staff meetings. It was primarily through this experience that she learned that research activity and production was an expected part of a university staff job. She said that at the monthly staff meetings, the department director would praise research productive staff and address non-productive staff directly to ascertain what factors were obstructing their academic research productivity. From their responses, she would offer suggestions and so on, all with the aim of encouraging and ensuring that staff members were fulfilling their research obligations (P6/T1:54:19.12).

Hoshi also observed that academic staff all held research degrees (PhD), and while that was not the current situation in Mexico, she reasoned it was just a matter of time before the same position requirements would be expected in Mexican universities. Obtaining the doctorate then became part of her cognized career goals (P6T:2:05:47.70). Hoshi also had the academic goal of studying a graduate degree in the United States at the same university, but as chance would have it, paperwork requirements and other factors prevented this. With much regret she returned to Mexico (P6/T1:37:02.72).

Hoshi's parents, who were identified as specific career role models from the childhood stage (P6/T0:16:16.76), encouraged her to continue on with her studies. Although they were not wealthy, they made the sacrifices to get her into a graduate program at a prestigious (at that time) private university. At the university Hoshi came in contact with a pivotal career role model who profoundly shaped her academic and career path development and specifically led to her current level of research activity in her specific area of linguistics (P6/T1:49:52.12).

Chance encounters happen all the time. The effects they produce on people's lives vary from no effect, only slight, to life changing. While the following aphorism was directed toward scientific discovery, in explaining the intensity of the effect of chance on lives, much of the literature on chance encounters cites Pasteur's comment that chance favors the prepared (e.g., Bandura, 1998; Cabral &Salomone, 1990; Díaz de Chumaciero, 2004). In light of this often quoted phrase and the heuristic proposed by Bandura (1982) (discussed in detail in 2.3.1.3 above) for determining the overall effect of chance encounters on life, it might be concluded that many of the chance events indicated in the interviews flourished into life and career path changing events because the participants were receptive in some way to the chance encounter.

Bandura (1998) suggests that environmental and personal factors working in the triadic reciprocal causation model of SCT affect the relative impact of any chance encounter on life/career paths. Individual attributes, skills, and interests will determine the level of change in life/career path (please see 2.3.1.3 above for the full discussion). Cabral and Salomone (1990, p. 10) add two personality factors, 'locus of control' and 'self-concept', to the explanation of the overall impact a chance event will have on life/career path direction.

Locus of control has to do with an individual's conception of where the control in her or his life lies, more externally or more internally. Individuals who have a more external, deterministic conception of control are less likely to be "proactive" when chance encounters present themselves (Cabral & Salomone, 1990, p. 12). People who have established beliefs in their ability to cope with and take advantage of change are more likely to recognize and use chance encounters to change life path trajectories.

The self-concept factor is probably more illustrative of chance encounters observed in the study participants' lives than locus of control perceptions and seems to

support and illuminate the notion illustrated in the previous section, *goal cognizing*. We all operate under a set of self-conceptions that form "prototypes" or "cognitive schemata" that are used as a frame for our interpretations of the world. The interpretative frames also affect our behavioral choices and outcome evaluations which thus act as reinforcements to self-conceptions (Cabral & Salomone, 1990, p. 12).

Thus, it can be posited that career choices are "based on the actual ability of the occupation to reinforce the individual's self-concept" (ibid). This supports the importance of knowing oneself, being introspective, and being able to accurately assess behavioral outcomes as essential factors in successful academic and career path development.

6.2.4 Section conclusion

The purpose of this section (6.2) has been to provide details from the interviews that link to the broader picture of the participants and the findings from the interviews presented in preceding section (6.1). This section was divided into the two principal SCT class determinants: environmental (6.2.1) and personal (6.2.2). Based on the literature presented in 2.3.1.0 above, the environmental factors *career role models, family influences*, *efficacy building experiences, perceived barriers and coping efficacy*[58], and *chance encounters* and the personal factors: *interest, physiological judgments, career goal cognizing,* and *goal attainment* were selected for analysis in the research sample. As mentioned above (6.2, ¶3 above) and demonstrated in the discussion thus far, because of the reciprocal interactivity of the SCT factors, it is not always possible to pull them apart and discuss them separately. Many of the SCT factors were presented together within the individual class sections.

[58] *Coping efficacy* is a personal class determinant, but it is especially associated with barriers

Since this section (6.2) is an amplification of the previous section (6.1), the same overall conclusions can be drawn. The differences, based on the SCT analysis framework, in academic and career path development between the RA and NRA groups seemed most notable in the childhood and adolescent stages. By adulthood, the noticeable gap between the two groups appeared to narrow somewhat.

Differences between the two groups were most pronounced in the areas of *career role models, interest* (early interest expressed related to academic factors, and early current career interest), *physiological judgments (efficacy assessments)*—related to *efficacy building experiences,* and *career goal cognizing.* As illustrated in Fig. 6.2 below, these factors both appear to influence and be influenced by each other, so the presence of one factor tends to imply the presence of another. This reciprocal interactivity is in keeping with one of the major features of SCT, the interactivity of the factors it comprises.

RA participants indicated earlier and more career and research role models than the NRA participants. The RA participants continued to identify with different career role models throughout their career path development. Role models have been identified as important elements in the development of *interests* (e.g., Nauta & Kokaly, 2001). The role model factor was influential in the career path identification, *specific career interest,* in the RA participants. Intertwined with role models and early academic and career interests, were the development of positive *efficacy assessments* partially a result of *efficacy building experiences.* RA participants also seemed to indicate the onset of positive efficacy beliefs in their cognitive abilities beginning sooner than NRA. *Chance encounters* in the case of the RA led to identification of some, not all, career *role models* and therefore *career goal cognizing*, which also

implied a link with *career related interests*, which of course led to possibly more accurate or well informed *career goal cognizing* on the part of the RA participants.

This interactive and reciprocal "one factor leading to another" feature of the SCT determinants as seen with the RA participants is visualized in Fig. 6.2 below.

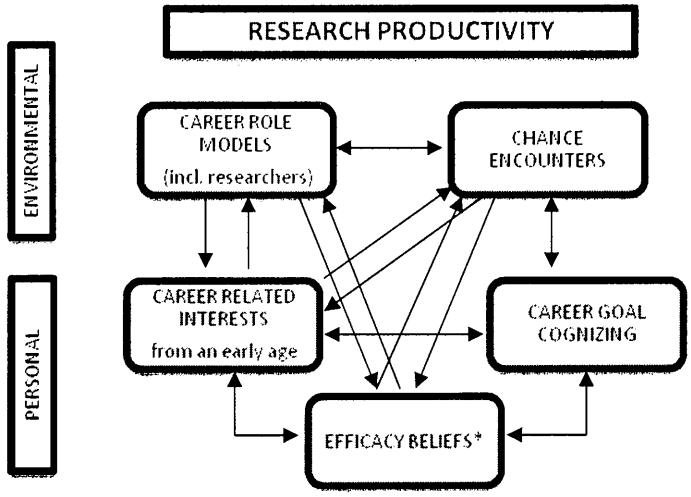


Figure 6.2 Influential factors in academic and career path development emerging in childhood and adolescence -- RA participants

These factors appear to differentiate the academic and career path development of RA from the NRA. The reciprocal interactivity of the elements negates speculation on the primacy of one factor over another. As SCT posits, the factors work as a complicated system leading to a specific behavior. **Efficacy beliefs* also include *efficacy building experiences* related to academic and career path development.

One factor that both groups appear to have in common from childhood (with the exception of Leonard (R) and Miles (N)) is the *family influence* factor. The majority of the participants indicated that their parents, either both or more one than the other, were very much involved in their personal development. Many of the participants indicated that their parents saw education as a way to enjoy a better life and most parents strongly desired that for their children.

The final chapter section below continues this line of comparison between the RA and NRA groups, specifically as it related to the two RQs associated with the second phase of the main study (see below).

6.3 Chapter conclusion

As mentioned at the beginning of this chapter (6.0, ¶4 above), the overall research strategy of this study, in order to arrive at an improved understanding of research engagement or lack thereof in ELT academic staff (working in a research university), lies in the comparison of data from RA and NRA participants, in order to establish, framed by the theories of TpB and SCT, an understanding of what distinguishes those from the same research population who are research active from those who are not research active.

The purpose of this chapter has been to attempt to identify patterns in the life story interviews that were conducted with the RA and NRA subjects, and to interpret them from the perspective of the SCT framework of human volitional behavior, as a means of leading to possible answers to the two second phase research questions. The data indicate findings with respect to each of the RQs as follows:

RQ1. *In what ways do SCT environmental class determinants seem to have played a part in participants' academic and career development?*

All of the SCT environmental class determinants included in the study[59] appeared to have played a role in the academic and career development of all participants. However, when observed within the career path developmental stages of SCCT, the data indicated that RA participants as a group were influenced by a greater preponderance of earlier current *career role models* than the NRA participants (6.2.1.1 above). RA participants seemed to have experienced earlier academic and career related *efficacy building experiences* than the NRA ones (6.2.1.3 above), who indicated career efficacy building experiences primarily in adulthood. *Family influences* seemed to have played a role in both RA and NRA groups (6.2.1.2 above).

[59] *career role models, family influences, efficacy building experiences, perceived barriers and coping efficacy*

All of the participants indicated *barriers* and efficacy beliefs in their ability to *cope* with perceived barriers (6.2.1.4 above). However, RA participants, in many cases, displayed a sort of single-minded pursuit of their chosen careers, some from childhood and others from the adolescent stage, despite many set-backs and barriers. In contrast, NRA participants as a group indicated their final career destination was more a product of default, i.e., all of the NRA participants indicated early career path interests and pursuits unrelated to their current career (ELT) and they reported being obstructed for a variety of reasons in their original career path.

RQ2. *In what ways do SCT personal class determinants seem to have played a part in participants' academic and career development?*

Like those of the environmental class, SCT personal class determinants[60] seem to have had a certain role to play in all the participants' lives. However, when observed within the career path developmental stages of SCCT, RA participants as a group seem to have indicated earlier *current career interests* and earlier *academic interests* than the NRA group. These interests were closely associated with positive academic and career *efficacy beliefs* and *career goal cognizing* which seem to have emerged in the RA group earlier (childhood and adolescence) than in the NRA group (adulthood).

The factor *chance encounters* was added to the model because it was seen to be a notable feature of all of the life paths of the participants. What differentiates this factor in the comparison of the participants is the relative influence of chance encounters in effecting career path development. Because of the distribution of the SCT factors (see Fig. 6.2 above) RA participants were receptive to the effects of chance encounters in their lives which contributed to their development as researchers.

[60] *interest, physiological judgments (efficacy assessments), career goal cognizing,* and *goal attainment*

Chance events certainly happened to NRA, but none of the events or encounters, evidently, led to their becoming researchers.

Another factor that emerged from the interview data was the importance of groups in the academic and career path development of the RA participants. As discussed in 6.2.1.4, **Adolescence,** ¶2 above, group formation and affiliation was indicated by many of the RA participants as essential in their development as researchers. NRA participants did mention groups but not in the sense of contributing to their current career path development.

The group element is an important concept in the environmental class determinants in SCT as well as TpB. Membership of a group milieu tends to influence the individual's behavior so that it becomes compatible with or conforms to the culture of the particular group. Membership in academically minded groups, as indicated by the RA participants, would tend to influence the individual to engage in academically focused activities. Those activities, in turn, would tend to strengthen the academic focus of the group (members). The TpB posits that an individual's perception of social factors (i.e., approval, disapproval, or disinterest toward the target behavior on the part of important others) is a facet of behavioral engagement that the individual evaluates when making decisions to engage or not in a particular activity. Thus, membership or association with a particular group will tend to perpetuate and strengthen behaviors that are valued in that environment (Ajzen, 2005; Bandura, 1982).

The findings discussed in this chapter are part of the whole picture of research engagement or lack thereof in this study sample. The other part of the picture was constructed in Chapter 5. The final chapter which follows joins the two sets of results

(Phase One and Phase Two) to attempt to build an overall picture of factors affecting research engagement in this setting. It also concludes the thesis by proposing practical implications of the findings, study contributions, limitations of the study, and suggestions for further research.

Chapter 7

Discussion and Conclusions

7.0 Chapter introduction and overview

This study has aimed to understand factors affecting levels of research engagement in faculty of modern languages (FML) academic staff in the area of English language teaching (ELT) working in research oriented institutions (see 3.2 above). In Chapter 2, in the light of the theory of planned behavior (TpB) and social cognitive theory (SCT), a multi-theoretical model of research behavior was constructed (see Fig. 2.4 above) in an attempt to provide a framework for the investigation. The factors contributing to research behavior proposed in this conceptual model were explored via a comparison of the characteristics of both research active (RA) and non-research active (NRA) groups of participants (see 2.5 above).

The study research questions were revised twice as a result of elements revealed as it progressed. The study began with three questions based on the academic research productivity literature, as reviewed in 1.3 above. The initial three questions were articulated as follows:

> RQ 1: What seem to be the main personal variables affecting the academic research productivity of the subjects?
> RQ 2: What appear to be the primary environmental variables also of influence?
> RQ 3: In what ways can feedback processes also be seen to affect the matter?

Based on the research model constructed in Chapter 2 (see Fig. 2.4 above) and the methodological approach for the main study as set out in 2.5, the research questions were subsequently refined as explained in 4.1, ¶5 above; two data predictions were added in the form of hypotheses which were seen to contribute to the answers to the RQs above. Based on the TpB, the hypotheses below help to identify the main personal factors, environmental factors, and feedback processes implicit in the TpB model by contributing to the comparison of RA and NRA groups being built:

> H1. Group scores on the direct measures scales of Intention, Identity, Behavioral Beliefs, Normative Beliefs, and Control Beliefs in the TpB questionnaire administered will be significantly higher in RA than NRA participants.
>
> H2. Group scores on the indirect measures scales of Attitudes Toward the Behavior, Subjective Norm, and Perceived Behavioral Control in the same questionnaire will be significantly higher in RA than NRA participants.

The relationship between H1 and H2 is made more explicit below in the exposition of the revised research questions, particularly as they related to RRQ1.

The hypotheses were related to the interpretation of the Phase One quantitative data. Since the main study data did not demonstrate normal distributions, only statistical tests were used to compare groups (rather than additional tests to explore relationships between study variables). Statistically significant differences between

RA and NRA participants' beliefs and attitudes toward research behavior were identified to form the basis for the comparison of RA and NRA participants.

Research questions associated with Phase Two qualitative data interpretation, thus, were associated with the SCT framework established for that study phase and were directed toward an understanding of possible antecedent or background factors to the first phase findings:

> RQ1. In what ways do SCT environmental class determinants seem to have played a part in participants' academic and career development?
>
> RQ2. In what ways do SCT personal class determinants seem to have played a part in participants' academic and career development?

All of the research questions and hypotheses can be subsumed into the following questions: The primary research question (PRQ) underlying the entire study sought to understand the notable differences observed among academic staff members' research engagement and productivity in an environment where research engagement and a certain level of productivity are assumed on the part of academic staff and where the environment provides ample incentive to engage in research behavior (recognition, professional development, social obligation, pecuniary rewards and so on). Contributing to the answer to this principal question, the research questions were refined as follows:

R(evised)RQ1. Is there a detectable difference between RA and NRA participants in terms of attitudes and beliefs regarding research engagement? And if so, what are they, and as a means of attempting to account for those detected differences:

RRQ2. In what ways do SCT environmental class determinants seem to have played a part in participants' academic and career development, and

RRQ3. In what ways do SCT personal class determinants seem to have played a part in participants' academic and career development?

Thus, the aim of the three questions articulated above was to lead the inquiry to an understanding, through the frameworks of TpB and SCT, of the factors seen to underpin research engagement in the study context.

The first of these three revised research questions (RRQ1) was examined in the first phase of the research, through the generation of quantitative data via the application of TpB and associated with the two expressed hypotheses above. Addressing the two following revised questions posed above (RRQ2 and RRQ3), in the second phase of the research, qualitative data via life story interviews, informed by an SCT perspective, were generated in order to identify potential background factors relevant to TpB data and ultimately to research activity of the participants (cf. section 3.8 above). The answer to the larger underlying question (PRQ) articulated above was a product of the combination of Phase One and Phase Two findings and is addressed in this final chapter. The overall structure of the main study research design and associated thesis chapters is shown in Fig. 7.1 below.

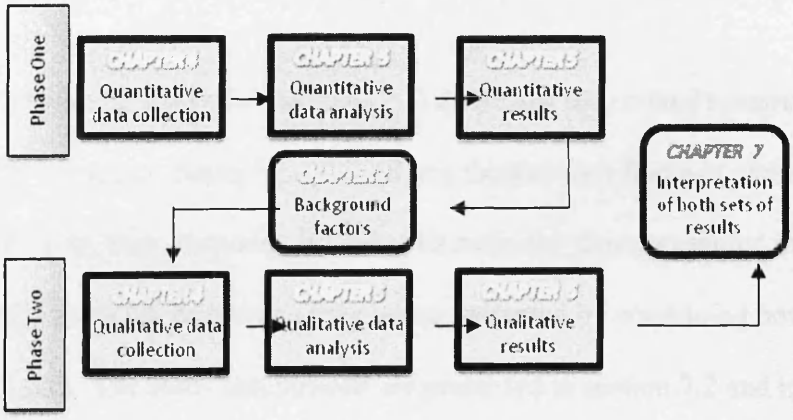


Figure 7.1 Main study design
(based on Creswell &Plano Clark, 2007, p. 63)
In Phase One, quantitative interpretative approaches were used within the TpB framework (RQ1). In Phase Two, qualitative approaches were used within the SCT framework to further explore differences between RA and NRA groups found in the first phase analysis (RQs 2 and 3). Both data sets were brought together, examined and interpreted jointly in the current chapter (PRQ).

Fig 7.1 above shows the two-phase, mixed-methods design used in this study. Qualitative data were collected after the quantitative phase to attempt to shed further light on the quantitative data in more depth. In the first phase of the study, TpB questionnaire data were collected from research participants (see 4.3.1 above) to explore TpB factors with respect to research activity. In the second phase, life story interviews were used to explore the role of SCT behavioral determinants (see 2.3 above) in the overall formation of RA and NRA academic staff in this research location (see 1.2 above).

The underlying rationale for the two-phase, mixed-method design of this study was that quantitative data and their analysis would provide an overall picture of attitudes and of social and control factors regarded as determinate factors influencing intention to engage in research activity. The qualitative data and their ensuing analysis were seen as means of refining those results by exploring participants' academic and career path development in much more depth (Creswell & Plano Clark, 2007).

The following discussion section (7.1) addresses the *revised* research questions described in 7.0 above, firstly by summarizing the key data findings presented in Chapter 5 (7.1.1), then, secondly, by doing likewise for those presented in Chapter 6 (7.1.2), and, finally, by examining the picture presented by combining both sets of findings (7.1.3). The study conclusions are presented in section 7.2 and include an indication of the contributions it is felt the research makes to background theory (7.2.1) and to the focal theory (7.2.2). The section ends with a presentation of study limitations (7.2.3), directions for future research (7.2.4), and final comments (7.3).

7.1 Summary and Discussion of Results

This discussion section is divided into two principal subsections, a summary and discussion of the results of phase one of the study (7.1.1) and a parallel summary and discussion of the results of phase two (7.1.2).

7.1.1 Quantitative results summary

Revised research question 1[61] presented above (7.0) was the focus of the quantitative data analysis presented in Chapter 5. The results were divided into three categories summarized in the following three sections:

7.1.1.1 Descriptive characteristics of the participants (5.1 above)

The overall purpose of this part of the research was to provide additional data intended to support the RA and NRA comparison. The comparison of the groups, as explained above (7.0, ¶1), was seen as a way to approach an understanding of the observed variation of research engagement in this setting. Table 7.1 below describes the six variables examined.

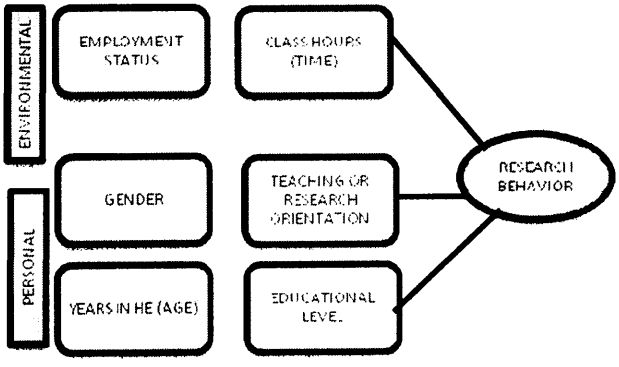


Figure 7.2 Main study variables found to be associated with research behavior (does not imply causality). *Time, a research or teaching orientation*, and *educational level* seemed to be associated with research behavior. *Employment status, gender* and *age* did not appear to be associated with research behavior in this sample.

[61] RRQ1-- Is there a detectable difference between RA and NRA participants in terms of attitudes and beliefs regarding research engagement? And if so, what are they?

Results from this analysis indicated that factors having an association with academic research productivity in this sample were the variables related to *time* (as measured by classroom hours), *educational level*, and *professional orientation.* Factors that seemed to have no association with academic research productivity are *age, gender* and *employment status* (see full results presentation in 5.1 above).

These results confirm prior studies on academic research productivity related to these factors (see contributions to focal theory below, 7.2.2). *Time* is a variable often cited in the literature as negatively associated with academic research productivity (e.g., Borg, 2007; Burke & James 2005; Jungnickel, 1997). Not unexpectedly, the academic research productivity literature clearly indicates that *educational level* and academic research productivity are highly positively associated (e.g., Burke & James, 2005; Ferrer & Katerndahl, 2002; Stack, 2002). And, the data do seem to support findings from other studies that indicate that *orientation to research* or *teaching* is a variable in academics' engagement or lack of engagement in research activity (e.g., Bailey, 1999; Blackburn, et al., 1991; Perry, et al., 2000; Ramsden, 1994; Zainab, 1999). These studies have shown that respondents who report an interest in research over teaching are significantly more research productive than their counterparts who report an interest in teaching over research. In many instances academic research productivity is seen to come at the expense of teaching proficiency, i.e., it is not possible to attend to both activities with any kind of equal levels of productivity (Perry, et al., 2000).

Age and *gender* were shown to have no apparent association with academic research productivity in this research sample. That finding is supported by several studies (e.g., Ferrer & Katerndahl, 2002; Perry, et al., 2000; Sax, et al., 2002; Stack, 2002). In particular, Gonzalez-Brambila and Veloso's (2007) study of academic

research productivity in Mexican scientists found that there was no significant *age* or *gender* difference in academic research productivity for their sample (N=14,328).

Employment status, i.e., full-time, part-time, tenured, non-tenured, has been shown in the literature to be associated with academic research productivity. Academic research productivity studies tend to agree that tenured faculty members are more research productive than non-tenured (e.g., Bailey, 1999; Ferrer & Katerndahl, 2002; Wood, 1990). In the present study, however, there seemed to be no association between full-time tenured and full-time non-tenured and research activity.

7.1.1.2 Research indicators (5.2 above)

In the research sample, 95.6% of the RA and 18.2% (four participants) of the NRA participants possessed a *Perfil PROMEP*[62], and 55.6% of the RA participants were affiliated with the *SNI*[63]. No NRA participants were members of the SNI. All of the RA participants and none of the NRA were affiliated with the university's *Padrón de Investigadores*[64]. Membership in these three registers is based principally on peer evaluations of academic research productivity. The findings from this paragraph are provided to frame the findings presented in the two following paragraphs.

Participant affiliation with *Cuerpos Academicos*[65] provided unexpected results. 97.8% of the RA sample indicated that they belonged to a faculty research group. Surprisingly, 81.8% of the NRA participants also indicated that they belonged to a faculty research group. While participants were not asked specifically *why* they were affiliated with a faculty research group, it might be assumed that it was because they wanted to engage in research activities.

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[62] That is had received national recognition from the *Secretaría de Educación Pública* (Ministry of Education) and *Instituciones de Educación Superior* (public institutions of higher education)
[63] Members of the National Society of Researchers
[64] Members of the university Register of Researchers
[65] Membership in faculty-level research groups

Two additional factors provided findings that were unexpected on the part of the NRA participants but that added to the overall interpretation of attitudes toward research engagement. 97.8% of the RA group and 95.5% of the NRA group expressed the belief that research activity is a professional obligation, and both RA (76%) and NRA (73%) believed that research activity should be considered in promotion evaluations (full results are presented in 5.2 above).

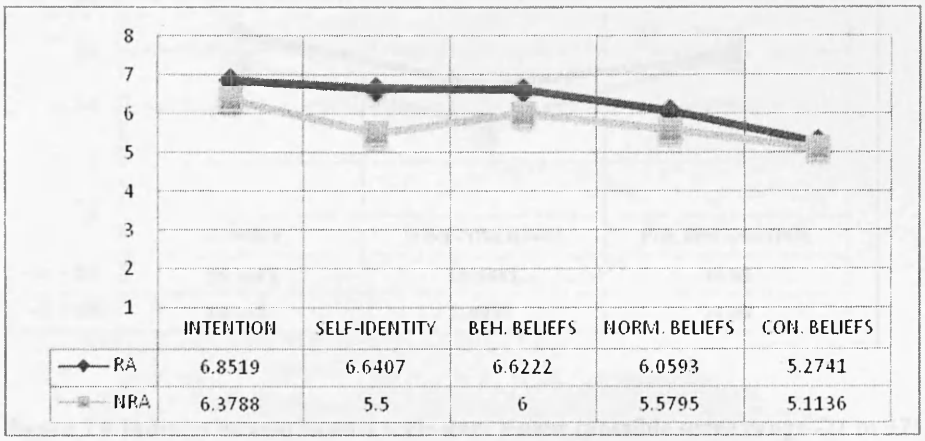
7.1.1.3 Hypothesis testing results (5.3 above)

The results presented in this section were guided by two predictions (H1 and H2 below) and were associated with RQ1[66] articulated above:

> *H1. Group scores on the direct measures scales of Intention, Identity, Behavioral Beliefs, Normative Beliefs, and Control Beliefs in the TpB questionnaire administered will be significantly higher in RA than NRA participants.*
>
> *H2. Group scores on the indirect measures scales of Attitudes Toward the Behavior, Subjective Norm, and Perceived Behavioral Control in the same questionnaire will be significantly higher in RA than NRA participants.*

As hypothesized, the variables associated with the direct measurements (H1) (Fig. 7.3 below, first presented in Fig. 5.2, p. 142),with the exception of *control beliefs,* displayed statistically significant differences between the RA and NRA groups, i.e., in terms of *intention, self-identity, behavioral beliefs*, and *normative beliefs*. While RA mean scores for *control beliefs* were higher than NRA mean scores, the difference was not significant. Of the five variables, differences between RA and NRA groups were most notable in the variable *self-identity* (see 5.3.1 above).

[66] Is there a detectable difference between RA and NRA participants in terms of attitudes and beliefs regarding research engagement?



	INTENTION	SELF-IDENTITY	BEH. BELIEFS	NORM. BELIEFS	CON. BELIEFS
RA	6.8519	6.6407	6.6222	6.0593	5.2741
NRA	6.3788	5.5	6	5.5795	5.1136

Figure 7.3 Direct measurements scale item means (possible score range 1 to 7)
Scores were significantly different between RA and NRA in all scales except control beliefs. The greatest difference between RA and NRA appeared in the self-identity scale. Overall beliefs expressed by both groups on all scales were high, indicating positive beliefs and attitudes toward research engagement.

In regard to the indirect measurements (H2) (Fig. 7.4 below, first presented in Fig. 5.3, p. 145), two of the three variables displayed statistically significant differences between the RA and NRA groups, i.e., *attitudes toward the behavior* and *subjective norm.* Similar to the direct measurements, the variable *perceived behavioral control* was not significantly different. Of the three variables, differences between RA and NRA groups were most notable in the variable *subjective norm.* This finding may indicate that NRA participants perceived less social pressure to engage in research than RA participants (see 5.3.2 above).

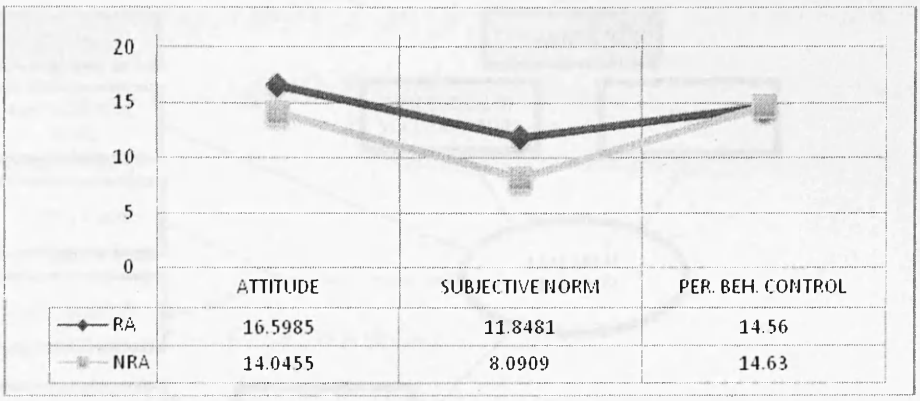


Figure 7.4 Indirect measurements scale item means (possible score range -21 to +21)
RA scores were higher in the attitudes and subjective norm scales, and essentially equal for perceived behavioral control. The greatest difference in scores between RA and NRA subjects occurred in the subjective norm scale.

On the whole, the results indicated are consistent with the TpB framework. The theory predicts that persons more likely to engage in the behavior under study would score higher than those less likely to engage in the behavior. This appears to be true with this data with the exception of the control variables, *control beliefs* and *perceived behavioral control*. Mean scores for these variables indicated that both RA and NRA subjects perceived essentially very few impediments to their engagement in research. A possible explanation for the findings related to these two variables has been proposed, viz., that it might be difficult for NRA participants to conceptualize potential control barriers to carrying out research when there is little or no personal experience-based evidence on which to formulate those beliefs (Sheeran & Orbell, 1996) (see sections 5.3.2 and 5.3.3 above).

These factors (TpB measurements) combined with the factors indicated as having an association with research engagement presented above (demographic factors, 7.1.1.1 and research indicators, 7.1.1.2) were combined to form the following associative model of research engagement for the research sample (first presented in Fig. 5.4, p. 148).

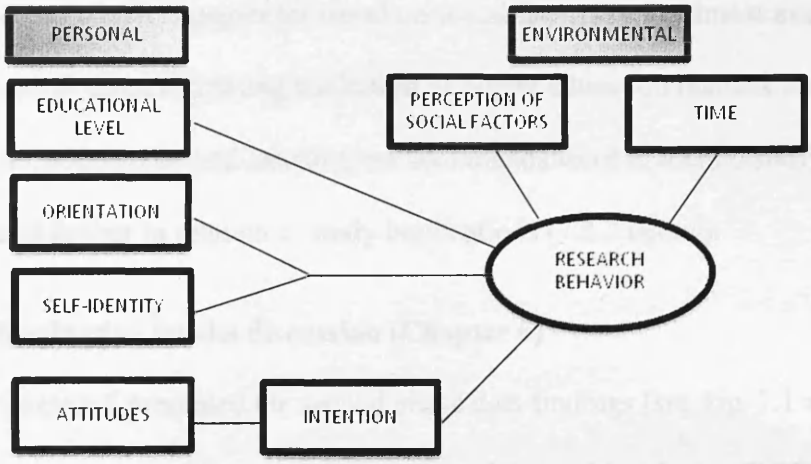


Figure 7.5 Associations between personal and environmental factors and research behavior (does not imply causality)

Personal factors are listed by level of the magnitude of difference between RA and NRA groups. ***Educational level*** displayed the largest difference between the groups. ***Orientation to research or teaching*** and ***self-identity*** followed and are shown as joined because an association between the two constructs is assumed (presumably an orientation to research and self-identity as a researcher would both be present in a cognized representation of the self). TpB variables of ***attitudes toward the behavior*** and ***intentions*** to engage in the behavior are represented as linked concepts. Attitudes influence intentions to engage in the behavior. ***Environmental factors*** seen as having a possible association with research behavior are the TpB ***social factors*** and ***time*** as measured by classroom hours.

The quantitative results presented in this summary indicate that *time*, a *research* rather than teaching *orientation*, and *educational level* were associated with academic research productivity in this sample. *Attitudes*, assessed on the group level, appeared positive towards research engagement. The participants appeared to be aware of a *professional obligation* to engage in research, and participants seemed to perceive *social factors* (approval and disapproval) associated with research engagement.

Supporting the influence of social factors were the issues of "socially desirable responding" and "hypothetical bias", which were suspected to have moderated the responses of the NRA participants (see 5.4.1 and 5.4.2 above). This might indicate that NRA participants tended to give overly positive representations of their beliefs

regarding research engagement based on social factors (e.g., almost everyone working in a research degree-granting institution of higher education realizes that academic research productivity and teaching are dual mandates of academic staff). This issue is discussed further in relation to study implications (7.2.2 below).

7.1.2 Qualitative results discussion (Chapter 6)

Chapter 6 presented the second phase data findings (see Fig. 7.1 above). Life story interviews were interpreted through social cognitive theory (SCT) using the career path development frame from social cognitive career theory (SCCT) (see 6.0, ¶5 above). Chapter 6 addressed RRQ2 and RRQ3 as reviewed below.

Findings from the life story interviews in general confirmed prior research as reported in the career development and SCT literature. Existing research has empirically demonstrated the primacy of the factors (see footnotes 64 and 65 below) forming the basis of the interview analysis on academic and career path development (as discussed in 2.3.1 above). This study has expanded the concepts by applying them to understanding differences in academic and career path development between a research sample working in the same context but with widely different outcomes in the area of research engagement.

RRQ2. In what ways do SCT environmental class determinants seem to have played a part in participants' academic and career development?

All of the SCT environmental class determinants included in the study[67] appeared to have played a role in the academic and career development of all participants. However, when observed within the career path developmental stages of SCCT, the data indicated that RA participants as a group were influenced by a greater preponderance of earlier current career *role models* than the NRA participants (6.2.1.1

[67] *career role models, family influences, efficacy building experiences, perceived barriers and coping efficacy*

above). Also, RA participants seemed to experience academic and career related *efficacy building experiences* sooner in their development than the NRA participants (6.2.1.3 above), who indicated career efficacy building experiences primarily in adulthood.

Family influences seemed to have positively influenced the academic development of most of the participants and the current career development in many of the RA participants (6.2.1.2 above). Furthermore, all of the participants indicated *barriers* and *efficacy beliefs* in their ability to *cope* with perceived barriers (6.2.1.4 above). However, RA participants, in many cases, displayed a sort of single-minded pursuit of their chosen careers, some from childhood and others from the adolescent stage, despite many set-backs and barriers. In contrast, NRA participants as a group indicated their final career destination was more a product of default, i.e., all of the NRA participants indicated early career path interests and pursuits unrelated to their current career (ELT), and reported that, for a variety of reasons, they were obstructed in their original career path pursuits (see 6.2.2.2 above).

RRQ3. In what ways do SCT personal class determinants seem to have played a part in participants' academic and career development?

Similarly to the environmental class, SCT personal class determinants[68] seem to have had a certain role to play in all the participants' lives. However, when observed within the career path developmental framework of SCCT, RA participants as a group seemed to have indicated *current career interests* and *academic interests* developing sooner than the NRA group. These interests were intrinsically associated with positive academic and career *efficacy beliefs* and *career goal cognizing* which seemed

[68] *interest, physiological judgments (efficacy assessments), career goal cognizing,* and *goal attainment*

to have emerged, logically, in the RA group earlier (childhood and adolescence) than in the NRA group (adulthood) (discussed further in 7.1.3 below).

The factor *chance encounters* was added to the model because it was seen to be a notable feature of all of the life paths of the participants. What differentiates this factor in the comparison of the participants was the relative influence of chance encounters in effecting career path development. It appeared to be the case that, because of the distribution of the SCT factors (see Fig. 6.2 above), RA participants were receptive to the effects of chance encounters in their lives which contributed to their development as researchers. Chance events certainly happened to NRA, but none of the events or encounters were observed or identified as leading, obviously, to their becoming researchers.

7.1.3 Combining the quantitative and qualitative data results

This section combines the findings reported in 7.1.1 and 7.1.2 above to achieve the principal aim of this study, i.e., to identify, understand, and attempt to provide an explanation for levels of research engagement in faculty of modern languages (FML) academic staff in the area of English language teaching (ELT) via the multi-theoretical model of research behavior constructed in Ch. 2 (see Fig. 2.4 above) (PRQ – as presented in 7.0 above).

A way to approach an understanding of the differences observed between the two groups (RA and NRA) in their academic and career path development is through presentation of a "synthetic-montage" (Wengraf, 2001, p. 335) of an RA and an NRA participant. Wengraf (ibid) explains that the researcher, when creating an interpretation of interviews, creates a portrait of the participant in much the same way as an artist would paint a portrait of an individual. The portrait is a result of the way the artist or in this case the researcher interprets and represents the object of

observation. The portrait is always situated within an interpretative frame bounded by culture, context, purpose, and the abilities and limitations of the artist. With this in mind, the purpose in the case of the montages presented below, is to bring together the most salient features of the findings from the interviews that help illustrate the differences between the two groups. This is explained further in the following paragraph.

To create the synthetic-montage the following two composite portraits were constructed from the most common or typical features observed from the quantitative and qualitative findings as presented in Chapters 5 and 6 (and as summarized in sections 7.1.1 – Ch. 5 and 7.1.2 – Ch. 6 above). Each synthetic portrait is divided into the developmental stages of SCCT: childhood, adolescence and adulthood. The first montage below creates a portrait of an RA participant (line numbered, RA1-RA49) and the second a portrait of an NRA participant (lines NRA1-NRA38). Both of the composite participants are portrayed as males merely because the majority of the participants were males.

As with the interview findings, the synthetic portraits presented below demonstrate the subtle but significant differences between the two groups. As stated in 6.2.1.2, ¶7 above, all of the participants have gone, in terms of career and personal development, beyond what might have been expected of them, considering their backgrounds (cf. RA1-5 and NRA1-6). Thus, there are many similarities between the two portraits, and indeed, the differences may be hard to spot at first glance.

The differences in the two portraits tended to lay, as demonstrated in the findings, in the early development of self-efficacy beliefs (cf. RA19-20 and NRA22-23), efficacy building experiences (cf. RA20-21 and NRA22-23), childhood development of academic efficacy beliefs (cf. RA13-15; RA20-22 and NRA6-7), the

RA identification of specific career goals in childhood or adolescence and the, relative to RA, NRA late identification of current career goals in adulthood (cf. RA22-23 and NRA15-16), and the identification of current career role models (cf. RA16-18; RA28-29; RA30-34 and NRA20-21). In the case of the RA participants, these elements combined with the reciprocal interaction between the elements (as proposed in the theoretical model presented in Ch. 2) had the net result of compounding the influence of the factors on the overall development of the RA participants as researchers. In the case of the NRA participants, other life path trajectories (NRA17-18) had the effect of lessening the cumulative effects of the factors which in the development of the RA led to research behavior.

These characteristics are illustrated in the following synthetic portraits.

RA participant

Julian's family was poor. He grew up in an urban area characterized by crime, violence and various kinds of substance abuse on the part of the residents. His father was a laborer who finished primary school and then started working at the age of 12. Julian's mother only went to the third level of primary school. Both of the parents came from rural areas. There were six children in the family. Julian was the fourth child. The parents had a great desire for all of their children to pursue professions because they saw that as a way to a better life. Because of this the parents made sacrifices to make sure their children had educational opportunities. They provided models of hard workers and attentive parents. The parents also instilled in their children a love and respect for education and learning.

Partly because of these educational values, when Julian entered primary school, he had the example of his older siblings to model his own behavior on. They were studious and known by their teachers, who became Julian's teachers, as good, hard-working students. The renown of his older siblings put a sort of social pressure on Julian to excel in his studies as they had. That social pressure coupled with the educational values taught by his parents led Julian to develop an early interest in academic matters.

In early adolescence Julian had come in contact with his first role model outside of the family, a primary school teacher. In his last year of primary school (approximately 11 years old) Julian had a teacher who inspired his love of reading, which in turn, served

RA19 to increase his academic abilities beyond those of most of his peers. At this point Julian
RA20 came to realize that he could stand out in academic areas. As a partial result of his
RA21 positive academic efficacy beliefs, Julian began to take an interest in his potential career
RA22 path by the time he entered secondary school (approximately 12 years old). By the
RA23 middle of secondary school, he had identified a professional career and his academic and
RA24 career path pursuit strategy. However at the same time, he had to start working in a
RA25 menial job to help support his parents and to earn money for his education. From this
RA26 point on, he worked half the day and went to school the other half.
RA27 In late adolescence, Julian entered preparatory school where most of his academic
RA28 experiences were directly related to his career path. He came in contact with many
RA29 specific career role models principally in the form of his teachers who provided career as
RA30 well as academic role models. During this period he had identified peers and colleagues
RA31 and had formed academic groups dedicated to studying and discussing their mutually
RA32 chosen career paths. The groups strengthened his academic abilities and served to
RA33 provide more opportunities for identification of more influential role models as his
RA34 sphere of contacts increased.
RA35 His university years were highly focused on his chosen career path. There were
RA36 many opportunities to work with researchers in his chosen field. Julian married in his
RA37 third year of undergraduate studies (at age 23) and subsequently had two children in the
RA38 following two years. His new family responsibilities required him to take a job teaching
RA39 his area in secondary school. However, to make enough money to support his family, he
RA40 had to teach full-time which left little time for his university studies. He managed to
RA41 finish his undergraduate studies, but had to delay his entry into graduate school because
RA42 of financial reasons. He maintained contact with his academic groups and their mutual
RA43 interests and hobbies associated with his chosen career field. On one occasion the group
RA44 was brought into contact with some of the university professors in the field.
RA45 Subsequently, Julian was offered a position in the university which allowed him to
RA46 continue his studies. He finished his masters and then his doctoral degree.
RA47 He is now a nationally recognized researcher who has won many awards and has
RA48 many publications. He credits his success to his parents, his love of reading, the role
RA49 models throughout his development, and a little credit to luck.

NRA participant

NRA1 William also came from a poor family. His father, who finished secondary
NRA2 school and immediately started working, was a factory worker in a large city. His

mother also finished secondary school but married young and worked in the home. William's mother was the primary promoter of education and educational values in the family. She made sure that William and his siblings did not get involved in destructive neighborhood adolescent groups. William was the second to the oldest of five children. William was neither interested nor actively disinterested in school in his primary school years. He had friends, was involved in sports, and described himself as an average student. His sister studied medicine, but the other siblings finished secondary school and entered the workforce.

In secondary school he began to think about his career options. His favorite subjects in school were literature, geography and history. Some of his career aspirations were entering the priesthood or studying psychology; he also looked into accounting but had no real interest in it. In secondary school he had mandatory English language classes. Initially he was not interested in English primarily because his teachers were, as he described them, "incompetent". Toward the end of his secondary school year he was still uncertain of his career goals. He started working with his father in the factory at the age of 15.

By preparatory school (16-18 years old), he was studying psychology with the intention of entering that career path. He worked in the factory during the nights and attended classes in the mornings and early afternoons. One year in preparatory school he had a competent and inspiring English teacher and William discovered that he enjoyed learning English and had a sort of ability with the language that his peers did not seem to possess. This ability contributed to his positive efficacy beliefs related to his second language learning which in turn led him to seek out language learning opportunities. In his final preparatory school year (approximately 18 years old) he participated in a youth camp summer program in the United States.

When he returned, he finished preparatory school and lacking another career direction, he found it very easy to find a job teaching English. After five years teaching English in the secondary and preparatory levels, he found a job teaching in the university. It was possible at that time to teach a foreign language in the university without a university degree. After a number of years the university opened an undergraduate ELT training program and William was one of the first generation of students to complete the program. He was immediately hired as a teacher in the ELT program. He taught there for 20 years and then studied his masters' degree in ELT. Now he is only a few years from retiring from the university. He is a very competent and popular teacher in the program; however, he was never interested in doing research. He regards research as part of his work at the university but sees no real

NRA38 compulsion to engage in research and publishing at this point.

When comparing the two composite portraits above (and the data from which they derive), one overarching theme seems to emerge from the accounts. As SCT posits, environmental and personal factors work through a system of triadic reciprocal causation (TRC), i.e., there is a three-way causal relationship between environmental factors, personal factors and a given behavior with 'causes' running in both directions between all three factors. A personal determinant like *interest* will influence the presence of an environmental factor. To take the case of the RA composite first, this phenomenon can be seen to occur at RA 29-34, where interest can be seen to relate to influential *role models* entering the picture. As a result, now both *interest* and *role models* can be seen as contributing to the action or behavior. In turn, the behavior can be seen as feeding the *interest*, which tends to reinforce *efficacy beliefs*, which in turn tends to lead to immersion in environments related to the interest, additional positive career role models, and opportunities for fortuitous *chance encounters*, exemplified in the case of the RA composite at RA 35-46. The increase in positive *self-efficacy beliefs* can be seen to allow the individual to survive *barriers* and *obstructions,* as illustrated at RA 39-40, which in turn builds *resiliency*, which further bolsters *efficacy beliefs*, and so on, effects represented by RA 35-46.

The effect of TRC can be seen to have operated in the lives of the NRA participants as well, but more disadvantageously, in terms of future research involvement. The principal difference can be seen to lie in the absence of a more singular type focus related to academic and career development on the part of the RA that contributed to the *accumulation* of factors leading to the eventual development of research engagement.

Thus, for example, in the NRA composite above, as NRA 7 indicates, William's *interest* in school (i.e., activities associated with learning) in his childhood stage was not especially strong. In adolescence, his interest in fields of study and potential career areas was divided among different areas, as NRA 11-13 illustrates. Thus, in William's case, the configuration of TRC was such that it did not lead to the kinds of strengthening of SCT factors observed in Julian's case. It could be posited that William's ambiguity about potential academic and career paths affected his identification of any specific career *role models* at this stage, unlike in Julian's case (cf. RA 29-34). The absence of influential specific role models can be seen, in turn, to have inhibited the development in William of specific career *interests* and/or career *goal cognizing* and/or career *efficacy beliefs* at this stage and, therefore, did not lead to his immersion into any academic or career related environments which were associated with his final career choice.

By William's adult stage, as NRA 22-23 shows, he had come in contact with a situation which had the effect of building his *efficacy beliefs* related to his ability to learn English. The same type of efficacy-building experience was identified in Julian's story (see RA 16-18). The difference is that it occurred much earlier, in his last year of primary school. Finally, as NRA 27-28 illustrates, William's current career trajectory began in adulthood and was more of a convenient choice rather than a deliberate action. Thus, in William's case, the primary apparent disadvantage was *when* the accumulation of certain factors was set in motion, later in life than in Julian's case. This said, quite clearly, the explication of events as portrayed in these montages does not explicitly make clear why Julian is a researcher and William is not, but it does appear to show how a set of factors reacted and interacted to set certain behaviors in motion in both of the life trajectories pictured, and therefore predisposed

events to take the courses they did. This reaction and interaction of factors is discussed further as related to the RA participants in the following paragraphs.

Thus, in overall terms, the main point which the contrasting and comparing of these two montages is intended to illustrate is that, in many of the interview accounts provided by the RA participants, as interpreted through the SCT, it is apparent that those factors seen as contributing to academic and career path development occurred at a relatively early stage and were so interrelated that the presence of one presumed the presence of the other and led to the presence of yet another, creating a sort of "bootstrapping" effect, i.e., so that the presence of one factor in some way assisted in the development or presence of another which reciprocally reinforced the strength or presence of the first factor, and so on. This concept is closely related to the advantage observed in "those who have" creating a condition whereby "those who have" continue to "accumulate" because they "have" something to begin with. This phenomenon has been conceptualized as the "Matthew effect" (Merton, 1968, p. 58). The name of the effect comes from a Christian Bible verse as quoted in Merton's Matthew effect article:

> For unto everyone that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath.

While Merton identified the Matthew effect associated with eminent scientists and Nobel Prize winners[69], since then the term has been used to describe a variety of situations where "having" in the first place leads to more "having" as time passes. The opposite is also implied, i.e., that not "having" to begin with leads to a permanent lag in "having" compared to those that "have". The Matthew effect has been identified and studied in, *inter-alia,* areas of reading (e.g., Stanovich, 1986), reading and vocabulary learning (e.g., Penno, et al., 2002), cooperative learning (e.g.,

[69] "...for equally good scientific work, renowned scientists tend to get more credit than unknown scientists" (Strevens, 2006, p. 160).

Onwuegbuzie, et al., 2003), social policy and economic theory (e.g., Bonitz, 2005; Hu, et al., 2006; Wade, 2004), medicine (e.g., Essink-Bot, et al., 2006; Mildestvedt & Meland, 2007), early childhood intervention (e.g., Bakermans-Kranenburg, et al., 2005), and science (e.g., Bailón-Moreno, et al., 2007; Laudel, 2006; Strevens, 2005).

The precedent of identifying Matthew effects in a variety of situations can also be applied in this study to the accumulation of SCT variables throughout academic and career path development that, as has been shown, led to career stage research engagement (discussed further in 7.2.2 below).

This idea is expanded in the following section, in presenting the overall conclusions of the study.

7.2 Conclusions

This section will attempt to articulate the possible contributions of the study to background theory (TpB and SCT) and focal theory (academic research productivity) as they relate to research engagement by ELT faculty members working in a research degree granting university.

7.2.1 Contribution to background theory

It can be argued that a potential contribution to background theory of this study is the combination of the theory of planned behavior (TpB) and social cognitive theory (SCT) in understanding research engagement of university academic staff. The study demonstrated the viability of synthesizing the two theories into an integrated framework for understanding this behavior in this research context. The TpB has proven efficacious in predicting and accounting for volitional behavior in a number of domains (see 2.2 above). In this study, while data distribution did not allow investigation of the relationships between the variables, the results indicated that

when comparing groups the TpB was able to distinguish between RA and NRA participants, thus providing a useful framework for the basis of the comparisons used in this study. The data also conformed to the principal analytical premise of the TpB that those most likely to engage in the behavior under study would score higher in terms of the instrument evaluation than those less likely to engage in the behavior (see 5.3 above).

While the TpB has empirically demonstrated utility in understanding engagement in a specific behavior within a specific time frame, it does not expressly address background factors which could be seen to influence the beliefs held toward the particular behavior. Thus, SCT was incorporated into the research engagement model to help identify and assign primacy to factors underlying the more immediate identified TpB factors. This study has expanded the concepts held by both theories by applying them to understanding differences in academic and career path development between a research sample working in the same context but with widely different outcomes in the area of research engagement.

The TpB and SCT were seen as compatible in this research situation because they both posit that volitional behavior is a product of environmental as well as personal factors and incorporating 'feedback' and 'feedforward' evaluative processes. As discussed in 1.3 above, these two classes of behavioral determinants plus the evaluative processes have been identified in the academic research productivity literature as fundamental in understanding research engagement.

7.2.2 Contribution to focal theory

The research can also be seen as having made potential contributions to the focal theory. As detailed in 1.3 above, nearly a century of research on factors associated

with research engagement and productivity have all generally concurred that the correlates of academic research productivity fall into three broad categories: environmental factors (see Appendix A), personal (sometimes referred to as 'individual') factors (see Appendix B), and feedback processes, i.e., principally, "cumulative advantage theory" and "reinforcement theory" (see Appendix C).

Research activity is widely accepted as one of the dual mandates of staff working in higher education. One obligation, clearly, is to teach and the other is to engage in research as a form of knowledge creation and / or knowledge advancement (Burke & James, 2005). Academic staff members working in higher education usually have several motives for engaging in research activities. Many of the motivations are in the form of financial rewards principally related to questions of promotion and research funding. However, as many researchers will claim (Bailey, 1999) much of their research activity is based more on intrinsic types of rewards, i.e., personal challenge and satisfaction, professional development and recognition among their peers, knowledge generation, being a better more well informed teacher, and so on (ibid). The same motivations and reasons for research activity can be seen to hold true for ELT practitioners, particularly those working in institutions of higher education as in the case of this present study.

However, involvement of this kind is typically underdeveloped among EFL teachers around the world (see, e.g., Borg, 2007) despite the importance attached to it in the professional literature, the overall agreement of teachers that research activity should be a component in their practice, and its being generally regarded in a positive light. To date there have been very few empirical studies examining factors affecting research engagement of ELT academic staff working in institutions of higher education. Thus, this study has attempted to fill that gap by furthering understanding

of the factors affecting academic research productivity in higher education in general and in ELT staff specifically.

Thus, the specific contribution to the focal theory lies in the comparison of RA and NRA groups addressing the gap articulated above. As Wengraf (2002, p. 343) contends, with much research of this nature "models that are concerned for intelligible differences are more valuable than those concerned for universal or ahistorical constants." In other words, our understanding of a situation often lies in our comprehension of the comparison and contrast of the variables involved in specific situations.

In this specific research situation, the comparison has revealed mutually positive attitudes towards research engagement, equal recognition of the obligation of research engagement in this setting, the mutual belief that research activity should be part of promotion decisions, and an expressed intention to continue (in the case of the RA) and to begin to undertake research activity (in the case of the NRA) over the next five years (see 5.3 above).

The contrasts between the groups provided more revealing information regarding research engagement in this research context. Underlying all of the contrasts summarized in the above sections (7.1) is an explanatory concept differentiating RA from NRA: a "Matthew effect of accumulated SCT factors" in the case of the RA participants. None of the NRA participants had any intention of becoming researchers, and all of them started on their current career paths as adults. It is primarily the Matthew effect of accumulated SCT factors that provides an explanation for the differences between the RA and NRA groups observed in the TpB data and as observed in the SCT data as it is specifically related to research engagement in this research context.

To some extent this study shows that, regarding the presence of academic research productivity in the careers of the participants, the "die is cast" in many respects in early academic and career path developmental stages. However, this finding should not be viewed deterministically, but, rather, as increasing the potential for events to move in certain directions. In other words, the Matthew effect observed in this setting does not necessarily predestine NRA academics to a professional life devoid of the benefits of research engagement.

To illustrate this point, I provide the following examples of myself and my partner in a number of research projects, both academic staff members of the FML. While we do not regard ourselves on the same research level as the RA participants, we are nevertheless members of the *Padrón de Investigadores* (register of university researchers), have a *Perfil PROMEP* (national recognition for academic research productivity) and are members of a *cuerpo academico,* (faculty research group). While our academic research productivity is nowhere near as prolific as the RA participants, we do manage to publish once a year and are active in national and international conferences.

Despite all the above, our profiles, when observed through the framework developed for this study, are more similar to the NRA participants than the RA. I will provide a brief summary of my own academic and career path development, followed by that of my colleague's (N = Nancy, K = Katherine). The two narratives are discussed further below in terms of their relation to each other and to the synthetic-montages (7.1.3 above).

N1 My family was securely middle class. My father was an engineer,
N2 undergraduate degree from the University of Missouri, graduate degree from the
N3 University of Michigan and post-graduate work from the Chrysler Institute. He
N4 worked for 35 years in an automotive research laboratory. He provided a sort of

N5 general educational and professional role model for me. I remember seeing for the
N6 first time his occupation spelled out on my birth certificate and feeling a sort of
N7 awe: "research scientist". What seemed like a good start to my academic and
N8 career path development, however, was derailed by my mother's choice of
N9 religious belief system.

N10 My mother was a-stay-at-home mother, like most in that era. I am the
N11 youngest of five children. None of my siblings has pursued formal education
N12 beyond high school. I believe this is principally the result of the teachings of my
N13 mother's fundamentalist, apocalyptic religion which all of my siblings adhered to.
N14 The religious group explicitly discouraged any pursuit of higher education.

N15 During my childhood and adolescence I had an active dislike of school
N16 because I felt different from the other students because of the religion. It
N17 embarrassed me. By the middle adolescent period, I had come to realize that the
N18 religion was not for me. I knew that I would have to escape the cult-like restraints
N19 of the religion if I were ever to be existentially at peace within myself.

N20 By early adulthood (18) after graduating from high school, I left home.
N21 Before I left, my father heretically whispered to me that he would pay for me to
N22 attend the University of Missouri. However, and in retrospect, unfortunately, I had
N23 to deal with getting the religion out of my head first. It was almost an unconscious,
N24 reptilian brain drive to escape at that point. I could not have thought about
N25 academic matters.

N26 I got as far away from my family as I could but only because of the religion.
N27 One of the tenets of the religion is that if anyone leaves, the family is ordered to
N28 "shun" her or him, which my mother and siblings obediently did. Of course, I was
N29 fully aware that this would happen, but it did not deter me. Fortunately, my dear
N30 father kept in contact. After about a year I started studying in a small community
N31 college. I quickly found out that I was not quite ready for that. So I joined the
N32 United States Coast Guard trying to find some kind of security as well as some sort
N33 of professional development.

N34 I stayed in the Coast Guard for six years. In the last two years, I took
N35 advantage of the Guard's university benefits and finished a two year "associate's
N36 degree". This time I was ready for higher education. After I ended the enlistment,
N37 I started my undergraduate studies a little older than my peers (around 25 years
N38 old). Somewhere near the end of my undergraduate studies, I decided that I wanted
N39 to enter library science. After graduation with a BA in English I worked for a year
N40 or so, and then applied to a graduate program in library science. I was not

admitted, but by this time I knew that I wanted a master's degree in something (partly inspired by my father), so I chose the field of ELT. At this point I am not exactly sure why I chose it, other than I have always had an interest in languages.

In one of the first semester courses of the master's program, I had a course on second language acquisition research. I remember the instructor saying that in ELT there are two paths: teaching or research. Of course, now I realize that that was not completely accurate, but at the time, research appealed to me more than teaching. When I finished the master's, I taught ESL in the States for a semester and then decided that I needed "overseas" experience, so I came here to Mexico. As chance would have it, my future research partner was the director of the ELT program in the university where I now work. She was responsible for hiring me, and although she probably would not admit it, she has been a positive role model to me (and many other people) particularly in research activity.

While her academic and career paths differed markedly from my own, they are similar to mine and those experiences observed with the NRA participants in terms of arriving to ELT later in life and not as a primary career choice.

Katherine[70] comes from an upper middle class background. Her mother's family was very wealthy. Katherine's grandfather was someone very high up in the government. His signature was on the paper money of her country at one time. Katherine's father was an engineer who worked in hydro-electrics. Katherine's mother studied engineering in the university, something that was very rare for a woman to do at that time.

Katherine is the oldest of four children. She grew up in a very privileged situation. During her childhood and adolescent years the family lived in several countries including Venezuela and the United Kingdom. As a result of this, she attended a prestigious private English-medium school found throughout Latin American countries so that she could move to the various locations without breaks in her education. In her adolescent years, the family moved back to her home country and she attended a private religious school.

This time period was characterized by ideological upheaval in the country. Many of the social problems revolved around racial issues (the country had and still has a very large indigenous population. It had a minority European class, of

[70] Pseudonym

K17 which Katherine's family was a part, which controlled most of the country's
K18 resources). During this time, some of Katherine's teachers joined hunger strikes
K19 with the guerillas and died for their beliefs. A German language teacher who came
K20 to her house for three years to teach German was a girlfriend of Ernesto "Che"
K21 Guevara[71]. She was rumored to have been pregnant with Guevara's child when
K22 they were both killed by government forces. Katherine said that her mother was
K23 unaware that Guevara's girlfriend was the children's language teacher. If she had
K24 known, she would have been very upset. These events made an enormous
K25 impression on Katherine.
K26 She identified a pivotal moment in her life as being when she went to the
K27 public university. That is the first time she left the relatively isolated world of
K28 private schools and came in contact with people from a variety of social classes. It
K29 was in this period when she realized that the indigenous people were more than
K30 house servants. She saw that they were not just happy cooperative people, but
K31 people who could also be angry and who demanded social change.
K32 In her university years she studied architecture. She said she chose it
K33 primarily because she was good in mathematics. She had many interesting
K34 experiences during her university years such as going to live in villages while
K35 constructing homes and schools. This gave her much experience in project
K36 planning and execution. However, the social upheaval continued in the country
K37 during this period. One of her friends was shot and killed in a student protest
K38 action before her eyes. Her father thought it would be a good idea to get the
K39 children out of the country, so Katherine and her sister went to Spain to study. Her
K40 sister went to Barcelona and Katherine went to Seville. Things were not much
K41 better in Spain at that time because it was the Franco years, so after a year
K42 Katherine returned to her country and to the university. Towards the end of her
K43 university years she met her husband.
K44 He was part of the student rebellion at the time and at one point after they
K45 were married and Katherine was pregnant with their first child, her husband was
K46 taken by government forces to prison in another country. He told her later that he
K47 was afraid that he was going to be thrown out of the plane like so many other
K48 insurgents of that time. When he was finally allowed to return, they fled to
K49 Mexico.
K50 Her husband studied for his master's degree in Mexico. Katherine found a

[71] Ernesto Guevara was a Marxist revolutionary from Argentina who fought for the civil rights of oppressed people throughout Latin America. He was assassinated in Bolivia in 1967.

K51 job teaching English in the university just because she knew the language from her
K52 secondary school years. When the university opened an ELT undergraduate
K53 program, Katherine was in the first cohort to graduate because she was already
K54 working in the language department. When she was 43, she studied for her
K55 master's degree in ELT with Aston University. After finishing that she became
K56 director of the ELT undergraduate program in my university. That is where our
K57 paths crossed.
K58 It is difficult to express in such a parsimonious account the full extent of all
K59 the experiences she has had and how they have contributed to her development.
K60 However, she often identified one predominant consequence of her experiences,
K61 the development of a high level of *coping efficacy* and therefore *resiliency*. These
K62 two qualities and others such as a native curiosity to learn and a desire to *seguir*
K63 *adelante* ('to progress' as one of the RA participants remarked) seems to have been
K64 what has allowed her to become one of the most (probably the only) locally and
K65 nationally distinguished academic staff members of the FML.

The purpose of including the above two narrative accounts is to illustrate the point made earlier that a Matthew effect of SCT factors in life path development directly associated with development as a researcher does not mean that any alternative life path, even those that seem to contrast with the RA participants' academic and career path development, indicates that becoming a researcher is out of reach.

Similar to the career and life path trajectories of the NRA participants as reported in Ch. 6 and as illustrated in the NRA synthetic portrait (p. 222), both Katherine and I began our ELT professional lives much later in life than the typical RA participant and our career selection was not based on any deliberate choice, but was a sort of default option (cf. NRA15-16, N42-43, and K51-52). In my case, I chose to study the MA-TESOL because I was not accepted in a library science graduate program (N40), and in Katherine's case, she started teaching English because she needed a job and she had knowledge of English from her secondary school days

(K51-52). This later specific career development exemplified in our stories and the NRA stories meant that we were not beneficiaries of the accumulation of factors (inter alia, *specific career role models, efficacy building experiences, specific career interests*, and *career related chance encounters*) that helped the RA participants to develop fully as academic researchers. However, according to the concept of research established for this study (see 1.1 above, p. 1) we are described as RA. As mentioned above (7.2.2, ¶7), this implies that the Matthew Effect of SCT factors observed in the RA participants can be regarded as increasing the potential for events to move in certain directions (i.e., leading them to become productive researchers). However, it does not imply that without the accumulation of these factors an individual is bereft of any chance of becoming research productive. Rather, the Matthew effect can be seen to act in a facilitating manner; its presence is helpful, but, as these two profiles testify, its absence does not automatically inhibit research engagement.

As a consequence, a further contribution of this study is in terms of providing a basis for the development of possible interventions (see 7.2.4 below) to encourage greater involvement in research activity on the part of NRA (ELT) practitioners through a "deep" approach to understanding the causes of NRA behavior and the need in practical terms of, for instance, trying to put back into the equation some of the Matthew effect that did not occur earlier. Thus, my research has shown that, rather than being due to, e.g., insufficient training in research methods or other more "technical" aspects of undertaking research activity, the NRA participants lack of research activity was primarily attributable to the absence, at the crucial earlier life/career stages, of the "socio-cultural" influences that have been shown to be so instrumental in the development of the research trajectories of the RA participants. Such an understanding provides a prima facie basis making any interventions aimed at

remedying this lacuna in the career/life experiences of NRA faculty likely to be more relevant and effective. Possible interventions in keeping with this perspective are proposed in 7.2.4 below as part of a consideration of further avenues for research.

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Finally, I also feel that this program of research has contributed to my development as a qualitative researcher. To clarify this point, I will first of all briefly reprise the interview data collection and interpretation approaches that were used in the study.

Research interviews are typically classified into three data collection types: structured, semi-structured, and unstructured (Robson, 2005). The type of interview used is linked in some way with the intended depth of the interview. Since my purpose was to develop a deep understanding of the participants and their life path development, I used semi-structured interviews in the form of the life story approach.

A further distinction can be made in the interpretation of collected interview data, between i) a "hypothetico-inductivist" approach, typified by grounded theory where the underlying theory emerges from the interpretation of the interview data, and ii) a "hypothetico-deductivist" approach, where interview data is interpreted through the lens of a "body of established theory" (Wengraf, 2002, p. 2). The interview data interpretation for this study used the deductivist model, although there were also elements of inductive interpretation involving findings that fell somewhat outside of

the theoretical model used (i.e., RA group membership (see p. 183) and the influence of chance or fortuitous encounters (see p. 192)).

The model for the life story format of the interviews was provided by Lieblich, et al. (1998). This provided the theoretical position (please see 3.8.1 above) and the procedural protocol (please see 4.4 above) for the interviews. However, as Robson (2005, p. 291) observes, "you don't become a good interviewer just by reading about it." In other words, interviewing is regarded as a skill that improves through practice.

Semi-structured interviewing involves possibly more skill than either structured interviewing, which follows a strict protocol, or unstructured, which is more closely related to conversation (Wengraf, 2002). Oppenheim (1992, p.70) identifies a series of interviewer skills that are involved in semi-structured depth interviews of the sort used in this study, summarized as follows:

- be able to maintain control of the interview
- be able to make the respondent feel at ease
- probe gently but incisively
- present a measure of authority
- be able to handle the "hidden agenda" (i.e., the objectives of the research) in such a manner as to not reveal it but in sufficient level to elicit useful responses.

In my case, these skills were refined primarily during the pilot interviews and, though to a lesser extent, with each main study interview. The two pilot interviews allowed me to test out the protocol in a "low risk" situation (Robson, 2005, p. 290). The two respondents were able to provide feedback on the interview process mainly through their reactions to the procedure rather than through explicit comments on the interview protocol, e.g., by their willingness to provide detailed and candid information, mentioning the interviews and their positive reactions to them on other occasions, and appearing to genuinely enjoy the experience. The pilot interviews also helped me gauge the amount of time that would be required for each interview, and in

general get a feel for the potential environment created between the interviewer and the respondent as a result of the type of information elicited.

In addition to the above interpersonal skills, the interviewer must handle numerous other actions before, during, and after the interview. However, on the basis of my experiences in this study, I feel it is the actions required during the interview which require the highest level of interview management and skill. I found that the interview protocol provided by Lieblich et al. (1998) aided me in many of the functions required in this stage of the interview. Firstly, the format used (i.e., as described in 4.4.1 above, p. 113) provided a focal point for both myself and the respondent. It was a useful organizing tool for managing a large amount of information. It could be moved through chronologically or parts of the story could be returned to as the need arose during the interview. This greatly aided me in follow-up type elicitations because of the visual cues provided by the form.

Secondly, the life story protocol used helped me have the "space" to manage additional interview skills articulated in Oppenheim (1992), such as following the "hidden agenda", maintaining rapport with the respondent so he or she would keep talking, stopping or diverting the talk when it diverged too far from the interview purpose, reducing questioning to get the respondent to express ideas in her or his own way and thus lessen the possibility of leading the respondent in any direction.

Specifically, the "hidden agenda" in this case was to attempt to discover how the SCT variables played out in the lives of the respondents. Fortunately as it turned out, I did not have time to formulate the interpretative coding for analyzing the interviews until after they had taken place, so I was prevented from "leading" the respondents based on my coding system. However, at the same time, the interview form tended to keep the responses framed within the life story. I found that, in the actual process of

interviewing, the life story subject-matter being elicited was intrinsically interesting to me (beyond the objectives of the study), and this helped me to establish what I felt was a genuine rapport with the respondents. Humans can generally sense when someone is sincerely interested in what they are saying and when there is some lack of interest or only obligation motivating the interaction. At the same time, the life story form aided me immensely when I needed to recall certain events or moments in their lives that seemed particularly relevant to the overall interview objectives. Both these factors helped reduce the amount of my questioning and made me feel that I was able to really listen and encourage the respondent to talk freely and openly. The sample transcript provided in Appendix GG illustrates the ratio of respondent talk to interviewer talk that was common to all the interviews.

7.2.3 Limitations

This study has necessarily involved a number of constraints, and these have resulted in several limitations that affect any conclusions drawn from the data analyses. In what follows, thus, the main factors of this kind are discussed, with a view to providing a rationale for some of the proposals which are made in the subsequent section for further research that might build on and extend the work of this investigation.

The most notable limitations in the current study are in the areas of sample size, response rate, the cross-sectional design, data distributions, interview data and the interpretation of the findings, as well as the issues of "socially desirable responding" and "hypothetical bias".

Sample size. The potential for generalizability of the findings as a result of the single research site location and the size of the research sample are obvious limitations of

this study. The use of additional research sites, especially ones involving different socio-cultural settings, and a larger research population sample spread across them, would no doubt yield further insights.

Response rate. The response rate from the RA participants (Table 4.1 above) in the TpB portion of the study (35%) is probably less than optimal; however, when compared to several published career related TpB studies, it stands up fairly well (e.g., 23.6% in Arnold, et al., 2006; 19.3% in van Hooft, et al., 2005). Nevertheless, higher response rates would obviously be desirable.

Cross-sectional design. A notable limitation of the study in respect to the TpB data is the cross-sectional design and therefore the absence of a measure of actual engagement in the behavior. On the part of the RA participants, it is probably safely assumed that they will continue to engage in research thus making their estimations of *intention* fairly accurate. However, on the part of the NRA participants, there is no evidence that their expressed intention to engage in research will translate into actual behavior. Therefore, the study is almost certainly limited in its ability to predict behavior from expressed intention on the part of the NRA participants. Studies which remedied this deficiency would obviously be a useful further development.

Scale item response points. The TpB literature on questionnaire construction (e.g., Ajzen, 2006; Francis, et al., 2004a) recommends that individual response points on the bipolar scales be reversed on some of the items. In other words, that instead of, e.g., "never=1" and "always=7", some items should be reverse coded, i.e., as "always=1" and "never=7". The purpose of this is to reduce the chances of automatic responding (e.g., circling all 7s). However, as discussed in 3.9.1 above, the reversed scales in the pilot study appeared to cause problems for the participants. To avoid these perceived

response problems, the main study questionnaire did not have items with reversed endpoints. However, there was possible evidence of automatic responding on the part of a few respondents, i.e., always marking the same scale number on all the scales. Since it was not possible to determine whether it was a case of automatic responding or a genuine response, the few cases of what appeared to be this kind of responding were not eliminated from the study. Future studies might remedy this by devising a way of indicating reversed endpoints on questionnaire items, thus eliminating the potential occurrence of automatic responding. Unfortunately, this scheme did not occur to me until after the data collection.

Data distributions. As explained in 3.7.1.1 in connection with the pilot study, and in 5.3, ¶1, the study quantitative data did not present normal distributions. Parametric statistical tests were carried out in the pilot study despite the non-normal data distributions (discussed in detail in Appendix N). Thus, any conclusions drawn from the pilot study need to take this factor into account. Main study quantitative data also lacked normal distributions, which prevented analyses to compare relationships between variables. This restricted the possible range of conclusions which could be drawn from the data.

Interviews. With all retrospective accounts there is, of course, the possibility of representing previous experiences and events not as they actually happened but with an interpretation based on present knowledge. This feature may have colored some of the respondent's life accounts. However, I believe the possible effects of this on the overall interpretation of the data were minimal. The average length of the interviews (two hours) and the depth of the discussion seemed to elicit honest and thoughtful reflections from the participants, both RA and NRA. There was one exception that

was taken into consideration in the interview findings. One participant was in the same room during another participant's interview. There is some evidence that some of the elements discussed in the interview with the latter may have influenced the subsequent interview with the former (conducted the following week). However, the evidence was not felt to be strong enough to warrant elimination of the second interview from the study.

Interview findings. While every effort was made to ensure the validity of qualitative data analysis procedures (4.4.3 above), it needs to be acknowledged that the possibility of biased interpretation and representation of findings inevitably remains.

Socially desirable responding (SDR). As discussed in 5.4.1 above, SDR is defined by Paulhus (2002, p. 50) as a type of self-report response bias that represents a "tendency to give overly positive self-descriptions." In the case of this study, there is a possibility that, because of the socially sensitive nature of the topic, respondents might have felt under pressure to respond in ways that would present themselves in a more positive light. As indicated by the number of NRA participants signaling membership in a research group (5.2, ¶3 above), their agreement with the notion of research as a professional obligation and of the use of academic research productivity as an evaluation factor in promotion decisions (5.2, ¶4 above), there was evidence of an undercurrent of social responsibility related to the topic of academic research productivity that many faculty members in this setting may feel, and which thus may have "skewed" responses accordingly. It was thus proposed earlier in this thesis (see 5.4.1 above) that SDR was a possible moderating factor in the generation of the quantitative data. However, although, SDR, if present, was seen as having a potential to inflate the NRA questionnaire scores, it was not deemed to be a factor of sufficient

magnitude to affect overall results (see 5.4, ¶6 above). Nevertheless, it is a matter that should be kept in mind when assessing the results.

Hypothetical bias. Likewise, and possibly exerting a stronger influence on quantitative results (and as discussed further in 7.2.4 below), is the issue of hypothetical bias (HB) as a moderating factor. Thus, as has been shown (see 5.3.1 above), although NRA participants have stated strong intentions to engage in research within the next five years, there is little evidence on which to base that prediction. As a result, their estimations of intention to engage in research could be more hypothetical than actual. This, along with the possible SDR factors in NRA responses noted in the previous section, could raise questions about the trustworthiness of self-report data in this study. This is therefore clearly another important potential limitation of the research.

In the light of this review of the main constraints inherent in this study, the following section presents a number of recommendations for further research aimed at addressing these issues.

7.2.4 Recommendations for Further Research

One of the most important forms which further research in this area might take could involve an expansion of the sample size. One of the advantages of a larger sample would be that parametric statistical techniques are more forgiving in areas such as abnormal data distributions when the sample size is considerably larger than the one in this study. Other statistical procedures which are often used in TpB studies such as structural equation modeling (e.g., Hagger, et al., 2007; Pierro, et al., 2003; Lu et al., 2007) need large numbers of participants (200+) (Kline, 2005) but can make powerful inferences from the relationships between variables that a multiple

regression technique cannot (Hankins, French, & Horne, 2000). One way to increase sample size would be to enlist participants from similar universities throughout the country. However, disadvantages of this, and the reason this was not done in the study, are associated with time and resources needed to carry out the study on a larger scale.

Many of the other potential areas for further research are concerned with various TpB-related issues, as follows.

7.2.4.1 TpB questionnaire format

Firstly, one of the findings of the pilot study that had an effect on the main study was related to questionnaire format (see 3.9.1 above). Many of the guides written for TpB questionnaire construction (e.g., Ajzen, 2006; Francis, et al., 2004) recommend that the questionnaire should be applied to the participants with the questionnaire items arranged in a random order, i.e., an "unstructured" format in which the different scale items are randomly mixed together rather than grouped together in identifiable scales. The purpose of the unstructured format is to reduce the chances of a certain type of response bias where the participant is able to work out the underlying theory and then respond according to what she or he perceives about the theory rather than to his or her actual beliefs or opinions. The pilot study questionnaire was administered in the unstructured format. However, as discussed in 3.9.1 above, this was seen to cause face validity problems. To reduce the effects of this validity problem, the main study questionnaire was "structured". The scales were kept together. Additionally, the purpose of each scale was explained in a manner not intended to reveal the underlying theory, but to inform the participant what the focus of the scale was (see 3.9.1 above). Further research into possible moderating effects of the questionnaire

format used in investigations of this kind would be useful, given the apparent contradiction between what the literature recommends and the experience of this study.

7.2.4.2 Hypothetical bias correction

Secondly, as noted in the previous section (7.2.3), SDR and HB were identified as possible moderating variables in the TpB behavior model in this study. Some TpB studies have examined the "intention-behavior" gap and have suggested strategies for reducing it (e.g., Ajzen, et al., 2004; van Hooft, et al., 2005). In the first of these (Ajzen, et al., reviewed in 5.4.2 above), a "corrective entreaty" was incorporated in which participants were told of the evidence and causes of HB in similar studies. Thus, they were told that people tend to "focus on doing good and tend to ignore the cost to them when it is hypothetical (voting on an imaginary referendum to establish a scholarship fund)". As reported in this study, the corrective entreaty asked participants to respond to the questionnaire as if it were a real referendum (Ajzen, et al., 2004, p. 1113). They found that the corrective entreaty was able to "eliminate the [hypothetical] bias" in their study (ibid).

In the light of the possible moderating effects of HB in this study, further research with NRA participants incorporating a similar type "corrective entreaty" would be very useful. It was not added to the current study because the issue of hypothetical bias only became clear after the data had been collected.

Similarly to the Ajzen et al. study above, van Hooft et al. (2005) also looked at the intention-behavior gap and proposed two moderators affecting the relationship between expressed intentions and actual behavior, i.e., "action-state orientation" and

"procrastination" (ibid, p, 241, 242). The following provides an explanation of the two concepts just mentioned.

As identified by Gollwitzer (1999), in addition to cognizing action outcomes, people will also conceptualize specific implementations needed to realize their expressed intentions into actions. These implementations can be in the form of a deadline (By Wednesday I will finish X) or in various goal achievement strategies intended to overcome or deal with potential barriers (What can I do in case of Y contingency?). Essentially, implementation intentions involve the conceptualization of "when, where and how a specific behavior will occur" (van Hooft, et al., 2005). Those persons who are able to make action implementation plans ahead of time are seen to more effectively match their behavioral intentions to their actual behavior than those who deal with contingencies "in situ" (Gollwitzer, 1999, p. 495). Thus, as pictured in Fig. 7.6 below, implementation intentions are posited as an intervening factor between intention and action.

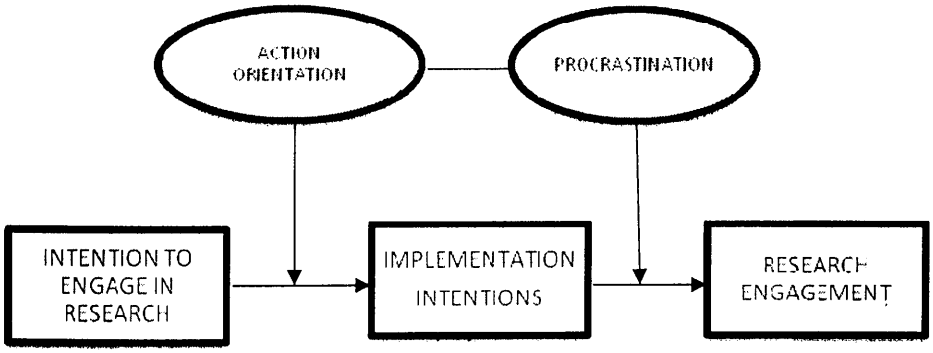

Figure 7.6 Intention-behavior relation proposed for research engagement (adapted from van Hooft et al., 2005)

Specific action implementation intentions are posited to influence the relationship between expressed intentions to engage in a behavior and engagement in the actual behavior. "Action orientation" and "procrastination" are seen to affect the strength of the relationship between intentions, implementation plans, and the actual behavior. "Action orientation" refers to the ability of the individual to form plans (implementation intentions) associated with carrying out the action, and "procrastination" refers to the delaying of or failure to carry out those plans.

Van Hooft, et al. (2005) add the moderating effects of "action-orientation" and "procrastination" to Gollwitzer's model of intention, implementation plans, and action. Action-orientation refers to a set of self-regulatory devices which guide the initial formation of a behavioral intention and also maintain the intention until the action is accomplished (ibid). Procrastination refers to postponement of action that leads to goal attainment. In their model (Fig. 7.6 above) "action orientation" is seen to intervene between the formation of intentions and the formation of action implementation plans. Van Hooft, et al. (2005) make a distinction between people who are able to conceptualize implementation actions (action oriented) and people who have difficultly (state oriented) developing implementation actions and thus moving from action intentions to actual behavior.

In their model (Fig. 7.6 above) those who tend to engage in procrastination, i.e., procrastinators, are able to form intentions and to cognize action implementation plans but are not effective in carrying out the implementation plans to the point of engaging in the behavior. Thus, in the model visualized in Fig. 6.7 above, procrastination is seen to moderate the effects of implementation plans on the actual behavior (Van Hooft, et al., 2005).

This suggests a further line of investigation, particularly focused on NRA participants and the observed discrepancy in their responses and their actual behavior. One possible line of inquiry of this kind could focus specifically on the deliberate formation of research engagement behavioral implementation plans, their form, execution, and their ultimate influence on research activity. This might provide further, more fine-grained understanding of the various phases potentially involved in

the intention-behavior gap. Such a study might provide the basis for an "intervention" aimed at changing intention and therefore behavioral outcomes.

The following suggestions for further research are therefore concerned with exploring the potential for intervention strategies aimed at attempting to change research behavior among NRA participants of the kind this study has focused on (and assuming a basic level of willingness to undergo such a change).

7.2.4.3 Intervention strategies

Any attempts at intervention might desirably begin with teachers' personal conceptualizations of what constitutes "research." Although such constructs were not included in earlier parts of this study, for the reasons explained in 1.3 above, there is a body of research (see 1.3 above), which shows that, regardless of other perceptions, teachers typically adopt personal beliefs, conceptions and definitions of what constitutes research. This indicates that any intervention is therefore likely to be more effective if a phenomenological stance is adopted from the outset. In other words, it would seem important, in the first instance, to attempt to uncover and engage with teachers' existing conceptualizations of research, however inchoate or apparently at odds with other, more "mainstream" views. In this way, the starting point is one which acknowledges, values and attempts to build on existing preconceptions, and which also enables the facilitator to get a clearer perspective of what might constitute the most productive further steps to be taken in the intervention process.

Along these lines of tapping into teachers' beliefs, TpB-based research of the kind this study has been concerned with is seen as capable of providing a variety of starting points for possible interventions of this nature. Thus, once the salient beliefs of the group of participants in question have been identified through a TpB-based

study, as done in this present investigation, focused, however, on a single population with a single trait, i.e., NRA participants, and also correcting for moderating variables as presented in the limitations section above (7.2.3), statistical procedures to uncover relationships between variables could be carried out. Those statistical procedures (e.g., a multiple regression procedure) would then be used to identify the variable(s) most likely to affect the dependent variable, intention. An intervention strategy could then be designed around the formation of new beliefs regarding the behavior in question. Thus, for example, if such a TpB study indicated that participants perceived a low level of social pressure to engage in research behavior, an intervention may be directed at introducing increased awareness of the public conception of a university as a generator of new knowledge which leads to an improvement of society in some way.

A second intervention could target research behavior control beliefs. While NRA participants in this study indicated control beliefs similar to RA participants, it was posited that NRA participants were not fully able to conceptualize potential control issues based on their lack of research experience. Anecdotally, it could be assumed that NRA have certain reservations about engaging in research because they sense certain impediments, e.g., lack of time, lack of English language writing ability, lack of understanding about research protocols.

The basic principle informing an intervention aimed at addressing this nexus of issues would be to examine the main features of a variety of ways in which research might be conducted with a view to clarifying the extent to which one or another of such approaches might allay at least some of the reservations in question. Thus, participants could be introduced in particular to what might be regarded as more "practitioner-friendly" forms of research, such as action research (AR) (e.g., Burns, 2005; Wallace, 2003) and "exploratory practice" (EP) (Allwright, 2003).

With respect to the former, it might be possible to help participants see that research involving a relatively formal, conventional research "technology" might nevertheless be appealing because, within the framework of an AR project, it is possible to use such research techniques in relation to attempting to throw further light on and possibly also ameliorate problems of direct practical significance to classroom teaching. In this way, in other words, because the research is combined with rather than separate from day-to-day pedagogic concerns, it should be possible to persuade the participants of its potential for time-saving and above all, its capacity to motivate them in the endeavor because of its immediate practical benefits.

However, if it was felt that the participants were nevertheless daunted by the learning curve involved in mastering some of the "standard" research techniques involved in AR (such as questionnaire design), then EP could be explored as an alternative since it incorporates research activity into existing class time and teaching-learning activities, via the use of "pedagogically exploitable practices". This might help to further reinforce the belief that research does not necessarily involve large investments of extra time, and can be done using well-understood pedagogical procedures (Allwright, 2003).

In addition, it might be possible for either of these approaches to be conducted on a small group basis, especially initially, thus lessening the individual burden, and to involve several small-scale but parallel investigations, so that the level of variety and complexity involved can be kept to more manageable proportions, but, at the same time, making it possible to undertake a study of greater potential "weight".

Additional possibilities include the use of a case study approach (Richards, 2003), whereby the scale of the enquiry is narrowed down somewhat, enabling more

time and attention to be devoted to acquiring understanding of how to master the relevant research techniques.

The main point in this section is that an intervention aimed at attempting to provide the participants with a greater sense of research efficacy might proceed, in these and similar ways, by showing how research can be made more manageable and approachable than might have been hitherto assumed. And, of course, research into the efficacy of interventions of this kind would provide a fertile source of further study that builds on the work reported in this thesis.

7.2.4.4 Life story research with RA ELT practitioners

A third line of possible further investigation relates to the accounts of my own and my research partner's life stories presented above. It would appear valuable to carry out further life story interviews with RA ELT practitioners in order to increase the potential for identifying additional factors associated with their research development. In particular, a comparison of RA ELT and RA non-ELT faculty life stories might reveal differences that could lead to a deeper understanding of research engagement by ELT practitioners, as well as, in turn, lead to more informed interventions aimed at increasing research participation among willing ELT faculty.

7.2.4.5 Academic research productivity and "scale-free" networks – a statistical model of Matthew effect

A "Matthew effect" was observed in the SCT RA interview data (presented in 7.1.3, ¶3 above). The influences of Matthew effects and the "Pareto Law" in the field of economics were the focus of a study by Wu, et al. (2006). These researchers devised a means of describing and understanding distribution of wealth using "evolutionary" (adaptive) computer games. Using network theory (scale-free networks) and statistical physics they created a model that indicated a proportional

relationship between personal wealth and personal contacts. In other words, in their model, given that you are wealthy to begin with, the more people you know the richer you can become, thus supporting evidence of the presence of a Matthew effect in economics. It would be very interesting to see if a model of RA and SCT variables could be similarly constructed using the same or similar approaches.

7.3 Concluding comments

This study as a whole has attempted to complement existing interest in the field of ELT in promoting greater involvement of ELT practitioners in research activity, on the one hand, and to also contribute to further understanding of the factors affecting research engagement in general on the other. It has shown that any attempt to promote greater research involvement among NRA faculty should, in particular, be based on an in-depth understanding of the factors affecting lack of research activity. While these are clearly complex and manifold, this study has indicated that they can be seen as rooted at least partly in deep-seated socialization processes occurring (or failing to occur) at crucial stages in life-career development. It is hoped that an appreciation of the importance of this factor will lead to better understanding of the possible causes of lack of research activity among ELT practitioners (and others), and, as a further consequence, contribute to the development of appropriate interventions aimed at influencing this behavior. It is also hoped that the example of this study will create interest in further related research of the kind indicated in the previous section.

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APPENDIX A: ENVIRONMENTAL VARIABLES IN RESEARCH PRODUCTIVITY

ENVIRONMENTAL VARIABLES	
Graduate school (research socialization)	
Crane, 1965 [1]	Chubin, et al., 1981 [1]
Reskin, 1979 [1]	Blackburn, et al., 1991
Long, et al., 1979 [1]	Tierney, 1997[8]
Long, 1978	Grbich, 1998
Hansen, et al. 1978	Brocato, 2001[2]
Prestige of department or institution	
Lazarsfeld & Thielens, 1958[3]	Long, 1978
Berelson, 1960 [3]	Blackburn et al., 1978 [1]
Crane, 1965[3]	Long & McGinnis, 1981 [1]
Hargens & Hangstrom, 1966 [1]	Wiley, et al., 1981 [1]
Parsons & Platt, 1968 [1,3]	Dundar & Lewis, 1998
Eckert & Williams, 1972[3]	Hollingsworth & Hollingsworth, 2000 [4]
Blau, 1973 [1]	
Cole & Cole, 1973 [1]	
Collegiality / Collaboration / Research groups	
Pelz, 1956 [1]	Creswell, 1985[2]
Parsons & Platt, 1968 [1,3]	Blackburn, et al., 1991
Blau, 1973 [1]	Grbich, 1998
	Dundar & Lewis, 1998
Pelz & Andrews, 1976 [1]	Creamer, 1999
Blackburn, et al., 1978	Ferrer & Katerndahl, 2002
Reskin, 1978 [1]	Lee & Bozeman, 2005
	Rumsey-Wairepo, 2006
Finkelstein, 1984[2]	Rey-Rocha, et al., 2007
Time	
Finkelstein, 1984 [2]	Creamer, 1999
Creswell, 1985[2]	Burke & James, 2005
Blackburn, et al., 1991	
Organizational freedom	
Box & Cotgrove, 1968 [1]	Wood, 1999
Vollmer, 1970 [1]	Ramsden, 1994
Parmerter & Garber, 1971 [1]	Hollingsworth & Hollingsworth, 2000 [4]
Stahl & Stevens, 1977 [1]	
Organizational commitment	
Box & Cotrgrove, 1968 [1]	Burke & James, 2005
Blackburn, et al., 1991	Smeby & Try, 2005
Jungnickel, 1997	
Organizational structure	
Meltzer & Salter, 1962 [1]	Grbich, 1998
Organizational type	
Lazarsfeld & Thielens, 1958[3]	Blackburn, et al., 1991
Berelson, 1960 [3]	Prpic, 1996 [4]
Crane, 1965 [3]	Dundar & Lewis, 1998
Parsons & Platt, 1968 [3]	Perry, et al. 2000
Eckert & Williams, 1972 [3]	Porter & Umbach, 2000
Blackburn, et al., 1978	Brocato, 2001[2]
Pellino, et al., 1981[5]	Bland, et al., 2002
Long & McGinnis, 1981	
Wood, 1999	
Effects of research grants / Financial support	
Dundar & Lewis, 1998	Lee, 2004

Teaching responsibility	
Blackburn, et al., 1978	Burke & James, 2005
Porter & Umbach, 2000	
Use of Internet	
Barjak, 2006	
Country (and country of PhD)	
Waworuntu & Holsinger, 1989	
Teodorescu, 2000	European commission, 2003 [4]
Van Leeuwen, et al., 2001 [4]	Gonzalez-Brumbila & Veloso, 2007
Faculty rank	
Blackburn, et al., 1978	Burke & James, 2005
Blackburn, et al., 1991	Smeby & Try, 2005
Dundar & Lewis, 1998	
Ferrer & Katerndahl, 2002	
Career age	
Bayer & Dutton, 1977	Ferrer & Katerndahl, 2002
Blackburn, et al., 1991	Smeby & Try, 2005
Group size / Department size	
Bell & Seator, 1980 [6]	Johnson, et al., 1995 [6]
Rushton & Metzer, 1981 [6]	Kyvik, 1995[6]
Baird, 1986; 1991 [6]	Dundar & Lewis, 1998
Jordan, et al., 1988; 1989 [7]	Bland, et al., 2002
Crewe, 1988 [6]	Ferrer & Katerndahl, 2002
Blackburn, et al., 1991	
Golden & Carstensen, 1992 [7]	
Johnson, 1994	
Salary	
Tuckman & Leahey, 1975 [6]	Finkelstein, 1984 [6]

Notes

[1] Cited in Fox, 1983

[2] Cited in Bland et al., 2005

[3] Cited in Blackburn, et al. 1978

[4] Cited in Barjak, 2006

[5] Cited in Bland, et al., 2002

[6] Cited in Blackburn, et al., 1991

[7] Cited in Dundar & Lewis, 1998

[8] Cited in Grbich, 1998

APPENDIX B: INDIVIDUAL VARIABLES IN RESEARCH PRODUCTIVITY

INDIVIDUAL VARIABLES	
PSYCHOLOGICAL CHARACTERISTICS	
The sacred spark theory	
Cole & Cole, 1973 [1]	Pelz & Andrews, 1976 [1]
Merton, 1973 [1]	
Stamina	
Weber, 1946 [1]	Blackburn, et al., 1978
Eiduson, 1962 [1]	Levin & Stephan, 1991
Shockley, 1957 [1]	Bland & Ruffin, 1992 [5]
Bernard, 1964 [1]	Ramsden, 1994
Zuckerman, 1970 [1]	Ramesh Babu & Singh, 1998 [4]
McCarrey, 1971 [1]	
Merton, 1973 [1]	
Pelz & Andrews, 1976 [1]	
Cognitive, emotional, perceptive styles, personality traits	
Cattell & Drevdahl, 1955 [1]	Wood, 1999
Knapp, 1963 [1]	Brocato, 2001 [2]
Roe, 1964 [1]	Burke & James, 2005
Biographical background	
Roe, 1952 [1]	Taylor & Barron, 1963 [1]
Roe, 1964 [1]	Chambers, 1964 [1]
Stein, 1962 [1]	Taylor & Ellison, 1967 [1]
Cognitive structure	
Eiduson, 1962 [1]	Gordon & Morse, 1970 [1]
Selye, 1964 [1]	
Cognitive style	
Wilkes, 1980 [1]	
Work Habits	
Mills, 1959 [1]	Hargens, 1975; 1978 [1]
Simon, 1974 [1]	
Perceived control (efficacy, confidence)	
Blackburn, et al., 1991	Bailey, 1999
Grbich, 1998	Perry, et al. 2000
Social identity	
Rey -Rocha, et al., 2007	
Interest in research	
Blackburn, et al., 1978	Perry, et al. 2000
Finkelstein, 1984 [2]	Burke & James, 2005
Creamer, 1999	
DEMOGRAPHIC CHARACTERISTICS	
Age	
Lehman, 1953; 1958 [1]	Clark & Lewis, 1985 [7]
Pelz & Andrews, 1976 [1]	Levin & Stephan, 1991
Bayer & Dutton, 1977	Ramsden, 1994
Blackburn, et al., 1978	Perry, et al. 2000
Knorr, et al., 1979 [1]	Wray, 2003 [4]
Cole, 1979	Caroyol & Matt, 2004 [4]
Hammel, 1980 [1]	Gonzalez-Brumbila & Veloso, 2007
Gender	
Clemente, 1973 [3]	Sax, et al. 2002
Blackburn, et al., 1978	Ferrer & Katerndahl, 2002
Creamer, 1999	Stack, 2002
Perry, et al. 2000	Gonzalez-Brumbilla & Veloso, 2007
Family related factors	
Sax, et al. 2002	Ferrer & Katerndahl, 2002

	Fox, 2005
Race / Ethnicity	
Ferrer & Katerndahl, 2002	

Notes

[1] Cited in Fox, 1983
[2] Cited in Bland et al., 2005
[3] Cited in Blackburn, et al. 1978
[4] Cited in Barjak, 2006
[5] Cited in Bland, et al., 2002
[6] Cited in Blackburn, et al., 1991
[7] Cited in Dundar & Lewis, 1998
[8] Cited in Grbich, 1998

APPENDIX C: FEEDBACK PROCESSES IN RESEARCH PRODUCTIVITY

FEEDBACK PROCESSES	
Cumulative advantage	
Zuckerman, 1970 [1]	Long, 1978
Cole & Cole, 1973 [1]	Allison, et al., 1982
Merton, 1973 [1]	Finkelstein, 1984[2]
Clemente, 1973 [3]	Clark & Lewis, 1985 [7]
Allison & Stewart, 1974 [1]	Creswell, 1985 [2]
Fulton & Trow, 1974 [3]	McGuire, 1998
Blackburn, et al., 1978	Creamer, 1999
Gaston, 1978 [1]	Zucker, et al., 2007
Reinforcement	
Lightfield, 1971 [1]	Levin & Stephan, 1991
Cole & Cole, 1973 [1]	Tien & Blackburn, 1996
Gaston, 1978 [1]	Creamer, 1999
Reskin, 1978 [1]	Tien, 2000

Notes

[1] Cited in Fox, 1983
[2] Cited in Bland et al., 2005
[3] Cited in Blackburn, et al. 1978
[4] Cited in Barjak, 2006
[5] Cited in Bland, et al., 2002
[6] Cited in Blackburn, et al., 1991
[7] Cited in Dundar & Lewis, 1998
[8] Cited in Grbich, 1998

APPENDIX D: PILOT STUDY ELICITATION INSTRUMENT AND RESULTS

I. Behavioral outcomes

a. What do you believe are the advantages of your doing research related to your profession in the next 1-2 years?
b. What do you believe are the disadvantages or your doing research related to your profession in the next 1-2 years?
c. Is there anything else you associate with your doing research related to your profession in the next 1-2 years?

II. Normative – relevant referent individuals and groups

a. Are there any individuals or groups who would approve of your doing research related to your profession in the next 1-2 years?
b. Are there any individuals or groups who would disapprove of doing research related to your profession in the next 1-2 years?
c. Are there any other individuals or groups who come to mind when you think about doing research related to your profession in the next 1-2 years?

III. Control Beliefs – that facilitate or impede

a. What factors or circumstances would enable you to do research related to your profession in the next 1-2 years?
b. What factors or circumstances would make it difficult or impossible for you to do research related to your profession in the next 1-2 years?
c. Are there any other issues that come to mind when you think about the difficulty of doing research related to your profession in the next 1-2 years?

ATTITUDES A – advantages of engaging in research
Better understanding of learning processes
Able to inform others
Belonging to groups that do research
Increase knowledge about the field
Be a better teacher
Learn more
Be able to do research in her field
Personal satisfaction
Increase knowledge
Able to inform others (propose something to improve learning)
To contribute something
Engaged in the profession
Teach better
Learn better
Makes work meaningful
Be aware of what's happening
Focus on processes
Anticipate possible situations or issues
Beca de desempeño
Group of people who do research
SNI
Having publications
Directing theses
Perfil promep
Research grants VIEP
Have less classes
Prestige
Estimulos
Personal satisfaction
Personal satisfaction

Recognition
Increased confidence
Learning new things
ATTIDUDES B – disadvantages of engaging in research
Not enough money for needed resources
Difficult and worthless if the institution does not recognize you
Lack of money
Lack of emotional support
Time
Money
Some people might feel threatened
Isolation from others because of doing research
Time for other important things
Uncertainty about results it's risky
Money
Expending energy
Constant worry about the project
Not being accepted into a research group
Time
Not enough support (emotional)
ATTITUDES C – any other comments related to advantages or disadvantages related to engaging in research
Be recognized in the educational field
Be engaged and committed to research
To be able to produce something helpful to society
Doing something interesting being motivated by her research because it's interesting
Being in a cuerpo academico
Networking and socializing
Building self-esteem

NORMATIVE BELIEFS –A Individuals/groups who approve of your doing research
Colleagues
Authorities in the university
Authorities in the school
Other researchers
Colleagues
Authorities university
Authorities in the school
Promep
University
Authorities in the university
Authorities in the school
Other teachers
Students
People who I do research with
My family
School
University
Maestria
VIEP -
Promep
Colleagues
Friends (some)
Kids
Family

University

NORMATIVE BELIEFS –B Individuals/groups who disapprove of your doing research
Colleagues
School administration
Colleagues who don't do research
Competitors in research
Friends who don't do research
People who feel threatened
Colleagues

NORMATIVE BELIEFS –C Any other thoughts related to this topic
Family doesn't care
University doesn't care
Research group (Essex)
Other universities
A research group

CONTROL BELIEFS –A enabling research factors
Being employed by a research group
Being able to contribute something to a group
Having teenagers – they're old enough to take care of themselves
People to advise and help
Facilities to get the information required
Working in higher education
A reason to do it
An obligation to do research
Having a small family
Having enough time
A well defined topic
Doing research alone
Believing that the research is important
Having more time
Learning how to do it
Having someone to work with consistently
Access to resources
Knowing how to search
Having enough time
Natural curiosity
Working in higher education
Being part of a group

CONTROL BELIEFS –B Factors that make research behavior difficult or impossible
Not working in higher education
Not having resources
Not having books –literature
Not having time
Lack of contact with an institution (not working in HE)
Not knowing the topic
Not an interesting topic
Lack of time
Time
Resources –references

No one to work with
Lack of time
Not knowing how to do research
External distractions – noise, not a quiet place to work
Being in a professional school rather than an academic school.
Time
Lack of networking
Lack of resources

CONTROL BELIEFS –C Any other thoughts related to research behavior and control beliefs
If the research group would stop doing research
Working by herself – prefers collaborative work
Time
Having to present the research in front of people

APPENDIX E: PILOT STUDY STRUCTURED QUESTIONNAIRE (master pilot study questionnaire)

SECTION 1

About your BACKGROUND **Years**

A. How long have you been teaching?
How long have you been teaching in higher education?

B. Are you a Female ☐ **Male** ☐

C. What is your highest level of education?
What year were you awarded your degree?

D. How many classroom hours per week do you have?

E. Are you (please circle) full-time, part-time, *definitivo, non-definitivo*

Do your feel that research is part of your job at the university?y/n

SECTION 2

(INTENTIONS)

1) I expect to engage in research in my area within the next 1-2 years.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

2) I want to engage in research in my area within the next 1-2 years.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

3) I intend to engage in research in my area within the next 1-2 years.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

(DIRECT MEASURE ATTITUDES)

My doing research in my area in the next 1-2 years is

Worthless	1 2 3 4 5 6 7	Rewarding
Good	1 2 3 4 5 6 7	Bad
Fulfilling	1 2 3 4 5 6 7	Will make no difference
Unpleasant	1 2 3 4 5 6 7	Pleasant

(DIRECT MEASURES NORMS)

4. Most people who are important to me think that
I should : 1 : 2 : 3 : 4 : 5 : 6 : 7 :should not
do research in my area in the next 1-2 years.

5. It is expected of me that I do research in my area in the next 1-2 years.
Disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Agree

6. I feel under some social pressure from my peers and the university to do research in my area in the next 1-2 years.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

(DIRECT MEASURES CONTROL BELIEFS)

1. I am confident that I could engage in research in the next 1-2 years if I wanted to.
Strongly agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly disagree

2. For me to engage in research in the next 1-2 years is
Easy : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Difficult.

3. The decision to engage or not engage in research in the next 1-2 years is beyond my control.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

4. Whether I engage in research in the next 1-2 years is not entirely up to me.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

5. I have easy access to sufficient literature for my research projects.
Disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 :Agree

6. I can find resources for my research using online databases and other online resources.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

(INDIRECT MEASURES ATTITUDE)
[Behavioral Beliefs]

1. My doing research in the next 1-2 years will give me a certain amount of prestige and recognition.
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

2. The possibility of becoming a member of or maintaining the benefits of the *prefil promep, becas de desempeño, padrón de investigadores* makes my doing research in the next 1-2 years
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

3. The possibility of increasing my personal knowledge through doing research makes my doing research in the next 1-2 years
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

4. If I do research in the next 1-2 years, I will have a feeling of personal and professional satisfaction.
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

5. Doing research in the next 1-2 years will contribute to my professional development.
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

6. Doing research in the next 1-2 years will make me more knowledgeable and able to inform others in matters related to my profession.
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

7. Uncertainty about my research project (for example the results) and constant worry about my project in general makes the likelihood of my doing research in the next 1-2 years
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

[Outcome Evaluations]
1. Having a certain amount of prestige and recognition is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

2. Becoming a member of or maintaining the benefits of *prefil promep, becas de desempeño, padrón de investigadores* is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

3. Increasing my personal knowledge is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

4. Having a feeling of personal and professional satisfaction from having done research is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

5. My professional development from doing research is

Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

6. Being knowledgeable and being able to inform others is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

7. Uncertainty and worry about my research project is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

(INDIRECT MEASURES NORMS)

[Normative beliefs]

1. The university thinks I
should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should
do research.

2. Other colleagues in the faculty of modern languages
do not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : do
research at least once a year.

3. My colleagues in the faculty of modern languages think I
should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should
do research.

4. The administration of faculty of modern languages thinks I
should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should
do research.

5. Other *profesores/investigadores* in the university
do not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : do
research at least once a year.

6. My family thinks that
I should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should do research
related to my profession in the next 1-2 years.

7. Colleagues and/or acquaintances who do ***not*** do research think that I
I should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should do research.

[Motivation to comply]

1. How much do you care that the university thinks you should do research?
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

2. Doing what other colleagues do is important to me
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

3. What my colleagues think I should do matters to me.
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

4. Doing what other *profesores/investigadores* do in other faculties in the university is important to me.
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

5. How much do you care that your family thinks you should do research?
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

6. How much do you care that the administration of the faculty of modern languages thinks you should do research.

Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

7. How much do you care that colleagues and/or acquaintances who do ***not*** do research think you should or should not do research.

Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

(INDIRECT MEASURES CONTROL)
[Control Beliefs]

1. I think that having sufficient time to do research is a main factor to my doing research in the next 1-2 years.

Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree

2. I think that *not having* sufficient time to do research is a main factor to my *not doing* research in the next 1-2 years.

Agree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Disagree

3. I think that having a lot of family commitments would be a main factor to my *not doing* research in the next 1-2 years.

Agree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Disagree

4. Believing that my research is important and/or having a reason to do research is a main factor in my doing research in the next 1-2- years.

Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree

5. Knowing how to properly do research in my area is a main factor in my doing research in the next 1-2 years.

Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree

6. Being part of a research group or having someone to work with on a regular basis is a main factor in my doing research in the next 1-2 years.

Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree

[Control Belief Power]

1. Having enough time to do research would make doing research in the next 1-2 years

Less likely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

2. *Not having* sufficient time to do research would make my *not doing* research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

3. Not having a lot of family commitments would make my *doing* research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

4. Having a reason to do research and/or believing that my research is important would make my doing research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

5. Knowing how to properly do research in my area would make my doing research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

6. My being part of a research group or having someone to work with on a regular basis would make my doing research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

APPENDIX F: PILOT STUDY UNSTRUCTURED QUESTIONNAIRE

Thank you for participating in our research project.

The purpose of this study is to understand your feelings and perceptions about doing research. We would appreciate your responses to some questions about this. There are no right or wrong answers. Please tell us what you really think.

This should take you approximately 30 minutes to complete.

The questionnaires are anonymous.

SECTION 1

About your BACKGROUND **Years**

How long have you been teaching? ☐

How long have you been teaching in higher education? ☐

F. Are you a Female ☐ Male ☐

G. What is your highest level of education? ☐
What year were you awarded your degree? ☐

H. How many classroom hours per week do you have? ☐
I. Are you (please circle) full-time, part-time, *definitivo, non-definitivo*
J. Do your feel that research is part of your job at the university? ☐

SECTION 2

My doing research in my area in the next 1-2 years is

Worthless	1 2 3 4 5 6 7	Rewarding
Bad	1 2 3 4 5 6 7	Good
Will make no difference	1 2 3 4 5 6 7	Fulfilling
Unpleasant	1 2 3 4 5 6 7	Pleasant

---

1. I expect to engage in research in my area within the next 1-2 years.
   Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

---

2. Most people who are important to me think that
   I should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should
   do research in my area in the next 1-2 years.

---

3. It is expected of me that I do research in my area in the next 1-2 years.
   Disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Agree

4. I have easy access to sufficient literature for my research projects.
Disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 :Agree

---

5. I feel under some social pressure from my peers and the university to do research in my area in the next 1-2 years.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

---

6. I can find resources for my research using online databases and other online resources.
Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

---

7. The possibility of becoming a member of or maintaining the benefits of the *perfil promep, becas de desempeño, padrón de investigadores* makes my doing research in the next 1-2 years
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

---

8. The possibility of increasing my personal knowledge through doing research makes my doing research in the next 1-2 years
Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

---

9. Uncertainty about research (for example the results) and constant worry about a research project in general would make the likelihood of starting a research project in the next 1-2 years
Extremely unlikely : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely likely

---

10. Having a certain amount of prestige and recognition from doing research is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

---

11. Becoming a member of or maintaining the benefits of *perfil promep, becas de desempeño, padrón de investigadores* is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

---

12. Increasing my personal knowledge as a result of doing research is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

---

13. My professional development from doing research is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

---

14. Having a feeling of personal and professional satisfaction from having done research is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

---

15. Being knowledgeable and being able to inform others is
Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

---

16. Uncertainty and worry about my research project is
Unacceptable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Acceptable

17. The university thinks I
should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should
do research.

18. As far as I know the majority of my colleagues in the faculty of modern languages
do not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : do
research at least once a year.

19. My colleagues in the faculty of modern languages think I
should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should
do research.

20. The administration of faculty of modern languages thinks I
should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should
do research.

21. As far as I know the majority of *profesores/investigadores* in the university
do not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : do
research at least once a year.

22. My family thinks that
I should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should do research
related to my profession in the next 1-2 years.

23. Colleagues and/or acquaintances who do ***not*** do research think that I
I should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : should do research.

24. How much do you care that the university thinks you should do research?
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

25. Doing what other colleagues do is important to me
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

26. What my colleagues think I should do matters to me.
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

27. Doing what other *profesores/investigadores* do in other faculties in the university is important to me.
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

28. How much do you care that your family thinks you should do research?
Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

29. How much do you care that the administration of the faculty of modern languages thinks you should do research.

Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

---

30. How much do you care that colleagues and/or acquaintances who do ***not*** do research think you should or should not do research.

Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

---

31. I think that having sufficient time to do research is a main factor to my doing research in the next 1-2 years.

Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree

---

32. I think that *not having* sufficient time to do research is a main factor to my *not doing* research in the next 1-2 years.

Agree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Disagree

---

33. I think that having a lot of family commitments would be a main factor to my *not doing* research in the next 1-2 years.

Agree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Disagree

---

34. Believing that my research is important and/or having a reason to do research would be a main factor in my doing research in the next 1-2- years.

Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree

---

35. Knowing how to properly do research in my area would be a main factor in my doing research in the next 1-2 years.

Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree

---

36. Being part of a research group or having someone to work with on a regular basis would be a main factor in my doing research in the next 1-2 years.

Strongly disagree: -3 : -2 : -1 : 0 : +1 : +2 : +3 : Strongly agree

---

37. Having enough time to do research would make doing research in the next 1-2 years

Less likely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

---

38. *Not having* sufficient time to do research would make my *not doing* research in the next 1-2 years

More likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Less likely.

---

39. Not having a lot of family commitments would make my *doing* research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

---

40. Having a reason to do research and/or believing that my research is important would make my doing research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

41. Knowing how to properly do research in my area would make my doing research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

---

42. My being part of a research group or having someone to work with on a regular basis would make my doing research in the next 1-2 years

Less likely: 1 : 2 : 3 : 4 : 5 : 6 : 7 : More likely.

---

43. I want to engage in research in my area within the next 1-2 years.

Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

---

44. I intend to do research in my area within the next 1-2 years.

Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

---

45. I am confident that I could do research in the next 1-2 years if I wanted to.

Strongly agree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly disagree

---

46. For me to engage in research in the next 1-2 years is

Easy: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Difficult.

---

47. The decision to do or not to do research in the next 1-2 years is beyond my control.

Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

---

48. Whether I engage in research in the next 1-2 years is not entirely up to me.

Strongly disagree : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree

---

49. My doing research in the next 1-2 years will give me a certain amount of prestige and recognition.

Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

---

50. If I do research in the next 1-2 years, I will have a feeling of personal and professional satisfaction.

Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

---

51. Doing research in the next 1-2 years will contribute to my professional development.

Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

---

52. Doing research in the next 1-2 years will make me more knowledgeable and able to inform others in matters related to my profession.

Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely

APPENDIX G: PILOT STUDY DIRECT MEASURES T-TESTS

Group Statistics

	research active	N	Mean	Std. Deviation	Std. Error Mean
TINT	yes	19	6.82	.476	.109
	no	25	5.84	1.119	.224
TBB	yes	19	6.62	.580	.133
	no	24	5.80	.970	.198
TCB	yes	19	5.63	.825	.189
	no	25	4.18	.933	.187
TNB	yes	19	1.61	1.020	.234
	no	25	.48	1.341	.268

Table G.1 Comparison of means RA – NRA

YES= RA / NO=NRA

TINT = intention scale

TBB = behavioral beliefs scale

TCB = control beliefs scale

TNB = normative beliefs scale

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
TINT	Equal variances assumed	13.506	.001	3.590	42	.001	.985	.274	.431	1.538
	Equal variances not assumed			3.955	34.218	.000	.985	.249	.479	1.490
TBB	Equal variances assumed	7.227	.010	3.236	41	.002	.816	.252	.307	1.326
	Equal variances not assumed			3.424	38.441	.001	.816	.238	.334	1.299
TCB	Equal variances assumed	.512	.478	5.369	42	.000	1.452	.270	.906	1.997
	Equal variances not assumed			5.462	40.965	.000	1.452	.266	.915	1.988
TNB	Equal variances assumed	1.639	.208	3.070	42	.004	1.134	.369	.389	1.879
	Equal variances not assumed			3.187	41.998	.003	1.134	.356	.416	1.852

Table G.2 Pilot study independent samples t-test direct measures

TINT = intention scale

TBB = behavioral beliefs scale

TCB = control beliefs scale

TNB = normative beliefs scale

APPENDIX H: PILOT STUDY T-TESTS OF INDIRECT MEASUREMENTS

Group Statistics

	research active	N	Mean	Std. Deviation	Std. Error Mean
WATT	yes	19	66.47	25.187	5.778
	no	25	51.40	23.329	4.666
WSN	yes	19	59.95	28.033	6.431
	no	23	33.70	31.250	6.516
WPBC	yes	19	51.79	21.758	4.992
	no	25	47.84	21.663	4.333

Table H.1 Comparision of means indirect measures
YES = RA / NO= NRA

WATT = attitude toward the behavior scale
WSN = subjective norm scale
WPBC = perceived behavioral control scale

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
WATT	Equal variances assumed	.000	.988	2.051	42	.046	15.074	7.348	.245	29.902
	Equal variances not assumed			2.030	37.249	.050	15.074	7.427	.029	30.119
WSN	Equal variances assumed	.211	.648	2.837	40	.007	26.252	9.253	7.552	44.952
	Equal variances not assumed			2.867	39.697	.007	26.252	9.155	7.744	44.760
WPBC	Equal variances assumed	.000	.983	.598	42	.553	3.949	6.606	-9.381	17.280
	Equal variances not assumed			.598	38.816	.554	3.949	6.610	-9.422	17.321

Table H.2 Independent samples t-tests indirect measures

WATT = attitude toward the behavior scale
WSN = subjective norm scale
WPBC = perceived behavioral control scale

APPENDIX I: PILOT STUDY DIRECT MEASURES SCALE INTERNAL CONSISTENCY

INTENTION

Case Processing Summary

		N	%
Cases	Valid	44	97.8
	Excluded[a]	1	2.2
	Total	45	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.726	3

Item Statistics

	Mean	Std. Deviation	N
intentions direct	6.16	1.397	44
intentions direct	6.30	1.212	44
intentions direct	6.34	1.180	44

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
intentions direct	12.64	5.586	.272	.975
intentions direct	12.50	4.302	.708	.446
intentions direct	12.45	4.254	.757	.392

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
18.80	9.329	3.054	3

BEHAVIORAL BELIEFS

Case Processing Summary

		N	%
Cases	Valid	43	95.6
	Excluded[a]	2	4.4
	Total	45	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.810	4

Item Statistics

	Mean	Std. Deviation	N
attitude direct	6.21	1.186	43
attitude direct	6.26	1.026	43
attitude direct	6.26	.954	43
attitude direct	5.93	1.352	43

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
attitude direct	18.44	7.252	.716	.716
attitude direct	18.40	8.150	.688	.737
attitude direct	18.40	8.864	.609	.774
attitude direct	18.72	7.396	.545	.817

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
24.65	13.233	3.638	4

NORMATIVE BELIEFS

Case Processing Summary

		N	%
Cases	Valid	42	95.5
	Excluded[a]	2	4.5
	Total	44	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.721	.711	3

Item Statistics

	Mean	Std. Deviation	N
subjective norm	.33	1.857	42
subjective norm	1.67	1.426	42
subjective norm	.98	1.746	42

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	.992	.333	1.667	1.333	5.000	.445	3

The covariance matrix is calculated and used in the analysis.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
subjective norm	2.64	6.723	.649	.494	.489
subjective norm	1.31	10.999	.358	.128	.819
subjective norm	2.00	7.220	.655	.494	.482

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
2.98	16.414	4.051	3

CONTROL BELIEFS

Case Processing Summary

		N	%
Cases	Valid	44	97.8
	Excluded[a]	1	2.2
	Total	45	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.656	6

Item Statistics

	Mean	Std. Deviation	N
control direct	5.41	1.756	44
control direct	5.23	1.583	44
control direct	4.16	2.134	44
control direct	4.82	1.646	44
control direct	4.41	2.106	44
control direct	4.82	1.980	44

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
control direct	23.43	35.693	.382	.615
control direct	23.61	39.173	.258	.653
control direct	24.68	35.431	.268	.662
control direct	24.02	34.348	.504	.577
control direct	24.43	31.925	.438	.593
control direct	24.02	31.790	.496	.570

APPENDIX J: PILOT STUDY DIRECT MEASURES NORMALITY TESTS AND PLOTS

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
TINT	44	100.0%	0	.0%	44	100.0%
TBB	43	97.7%	1	2.3%	44	100.0%
TCB	44	100.0%	0	.0%	44	100.0%
TNB	44	100.0%	0	.0%	44	100.0%

TINT=TOTAL SCORES INTENTION SCALE
TBB= TOTAL SCORES BEHAVIORAL BELIEFS SCALE
TCB=TOTAL SCORES CONTROL BELIEFS SCALE
TBB=TOTAL SCORES NORMATIVE BELIEFS SCALE

Descriptives

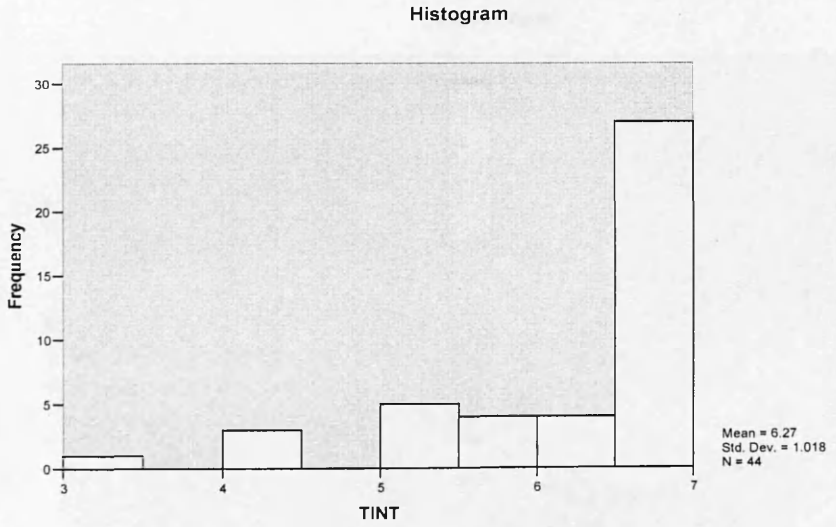
			Statistic	Std. Error
TINT	Mean		6.27	.153
	95% Confidence Interval for Mean	Lower Bound	5.96	
		Upper Bound	6.57	
	5% Trimmed Mean		6.37	
	Median		7.00	
	Variance		1.037	
	Std. Deviation		1.018	
	Minimum		3	
	Maximum		7	
	Range		4	
	Interquartile Range		1	
	Skewness		-1.387	.357
	Kurtosis		1.367	.702
TBB	Mean		6.16	.139
	95% Confidence Interval for Mean	Lower Bound	5.88	
		Upper Bound	6.44	
	5% Trimmed Mean		6.23	
	Median		6.25	
	Variance		.827	
	Std. Deviation		.909	
	Minimum		4	
	Maximum		7	
	Range		3	
	Interquartile Range		2	
	Skewness		-.882	.361
	Kurtosis		-.280	.709
TCB	Mean		4.81	.172
	95% Confidence Interval for Mean	Lower Bound	4.46	
		Upper Bound	5.15	
	5% Trimmed Mean		4.83	
	Median		4.83	
	Variance		1.300	
	Std. Deviation		1.140	
	Minimum		2	
	Maximum		7	
	Range		5	
	Interquartile Range		2	
	Skewness		-.244	.357
	Kurtosis		-.427	.702
TNB	Mean		.97	.200
	95% Confidence Interval for Mean	Lower Bound	.57	
		Upper Bound	1.37	
	5% Trimmed Mean		1.01	
	Median		1.00	
	Variance		1.761	
	Std. Deviation		1.327	
	Minimum		-2	
	Maximum		3	
	Range		5	
	Interquartile Range		2	
	Skewness		-.423	.357
	Kurtosis		-.650	.702

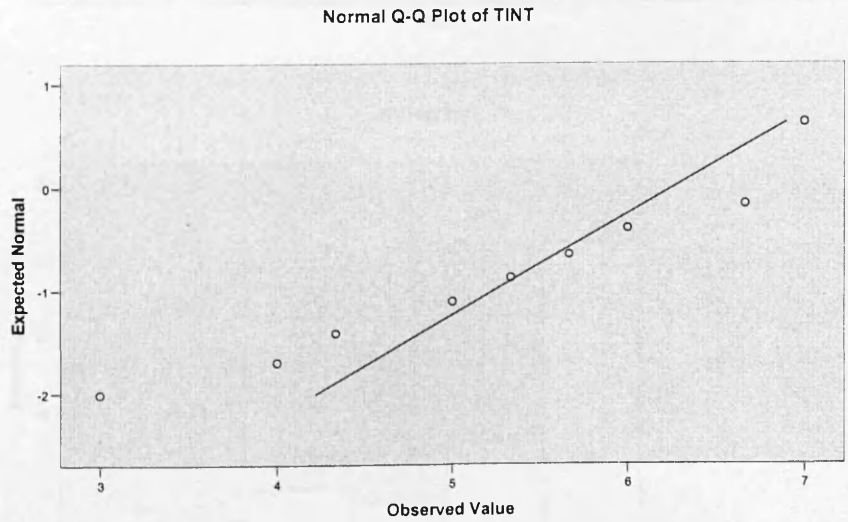
Tests of Normality

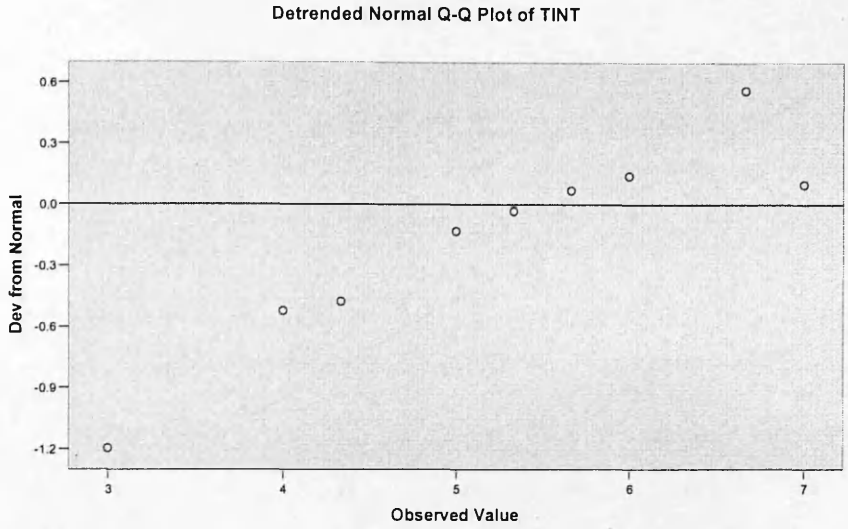
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TINT	.288	44	.000	.757	44	.000
TBB	.206	43	.000	.850	43	.000
TCB	.087	44	.200*	.981	44	.687
TNB	.109	44	.200*	.958	44	.113

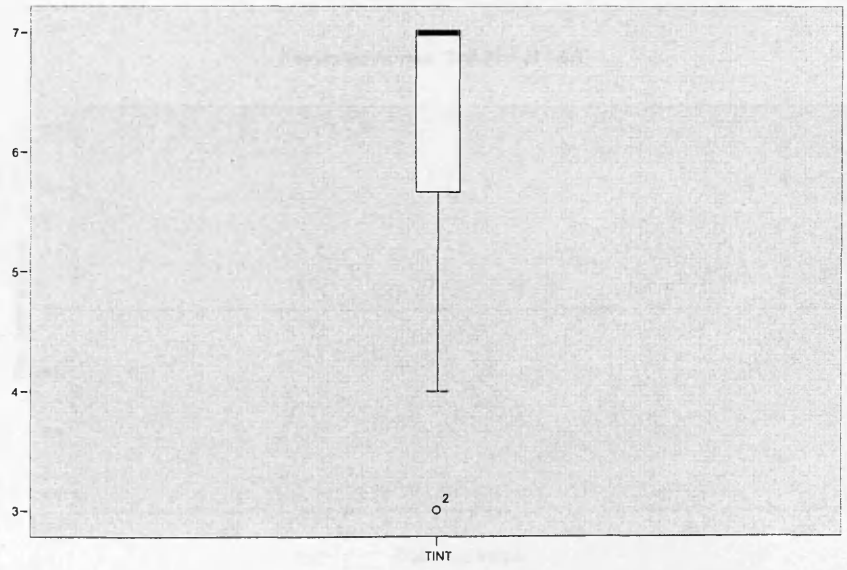
*. This is a lower bound of the true significance.

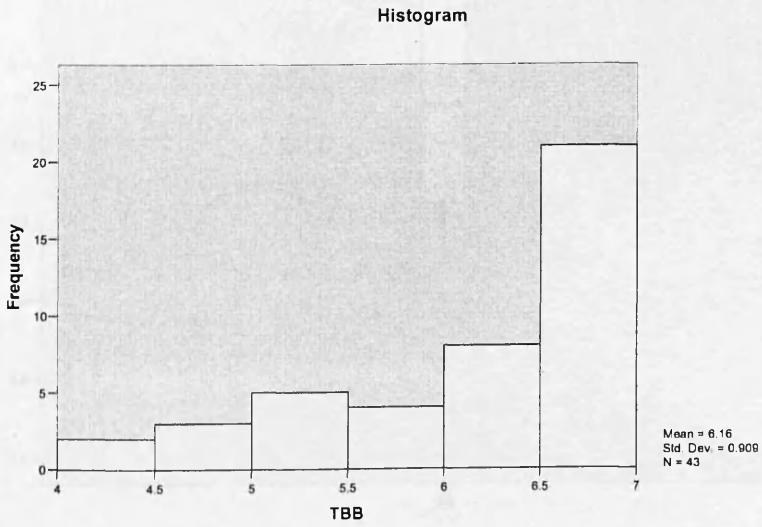
a. Lilliefors Significance Correction

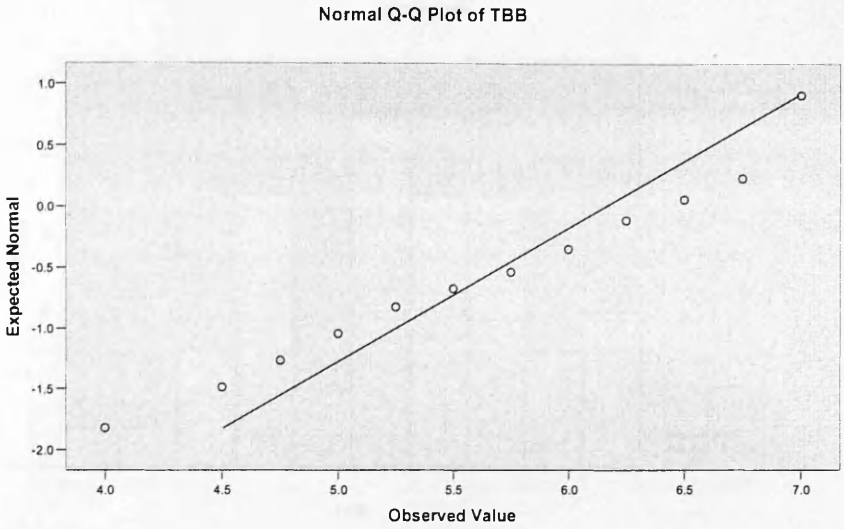


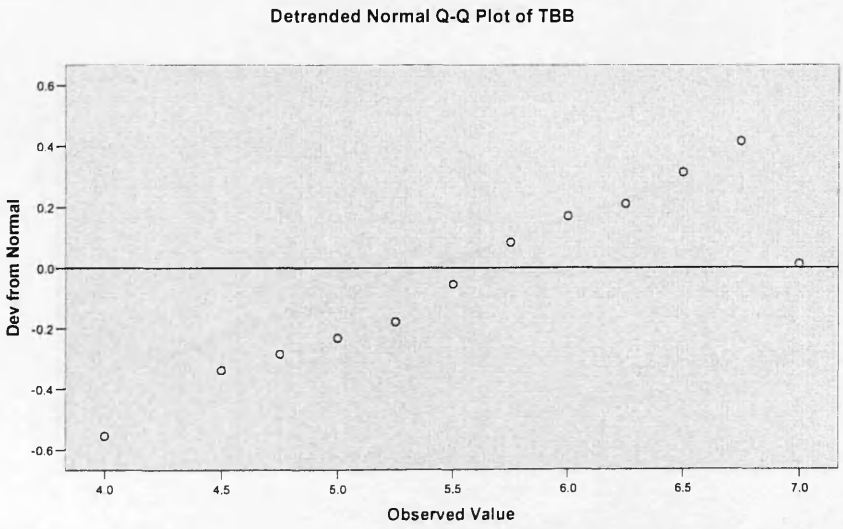


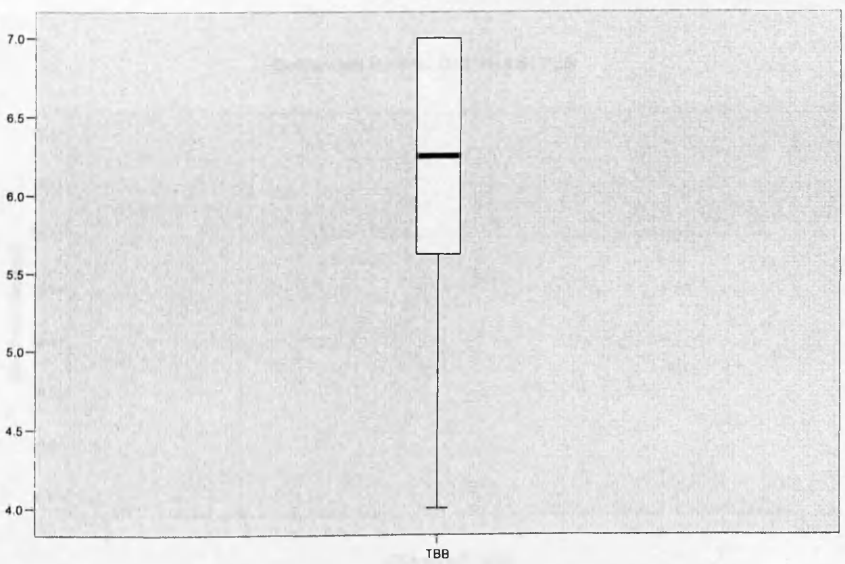

Detrended Normal Q-Q Plot of TINT
Dev from Normal
0.6
0.3
0.0
-0.3
-0.6
-0.9
-1.2
3
4
5
6
7
Observed Value

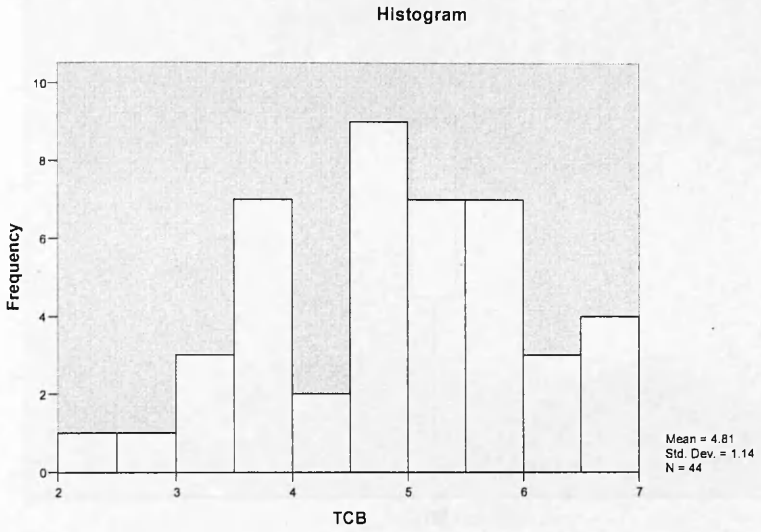

7
6
5
4
3
2
TINT

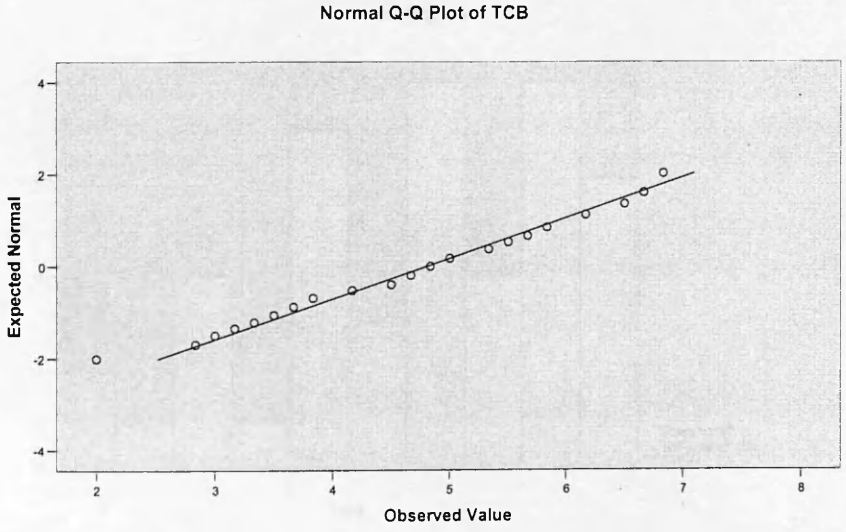

Histogram
Frequency
25
20
15
10
5
0
4
4.5
5
5.5
6
6.5
7
TBB
Mean = 6.16
Std. Dev. = 0.909
N = 43

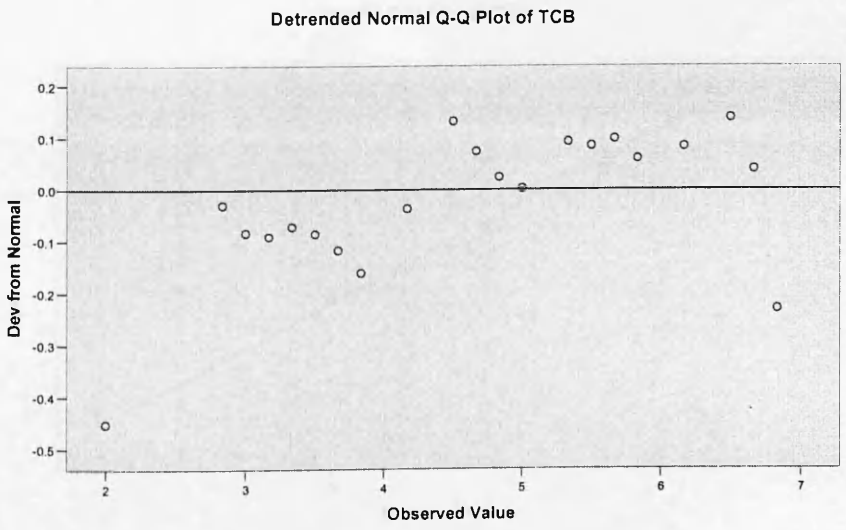

Normal Q-Q Plot of TBB
Expected Normal
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
4.0
4.5
5.0
5.5
6.0
6.5
7.0
Observed Value

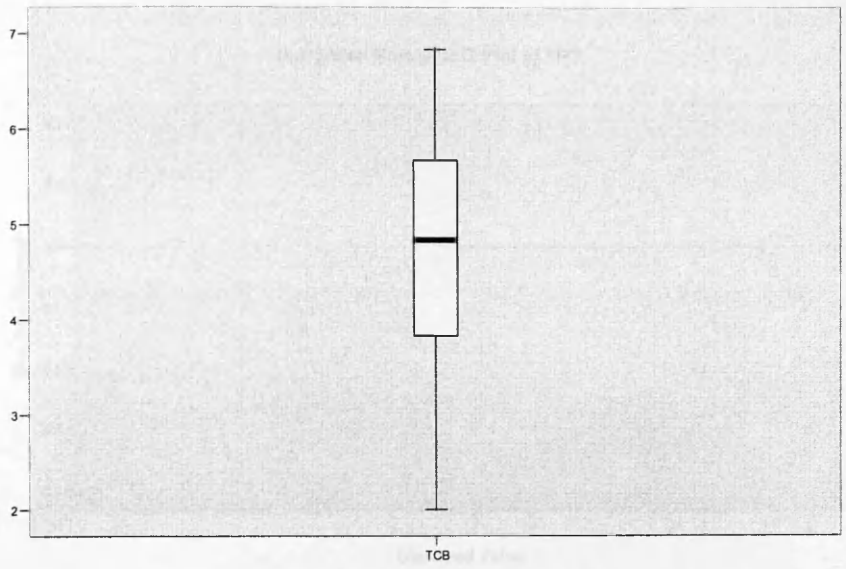

Detrended Normal Q-Q Plot of TBB
Dev from Normal
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
4.0
4.5
5.0
5.5
6.0
6.5
7.0
Observed Value


7.0
6.5
6.0
5.5
5.0
4.5
4.0
TBB

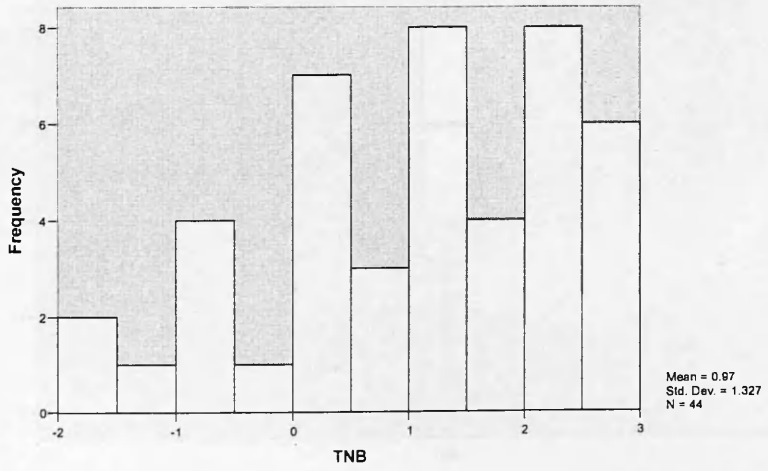

Histogram
Frequency
TCB
Mean = 4.81
Std. Dev. = 1.14
N = 44


Normal Q-Q Plot of TCB
Expected Normal
Observed Value

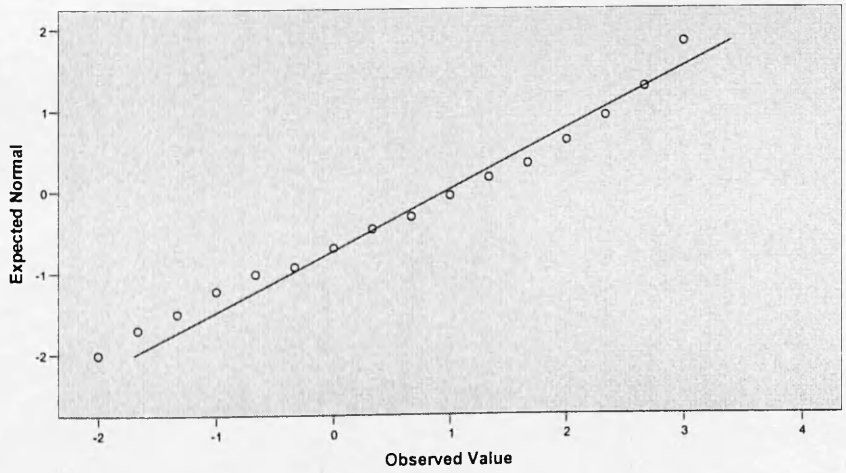

Detrended Normal Q-Q Plot of TCB
Dev from Normal
Observed Value

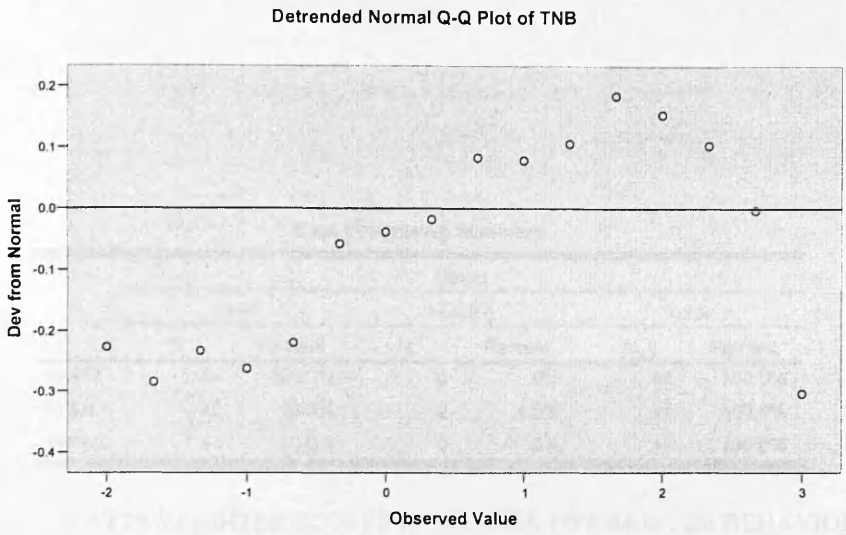


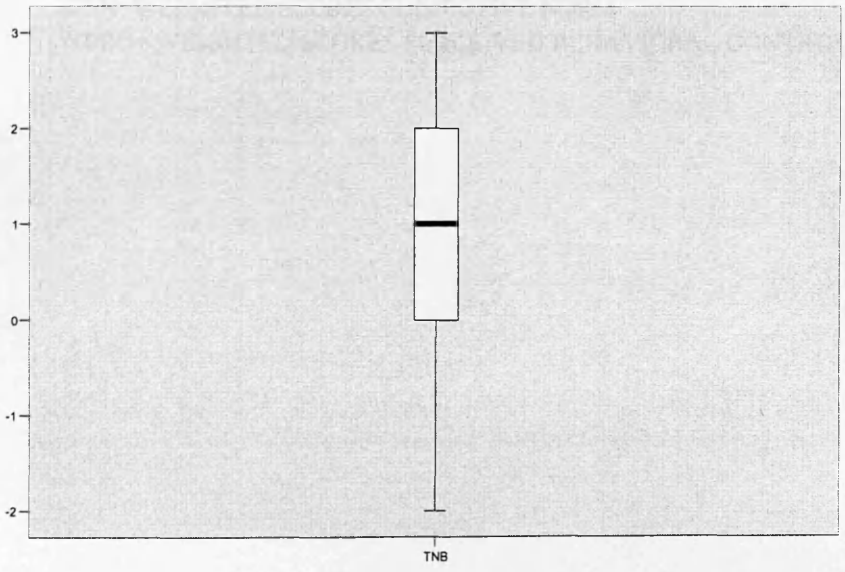
Histogram



Normal Q-Q Plot of TNB




Detrended Normal Q-Q Plot of TNB
Dev from Normal
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
-2
-1
0
1
2
3
Observed Value


3
2
1
0
-1
-2
TNB

APPENDIX K: PILOT STUDY INDIRECT DATA NORMALITY TESTS AND PLOTS

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
WATT	44	100.0%	0	.0%	44	100.0%
WSN	42	95.5%	2	4.5%	44	100.0%
WPBC	44	100.0%	0	.0%	44	100.0%

WATT=WEIGHTED SCORES ATTITUDES TOWARD THE BEHAVIOR
WSN=WEIGHTED SCORES SUBJECTIVE NORM
WPBC= WEIGHTED SCORES PERCEIVED BEHAVIORAL CONTROL

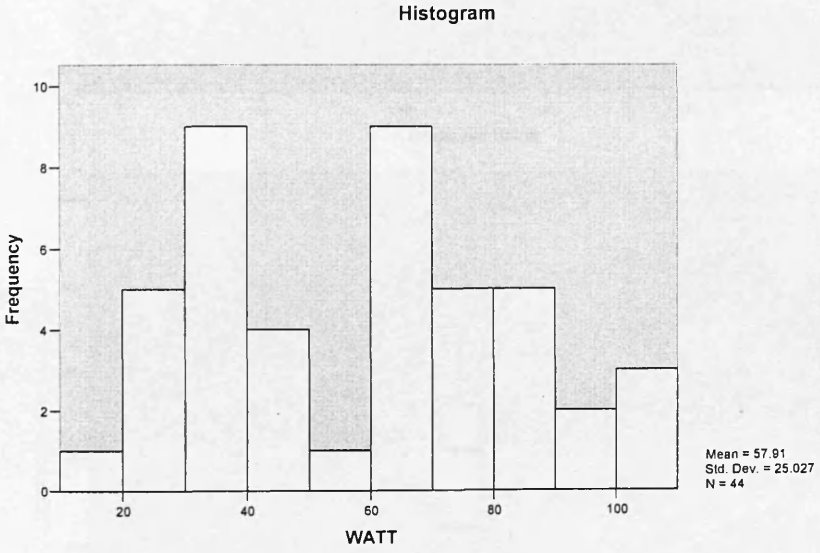
Descriptives

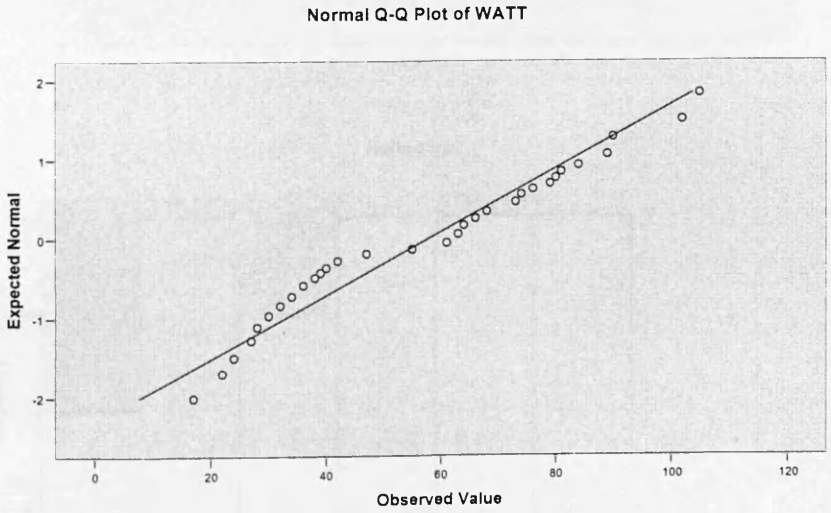
			Statistic	Std. Error
WATT	Mean		57.91	3.773
	95% Confidence Interval for Mean	Lower Bound	50.30	
		Upper Bound	65.52	
	5% Trimmed Mean		57.42	
	Median		62.00	
	Variance		626.364	
	Std. Deviation		25.027	
	Minimum		17	
	Maximum		105	
	Range		88	
	Interquartile Range		44	
	Skewness		.175	.357
	Kurtosis		-1.121	.702
WSN	Mean		45.57	4.985
	95% Confidence Interval for Mean	Lower Bound	35.50	
		Upper Bound	55.64	
	5% Trimmed Mean		45.98	
	Median		47.50	
	Variance		1043.909	
	Std. Deviation		32.310	
	Minimum		-13	
	Maximum		98	
	Range		111	
	Interquartile Range		63	
	Skewness		-.124	.365
	Kurtosis		-1.233	.717
WPBC	Mean		49.55	3.247
	95% Confidence Interval for Mean	Lower Bound	43.00	
		Upper Bound	56.09	
	5% Trimmed Mean		49.82	
	Median		48.00	
	Variance		464.021	
	Std. Deviation		21.541	
	Minimum		9	
	Maximum		84	
	Range		75	
	Interquartile Range		37	
	Skewness		-.211	.357
	Kurtosis		-1.056	.702

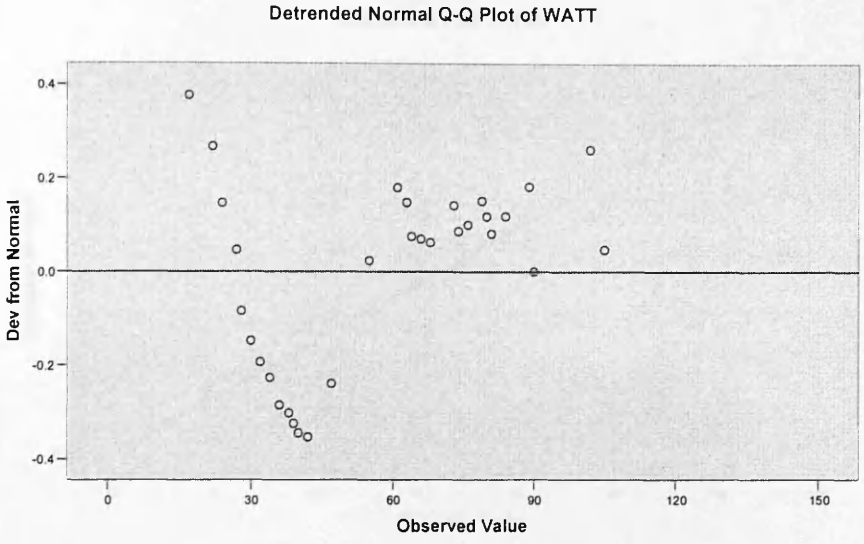
Tests of Normality

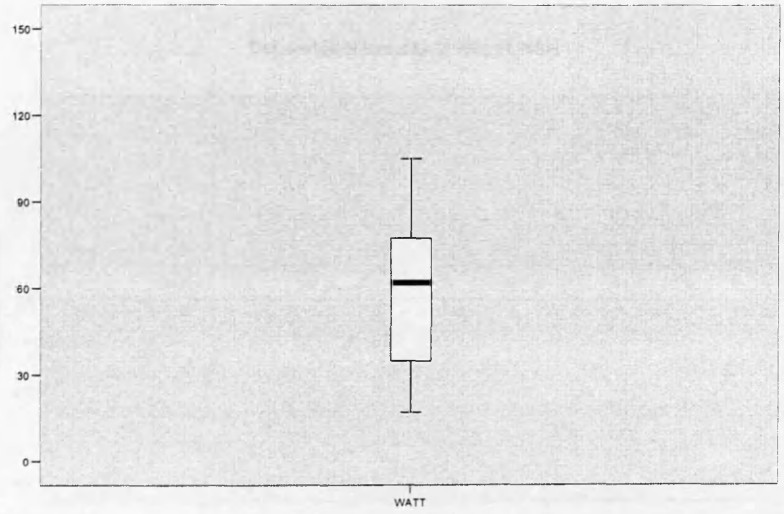
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
WATT	.147	44	.019	.946	44	.039
WSN	.118	42	.159	.948	42	.054
WPBC	.120	44	.116	.952	44	.066

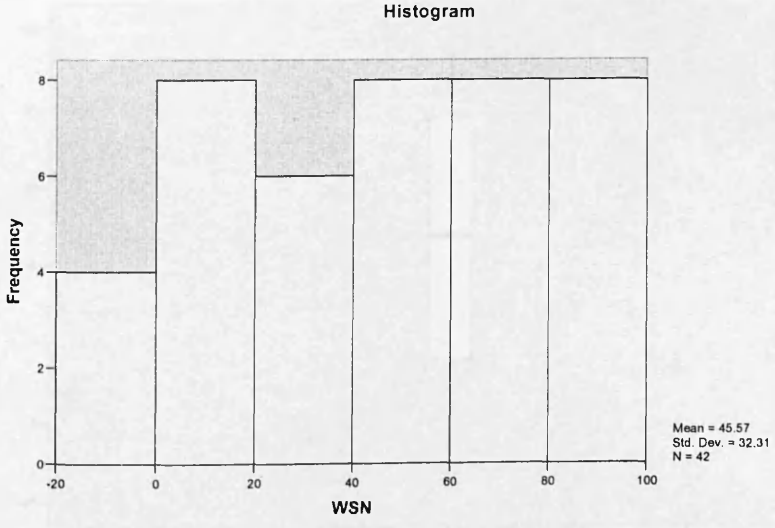
a. Lilliefors Significance Correction



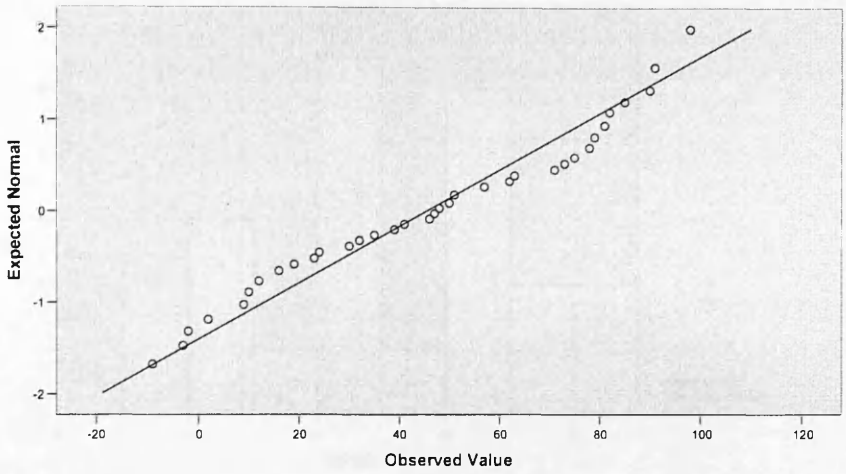



Detrended Normal Q-Q Plot of WATT
Dev from Normal
0.4
0.2
0.0
-0.2
-0.4
0
30
60
90
120
150
Observed Value

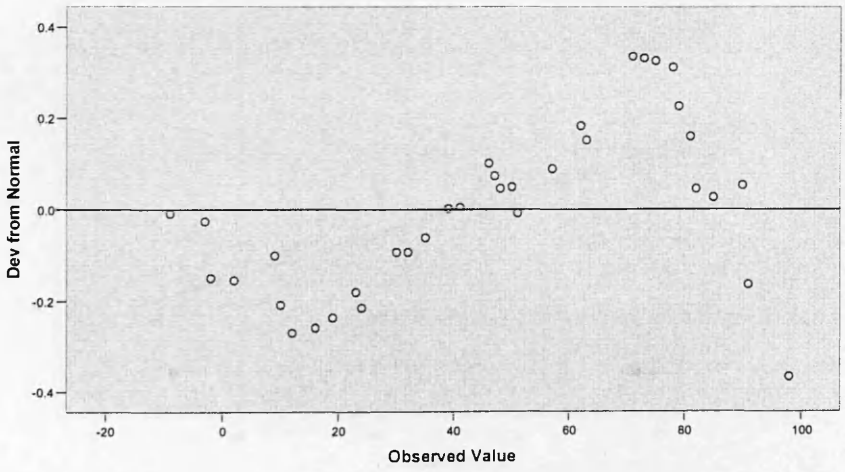

150
120
90
60
30
0
WATT

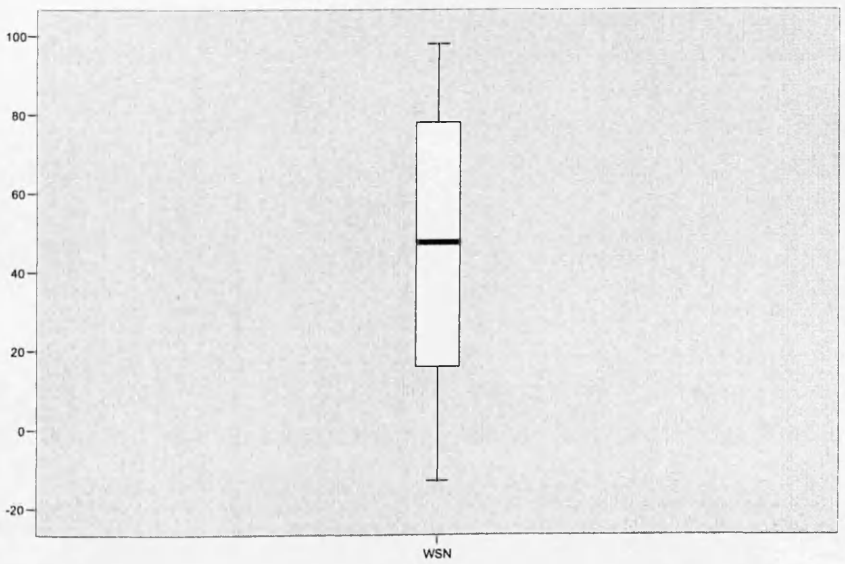

Histogram
Frequency
8
6
4
2
0
-20
0
20
40
60
80
100
WSN
Mean = 45.57
Std. Dev. = 32.31
N = 42

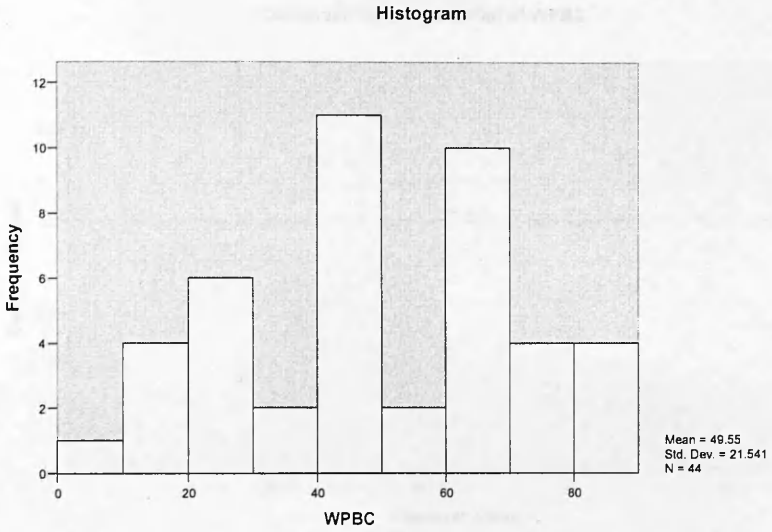
Normal Q-Q Plot of WSN

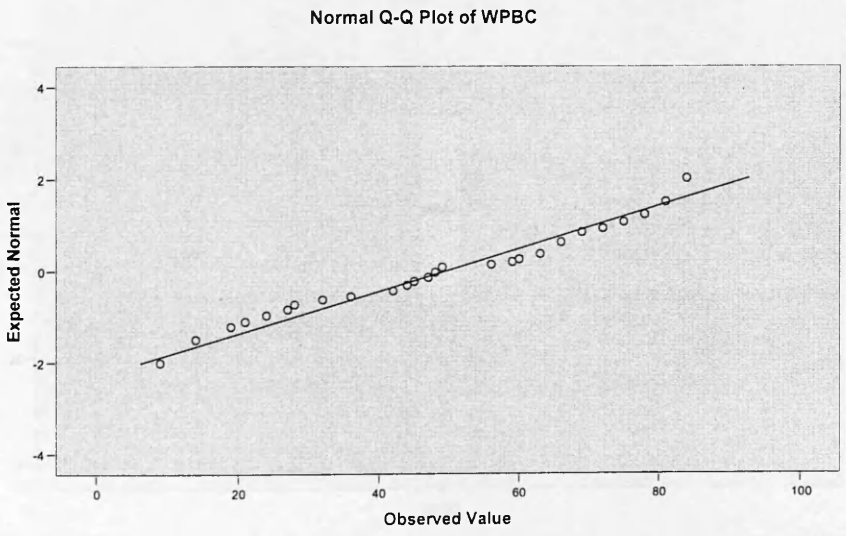


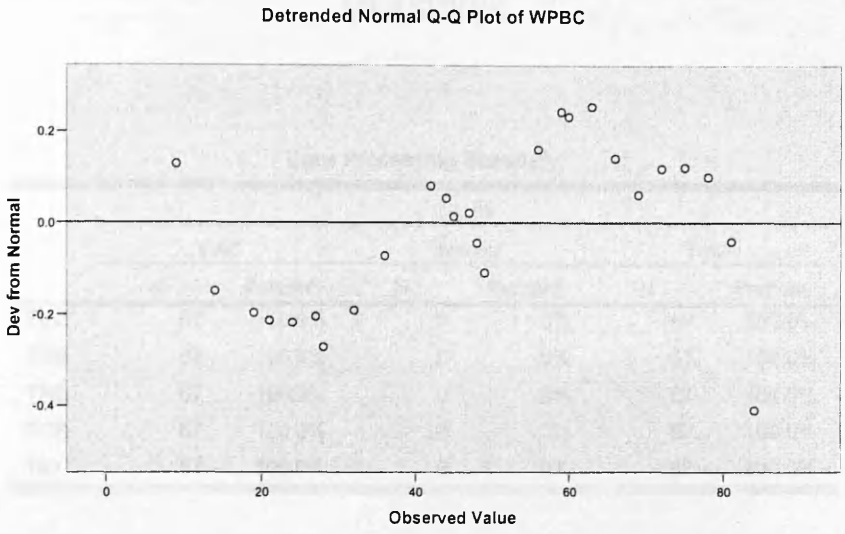
Detrended Normal Q-Q Plot of WSN

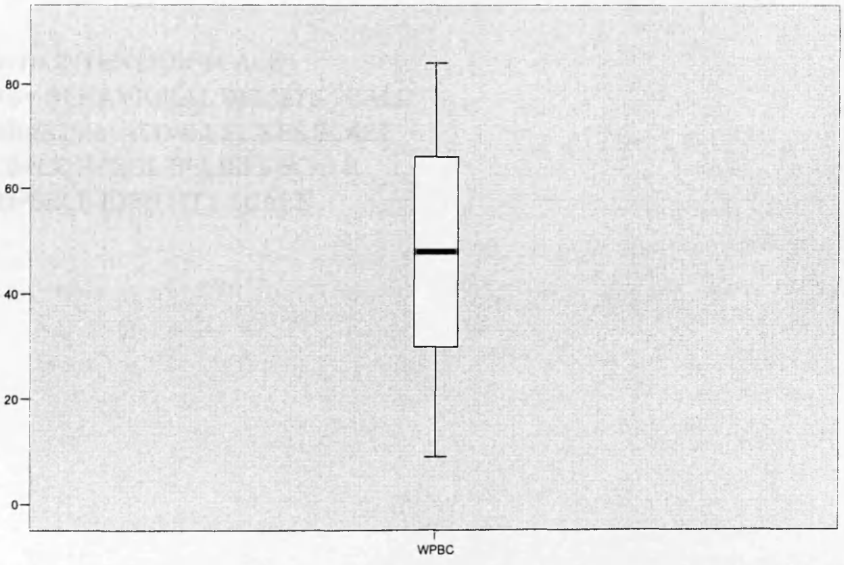





Histogram
Frequency
WPBC
Mean = 49.55
Std. Dev. = 21.541
N = 44


Normal Q-Q Plot of WPBC
Expected Normal
Observed Value


Detrended Normal Q-Q Plot of WPBC
Dev from Normal
0.2
0.0
-0.2
-0.4
0
20
40
60
80
Observed Value


80
60
40
20
0
WPBC

APPENDIX L: MAIN STUDY TESTS OF NORMAL DISTRIBUTION – DIRECT MEASURES

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
TINT	67	100.0%	0	.0%	67	100.0%
TBB	67	100.0%	0	.0%	67	100.0%
TNB	67	100.0%	0	.0%	67	100.0%
TCB	67	100.0%	0	.0%	67	100.0%
TID	67	100.0%	0	.0%	67	100.0%

TINT= INTENTION SCALE
TBB= BEHAVIORAL BELIEFS SCALE
TNB=NORMATIVE BELIEFS SCALE
TCB=CONTROL BELIEFS SCALE
TID=SELF-IDENTITY SCALE

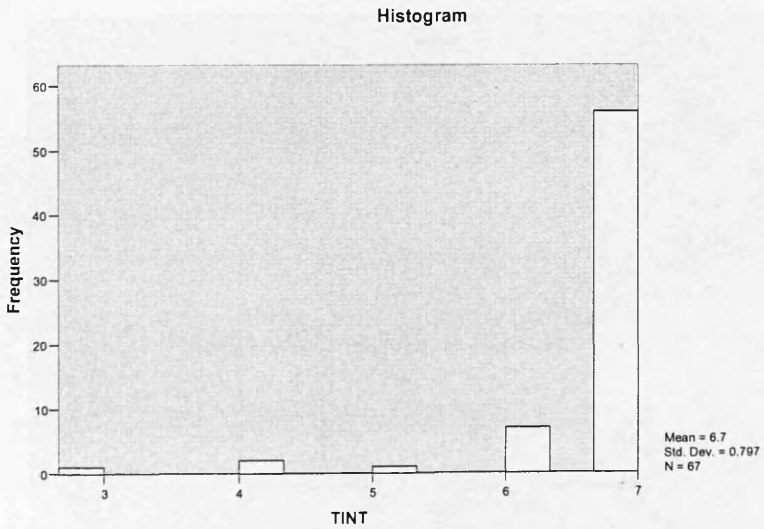
Descriptives

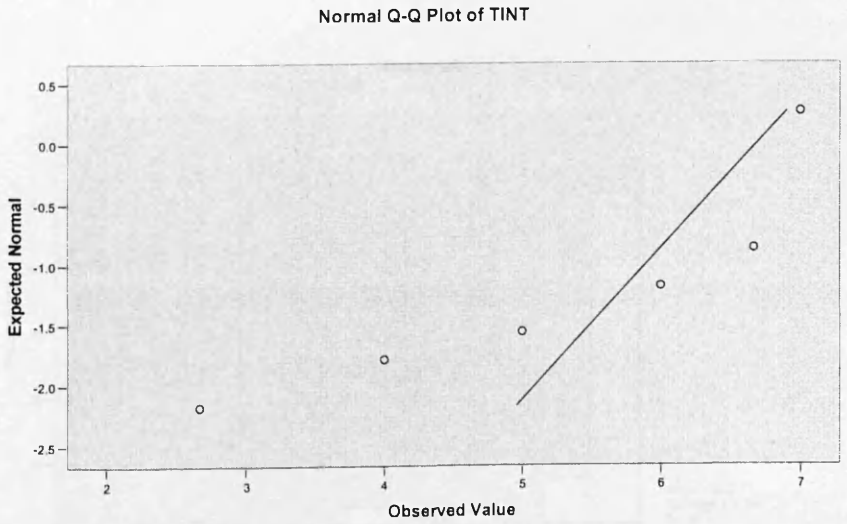
			Statistic	Std. Error
TINT	Mean		6.70	.097
	95% Confidence Interval for Mean	Lower Bound	6.50	
		Upper Bound	6.89	
	5% Trimmed Mean		6.85	
	Median		7.00	
	Variance		.635	
	Std. Deviation		.797	
	Minimum		3	
	Maximum		7	
	Range		4	
	Interquartile Range		0	
	Skewness		-3.404	.293
	Kurtosis		12.468	.578
TBB	Mean		6.42	.141
	95% Confidence Interval for Mean	Lower Bound	6.14	
		Upper Bound	6.70	
	5% Trimmed Mean		6.60	
	Median		7.00	
	Variance		1.325	
	Std. Deviation		1.151	
	Minimum		1	
	Maximum		7	
	Range		6	
	Interquartile Range		1	
	Skewness		-2.927	.293
	Kurtosis		9.608	.578
TNB	Mean		5.90	.132
	95% Confidence Interval for Mean	Lower Bound	5.64	
		Upper Bound	6.16	
	5% Trimmed Mean		6.00	
	Median		6.00	
	Variance		1.163	
	Std. Deviation		1.079	
	Minimum		3	
	Maximum		7	
	Range		5	
	Interquartile Range		2	
	Skewness		-1.019	.293
	Kurtosis		.710	.578
TCB	Mean		5.22	.142
	95% Confidence Interval for Mean	Lower Bound	4.94	
		Upper Bound	5.50	
	5% Trimmed Mean		5.24	
	Median		5.25	
	Variance		1.343	
	Std. Deviation		1.159	
	Minimum		3	
	Maximum		7	
	Range		4	
	Interquartile Range		2	
	Skewness		-.186	.293
	Kurtosis		-.826	.578
TID	Mean		6.27	.127
	95% Confidence Interval for Mean	Lower Bound	6.01	
		Upper Bound	6.52	
	5% Trimmed Mean		6.39	
	Median		6.75	
	Variance		1.077	
	Std. Deviation		1.038	
	Minimum		3	
	Maximum		7	
	Range		5	
	Interquartile Range		1	
	Skewness		-1.801	.293
	Kurtosis		2.957	.578

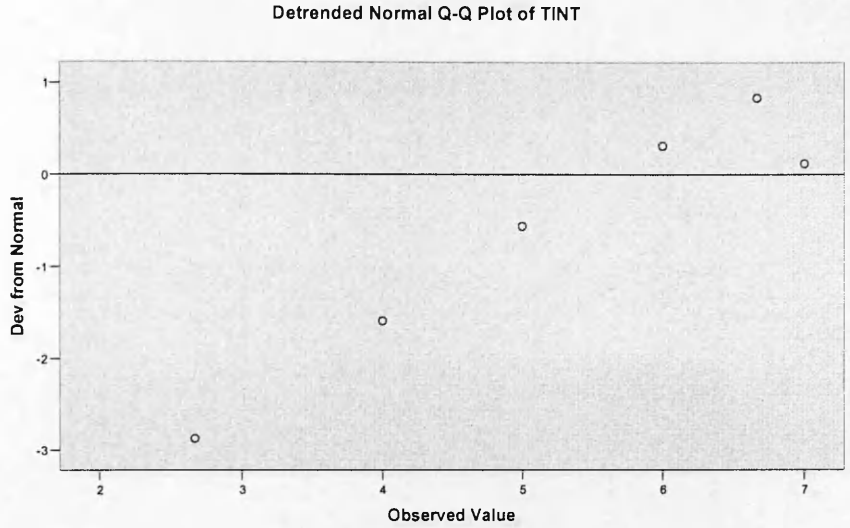
Tests of Normality

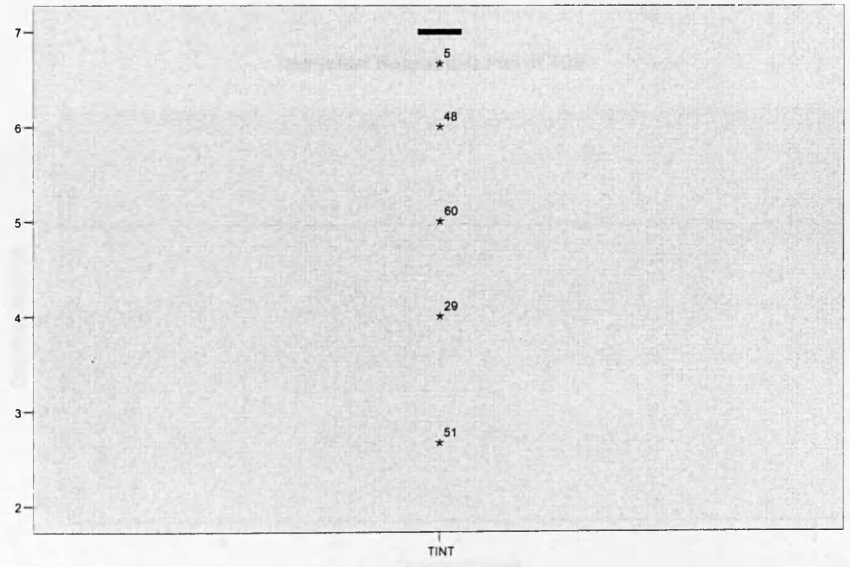
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TINT	.439	67	.000	.443	67	.000
TBB	.307	67	.000	.573	67	.000
TNB	.154	67	.000	.886	67	.000
TCB	.107	67	.053	.961	67	.036
TID	.240	67	.000	.736	67	.000

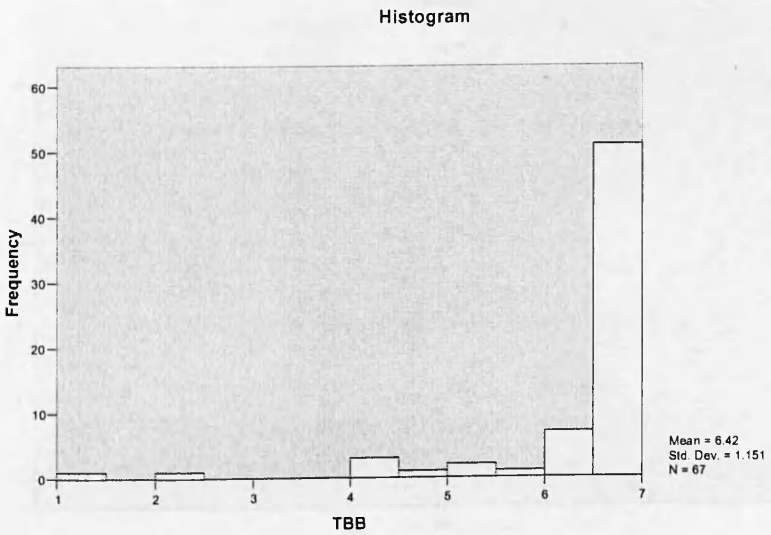
a. Lilliefors Significance Correction



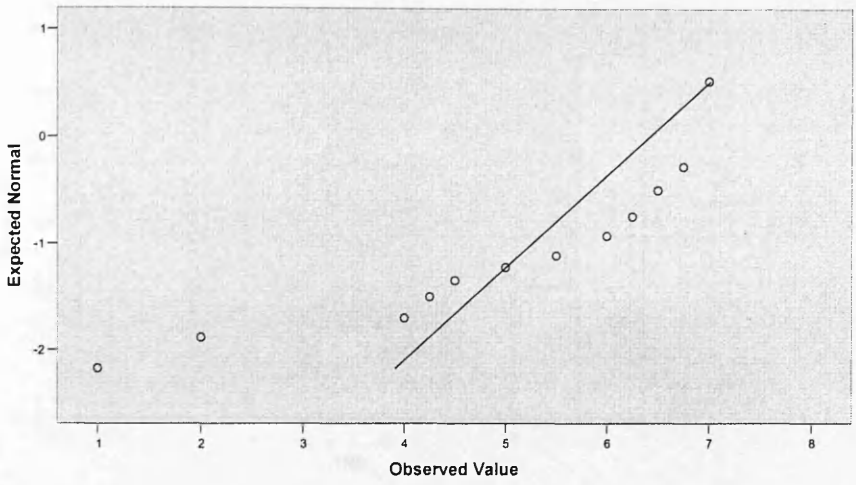



Detrended Normal Q-Q Plot of TINT
Dev from Normal
1
0
-1
-2
-3
2
3
4
5
6
7
Observed Value

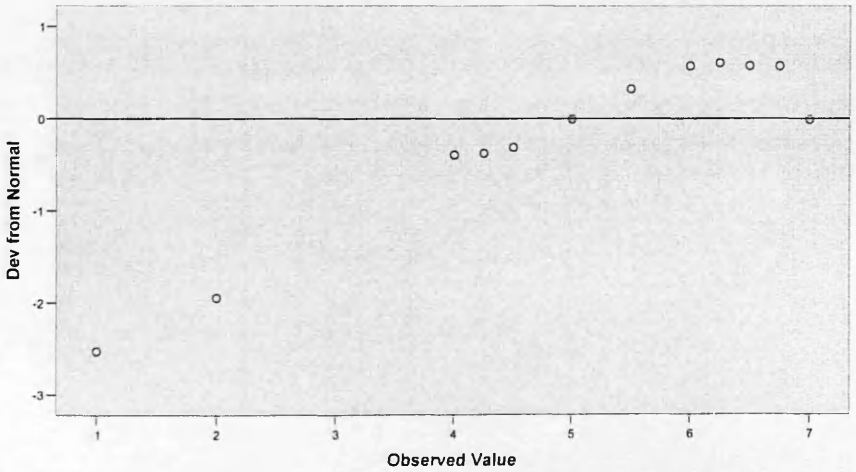

7
6
5
4
3
2
5
48
60
29
51
TINT

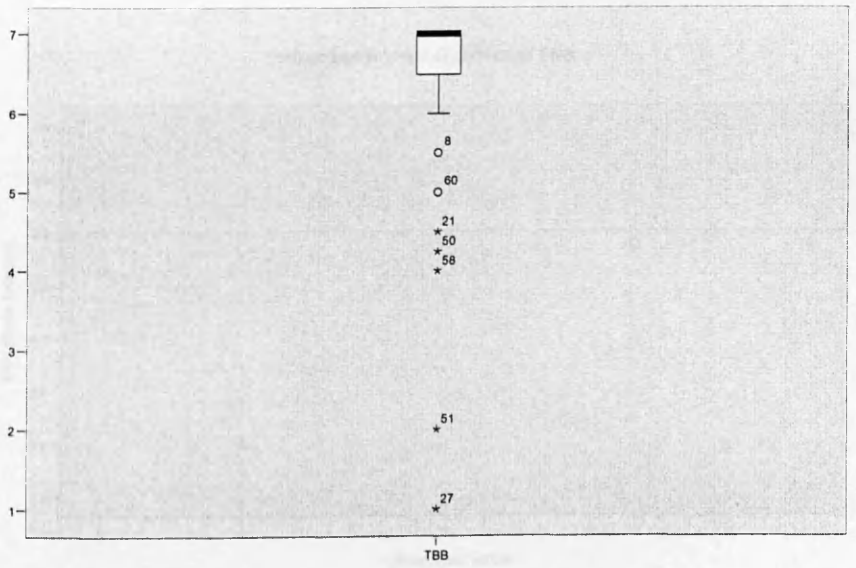

Histogram
Frequency
60
50
40
30
20
10
0
1
2
3
4
5
6
7
TBB
Mean = 6.42
Std. Dev. = 1.151
N = 67

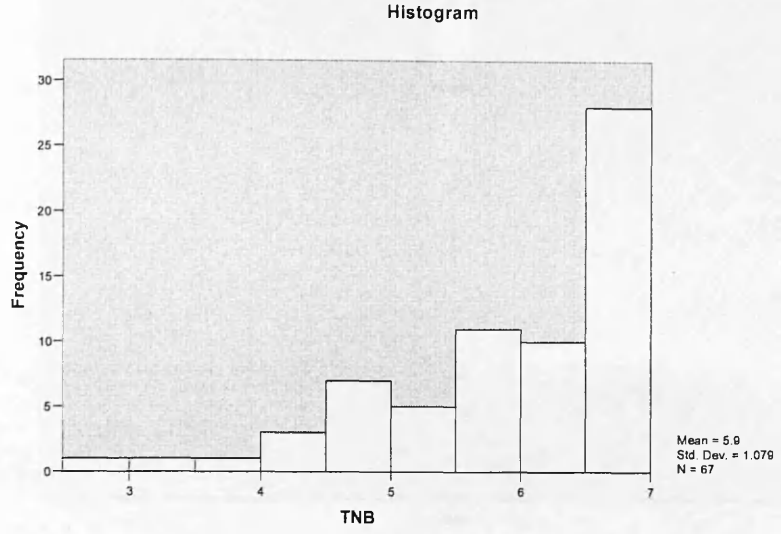
Normal Q-Q Plot of TBB

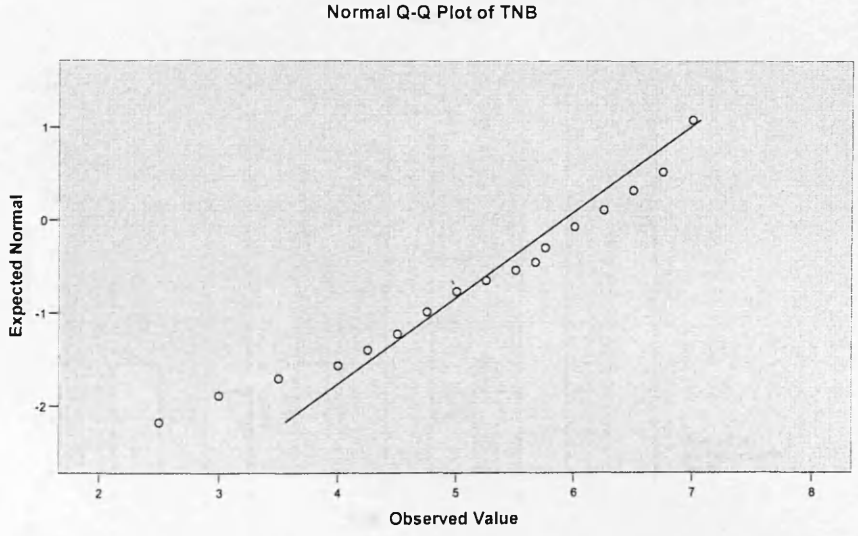


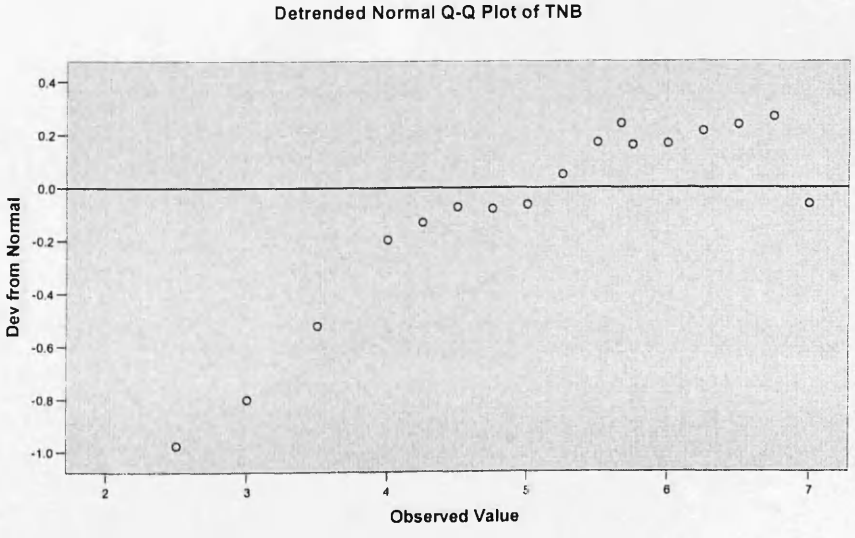
Detrended Normal Q-Q Plot of TBB

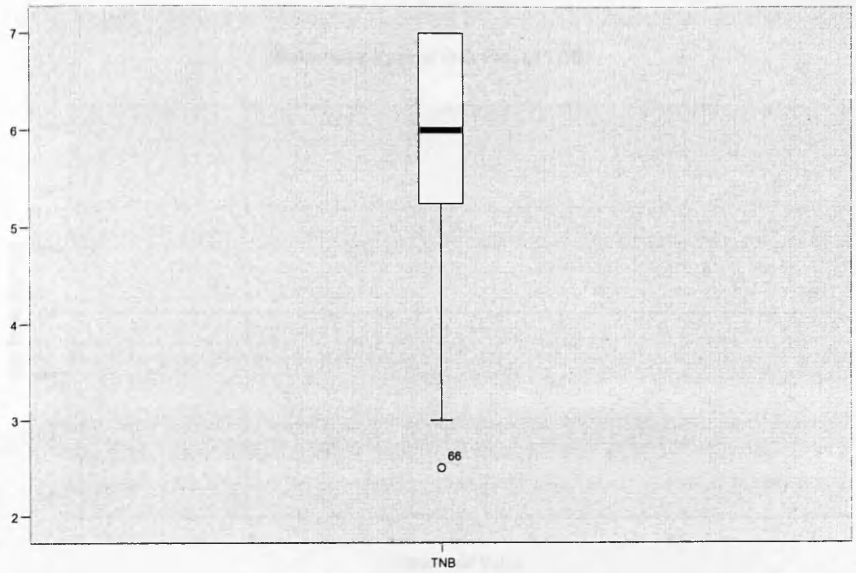




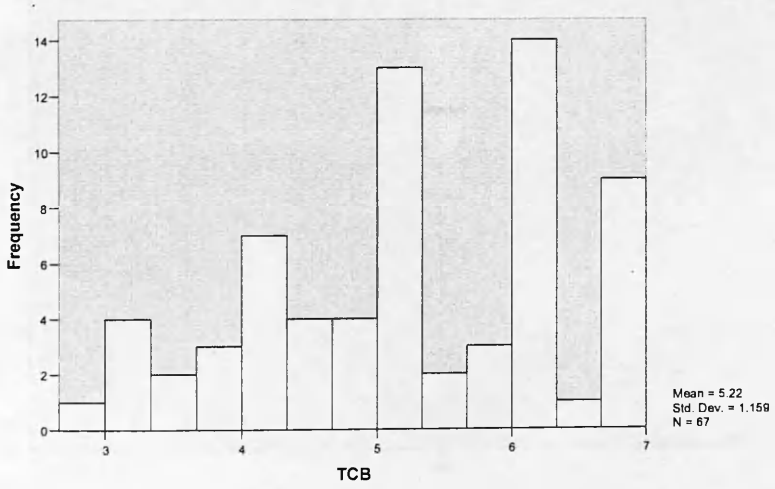

Histogram
Frequency
TNB
Mean = 5.9
Std. Dev. = 1.079
N = 67


Normal Q-Q Plot of TNB
Expected Normal
Observed Value

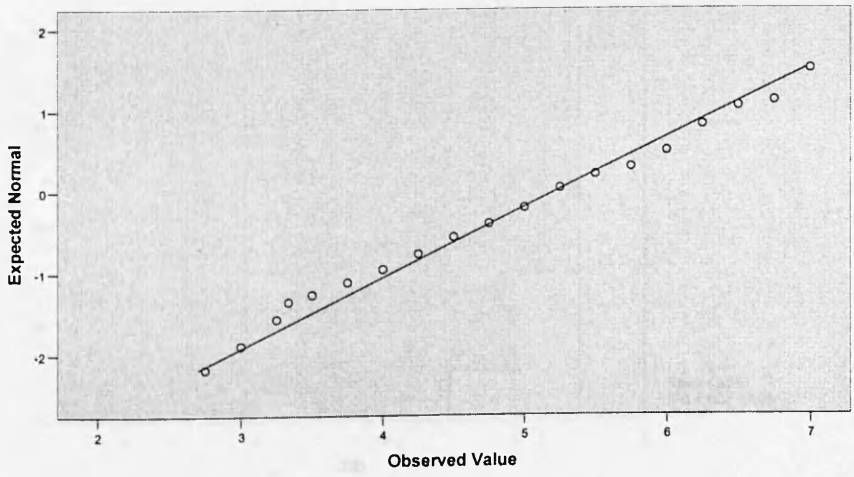

Detrended Normal Q-Q Plot of TNB
Dev from Normal
Observed Value

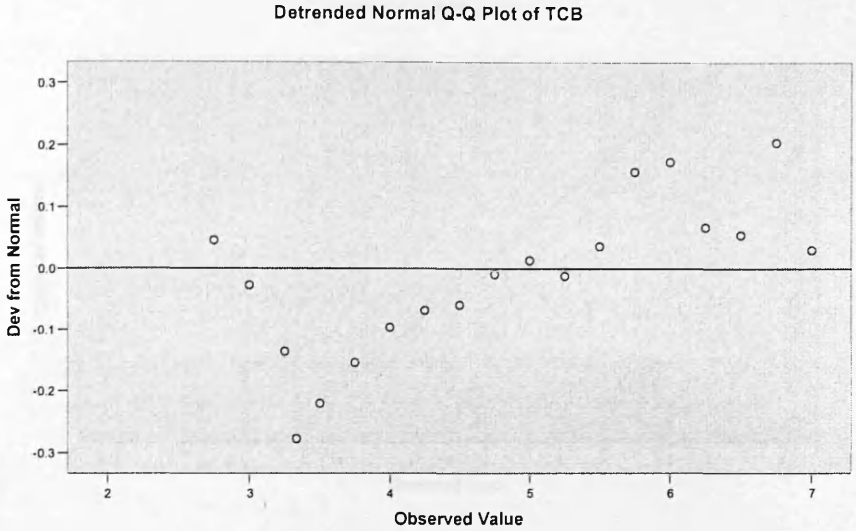


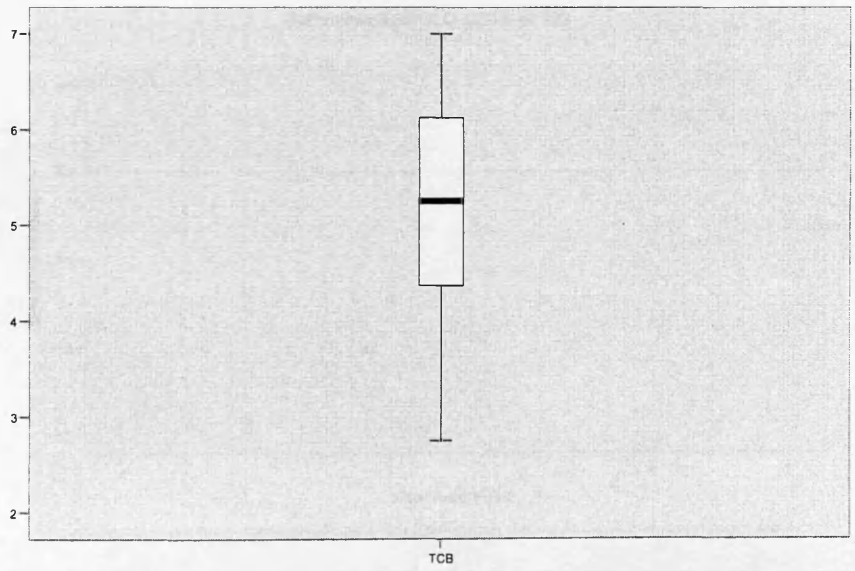
Histogram

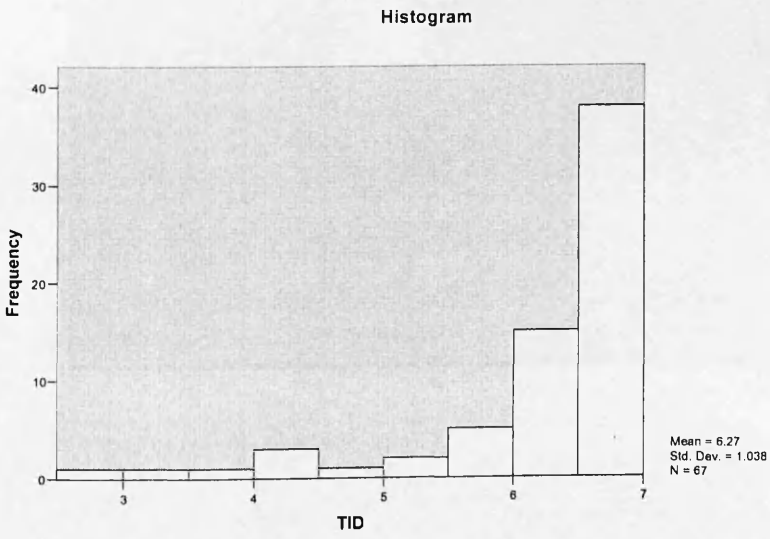


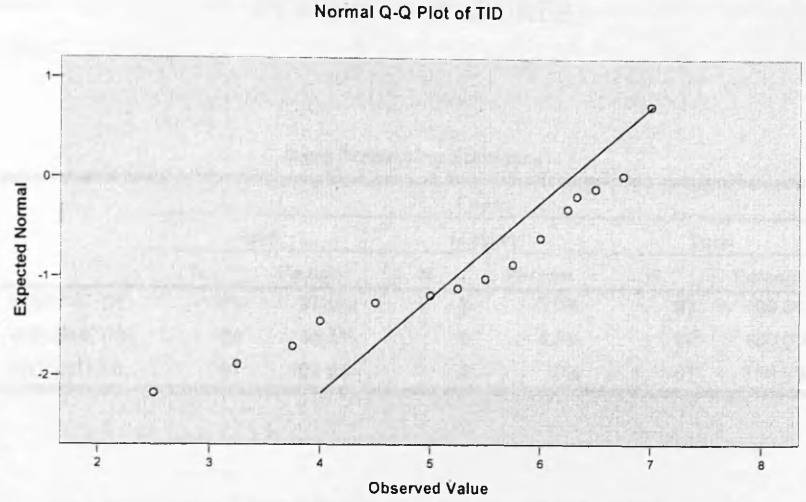
Normal Q-Q Plot of TCB

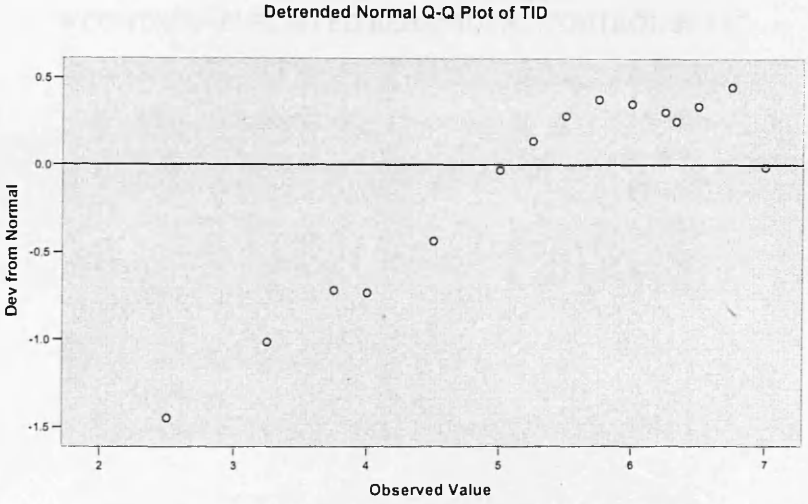


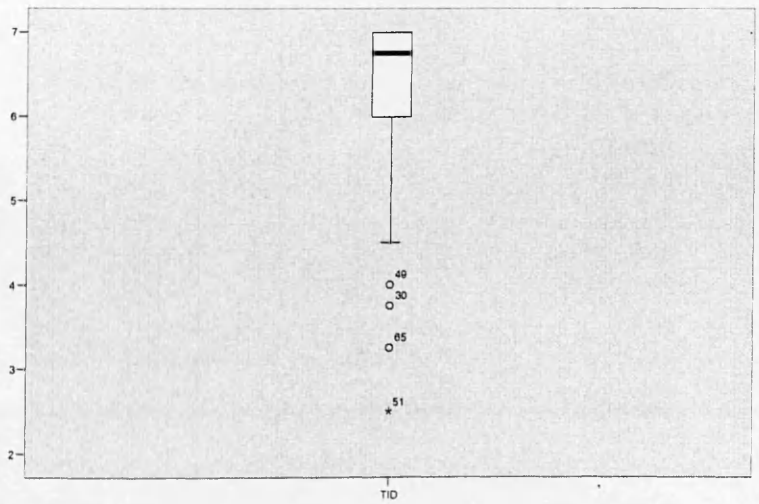

Detrended Normal Q-Q Plot of TCB
Dev from Normal
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
2
3
4
5
6
7
Observed Value


7
6
5
4
3
2
TCB


Histogram
Frequency
40
30
20
10
0
3
4
5
6
7
TID
Mean = 6.27
Std. Dev. = 1.038
N = 67


Normal Q-Q Plot of TID
Expected Normal
Observed Value


Detrended Normal Q-Q Plot of TID
Dev from Normal
Observed Value


49
30
65
51
TID

APPENDIX M: MAIN STUDY TESTS OF NORMAL DISTRIBUTION – INDIRECT MEASURES

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
WATTITUDE	65	97.0%	2	3.0%	67	100.0%
WSUBNORM	64	95.5%	3	4.5%	67	100.0%
WCONTROL	67	100.0%	0	.0%	67	100.0%

WATTITUDE=ATTITUDE TOWARD THE BEHAVIOR SCALE
WSUBNORM=SUBJECTIVE NORM SCALE
WCONTROL=PERCEIVED BEHAVIORAL CONTROL SCALE

Descriptives

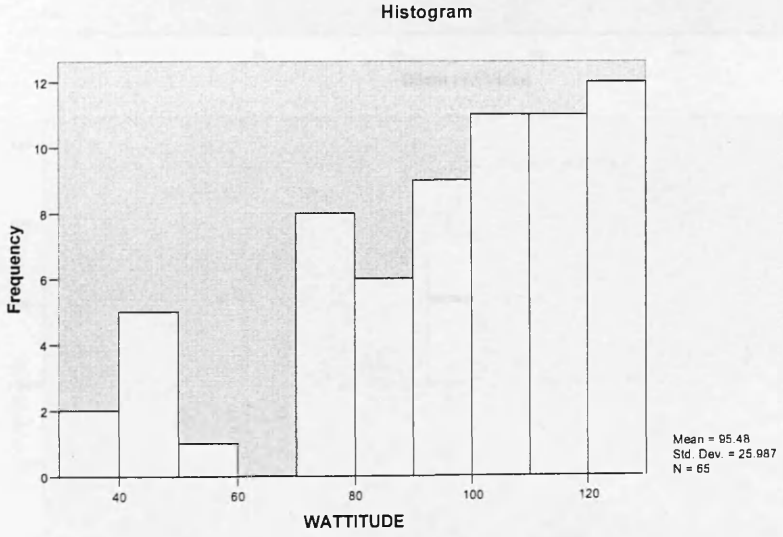
			Statistic	Std. Error
WATTITUDE	Mean		95.48	3.223
	95% Confidence Interval for Mean	Lower Bound	89.04	
		Upper Bound	101.92	
	5% Trimmed Mean		97.06	
	Median		101.00	
	Variance		675.347	
	Std. Deviation		25.987	
	Minimum		30	
	Maximum		126	
	Range		96	
	Interquartile Range		38	
	Skewness		-.853	.297
	Kurtosis		-.045	.586
WSUBNORM	Mean		41.53	3.306
	95% Confidence Interval for Mean	Lower Bound	34.93	
		Upper Bound	48.14	
	5% Trimmed Mean		42.08	
	Median		42.50	
	Variance		699.428	
	Std. Deviation		26.447	
	Minimum		-27	
	Maximum		84	
	Range		111	
	Interquartile Range		40	
	Skewness		-.263	.299
	Kurtosis		-.546	.590
WCONTROL	Mean		82.10	3.269
	95% Confidence Interval for Mean	Lower Bound	75.58	
		Upper Bound	88.63	
	5% Trimmed Mean		84.85	
	Median		91.00	
	Variance		716.004	
	Std. Deviation		26.758	
	Minimum		-3	
	Maximum		105	
	Range		108	
	Interquartile Range		35	
	Skewness		-1.443	.293
	Kurtosis		1.544	.578

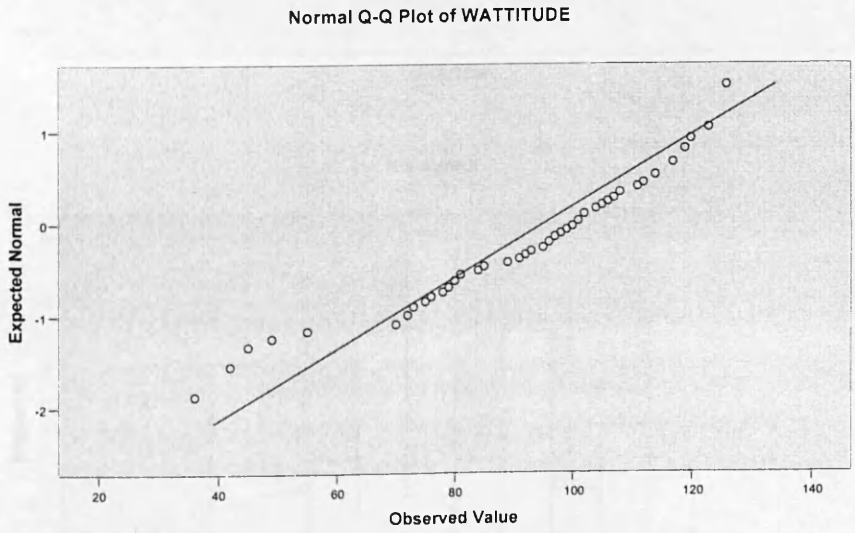
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
WATTITUDE	.120	65	.021	.909	65	.000
WSUBNORM	.071	64	.200*	.972	64	.151
WCONTROL	.200	67	.000	.814	67	.000

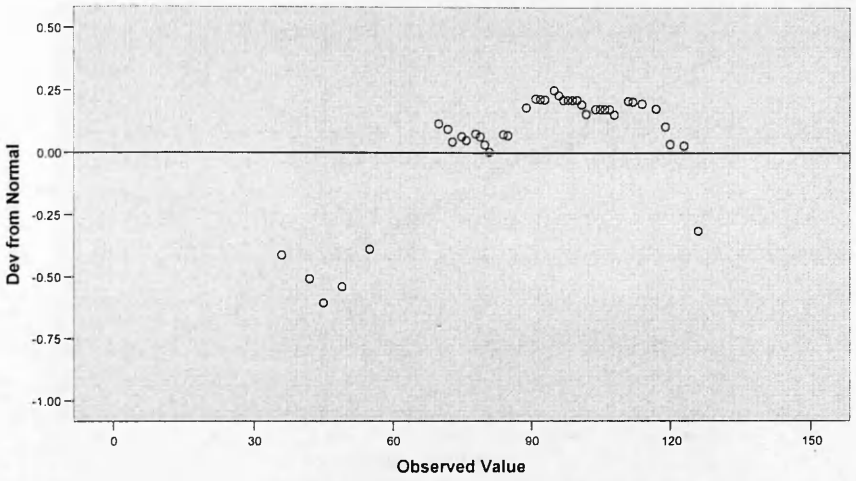
*. This is a lower bound of the true significance.

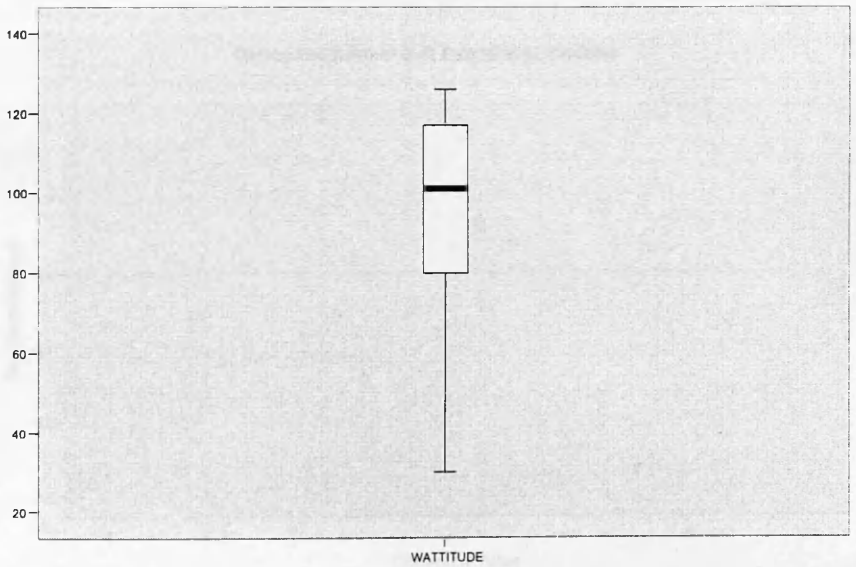
a. Lilliefors Significance Correction



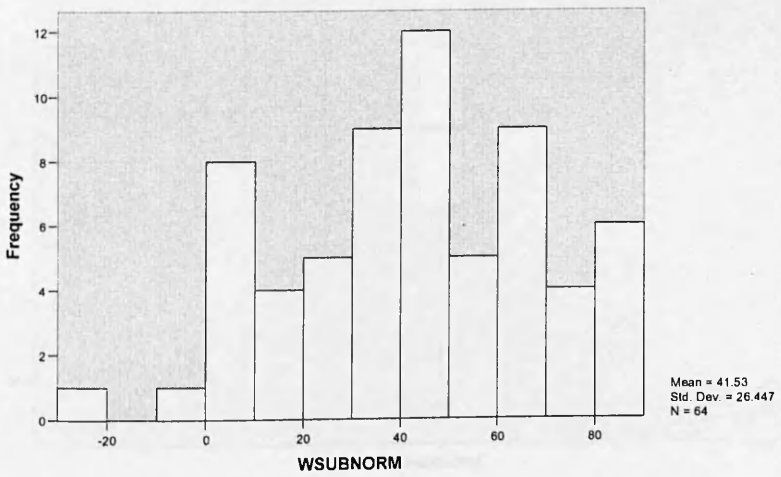


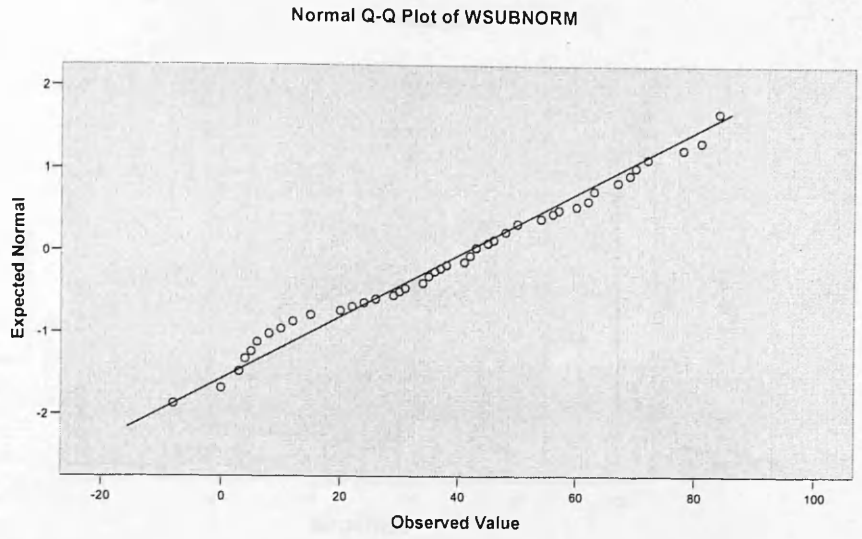
Detrended Normal Q-Q Plot of WATTITUDE

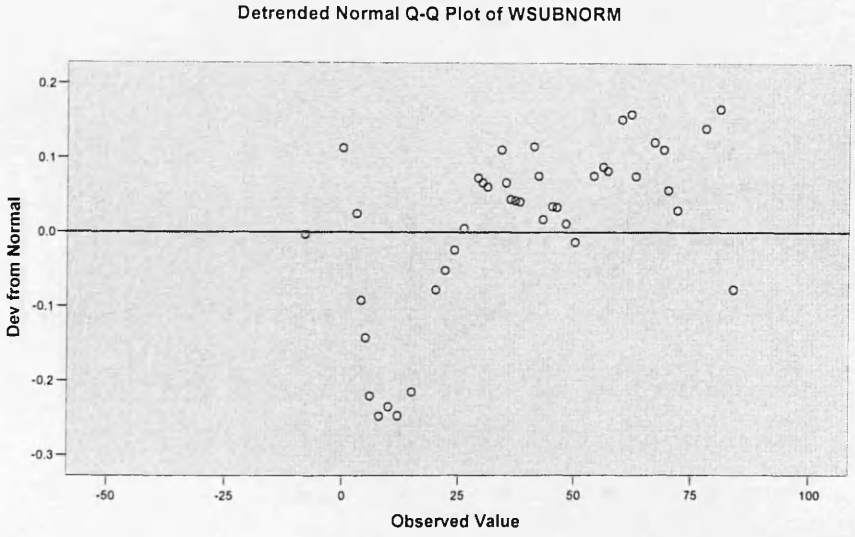


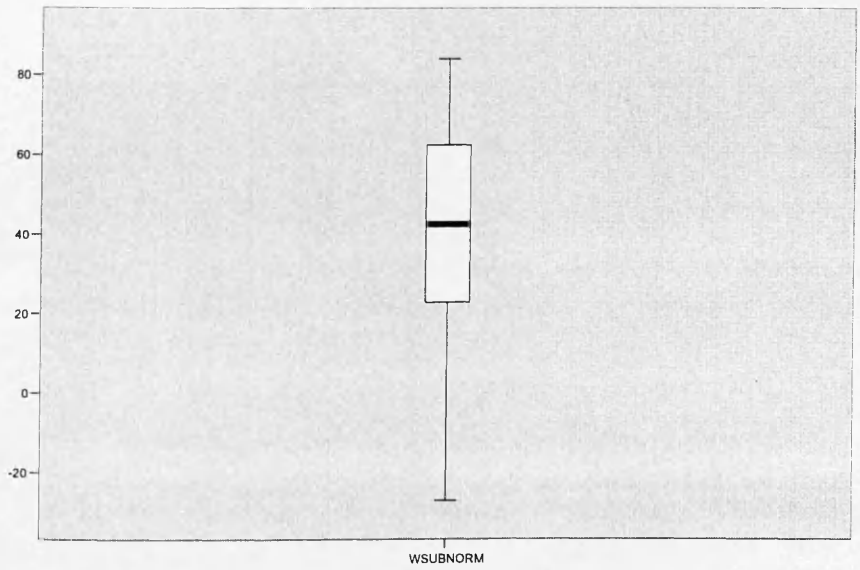


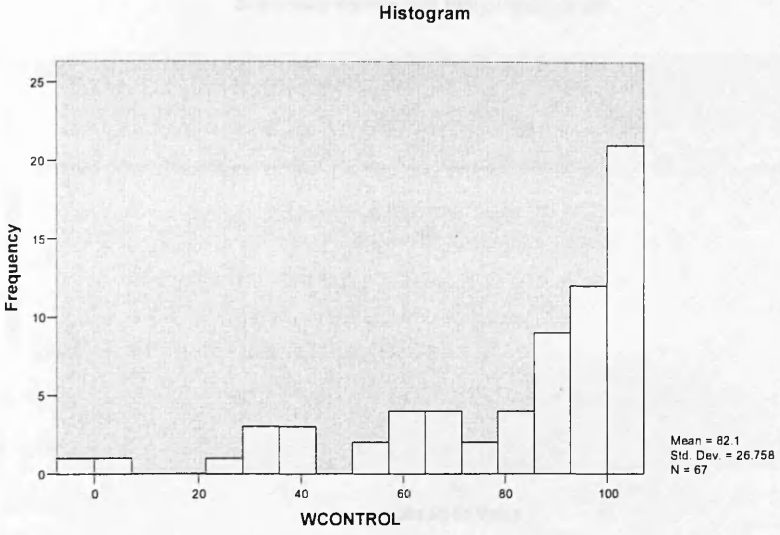
Histogram

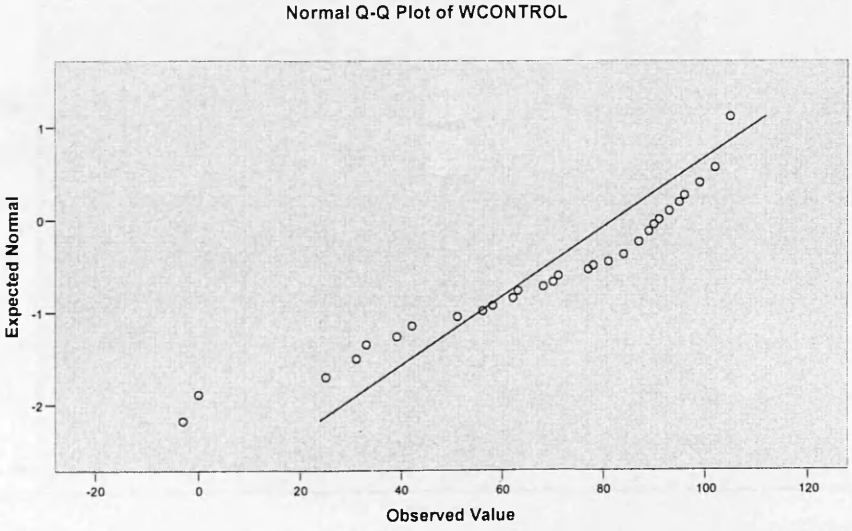


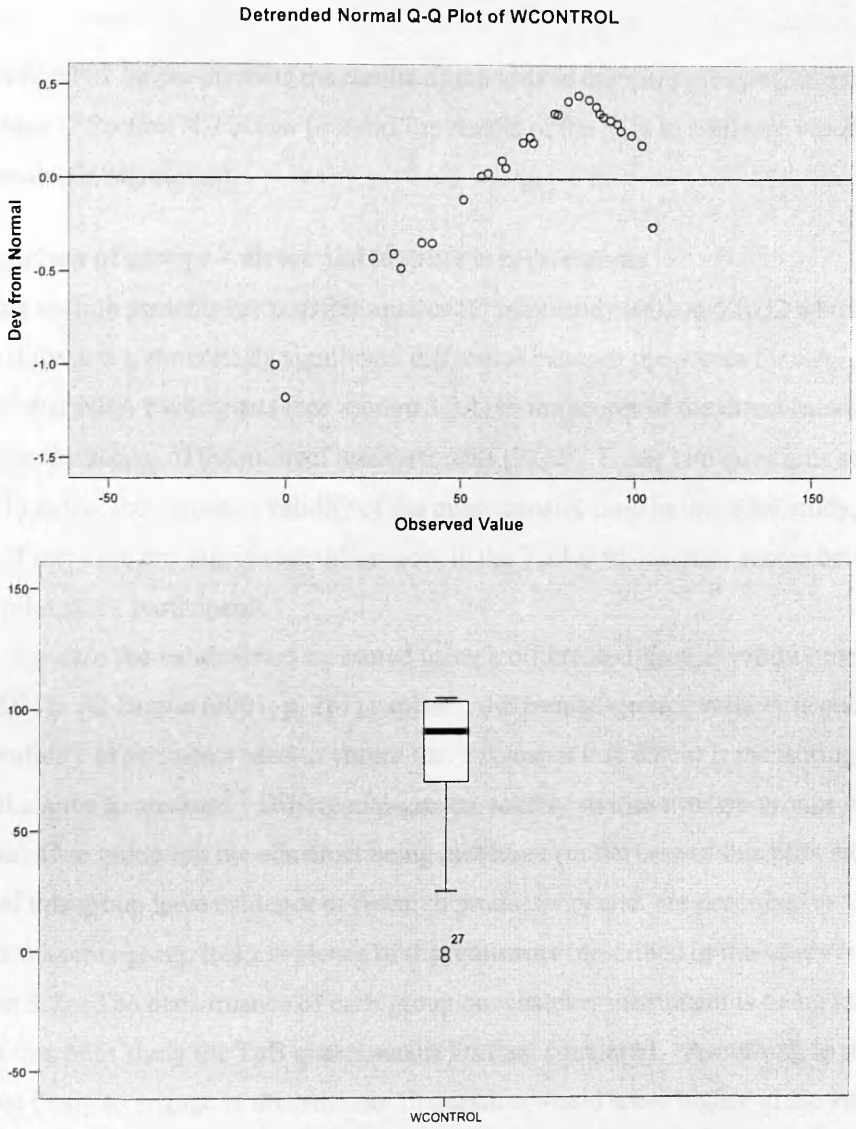

Normal Q-Q Plot of WSUBNORM
Expected Normal
2
1
0
-1
-2
-20
0
20
40
60
80
100
Observed Value


Detrended Normal Q-Q Plot of WSUBNORM
Dev from Normal
0.2
0.1
0.0
-0.1
-0.2
-0.3
-50
-25
0
25
50
75
100
Observed Value


80
60
40
20
0
-20
WSUBNORM


Histogram
Frequency
WCONTROL
Mean = 82.1
Std. Dev. = 26.758
N = 67


Normal Q-Q Plot of WCONTROL
Expected Normal
Observed Value


Detrended Normal Q-Q Plot of WCONTROL
Dev from Normal
0.5
0.0
-0.5
-1.0
-1.5
-50
0
50
100
150
Observed Value
150
100
50
0
-50
27
WCONTROL

APPENDIX N: PILOT STUDY DATA ANALYSIS RESULTS

Section N.1 below presents the results of the tests to compare groups (independent samples *t*-tests). Section N.2 below presents the results of the tests to compare variables (standard multiple regression).

N.1 Comparison of groups – direct and indirect measurements

This section presents the possible answers to pilot study RQ1 and RQ2 which seek to determine if there is a statistically significant difference between the scores for RA participants and NRA participants (see section 3.3.1) in the scores of the direct measurements (RQ1) and in the scores of the indirect measurements (RQ2). These two questions serve two purposes: 1) to test the construct validity of the questionnaire used in this pilot study, and 2) to determine if there are any significant differences in the TpB questionnaire scores between RA and NRA pilot study participants.

In this case the validity was measured using a differential-groups validity measure (Brown, 2001). As Brown (2001, p. 181) explains, differential-groups validity is one of three construct validity experiments used to ensure that a research instrument is measuring the construct it claims to measure. Differential-groups validity studies use two groups of participants. One group has the construct being measured (in the case of this pilot study members of this group have evidence of research productivity and are described as the RA group) and the other group lacks evidence of that construct (described in this study as NRA) (see section 3.2). The performance of each group on whatever instrument is being tested (in the case of this pilot study the TpB questionnaire) is then compared. According to the TpB people most likely to engage in the behavior in question would score higher in the various scales of the TpB questionnaire than those less likely to engage in the behavior. As will be seen, in all of the scales RA participants (who obviously engage in the behavior in question) as a whole scored higher than NRA participants (measurement of means). As a result this can be taken as evidence for the construct validity of the TpB questionnaire used in this pilot study.

As also reported, statistical tests of comparison of means (independent samples *t*-tests) showed a variety of significant and non-significant results in the comparisons of the means of the scores of RA and NRA participants. As will be argued, it might therefore be reasonable to claim that at least for the purposes of this pilot study, the questionnaire has a reasonable level of construct validity in that is was able to differentiate between these two groups.

Scores and statistical tests related to RQ1 and RQ2, as well as limitations of the tests, are reported in the following sections.

N.1.1 Scores of direct measurements (RQ1)

Table N.1 below presents the scores of the direct measurements (see section 3.7.1). The maximum possible score on these scales is 7. All direct measurement scales were measured on a seven point scale (1=strongly disagree to 7=strongly agree). RA participants (n=19) are represented by "yes" and NRA (n=25) by "no" in Table N.1 below.

Group Statistics

	research active	N	Mean	Std. Deviation	Std. Error Mean
TINT	yes	19	6.82	.476	.109
	no	25	5.84	1.119	.224
TBB	yes	19	6.62	.580	.133
	no	24	5.80	.970	.198
TCB	yes	19	5.63	.825	.189
	no	25	4.18	.933	.187
TNB	yes	19	1.61	1.020	.234
	no	25	.48	1.341	.268

TINT	Mean scale scores of intention
TBB	Mean scale scores of behavioral beliefs
TCB	Mean scale scores of control beliefs
TNB	Mean scale scores of normative beliefs

Table N.1 Pilot study mean scores of direct measurements

Independent-samples t-tests were conducted to compare the direct measurements of scores for RA and NRA active subjects. Statistically significant differences on the scores of the direct measurements were found on all scales(see Appendix G for the results of the t-tests of the direct measurements).

The effect size was calculated at $r = \sqrt{\frac{t^2}{t^2+df}}$ (Pearson's coefficient r) (Field, 2005, p. 32) where t and df are values in the SPSS output. Cohen's guidelines of: small effect size = 0.0 to .20, medium effect size = .20 to .50, and large effect size = .50 and above are used (Salkind, 2004). The effect sizes for the results of the t-tests of the direct measures were: TINT= .56, TBB= .49, TNB= .64, TCB= .43 which indicated a large effect size. In other words, the effect sizes as calculated above indicated a lack of similarity between the two groups.

N.1.2 Scores of indirect measurements (RQ2)

Table N.2 below presents the scores of the indirect measurements (see section 3.7.2). The scores represented in this table were the mean scores of the multiplicative composites of the indirect measures and were the results of the calculations: $A_B \propto \sum b_i\, e_i$ for the variable WATT, SN $\propto \sum n_i\, m_i$ for the variable WSN, and PBC $\propto \sum c_i\, p_i$ for the variable WPBC (Ajzen,

2006) (as explained in 3.5.4 above). RA participants (n=19) are represented by "yes" and NRA (n=25) by "no" in Table N.2 below.

Group Statistics

	research active	N	Mean	Std. Deviation	Std. Error Mean
WATT	yes	19	66.47	25.187	5.778
	no	25	51.40	23.329	4.666
WSN	yes	19	59.95	28.033	6.431
	no	23	33.70	31.250	6.516
WPBC	yes	19	51.79	21.758	4.992
	no	25	47.84	21.663	4.333

WATT	Total scale scores of attitude towards the belief
WSN	Total scale scores of subjective norm
WPBC	Total scale scores of perceived behavioral control

Table N.2 Pilot study mean scores of indirect measurements

Independent-samples t-tests were conducted to compare the indirect measurements of scores for RA and NRA active subjects. Statistically significant differences on the scores of the direct measurements were found on scales measuring attitudes toward the behavior and subjective norm(see Appendix H for the results of the t-tests of the indirect measurements).

The effect size is calculated at $r = \sqrt{\frac{t^2}{t^2+df}}$ (Pearson's coefficient r) (Field, 2005, p. 32) where t and df are values in the SPSS output. Cohen's guidelines of: small effect size = 0.0 to .20, medium effect size = .20 to .50, and large effect size = .50 and above are used (Salkind, 2004). The effect sizes for the results of the t-tests of the indirect measures are: WATT= .30, WSN= .41, WCB= .09 which indicate a medium effect size for WATT and WSN and a small effect size for WCB. In other words, the effect size as calculated above indicates a lack of similarity between the two groups in the measurements of WATT and WSN.

N.2 Results of the tests to explore relationships among variables (standard multiple regression)

The following sections discuss how well the pilot study questionnaire data conform to the assumptions associated with the regression techniques used followed by the presentation of the regression analyses.

Multiple regression operates under a large number of assumptions about the data that are not quite as tolerant as some of the tests used in the previous section (see 3.7.1.1 above for the limitations of the tests to compare groups) (Salkind, 2004). However, despite the

limitations of this sample and the data, the data do meet many of the assumptions of this statistical technique. The assumptions and the characteristics are presented below in the following order: Sample size, Multicollinearity, Normality, Outliers. The assumptions and the data for the direct measurements (N.2.1 below) are presented first followed by the indirect measures (N.2.2 below). The discussion of the conformity of the data with the assumptions of multiple regression is followed by the presentation of the findings (evaluation of the model) for the direct measures (N.2.2 below) and the indirect measures (N.2.3.4 below).

N.2.1 Assumptions: Direct measurements

N.2.1.1 Sample size

Pallant (2005) recommends that for multiple regression techniques the sample size should be about 15 subjects for each predictor variable[72], which in this case was 15x3=45 subjects. The sample size for the pilot study was N=44. For the pilot study the sample size was probably not a violation of this assumption for multiple regression although it is probably not robust enough for a main study.

N.2.1.2 Multicollinearity

All of the values expressed in this section come from Pallant (2005). Predictor variables should correlate with the outcome variable (>.3). In the case of this data, TBC=.793, TCB=.530, TNB=.272[73], were all above .3, so they all correlated appropriately with the outcome variable, *intention*. Multicollinearity is defined as a high correlation between the predictor variables (r = .9 and above). Therefore, predictor variables should not correlate with each other (<.7). The correlations for the three predictor variables were: TBB/TNB=.371, TBB/TCB=.480, TNB/TCB=.336. They did not display multicollinearity - in other words, they did not correlate with each other.

According to Pallant (2005) some multicollinearity problems in regression techniques cannot be detected in the correlation results (from the correlations table generated in the regression test). SPSS also conducts another procedure to test for multicollinearity referred to as Tolerance and VIF values and found in the Coefficients table (Table L.5 below). The Tolerance value indicates how much variability of one predictor variable is not explained by another predictor variable. If the value is less than .10 there could be some issues of

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[72] Regression variables are more accurately referred to as predictor variables rather than independent variables and outcome variables rather than dependent variables. This is because independent and dependent variables express relationships related to controlled experiments in which the researcher controls the independent variables to look for reactions in the dependent variable(s). This generally does not happen in correlational research (in which multiple regression as a technique falls). Therefore, the variable labels predictor and outcome are used in this paper (Field, 2005).

[73] TBB=Behavioral Beliefs, TNB=Normative Beliefs, TCB=Control Beliefs (the three predictor variables in the direct measures)

multicollinearity in the variables. In the case of these data all the values were greater than .10, viz: TBB=.720, TCB=.741, TNB=.830. This reinforces the correlation finding above that there were no issues of multicollinearity with this data.

The other value mentioned by Pallant (2005) is the VIF (Variance Inflation Factor) which is the opposite of the tolerance value. VIF values should be less than 10 to show an absence of multicollinearity. The values for this data were all below 10: TBB=1.389, TCB=1.350, TNB=1.204.

N.2.1.3 Normality and Outliers

Another of the assumptions of multiple regression is that of a normal distribution. Figure N.1 below shows the normal probability plot of the distribution of the data. If there are no significant deviations from the normal distribution, the points should approximately follow the diagonal line. The points on this plot roughly follow the line, so the distribution was probably close to normal although not exactly ideal.

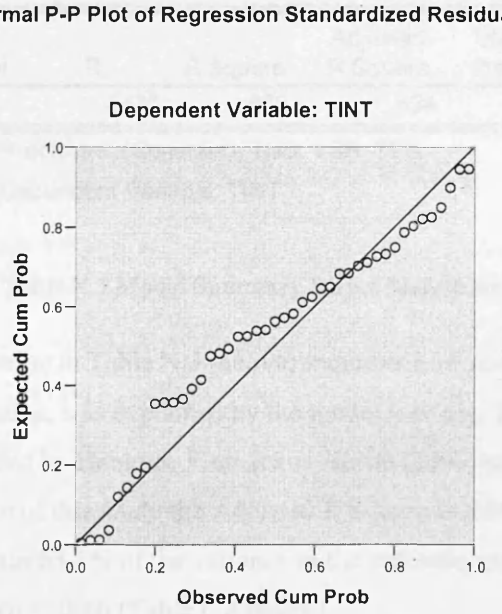

Figure N.1 Normal P-P Plot of Regression Standardized Residual

Multiple regression does not tolerate outliers in the data. As described by Pallant (2005) outliers can be measured by using the Mahalanobis distance value. This value should not exceed 16.27 (p.151). The values for this data did not exceed this value (the highest was 13.57205) which indicated that there are no values that violated this assumption.

In summary, the pilot study data from the direct measures did not seem to violate any of the assumptions associated with multiple regression.

The following section presents the findings from the multiple regression technique used on the direct measures. These were associated with research questions RQ3 and RQ4 presented below. The indirect data conformity to the assumptions of multiple regression and the findings are presented after this section (N.2.3 below).

N.2.2 Evaluation of the model for direct measures

This section presents the answer to RQ3[74]. This question sought to explain how well the three predictor variables of the direct measurements *as a set* can predict the value of the outcome variable. The outcome variable, *intention*, in the TpB indicates "a person's readiness to perform a given behavior" (Ajzen, n.d., *TpB Diagram*). For the purposes of this pilot study this finding was contributory to the findings related to RQ4[75] which sought to explain which of the three variables was the better predictor of *intention*. The answer to RQ3 was needed first as an assessment of the model as a whole before the answer to RQ4 could be fully understood. This is discussed in more detail below.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.660	.634	.622

a. Predictors: (Constant), TNB, TCB, TBB

b. Dependent Variable: TINT

Table N.3 Model Summary Direct Measurements

The R Square value in Table N.3 (above) indicates how much of the variance in the outcome variable, *intention*, was explained by the model (see Fig. 2.5 above). The Adjusted R Square is recommended by Hankins, French and Horne (2000) as a more accurate value in TpB studies. In the case of this study the Adjusted R Square is .634 and indicated that the model was able to explain 63.4% of the variance in the outcome variable. This result was statistically significant (p = .000) (Table L.4 below).

[74] RQ3: How much of the variance in intention can be explained by the following set of variables: behavioral beliefs, normative beliefs, and control beliefs?

[75] RQ4: Which of these variables is the better predictor of intention?

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.319	3	9.773	25.260	.000[a]
	Residual	15.089	39	.387		
	Total	44.408	42			

a. Predictors: (Constant), TNB, TCB, TBB

b. Dependent Variable: TINT

Table N.4 ANOVA Direct Measurements

The predictor variables as a set were able to predict the variance in the outcome variable. RQ4 sought to identify *which* of the three predictor variables in the model contributed the most to the prediction of the outcome variable.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Correlations			Collinearity Statisti	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.423	.697		.606	.548	-.987	1.833					
	TBB	.810	.124	.717	6.515	.000	.559	1.062	.793	.722	.608	.720	1.3
	TCB	.185	.097	.207	1.904	.064	-.011	.381	.530	.292	.178	.741	1.3
	TNB	-.049	.079	-.063	-.615	.542	-.210	.112	.272	-.098	-.057	.830	1.2

a. Dependent Variable: TINT

Table N.5 Coefficients Direct Measurements

The Beta values in Table N.5 (above) provide a comparison of the three predictor variables. In this study the values were: TBB=.717, TCB=.207, TNB=.-.063. The largest beta coefficient was TBB (behavioral beliefs) at .717. This means that this variable made the strongest "unique contribution to explaining the" outcome variable (Pallant, 2005, p. 153).

This value for the variable TBB was statistically significant (p=.000). The values for TCB (.064) and TNB (.542) were not statistically significant.

The Part values listed in Table N.5 (above) give the total contribution of each particular variable to the R squared although it does not say anything about the adjusted R squared (for small samples). The Part values were: TBB=.608, TCB=.178, TNB=-.057. These values squared give the contribution of each of the variables which can be expressed in a percentage form:

TBB=.608^2 = .369 or TBB explained 36.9% of the variance on the outcome variable intention.

TCB=.178^2 =.032 or 3.2%

TNB= -.057^2 =.003249 or .32%

N.2.3 Assumptions: indirect measurements

N.2.3.1 Sample size (see N.2.1.1 above)

N.2.3.2 Multicollinearity (see N.2.1.2 above for a full discussion of this issue)

The predictor variables of the indirect measures in this study were not correlated with each other (<.7): WATT/WSN= .332, WATT/WPBC=.388, WSN/WPBC=.550[76]. The predictor variables should have a correlation with the outcome variable (>.3). The predictor variables correlated with the outcome variable WATT=.286, WSN=.513, WPBC=.354.

Tolerance values were acceptable: WATT=.829, WSN=.681, WPBC=.650, and VIF values were within acceptable levels: WATT=1.206, WSN=1.468, WPBC=1.538.

N.2.3.3 Normality and Outliers

The points on this plot (Fig. N.2 below) very roughly follow the line, so the distribution was probably close to normal although clearly not ideal.

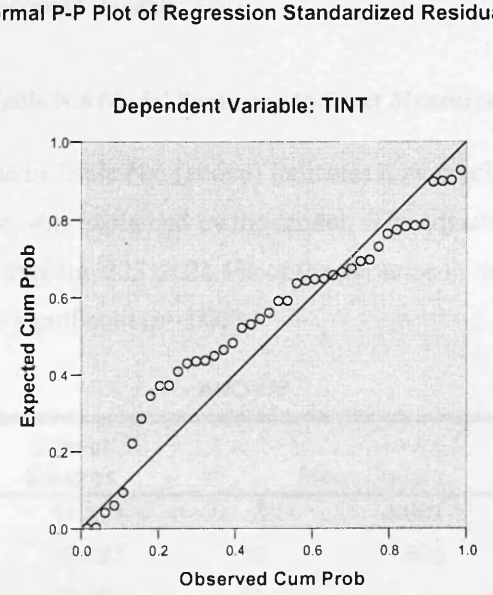

Figure N.2 Normal P-P Plot of Regression Standardized Residual Indirect Measures

The Mahalanobis distance value for the indirect measures did not exceed 16.27 value (the highest is 6.84096) which indicates that there were no values that violated the outliers assumption.

[76] WATT= Attitude toward the behavior, WSN= Subjective Norm, WPBC= Perceived Behavioral Control

N.2.3.4 Evaluation of the model for indirect measures

This section presents the answer to RQ5[77]. This question sought to explain how well the three predictor variables of the indirect measurements *as a set* could predict the value of the outcome variable. The outcome variable, *intention*, in the TpB indicates "a person's readiness to perform a given behavior" (Ajzen, n.d., *TpB Diagram*). For the purposes of this pilot study this finding was contributory to the findings related to RQ6[78] which sought to explain which of the three variables was the better predictor of *intention*. Like the direct measures, the answer to RQ5 was needed first as an assessment of the model as a whole before the answer to RQ6 could be fully understood. This is discussed in more detail below.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.531[a]	.282	.225	.896

a. Predictors: (Constant), WPBC, WATT, WSN

b. Dependent Variable: TINT

Table N.6 Model Summary Indirect Measures

The R Square value in Table N.6 (above) indicates how much of the variance in the outcome variable, *intention*, was explained by the model. The adjusted R Square for indicates that the model was able to explain .225 or 22.5% of the variance in the outcome variable. This value was statistically significant (p=.005).

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.973	3	3.991	4.968	.005[a]
	Residual	30.527	38	.803		
	Total	42.500	41			

a. Predictors: (Constant), WPBC, WATT, WSN

b. Dependent Variable: TINT

Table N.7 ANOVA Indirect Measures

RQ6 sought to identify *which* of the three predictor variables in the model contributed the most to the prediction of the outcome variable. Table N.8 below presents the Beta values needed to answer this question: WATT=.114, WSN=.437, WPBC=.070.

---

[77] RQ5 How much of the variance in intention can be explained by the following set of variables: attitudes, subjective norm, and perceived behavioral control?

[78] RQ6: Which of these variables is the better predictor of intention?

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	5.205	.412		12.644	.000	4.371	6.038					
	WATT	.005	.006	.114	.757	.454	-.008	.017	.286	.122	.104	.829	1.206
	WSN	.014	.005	.437	2.623	.012	.003	.024	.513	.391	.361	.681	1.468
	WPBC	.003	.008	.070	.410	.684	-.013	.020	.354	.066	.056	.650	1.538

a. Dependent Variable: TINT

Table N.8 Coefficients Indirect Measures

The largest beta coefficient is WSN (subjective norm) at .437. This means that this variable made the strongest "unique contribution to explaining the" outcome variable (Pallant, 2005, p. 153). This value was statistically significant for WSN (p=.012).

The Part values listed in Table 4.6 above give the total contribution of each particular variable to the R squared although it does not say anything about the adjusted R squared (recommended for TpB regression analyses). The Part values were: WATT=.104, WSN=.361, WPBC=.056.

WATT=$.104^2$= 0.0108 or 1.08%

WSN=$.361^2$ = 0.13 or 13%

WPBC=$.056^2$= 0.0031 or .31%

APPENDIX O: MAIN STUDY COVER LETTER ENGLISH – RA

Dear (researcher),

Background

Faculty members working in institutions of higher education throughout the world display a wide variety of levels of research productivity. While some faculty members have a high level of research productivity, others working side-by-side have a very low or no research productivity. What accounts for this observed variation in research productivity?

This question has been an object of investigation for decades. A large number of variables have been identified and studied for their effects on research productivity. By far the majority of subjects of these research productivity studies have been faculty members in the 'hard' sciences (e.g. physics and mathematics). A few studies have involved comparisons across disciplines. Many have been correlational, attempting to identify factors that are associated with research productivity. Some studies have approached research productivity from a theoretical perspective in order to explain causation rather than only note association.

Almost all studies from the past three decades have acknowledged that research productivity is associated with at least three major sets of variables, *viz*: i) the research environment (i.e., the institutional and other variables within the context where the research activity occurs, ii) the characteristics of the individual researcher (i.e., variables related to personality, demographic background, etc., and iii) "feedback processes", (i.e., processes that tend to sustain research productivity or reward research productivity). How these sets of variables interact and ultimately influence research productivity is still unknown. What is clear is that there are many ways in which to approach this topic.

This study

I am investigating research productivity using a theoretical approach. On the basis of data collected I will compare research active faculty members with non-research active members in an attempt to understand the differences between these two groups from a social psychological perspective. The project is a mixed-methods design in that quantitative data as well as qualitative data will be collected in an attempt to shed further light on understanding research productivity among faculty members working in an institution of higher education. The questionnaire attached represents the quantitative portion of this project.

Because you have submitted a research project to the VIEP this year, I have identified you as a research active faculty member in this institution. Your participation in this portion of this project will provide valuable data on the beliefs you hold regarding your research activity. Your participation will help contribute to our understanding of research productivity. All the data collected is strictly confidential and will be used only for the purposes of this investigation. The questionnaire is anonymous. Final results of the study will be provided to you if you are interested.

For your valuable participation, your name will be entered in a raffle for a drawing for a $50, $25, or $10 (dollar) gift certificate from Amazon.com. (151 research active faculty members will receive this letter and the chance to participate in the raffle.) drawing when and where how notified.

I would also like to invite you to participate in the qualitative portion of this investigation. This will involve an in depth interview with you regarding your interest in research and your development as an academic and a researcher, among other issues.

Please return this form with your questionnaire to ... by....

[ ] I would be willing to participate in the qualitative portion of this research project in the form of an interview done at my convenience in a location that I designate.

[ ] I wish to be informed of the results of this research project. Please send the results to:

_____

_____

RAFFLE NUMBER:

Please keep this portion

RAFFLE NUMBER:

APPENDIX P: MAIN STUDY COVERLETTER SPANISH – RA

ANTECEDENTES

Los miembros de la facultad que trabajan en instituciones de educación superior en el mundo manifiestan una amplia variedad de niveles de productividad en la investigación. Hay algunos facultativos que tienen un nivel alto de productividad en la investigación, sin embargo hay otros que aunque trabajan juntos, su nivel de productividad en la investigación es muy bajo ó carecen de ello. ¿Qué se debe considerar en ésta observación sobre la productividad en la investigación?

Esta pregunta ha sido objeto de investigación por décadas. Se ha identificado un gran número de variables y se han estudiado por sus efectos sobre la productividad en la investigación. Hasta ahora la mayoría de los sujetos de estos estudios de la productividad en la investigación has sido facultativos en las ciencias exactas (por ejemplo, física y matemáticas). Unos cuantos estudios han implicado comparaciones hacia estas disciplinas. Muchos estudios se han correlacionado, tratando de identificar los factores que están asociados con la productividad en la investigación. Algunos otros estudios se han aproximado a la productividad en la investigación desde una perspectiva teorética para explicar más bien la causa que una simple asociación.

Casi todos los estudios de las tres décadas pasadas han reconocido que la productividad en la investigación esta asociada con al menos tres importantes grupos de variables: i) el ambiente de investigación (por ejemplo, las variables institucionales dentro del contexto donde la actividad de la investigación sucede), ii) las características del investigador (por ejemplo, las variables relacionadas con la personalidad, los antecedentes demográficos, etc.), iii) "los procesos de retroalimentación", (por ejemplo, los procesos que tienden a mantener la productividad en la investigación o a premiar la productividad en la investigación). Se desconoce aún como interactúan estos grupos de variables y esencialmente como influencian la productividad en la investigación. Lo que esta claro es que hay muchas maneras de cómo abordar este tema.

ESTE ESTUDIO

Estoy investigando la productividad en la investigación usando un método teorético. En base a la información recolectada compararé investigadores facultativos activos con facultativos no activos en la investigación. Esto con un intento de entender las diferencias entre estos dos grupos, desde una perspectiva psicológica social. El proyecto se esta llevando a cabo bajo un diseño de método-mixto en lo cual tanto la información cuantitativa como la información cualitativa se recolectará en un intento de aclarar el entendimiento de la productividad de la investigación entre los facultativos que trabajan en una institución de educación superior. El cuestionario adjunto representa la parte cuantitativa de este proyecto.

Debido a que usted ha presentado un proyecto de investigación a VIEP este año, lo he identificado como un investigador facultativo activo en esta institución. Su participación en esta sección de este proyecto proporcionará una información valiosa de las creencias que usted considera de acuerdo a la actividad de la investigación. Su participación ayudará a contribuir a nuestro entendimiento de la productividad en la investigación. Toda la información recolectada es estrictamente confidencial y será usada solo para el propósito de esta investigación. El cuestionario es anónimo. Los resultados finales del estudio podrán serle enviados si usted así lo quiere.

Por su invaluable participación, su nombre entrará a una rifa a un sorteo de un regalo de $50, $25; o $10 (dólares) certificado de Amazon.com. (151 investigadores facultativos activos recibirán esta carta y la oportunidad de participar en la rifa.) El sorteo se llevará a cabo el 9 de noviembre de 2007 en la Facultad de Lenguas Modernas a las 14:00 hrs. El Personal Administrativo de la facultad conducirá el sorteo. A los ganadores se les notificará por medio de una lista que será enviada a las facultades o a las escuelas.

También me gustaría invitarles a que participen en la parte cualitativa de esta investigación. Esto los llevará a una entrevista a fondo de acuerdo a su interés en la investigación y a su desarrollo como académico e investigador, entre otros asuntos.

ATENTAMENTE,

Nancy Susan Keranen, Facultad de Lenguas, BUAP / lajoya108@yahoo.com / 044-222-436-5918 / 222-130-0799

POR FAVOR DEVUELVA ESTA FORMA JUNTO CON EL CUESTIONARIO A LA OFICINA DE ADMINISTRACIÓN DE SU FACULTAD O ESCUELA A MÁS TARDAR EL VIERNES 16 DE NOVIEMBRE 2007.

[ ] Estaría dispuesto a participar en la parte cualitativa de este proyecto de investigación en la forma de una entrevista hecha a mi conveniencia en el lugar que yo designe.

Por favor indicar como puedo contactarse:
Email:
Teléfono:
Otro:

[ ] Desearía que me informaran de los resultados de este proyecto de investigación. Por favor envíe los resultados a:

_____

_____

_____

NÚMERO DE RIFA:
Nombre de Facultad / Escuela:

Por favor guarde esta sección.

NÚMERO DE RIFA

APPENDIX Q: MAIN STUDY COVERLETTER ENGLISH - NRA

Dear (researcher),

Background

Faculty members working in institutions of higher education throughout the world display a wide variety of levels of research productivity. While some faculty members have a high level of research productivity, others working side-by-side have a very low or no research productivity. What accounts for this observed variation in research productivity?

This question has been an object of investigation for decades. A large number of variables have been identified and studied for their effects on research productivity. By far the majority of subjects of these research productivity studies have been faculty members in the 'hard' sciences (e.g. physics and mathematics). A few studies have involved comparisons across disciplines. Many have been correlational, attempting to identify factors that are associated with research productivity. Some studies have approached research productivity from a theoretical perspective in order to explain causation rather than only note association.

Almost all studies from the past three decades have acknowledged that research productivity is associated with at least three major sets of variables, *viz*: i) the research environment (i.e., the institutional and other variables within the context where the research activity occurs, ii) the characteristics of the individual researcher (i.e., variables related to personality, demographic background, etc., and iii) "feedback processes", (i.e., processes that tend to sustain research productivity or reward research productivity). How these sets of variables interact and ultimately influence research productivity is still unknown. What is clear is that there are many ways in which to approach this topic.

This study

I am investigating research productivity using a theoretical approach. The project is a mixed-methods design in that quantitative data as well as qualitative data will be collected in an attempt to shed further light on understanding research productivity among faculty members working in an institution of higher education. The questionnaire attached represents the quantitative portion of this project.

Your participation in this portion of this project will provide valuable data on the beliefs you hold regarding your research activity. Your participation will help contribute to our understanding of research productivity. All the data collected is strictly confidential and will be used only for the purposes of this investigation. The questionnaire is anonymous. Final results of the study will be provided to you if you are interested.

For your valuable participation, your name will be entered in a raffle of a variety of new and used books related to ELT or of general interest. The raffle will be held the 7th of December 2007 in the Facultad de Lenguas Modernas at 14:00 hrs. Administrative personnel will conduct the raffle. The winners well be notified through a posted list, emailed or contacted personally.

I would also like to invite you to participate in the qualitative portion of this investigation. This will involve an in depth interview with you regarding your interest in research and your development as an academic and a researcher, among other issues.

Please return this form with your questionnaire to ... by....

[ ] I would be willing to participate in the qualitative portion of this research project in the form of an interview done at my convenience in a location that I designate.

[ ] I wish to be informed of the results of this research project. Please send the results to:

RAFFLE NUMBER:

APPENDIX R: MAIN STUDY COVERLETTER SPANISH – NRA

Estimado(a)

ANTECEDENTES

Los académicos que trabajan en instituciones de educación superior en el mundo presentan una amplia variedad de niveles de productividad en la investigación. Algunos tienen un nivel alto de productividad en la investigación, sin embargo otros se dedican fundamentalmente a la docencia e investigan poco o nada. La pregunta entonces es: ¿Porqué existe esta diversidad respecto a la productividad en la investigación?

Esta pregunta ha sido objeto de investigación por décadas. Se ha identificado un gran número de variables, y se han estudiado sus efectos sobre la productividad en la investigación. Hasta ahora, la mayoría de los sujetos de estos estudios de la productividad en la investigación han sido académicos en las ciencias exactas (por ejemplo, física y matemáticas). Unos cuantos estudios han implicado comparaciones hacia estas disciplinas. Muchos estudios se han correlacionado, tratando de identificar los factores que están asociados con la productividad en la investigación. Algunos otros estudios se han aproximado a la productividad en la investigación desde una perspectiva teorética para explicar más bien la causa que una simple asociación.

Casi todos los estudios de las tres décadas pasadas han reconocido que la productividad en la investigación esta asociada con al menos tres importantes grupos de variables: i) el ambiente de investigación (por ejemplo, las variables institucionales dentro del contexto donde la actividad de la investigación sucede), ii) las características del investigador (por ejemplo, las variables relacionadas con la personalidad, los antecedentes demográficos, etc.), iii) "los procesos de retroalimentación", (por ejemplo, los procesos que tienden a mantener la productividad en la investigación o a premiar la productividad en la investigación). Se desconoce aún como interactúan estos grupos de variables y esencialmente como influyen en la productividad en la investigación. Lo que esta claro es que hay muchas maneras de abordar este tema.

ESTE ESTUDIO

Estoy investigando la productividad en la investigación, usando un método teorético desde una perspectiva psicológica social. El proyecto se esta llevando a cabo bajo un diseño de método-mixto en lo cual, tanto la información cuantitativa como la información cualitativa se recabará en un intento de aclarar el entendimiento de la productividad de la investigación, entre los académicos que trabajan en una institución de educación superior. El cuestionario adjunto representa la parte cuantitativa de este proyecto.

Su participación ayudará a contribuir a nuestro entendimiento de la productividad en la investigación. Toda la información recabada será estrictamente confidencial y será usada solo para el propósito de esta investigación. El cuestionario es anónimo. Los resultados finales del estudio podrán serle enviados si usted así lo desea.

También me gustaría invitarlo a que participe en la parte cualitativa de esta investigación. Para ello realizaremos una entrevista a fondo respecto a su desarrollo como académico.

ATENTAMENTE,

Nancy Susan Keranen, Facultad de Lenguas, BUAP / lajoya108@yahoo.com o
n.keranen@lancaster.ac.uk / 044-222-436-5918 / 222-130-0799

[ ] Estaría dispuesto a participar en la parte cualitativa de este proyecto de investigación en la forma de una entrevista hecha a mi conveniencia en el lugar que yo designe.

Sus datos de contacto:

[ ] Desearía que me informaran de los resultados de este proyecto de investigación. Por favor envíe los resultados a:

APPENDIX S: MAIN STUDY QUESTIONNAIRE INSTRUCTIONS ENGLISH

Thank you for your participation in this research project.

The purpose of this study is to understand your feelings and perceptions related to your engaging in research activity.

Research activity is defined for the purposes of this study as that type of activity which is recognized by the Mexican Ministry of Public Education when evaluating academics for standards of excellence related to research. Research in this sense involves projects registered with the faculty's established research groups (*cuerpos academicos),* research projects accepted by the university's vice-rector of investigation (funded projects), published refereed research articles in national and international journals, and published books or chapters that report on research done by the author. This set of criteria is selected as defining *research* in terms of the study because it is already established and recognized by the university as the guiding conception of academic research activity. It can also be seen as corresponding to international conceptions of academic research in general, i.e., to do with the carrying out and promulgating of original enquiry via "standard" methods of investigation.

The questionnaire is anonymous and will be used to understand research participation on a group level rather than on an individual level.

The questionnaire should take you no more than 20 minutes to complete.

QUESTIONNAIRE INSTRUCTIONS

Many questions in this survey make use of rating scales with 7 places; you are to circle the number that best describes your opinion. For example, if you were asked to respond to the statement: "The weather in Puebla is very pleasant" on such a scale, the 7 places should be interpreted as follows:

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

If you think the weather in Puebla is very pleasant, in other words you completely agree with the statement, then you would circle the number 7, as follows:

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

If you think the weather in Puebla is quite bad, in other words you completely disagree with the statement, then you would circle the number 2 or 1, as follows.

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

If you think the weather in Puebla is slightly pleasant, then you would circle the number 3.

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

If you think the weather in Puebla is neither pleasant nor unpleasant, then you would circle the number 4.

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

---

In making your ratings, please remember the following points:

* BE SURE TO ANSWER ALL ITEMS – PLEASE DO NOT OMIT ANY.

- You may feel that some of the items do not apply to you. If that is the case, please circle 4 or 0 (depending on the scale). These are neutral responses.

- You may feel that you do not know the answer to an item. Please indicate what you believe regarding that item. Whether it is actually 'true' or not, is not important.

- Please choose responses that represent what you actually believe at the moment of filling out the questionnaire. Do not answer based on how you feel you *should* respond, or what you would *like* under other circumstances to believe about the item.

    - Remember that the questionnaire is completely anonymous and is not scored on an individual basis but rather on a group basis.

* PLEASE NEVER CIRCLE MORE THAN ONE NUMBER ON A SINGLE SCALE.

*This is a translated document. You may find phrasing that is not exactly standard Spanish or not as you would express it. Please try to answer the items as best as you can.

APPENDIX T: MAIN STUDY QUESTIONNAIRE INSTRUCTIONS SPANISH

INSTRUCCIONES PARA EL QUESTIONARIO

En la mayoría de las preguntas de esta encuesta se aplica la escala de valoración con 7 espacios; usted debe encerrar en círculo el número que mejor describe su opinión. Por ejemplo, si se le pide que responda al enunciado: "El clima en Puebla es muy agradable" *en dicha escala, los 7 espacios se deben interpretar como sigue:*

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

Si usted cree que el clima en Puebla es muy agradable, es decir, usted esta completamente de acuerdo con el enunciado, entonces usted señale el número 7, como sigue:

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

Si usted cree que el clima en Puebla es bastante malo, es decir, usted esta completamente en desacuerdo con el enunciado, entonces usted señale el número 2 (o el 1), como sigue:

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

Si usted cree que el clima en Puebla es ligeramente agradable, entonces usted señale el número 3.

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

Si usted cree que clima en Puebla no es ni agradable ni desagradable, entonces usted señale el número 4.

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

---

Al hacer su valoración, por favor recuerde llevar a cabo los siguientes pasos:

*ASEGURESE DE CONTESTAR TODOS LOS PUNTOS – NO OMITA NINGUNO.

- Pudiera creer que alguno de los puntos no aplican con usted. En ese caso, por favor encierre en círculo el número 4 o el 0 (cero) (dependiendo de la escala). Esta serían respuestas neutrales.
- Pudiera sentir que usted no sabe la respuesta de algún punto. Por favor indique lo que usted crea de acuerdo al punto. Sea verdaderamente cierto o no, eso no importa.
- Por favor escoja respuestas que representen lo que usted realmente cree en el momento de llenar el cuestionario. No conteste en base a como cree que usted debería responder, o lo que le gustaría en otras circunstancias creer del punto.

° Recuerde que el cuestionario es completamente anónimo y los resultados no son individuales sino serán en base a un criterio grupal.

*POR FAVOR NUNCA ENCIERRE EN UN CÍRCULO MAS DE UN NÚMERO EN UNA ESCALA UNICA.
*Este es un documento traducido. Puede que encuentre frases que no son exactamente del español estándar o no sean como usted las expresaría. Por favor trate de contestar los puntos lo mejor que pueda. *Muchas Gracias!!*

APPENDIX U: MAIN STUDY QUESTIONNAIRE ENGLISH

Thank you for your participation in this research project.

The purpose of this study is to understand your feelings and perceptions related to your engaging in research activity.

Research activity is defined for the purposes of this study as that type of activity which is recognized by the Mexican Ministry of Public Education when evaluating academics for standards of excellence related to research. Research in this sense involves projects registered with the faculty's established research groups (*cuerpos academicos),* research projects accepted by the university's vice-rector of investigation (funded projects), published refereed research articles in national and international journals, and published books or chapters that report on research done by the author. This set of criteria is selected as defining *research* in terms of the study because it is already established and recognized by the university as the guiding conception of academic research activity. It can also be seen as corresponding to international conceptions of academic research in general, i.e., to do with the carrying out and promulgating of original enquiry via "standard" methods of investigation.

The questionnaire is anonymous and will be used to understand research participation on a group level rather than on an individual level.

The questionnaire should take you no more than 20 minutes to complete.

QUESTIONNAIRE INSTRUCTIONS

Many questions in this survey make use of rating scales with 7 places; you are to circle the number that best describes your opinion. For example, if you were asked to respond to the statement: "The weather in Puebla is very pleasant" on such a scale, the 7 places should be interpreted as follows:

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

If you think the weather in Puebla is very pleasant, in other words you completely agree with the statement, then you would circle the number 7, as follows:

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

If you think the weather in Puebla is quite bad, in other words you completely disagree with the statement, then you would circle the number 2 or 1, as follows.

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

If you think the weather in Puebla is slightly pleasant, then you would circle the number 3.

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

If you think the weather in Puebla is neither pleasant nor unpleasant, then you would circle the number 4.

The weather in Puebla is very pleasant.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

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In making your ratings, please remember the following points:

* BE SURE TO ANSWER ALL ITEMS – PLEASE DO NOT OMIT ANY.

- You may feel that some of the items do not apply to you. If that is the case, please circle 4 or 0 (depending on the scale). These are neutral responses.

- You may feel that you do not know the answer to an item. Please indicate what you believe regarding that item. Whether it is actually 'true' or not, is not important.

- Please choose responses that represent what you actually believe at the moment of filling out the questionnaire. Do not answer based on how you feel you *should* respond, or what you would *like* under other circumstances to believe about the item.

    - Remember that the questionnaire is completely anonymous and is not scored on an individual basis but rather on a group basis.

* PLEASE NEVER CIRCLE MORE THAN ONE NUMBER ON A SINGLE SCALE.

*This is a translated document. You may find phrasing that is not exactly standard Spanish or not as you would express it. Please try to answer the items as best as you can.

SECTION 1 – Background information

E. How long have you been teaching? years

F. How long have you been working in higher education? years

G. Female Male

H. Please mark your highest level of education: *Masters or Ph.D.*

I. How many classroom hours do you currently have? Week

In the following section please mark the response that applies to you.

J. Are you currently?

Full-time / part time
tenured / non-tenured

K. Do you have a Perfil Promep? Yes / No

L. Are you a member of the *SNI?* Yes / No

M. Do you belong to the Research Group of the BUAP? Yes / No

N. Do you belong to a faculty research group? Yes / No

O. Do you believe that engagement in research is part of your job at the university? Yes / No

P. Would you describe your professional orientation as: (please indicate which orientation dominates)

ORIENTED TOWARD TEACHING
ORIENTED TOWARD RESEARCH
BOTH

Q. How much do you think that research activity should be considered as a criterion for promotion?

Research productivity should NOT be a factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Research productivity should be a factor

SECTION 2 – [Identity Factors]

1. I define myself as someone who engages in academic research activity (as defined in footnote 1 below)
   Completely disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Completely agree

2. I think of myself as someone who is concerned with the consequences of engagement in academic research activity (as defined in footnote 1 below)
   Completely disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Completely agree

3. I think of myself as someone who enjoys engaging in academic research activity (as defined in footnote 1 below)
   Completely disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Completely agree

4. I am an academic researcher.
   Completely disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Completely agree

SECTION 3 – [Intentions]

4) I expect to engage in research in my area within the next 2-3 years.
   Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 |Strongly agree

5) I want to engage in research in my area within the next 2-3 years.
   Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

6) I intend to engage in research in my area within the next 2-3 years.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

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Direct measures - Attitudes]

My doing research in my area in the next 2-3 years is:

Worthless	| 1 | 2 | 3 | 4 | 5 | 6 | 7 |	Rewarding
Bad	| 1 | 2 | 3 | 4 | 5 | 6 | 7 |	Good
Will make no difference	| 1 | 2 | 3 | 4 | 5 | 6 | 7 |	Fulfilling
Unpleasant	| 1 | 2 | 3 | 4 | 5 | 6 | 7 |	Pleasant

[Direct measures – Normative Beliefs]

7. Most people who are important to me think that
I should now | 1 | 2 | 3 | 4 | 5 | 6 | 7 | should
do research in my area in the next 1-5 years.

8. It is expected of me that I do research in my area in the next 1-5 years.
Disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 |Agree

9. I feel under some social pressure from my peers to do research in my area in the next 1-5 years.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

10. I feel under some social pressure from the university to do research in my area in the next 1-5 years.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

[Direct measures – Control Beliefs]

7. I am confident that I could engage in research in the next 2-3 years if I wanted to.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

8. For me to engage in research in the next 2-3 years is
Difficult | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Easy.

9. The decision to engage or not engage in research in the next 2-3 years is beyond my control.
Strongly agree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly disagree

10. I have easy access to sufficient literature for my research projects.
Disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Agree

11. I can find resources for my research using online databases and other online resources.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

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SECTION 4 – Indirect measures

The items in the following three sections consist of two parts. One part measures the existence of the belief that you hold and the second part measures the strength of that belief. It may look like the items are repeating, but they are actually measuring different aspects of the same belief.

[Indirect measures – attitudes toward the behavior – behavioral beliefs]

8. My doing research in the next 2-3 years will give me a certain amount of prestige and recognition.
Extremely unlikely | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremely likely

9. The possibility of becoming a member of or maintaining the benefits of the *perfil promep, becas de desempeño, padrón de investigadores, or SNI* makes my doing research in the next 2-3 years

Extremely unlikely | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremely likely.

10. The possibility of increasing my personal knowledge through doing research makes my doing research in the next 2-3 years
Extremely unlikely | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremely likely.

11. Anticipating feelings of personal and professional satisfaction make my engaging in research activities in the next 2-3 years
Extremely unlikely | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremely likely.

12. Doing research in the next 2-3 years will contribute to my professional development.
Extremely unlikely | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremely likely

13. Doing research in the next 2-3 years will make me more knowledgeable and able to inform others in matters related to my profession.
Extremely unlikely | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremely likely

[Indirect measures attitude towards the behavior – outcome evaluations]

8. Having a certain amount of prestige and recognition is
Extremely undesirable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremely desirable.

9. Becoming a member of or maintaining the benefits of *perfil promep, becas de desempeño, padrón de investigadores,* or *SNI* is
Extremely undesirable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremely desirable.

10. Increasing my personal knowledge as a result of doing research is
Extremely undesirable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremely desirable.

11. Having a feeling of personal and professional satisfaction from having done research is
Extremely undesirable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremely desirable.

12. My professional development from doing research is
Extremely undesirable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremely desirable.

13. Being knowledgeable and being able to inform others is
Extremely undesirable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremely desirable.

This section asks about your beliefs regarding the social aspect of your engagement in research activity. You may not know for certain what that person or group actually thinks regarding your research behavior, but you have a personal belief about what the person or group thinks. Please regard each of these items as your belief in what the other person or group thinks about your engagement in research activity.

[Indirect measures norms – normative beliefs]

1. The university thinks I should not| -3 | -2 | -1 | 0 | +1 | +2 | +3 | should do research.

2. I believe the majority of my colleagues in my faculty
do not | -3 | -2 | -1 | 0 | +1 | +2 | +3 | do
research at least once a year.

8. My colleagues in my faculty think I
should not | -3 | -2 | -1 | 0 | +1 | +2 | +3 | should do research.

9. The administration of my faculty thinks I
should not | -3 | -2 | -1 | 0 | +1 | +2 | +3 | should do research.

10. I believe other professors / researchers in the university
do not | -3 | -2 | -1 | 0 | +1 | +2 | +3 | do research at least once a year.

11. My family thinks that
I should not | -3 | -2 | -1 | 0 | +1 | +2 | +3 | should do research
related to my profession in the next 1-5 years.

12. Colleagues and/or acquaintances who do ***not*** do research think that I
I should not| -3 | -2 | -1 | 0 | +1 | +2 | +3 | should do research.

[Indirect measures norms – motivation to comply]

8. It is important for me to do what the university thinks I should do.
Not at all | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much

9. Doing what other colleagues do in relation to research activity in my faculty is important to me.
Not at all | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much

10. What my colleagues think I should do related to research matters to me.
Not at all | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much

11. What the administration of my faculty thinks regarding my research activity is important to me.
Not at all | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much

12. Doing what other *profesores/investigadores* do in other faculties in the university is important to me.
Not at all | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much

13. What my family thinks about my research activity is important to me.
Not at all | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very much

14. The opinions of colleagues and/or acquaintances who do ***not*** do research negatively affect my research activity.
Very much | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Not at all

This section seeks to measure your beliefs regarding how much control you feel you have over engaging in research activity.

[Indirect measures perceived behavioral control – control beliefs]

7. I think that having sufficient time to do research is a main factor to my doing research in the next 2-3 years.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

8. Having very few family commitments is a main factor to my doing research in the next 2-3 years.
Disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Agree

9. Believing that my research is important and/or having a reason to do research is a main factor in my doing research in the next 2-3- years.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

10. To do research, I need to feel that I know what I'm doing.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

11. Being part of a research group or having someone to work with on a regular basis is a main factor in my doing research in the next 2-3 years.
Strongly disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly agree

[Indirect measures perceived behavioral control – control belief power]

7. Having enough time to do research would make doing research in the next 2-3 years
   Less likely | -3 | -2 | -1 | 0 | +1 | +2 | +3 | More likely.

8. Having very few family commitments would make my research activity in the next 2-3 years
   Less likely | -3 | -2 | -1 | 0 | +1 | +2 | +3 | More likely.

9. Having a reason to do research and/or believing that my research is important would make my doing research in the next 2-3 years
   Less likely | -3 | -2 | -1 | 0 | +1 | +2 | +3 | More likely.

10. Knowing how to properly do research in my area would make my doing research in the next 2-3 years
    Less likely | -3 | -2 | -1 | 0 | +1 | +2 | +3 | More likely.

11. My being part of a research group or having someone to work with on a regular basis would make my doing research in the next 2-3 years
    Less likely | -3 | -2 | -1 | 0 | +1 | +2 | +3 | More likely.

Thank you!

APPENDIX V: MAIN STUDY QUESTIONNAIRE SPANISH

Muchas gracias por su participación en este proyecto de investigación.

El propósito de este estudio es recabar sus opiniones y percepciones relacionadas con su participación en la actividad de investigación.

El concepto de investigación utilizado en este proyecto es el que plantea la Secretaría de Educación Pública (SEP) cuando evalúa estándares académicos de excelencia relacionados con la investigación. Este concepto de investigación abarca uno o todos los tipos de proyectos de investigación presentados a la Vicerrectoría de Investigación y Estudios de Posgrado (VIEP) de la BUAP, proyectos publicados en revistas nacionales e internacionales y libros o capítulos de estos. Este conjunto de criterios respecto a la investigación ya están establecidos y reconocidos por la universidad como la noción que quía la investigación académica. Este concepto respecto a la productividad en la investigación representa también la concepción de la investigación a nivel internacional: investigación original a través de métodos de investigación aceptados por la comunidad científica.

El cuestionario es anónimo y se usará para entender la participación en la investigación más bien a nivel grupal que a nivel individual.
El cuestionario no le tomará más de 20 minutos para responderlo.

INSTRUCCIONES PARA EL QUESTIONARIO

En la mayoría de las preguntas de esta encuesta se aplica la escala de valoración con 7 espacios; usted debe señale el número que mejor describe su opinión. Por ejemplo, si se le pide que responda al enunciado: "El clima en Puebla es muy agradable" *en dicha escala, los 7 espacios se deben interpretar como sigue:*

Si usted cree que el clima en Puebla es muy agradable, es decir, usted esta completamente de acuerdo con el enunciado, entonces usted señale el número 7, como sigue:

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

Si usted cree que el clima en Puebla es bastante malo, es decir, usted esta completamente en desacuerdo con el enunciado, entonces usted señale el número 2 (o el 1), como sigue:

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

Si usted cree que el clima en Puebla es ligeramente agradable, entonces usted señale el número 3.

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

Si usted cree que clima en Puebla no es ni agradable ni desagradable, entonces usted señale el número 4.

El clima en Puebla es muy agradable.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

Al hacer su valoración, por favor recuerde llevar a cabo los siguientes pasos:

*ASEGURESE DE CONTESTAR TODOS LOS PUNTOS – Por Favor No Omita Ninguno.

- Pudiera creer que alguno de los puntos no aplican con usted. En ese caso, por favor señale el número 4 o el 0 (cero) (dependiendo de la escala). Esta serían respuestas neutrales.

- Pudiera sentir que usted no sabe la respuesta de algún punto. Por favor indique lo que usted crea de acuerdo al punto. Sea "verdaderamente" cierto ó no, eso no importa.

*POR FAVOR NUNCA SEÑALE MAS DE UN NÚMERO EN UNA ESCALA UNICA.

*Este es un documento traducido. Puede que encuentre frases que no son exactamente del español estándar o no sean como usted las expresaría. Por favor trate de contestar los puntos lo mejor que pueda.

SECCION 1 – Información acerca de su desempeño laboral.

R. ¿Cuánto tiempo lleva enseñando? Años

S. ¿Cuánto tiempo lleva enseñando en educación superior? Años

T. Femenino Masculino

U. Por favor marquesu nivel más alto de educación: *Maestría o Doctorado*

V. ¿Cuántas horas de clases destina actualmente a la enseñanza? Semana

En la siguiente sección, marque la respuesta que le corresponda.

W. ¿Qué categoría de docente tiene usted?
tiempo completo / medio tiempo
definitivo / non-definitivo

X. ¿Cumple con unPerfil Promep? Si / No

Y. ¿Es usted miembro de*SNI?* Si / No

Z. ¿Pertenece usted al Padrón de Investigadores de la BUAP? Si / No

AA. ¿Pertenece usted a un cuerpo académico? Si / No

BB. ¿Cree usted que la investigación es parte de su trabajo en la universidad? Si / No

CC. ¿Describiría los intereses de su carrera académica como: (Por favor, indique que dominio predomina)

ORIENTADOS A LA ENSEÑANZA
ORIENTADOS A LA INVESTIGACIÓN
AMBOS

DD. ¿A qué grado considera que el ascenso o la definitividad en su trabajo, debe ser otorgado en esta universidad basada en su productividad de la investigación?

La productividad de la investigación NO debe ser un factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | La productividad de la investigación debe ser un factor

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SECCION 2 – [Factores de identidad]

5. Me defino como una persona que se compromete a la actividad de investigación académica (como se describe arriba).
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

6. Me considero como una persona que se preocupa por las consecuencias que conlleva la actividad de la investigación académica (como se define arriba).
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

7. Me considero como una persona que disfruta involucrarse en la actividad de investigación académica. (como se define arriba)
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

8. Soy un(a) investigador académico.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

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SECCION 3 – Sus creencias sobre su adaptación a la actividad de investigación

7) Espero intervenir en la investigación en mi área en los próximos 1-5 años.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

8) Quiero participar en la investigación en mi área en los próximos 1-5 años.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Totalmente de acuerdo

9) Quisiera hacer investigación en mi área en los próximos 1-5 años.
Totalmente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 |Totalmente de acuerdo

---

[Medición directa de creencias conductuales]
El quehacer de investigación en mi área en los próximos 1-5 años es:

Inútil	| 1 | 2 | 3 | 4 | 5 | 6 | 7 |	Gratificante
Malo	| 1 | 2 | 3 | 4 | 5 | 6 | 7 |	Bueno
Prejudicial	| 1 | 2 | 3 | 4 | 5 | 6 | 7 |	Provechoso
Desagradable	| 1 | 2 | 3 | 4 | 5 | 6 | 7 |	Agradable

[Medición directa de creencias normativas]

11. La mayoría de la gente que es importante para mi cree que
No debería | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Debería
hacer investigación en mi área en los próximos 1-5 años.

12. Se espera de mí que haga investigación en mi área en los próximos 1-5 años.
En desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | De acuerdo

13. Siento cierta presión social de parte de mis compañeros de trabajo que debo hacer investigación en mi área en los 1-5 años próximos.
Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

14. Siento cierta presión social de parte de la universidad que debo hacer investigación en mi área en los 1-5 años próximos.
Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

[Medición directa de creencias controladas]

12. Creo que podría hacer investigación en los próximos 1-5 años si lo quisiera.
Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

13. Para mi, intervenir en la investigación en los próximos 1-5 años es
Difícil | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fácil

14. La decisión para investigar o no en los próximos 1-5 años está más allá de mi control.
Fuertemente de acuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente en desacuerdo

15. El acceso a la literatura para mis proyectos de investigación está a mi alcance.
En desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | De acuerdo

16. Puedo encontrar recursos para mi investigación usando bases de datos en línea y otros recursos en línea.

Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

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SECCION 4 – Medición Indirecta

Los puntos en las siguientes secciones se dividen en dos partes. Una parte mide la existencia de la creencia que usted tiene de hacer investigación y la segunda parte mide la fuerza de esa creencia. Podría parecer que se repiten las preguntas, pero lo que se mide son diferentes aspectos de la misma creencia sobre hacer investigación.

[Medición indirecta de actitudes hacia el comportamiento – creencias conductuales]

14. Mi quehacer de investigación en los próximos 1-5 años me dará cierto prestigio y reconocimiento.
    Extremadamente improbable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremadamente probable

15. La posibilidad de convertirme en miembro u obtener beneficios del *perfil promep, becas de desempeño, padrón de investigadores, o SNI* hace mi quehacer de investigación en los próximos 1-5 años.
    Extremadamente improbable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremadamente probable

16. La posibilidad de incrementar mi conocimiento personal a través de hacer investigación hace mi quehacer de investigación en los próximos 1-5 años
    Extremadamente improbable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremadamente probable

17. Si investigar el los próximos 1-5 años, lograré una satisfacción personal y profesional.
    Extremadamente improbable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremadamente probable

18. investigar en los próximos 1-5 años contribuirá con mi desarrollo profesional.
    Extremadamente improbable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremadamente probable

19. investigar en los próximos 1-5 años me hará más enterado y capaz de informar a otros en materias relacionadas con mi profesión.
    Extremadamente improbable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Extremadamente probable

[Medición indirecta de actitud hacia el comportamiento – evaluaciones de resultado]

14. Tener una cierta cantidad de prestigio y reconocimiento es
    Extremadamente no deseable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremadamente deseable

15. Convertirme en miembro u obtener los beneficios de *perfil promep, becas de desempeño, padrón de investigadores,* o *SNI* es
    Extremadamente no deseable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremadamente deseable

16. Incrementar mi conocimiento personal es
    Extremadamente no deseable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremadamente deseable

17. Lograr una satisfacción personal y profesional de estar haciendo investigación es
    Extremadamente no deseable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremadamente deseable

18. Mi desarrollo profesional al investigar es
    Extremadamente no deseable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremadamente deseable

19. Estar enterado y ser capaz de informar a otros es
    Extremadamente no deseable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Extremadamente deseable

En esta sección se le pide información de su creencia referente al aspecto social de su compromiso con la actividad de investigación. Quizá no sepa con seguridad lo que la persona o grupo realmente piense con respecto a su comportamiento de investigación, pero debe tener una creencia personal sobre lo que la persona o grupo piensa. Por favor, considere cada uno de estos puntos de acuerdo a lo que cree que la otra persona o grupo piensa de usted sobre su compromiso con la actividad de investigación.

[Medición indirecta de normas – creencias normativas]

13. La universidad cree que yo
    No debería | -3 | -2 | -1 | 0 | +1 | +2 | +3 | debería hacer investigación.

14. Creo que otros colegas en mi facultad
    No hacen | -3 | -2 | -1 | 0 | +1 | +2 | +3 | hacen investigación al menos una vez al año.

15. Mis colegas en mi facultad creen que yo
    No debería | -3 | -2 | -1 | 0 | +1 | +2 | +3 | debería hacer investigación.

16. La administración de mi facultad cree que yo
    No debería | -3 | -2 | -1 | 0 | +1 | +2 | +3 | debería hacer investigación.

17. Otros *profesores/investigadores* en la universidad
    No hacen | -3 | -2 | -1 | 0 | +1 | +2 | +3 | hacen investigación al menos una vez al año.

18. Mi familia cree que
    Yo no debería | -3 | -2 | -1 | 0 | +1 | +2 | +3 | debería
    investigar lo relativo a mi profesión en los próximos 1-5 años.

19. Colegas y/o conocidos que ***no*** hacen investigación creen que
    Yo no debería | -3 | -2 | -1 | 0 | +1 | +2 | +3 | debería investigar.

[Medición indirecta de normatividad – motivación para cumplir]

15. Hacer lo que la universidad cree respecto a mi actividad de investigación es importante para mí.
    Nada | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mucho

16. Hacer lo que otros colegas en mi facultad hacen es importante para mí.
    Nada | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mucho

17. Lo que mis colegas creen que debería hacer con respecto a la investigación me importa.
    Nada | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mucho

18. Lo que la administración de mi facultad cree respecto a mi actividad de investigación es importante para mí.
    Nada | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mucho

19. Hacer lo que otros *profesores/investigadores* hacen en otras facultades en la universidad con respecto a la investigación es importante para mí.
    Nada | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mucho

20. Lo que mi familia piensa sobre mi actividad de investigación es importante para mí.
    Nada | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mucho

21. Las opiniones de colegas y/o conocidos que ***no*** hacen investigación afecta mi actividad de investigación.
    Nada | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mucho

Esta sección busca medir sus creencias de acuerdo a cuánto control siente que tiene sobre el compromiso de la actividad de investigación.

[Medición indirecta de control percibido conductual – creencias controladas]

12. Creo que tener suficiente tiempo para hacer investigación es un factor principal para mi quehacer de investigación en los próximos 1-5 años.
Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

13. El no tener muchos compromisos familiares es un factor principal para mi quehacer de investigación en los próximos 1-5 años.
En desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | De acuerdo

14. Creer que mi investigación es importante y/o tener una razón para hacer investigación es un factor principal en mi quehacer de investigación en los próximos 1-5 años.
Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

15. Conocer cómo hacer investigación de manera adecuada en mi área es un factor principal en mi quehacer de investigación en los próximos 1-5 años.
Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

9. Conocer cómo redactar en una manera adecuada para mí disciplina, científicamente y en inglés es un factor principal en mi quehacer de investigación en los próximos 1-5 años.
Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

6. Ser parte de un grupo de investigación o tener a alguien para trabajar sobre una base regular es un factor principal en mi quehacer de investigación en los próximos 1-5 años.
Fuertemente en desacuerdo | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Fuertemente de acuerdo

[Medición indirecta de control percibido conductual – poder de creencias de control]

12. Tener tiempo suficiente para investigar haría el investigar en los próximos 1-5 años
Menos probable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Mas probable.

13. Tener pocos compromisos familiares haría mi actividad de investigación en los próximos 1-5 años
Menos probable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Mas probable.

14. Tener una razón para investigar y/o creer que mi labor de investigación es importante haría mi investigación en los próximos 1-5 años
Menos probable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Mas probable

15. Saber cómo investigar de forma adecuada en mi área haría mi quehacer de investigación en los próximos 1-5 años
Menos probable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Mas probable.

16. Saber cómo redactar de forma adecuada en mi área haría mi quehacer de investigación en los próximos 1-5 años
Menos probable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Mas probable.

17. El hecho de que yo sea parte de un grupo de investigación o que tenga alguien para trabajar sobre una base regular haría mi quehacer de investigación en los próximos 1-5 años
Menos probable | -3 | -2 | -1 | 0 | +1 | +2 | +3 | Mas probable.

Gracias!

APPENDIX W: MAIN STUDY MEASURES OF INTERNAL CONSISTENCY, DIRECT MEASURES

IDENTITY FACTORS

Case Processing Summary

		N	%
Cases	Valid	65	97.0
	Excluded[a]	2	3.0
	Total	67	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.854	4

Item Statistics

	Mean	Std. Deviation	N
IDENTITY FACTORS	6.22	1.192	65
IDENTITY FACTORS	6.35	1.304	65
IDENTITY FACTORS	6.51	.850	65
IDENTITY FACTORS	5.94	1.580	65

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
25.02	17.640	4.200	4

Case Processing Summary

		N	%
Cases	Valid	66	98.5
	Excluded[a]	1	1.5
	Total	67	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.943	3

Item Statistics

	Mean	Std. Deviation	N
INTENTION	6.68	.862	66
INTENTION	6.74	.771	66
INTENTION	6.65	.903	66

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
INTENTION	13.39	2.550	.908	.895
INTENTION	13.33	2.779	.942	.879
INTENTION	13.42	2.617	.808	.978

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
20.08	5.794	2.407	3

Case Processing Summary

		N	%
Cases	Valid	65	97.0
	Excluded[a]	2	3.0
	Total	67	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.939	4

Item Statistics

	Mean	Std. Deviation	N
BEHAVIORAL BELIEF	6.54	.937	65
BEHAVIORAL BELIEF	6.51	.970	65
BEHAVIORAL BELIEF	6.51	1.002	65
BEHAVIORAL BELIEF	6.45	1.199	65

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BEHAVIORAL BELIEF	19.46	8.534	.913	.905
BEHAVIORAL BELIEF	19.49	8.254	.935	.897
BEHAVIORAL BELIEF	19.49	8.691	.797	.938
BEHAVIORAL BELIEF	19.55	7.595	.813	.943

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
26.00	14.406	3.796	4

Reliability Statistics

Cronbach's Alpha	N of Items
.747	4

Item Statistics

	Mean	Std. Deviation	N
SUBJECTIVE NORM	6.18	1.345	65
SUBJECTIVE NORM	5.63	1.506	65
SUBJECTIVE NORM	5.92	1.361	65
SUBJECTIVE NORM	5.82	1.540	65

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SUBJECTIVE NORM	17.37	11.643	.591	.664
SUBJECTIVE NORM	17.92	9.791	.723	.576
SUBJECTIVE NORM	17.63	11.424	.608	.653
SUBJECTIVE NORM	17.74	13.196	.296	.826

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
23.55	18.876	4.345	4

Case Processing Summary

		N	%
Cases	Valid	65	97.0
	Excluded[a]	2	3.0
	Total	67	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.543	5

Item Statistics

	Mean	Std. Deviation	N
CONTROL BELIEF	6.48	1.239	65
CONTROL BELIEF	5.20	1.805	65
CONTROL BELIEF	4.42	2.331	65
CONTROL BELIEF	4.38	1.958	65
CONTROL BELIEF	4.83	1.816	65

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CONTROL BELIEF	18.83	26.893	.176	.549
CONTROL BELIEF	20.11	22.223	.306	.487
CONTROL BELIEF	20.89	20.473	.227	.557
CONTROL BELIEF	20.92	19.697	.412	.418
CONTROL BELIEF	20.48	20.128	.445	.402

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
25.31	30.685	5.539	5

The following four tables (Table X.1 through X.4) present information on the characteristics of the main study questionnaire data (see Appendix EE for variable descriptions and values). Table X.1 below describes the number of valid, missing, and the total cases used in the analysis of the direct measures. All of the cases were used in analyses of direct measures (N=67).

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
TINT	67	100.0%	0	.0%	67	100.0%
TBB	67	100.0%	0	.0%	67	100.0%
TNB	67	100.0%	0	.0%	67	100.0%
TCB	67	100.0%	0	.0%	67	100.0%
TID	67	100.0%	0	.0%	67	100.0%

TINT	Total scale scores of intention
TBB	Total scale scores of behavioral beliefs
TNB	Total scale scores of normative beliefs
TCB	Total scale scores of control beliefs
TID	Total scale scores of identity

Table X.1 Data Summary Direct Measures

Table X.2 below describes the number of valid, missing, and the total cases used in the analysis of the indirect measures. Certain cases have been excluded from the analysis because they are incomplete (not responded to by participants for unknown reasons). A Missing Value Analysis did not reveal any underlying patterns in the missing cases. All missing cases were excluded pairwise which excluded only the case missing the value but allowed the case to be included in analyses in which the case possessed data (Pallant, 2005).

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
WATTITUDE	65	97.0%	2	3.0%	67	100.0%
WSUBNORM	64	95.5%	3	4.5%	67	100.0%
WCONTROL	67	100.0%	0	.0%	67	100.0%

WATTITUDE	Total scale scores of attitude towards the belief

WSUBNORM	Total scale scores of subjective norm
WCONTROL	Total scale scores of perceived behavioral control

Table X.2 Data Summary Indirect Measures

Table X.3 below presents the results of the Kolmogorov-Smirnov test which assesses the normality of the distribution of the scores on the direct measures. In this case, a statistically significant (<.05) test result indicates a violation of the assumption of normality (Pallant, 2005). All of the scales presented statistically significant test results. Thus, none of the data from these measurements were distributed normally. This means that non-parametric statistical tests were more appropriate for these data.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TINT	.439	67	.000	.443	67	.000
TBB	.307	67	.000	.573	67	.000
TNB	.154	67	.000	.886	67	.000
TCB	.107	67	.053	.961	67	.036
TID	.240	67	.000	.736	67	.000

a. Lilliefors Significance Correction

TINT	Total scale scores of intention
TBB	Total scale scores of behavioral beliefs
TNB	Total scale scores of normative beliefs
TCB	Total scale scores of control beliefs
TID	Total scale scores of identity

Table X.3 Tests of Normality Direct Measures

Table X.4 below presents the results of the Kolmogorov-Smirnov statistics which assesses the normality of the distribution of the scores on the indirect measures. Only the WSUBNORM (subjective norm construct) data indicated a marginally normal distribution according to this test. This indicated that parametric test could be appropriate for the data in this scale. However, because of the absence of normal distributions for the other scales, non-parametric statistical tests were more appropriate for these data.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
WATTITUDE	.120	65	.021	.909	65	.000
WSUBNORM	.071	64	.200*	.972	64	.151
WCONTROL	.200	67	.000	.814	67	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

WATTITUDE	Total scale scores of attitude towards the belief
WSUBNORM	Total scale scores of subjective norm
WCONTROL	Total scale scores of perceived behavioral control

Table X.4 Tests of Normality Indirect Measures

Histograms, normal probability plots, and boxplots of all the scales can be examined in Appendix L for direct measurements and Appendix M for indirect measurements.

APPENDIX Y: MAIN STUDY DIRECT INDIRECT SCORE CORRELATIONS PEARSON AND SPEARMAN

Descriptive Statistics

	Mean	Std. Deviation	N
WATTITUDE	95.48	25.987	65
TBB	6.42	1.151	67

Correlations

		WATTITUDE	TBB
WATTITUDE	Pearson Correlation	1	.402**
	Sig. (2-tailed)		.001
	N	65	65
TBB	Pearson Correlation	.402**	1
	Sig. (2-tailed)	.001	
	N	65	67

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

			WATTITUDE	TBB
Spearman's rho	WATTITUDE	Correlation Coefficient	1.000	.215
		Sig. (2-tailed)	.	.085
		N	65	65
	TBB	Correlation Coefficient	.215	1.000
		Sig. (2-tailed)	.085	.
		N	65	67

Descriptive Statistics

	Mean	Std. Deviation	N
TCB	5.22	1.159	67
WCONTROL	82.10	26.758	67

Correlations

		TCB	WCONTROL
TCB	Pearson Correlation	1	.364**
	Sig. (2-tailed)		.002
	N	67	67
WCONTROL	Pearson Correlation	.364**	1
	Sig. (2-tailed)	.002	
	N	67	67

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

			TCB	WCONTROL
Spearman's rho	TCB	Correlation Coefficient	1.000	.384**
		Sig. (2-tailed)	.	.001
		N	67	67
	WCONTROL	Correlation Coefficient	.384**	1.000
		Sig. (2-tailed)	.001	.
		N	67	67

**. Correlation is significant at the 0.01 level (2-tailed).

Descriptive Statistics

	Mean	Std. Deviation	N
WSUBNORM	41.53	26.447	64
TNBNEW	5.90	1.079	67

Correlations

		WSUBNORM	TNBNEW
WSUBNORM	Pearson Correlation	1	.900**
	Sig. (2-tailed)		.000
	N	64	64
TNBNEW	Pearson Correlation	.900**	1
	Sig. (2-tailed)	.000	
	N	64	67

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

			WSUBNORM	TNBNEW
Spearman's rho	WSUBNORM	Correlation Coefficient	1.000	.894**
		Sig. (2-tailed)	.	.000
		N	64	64
	TNBNEW	Correlation Coefficient	.894**	1.000
		Sig. (2-tailed)	.000	.
		N	64	67

**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX Z: MAIN STUDY SCALE MEASUREMENT OF MEANS

Descriptive Statistics

RESEARCH ACTIVE		N	Minimum	Maximum	Mean	Std. Deviation
YES	SUMID	43	15	28	26.56	2.630
	SUMINT	44	12	21	20.55	1.532
	SUMBB	44	18	28	27.00	1.929
	SUMNB	43	12	28	24.19	4.188
	SUMCB	43	11	28	21.12	4.871
	SUMDIRECT	38	87	133	120.13	8.975
	Valid N (listwise)	38				
NO	SUMID	22	10	28	22.00	5.052
	SUMINT	22	8	21	19.14	3.427
	SUMBB	21	8	28	23.90	5.594
	SUMNB	22	10	28	22.32	4.476
	SUMCB	22	14	28	20.45	3.826
	SUMDIRECT	21	60	133	107.62	15.445
	Valid N (listwise)	21				

Table Z.1 Total direct measures raw scores RA and NRA (means)
(RA = YES / NRA =NO)

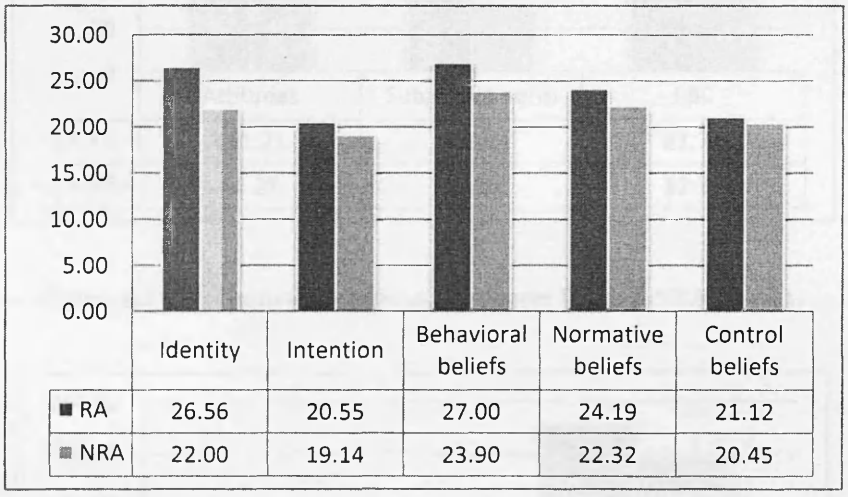


Figure Z.1 Total direct measures raw scores RA and NRA (means)

Descriptive Statistics

RESEARCH ACTIVE		N	Minimum	Maximum	Mean	Std. Deviation
YES	SUMATT	43	42	126	101.21	22.236
	SUMSN	42	-8	84	46.33	24.980
	SUMPBC	45	-3	105	81.78	27.892
	SUMINDIRECT	41	54	315	231.37	59.381
	Valid N (listwise)	41				
NO	SUMATT	22	30	126	84.27	29.504
	SUMSN	22	-27	84	32.36	27.310
	SUMPBC	22	31	105	82.77	24.892
	SUMINDIRECT	22	114	315	199.41	63.597
	Valid N (listwise)	22				

Table Z.2 Total indirect measures raw scores RA and NRA (means)
(RA = YES / NRA =NO)

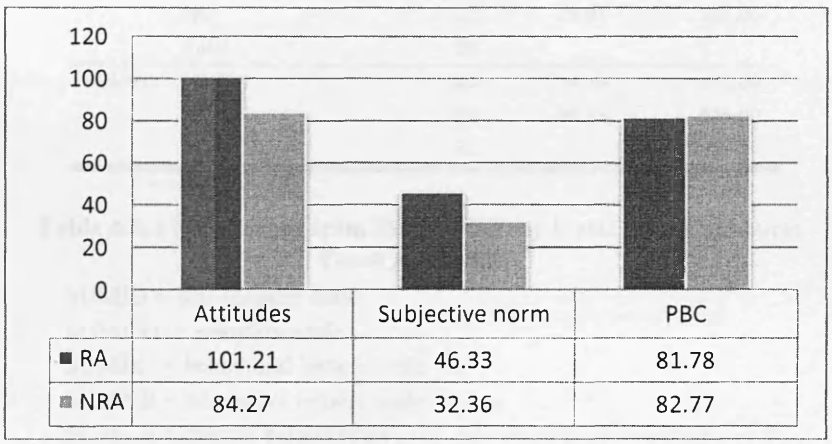


Figure Z.2 Total indirect measures raw scores RA and NRA (means)

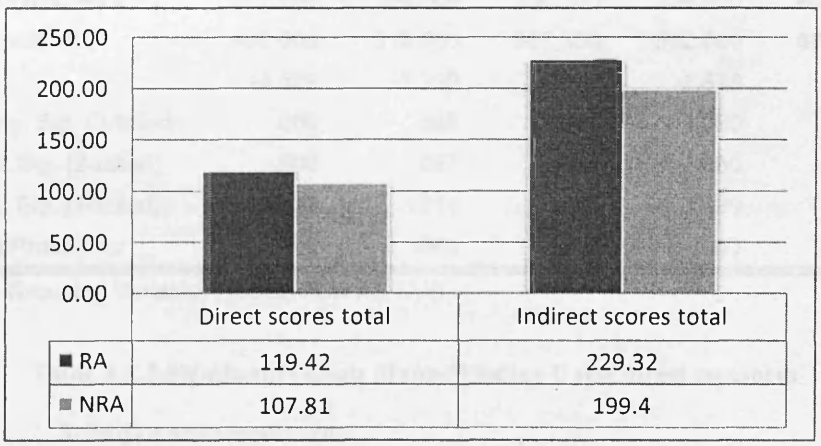


Figure Z.3 Total scores (means) direct and indirect

Ranks

	RESEARCH ACTIVE	N	Mean Rank	Sum of Ranks
SUMID	YES	43	39.88	1715.00
	NO	22	19.55	430.00
	Total	65		
SUMINT	YES	44	36.17	1591.50
	NO	22	28.16	619.50
	Total	66		
SUMBB	YES	44	35.85	1577.50
	NO	21	27.02	567.50
	Total	65		
SUMNB	YES	43	36.12	1553.00
	NO	22	26.91	592.00
	Total	65		
SUMCB	YES	43	34.16	1469.00
	NO	22	30.73	676.00
	Total	65		

Table AA.1 Mean ranks from Mann-Whitney U test Direct measures

Yes=RA, No=NRA

SUMID = self-identity scale
SUMINT = intention scale
SUMBB = behavioral beliefs scale
SUMNB = normative beliefs scale
SUMCB = control beliefs scale

Test Statistics[a]

	SUMID	SUMINT	SUMBB	SUMNB	SUMCB
Mann-Whitney U	177.000	366.500	336.500	339.000	423.000
Wilcoxon W	430.000	619.500	567.500	592.000	676.000
Z	-4.329	-2.239	-2.013	-1.878	-.696
Asymp. Sig. (2-tailed)	.000	.025	.044	.060	.487
Exact Sig. (2-tailed)	.000	.027	.044	.060	.492
Exact Sig. (1-tailed)	.000	.014	.024	.030	.246
Point Probability	.000	.002	.000	.000	.002

a. Grouping Variable: RESEARCH ACTIVE

Table AA.2 Significance levels Mann-Whitney U test direct measures

SUMID = self-identity scale
SUMINT = intention scale
SUMBB = behavioral beliefs scale
SUMNB = normative beliefs scale
SUMCB = control beliefs scale

APPENDIX BB: MAIN STUDY MANN-WHITNEY TESTS INDIRECT MEASURES

Ranks

	RESEARCH ACTIVE	N	Mean Rank	Sum of Ranks
WATTITUDE	YES	43	36.92	1587.50
	NO	22	25.34	557.50
	Total	65		
WSUBNORM	YES	42	35.67	1498.00
	NO	22	26.45	582.00
	Total	64		
WEIGHTEDPBC	YES	45	33.97	1528.50
	NO	22	34.07	749.50
	Total	67		

Table BB.1 Mean ranks scores indirect measures

YES=RA / NO=NRA

WATTITUDE = attitude toward the behavior scale

WSUBNORM = subjective norm scale

WEIGHTEDPBC = perceived behavioral control scale

Test Statistics[a]

	WATTITUDE	WSUBNORM	WEIGHTEDPBC
Mann-Whitney U	304.500	329.000	493.500
Wilcoxon W	557.500	582.000	1528.500
Z	-2.339	-1.881	-.020
Asymp. Sig. (2-tailed)	.019	.060	.984
Exact Sig. (2-tailed)	.019	.060	.987
Exact Sig. (1-tailed)	.009	.030	.493
Point Probability	.000	.000	.003

a. Grouping Variable: RESEARCH ACTIVE

Table BB.2 Significance levels indirect measures

WATTITUDE = attitude toward the behavior scale

WSUBNORM = subjective norm scale

WEIGHTEDPBC = perceived behavioral control scale

Debates about issues relating to TpB questionnaire construction and measurement exist in TpB literature (e.g., Armitage & Conner, 2001; Francis, *et al.* 2004b; French & Hankins, 2003; Hankins, French, & Horne, 2000). The central debate revolves around the use of the "multiplicative composite approach" in the scoring of the indirect measures (see 3.5.4). The solution to this debate lies in the choice of bipolar versus unipolar scales (Francis, *et al.* 2004b). The choice of scale is discussed below in CC.2.

CC.1 Multiplicative composites and scoring issues

The multiplicative composite approach refers to the equation for measuring the indirect scales: $A_B \propto \sum b_i e_i$ (Ajzen, 2006). In this equation *b* or *e* can be anything from --3 to +7. This includes the value zero and this is where authors have argued that the use of the composites is unsatisfactory (e.g., Bagozzi; Schmidt as cited in Francis, *et al.,* 2004b; French & Horne, 2003; Hankins, French, & Horne, 2000). Each of the variables: attitudes, subjective norms, and perceived behavioral control, are assessed as a belief composite. In the equation above *b* is the expectancy measure and *e* is the value measure. As Francis, *et al.* (2004b, p. 47-8) express it, "attitudes are measured 'indirectly' by weighting the perceived likelihood of a behavioural belief by a number representing the desirability of the outcome and summing the weighted scores." The other two constructs (subjective norms and perceived behavioral control) are computed in the same manner.

Francis, *et al.* (2004b, p. 48) express their opinion that the controversy about using the multiplicative composite approach in scoring of indirect measures expressed by some authors (e.g., Bagozzi; Schmidt as cited in Francis, *et al.,* 2004b) comes from regarding the multiplication function as an interaction -- where the relation between two variables is affected because of the value of a third variable (Vogt, 1999) -- rather than a weighting process. An interaction would require a true zero while a weighting process does not. To illustrate the weighting process I use one belief composite from my questionnaire:

[Behavioral Belief = *b*]

My doing research in the next 1-5 years will give me a certain amount of prestige and recognition. Extremely unlikely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Extremely likely
[Outcome Evaluation=*e*]
Having a certain amount of prestige and recognition is Extremely undesirable : -3 : -2 : -1 : 0 : +1 : +2 : +3 : Extremely desirable

Table CC.1 Belief Composite—Attitude toward the behavior

In Table CC.1 above *b* represents the expectancy of the belief. If the respondent indicates a 7 then she or he is saying that according to their accessible (salient) beliefs doing research would be a source of prestige and recognition for her or him. However this belief is weighted by the value (*e*) that the participant attaches to that belief. The bipolar scale provides the option of selecting a range of values from -3 to +3 including a zero. If the participant selects zero, the resulting composite score would be zero which would result in no quantity being added to the overall attitude towards the behavior (represented by the correlational coefficient A_B in the composite equation). The controversy regarding this measurement scheme is explained in the following paragraph.

French and Hankins (2003, p. 37) based on Evans (1991) and earlier Schmidt (1973 cited in Evans, 1991) make the argument that the multiplicative composite approach is statistically "uninterpretable". They say that for this procedure to be "statistically sensible" there would have to be a true zero value which would represent the complete absence of the measured construct. However, they point out, in psychology no such concept as true rational zero exists (French & Hankins, 2003, p. 38).

The zero that exists in the bipolar scale (-3 to +3) is an arbitrary zero like the zero in temperature scales. French and Hankins (ibid.) do acknowledge that someone could argue that the arbitrary zero would represent complete indifference to the belief in question, therefore, making it a rational zero. This is what Ajzen and Fishbein(1980) propose as related to measurement of group beliefs (as opposed to individual beliefs). French and Hankins (2003) say however that it is equally valid to consider that the expectancy beliefs be thought of as probabilities with zero expressing the complete absence of the expectancy value and 1 expressing the presence of the value. But this would change the pattern of the scales from a seven point Likert type

scale to one Likert type scale and one 0 to 1 scale which would make the expectancy – value model ($A_B \propto \sum b_i e_i$) impossible to calculate. A solution to this and the following problem is presented in CC.2 below.

Besides the issue with the zero there is a second problem with the statistical model used in TpB that occurs when the expectancy and the value are both measured with a bipolar scale (-3 to +3) (French & Hankins, 2003). A respondent who indicates that an outcome of a particular behavior was both good (+3) and likely to be performed (+3) would score the highest possible (+9). Likewise, a person indicating a behavior outcome as bad (-3) and that it was completely unlikely that he or she would perform the behavior (-3) would also score at the highest possible (+9) level. As Francis, *et al.* (2004b, p. 50) observe, this would seriously affect the "face validity of such a scoring system."

It might seem reasonable to avoid this problem by never using two bipolar scales together (in both the expectancy and the value scales). This is what Ajzen (2006) has suggested. He says that scale choice should be made after trends in the data have emerged. He refers to this as "optimal scaling." But the problem with optimal scaling is that there is no way to determine which scale to use before the data is collected. Ajzen (2006) suggests establishing validity by making a correlation between the belief composite (indirect measures) and the direct attitude measures. The scale that correlates the closest should be the one used (2006, p. 11). However, this presents problems of generalizability and reproducibility because one study may use one kind of scale and another might use a different type (French & Hankins, 2003).

French and Hankins (2003) suggest that the solution to this problem is to use individual salient beliefs rather than using beliefs generated in the qualitative (belief elicitation) study and formed into the questionnaire items and given to a group (modal beliefs). Since people would give beliefs about a behavior, they would also be likely to perform that behavior. In other words, they would not generate a belief that they did not care about. Therefore, the need for the composites would be eliminated. Only the outcome evaluations would be used to predict the attitude scores. Francis, *et al.* (2004b, p.54) however say that in their opinion this method is inappropriate for a variety of reasons, the main one being that it is not "operationally sensible." They mean that the indirect scores would not make sense without the composites.

French and Hankins (2003) generalized their measurement arguments about attitudes toward the behavior to the other two constructs: subjective norms and perceived behavioral control. Francis, *et al.*, (2004b) concede that there may be statistical problems for all three constructs, but they feel that the solution lies in the area of how the constructs are conceptualized – as either bidirectional or unidirectional and that conceptual distinction should determine the nature of the scale (either bipolar or unipolar). This idea is expanded in the following section.

CC.2 Choice of unipolar or bipolar scale

Francis, *et al.*, (2004b, p. 57) explain their conceptualization of the three constructs (attitudes, normative beliefs and perceived behavioral control). They describe the outcome evaluations in the attitude[79] measurements as a weight, and "as such they can be negative, zero, or positive." These measurements reflect the *impact* of the beliefs on attitudes towards the behavior. Therefore, they conclude that scales for the behavioral belief are best represented as a probability (unidirectional concept) by using the unidirectional scale (1 to 7), and the outcome evaluations, a good-bad bidirectional concept be reflected in a bipolar scale (-3 to +3).

Normative beliefs are those that express whether people or groups important to the individual engage in the behavior in question and whether they would approve or disapprove if the subject engaged in the behavior, in other words how much *social pressure* the subject feels to perform the target behavior. Those measures are weighted with the subject's motivation to conform or comply with those others. The beliefs about who would approve or not make no sense without the other measure of the subject's willingness to comply with those others. Francis, *et al.* (2004b) regard this *social pressure* as bipolar. In other words, the *social pressure* that a subject feels related to the behavior in question has direction towards the negative or towards the positive. Below is an example of the scales used in the pilot questionnaire to measure subjective norms.

[Normative beliefs=*n*]
The administration of faculty of modern languages thinks I should not : -3 : -2 : -1 : 0 : +1 : +2 : +3 : shoulddo research.
[Motivation to comply=*m*]

[79] In the TpB model., attitude is a product of beliefs towards the behavior (behavioral beliefs) and the strength of those beliefs (outcome evaluations).

How important is it to you that the administration of the faculty of modern languages thinks you should do research. Not at all: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Very much

Table CC.2 Bipolar and unipolar scales (from the pilot questionnaire)

Francis, *et al.* (2004b) regard the majority of social referents (motivation to comply with important persons' or groups' approval or disapproval of action) as positive, so they say that a unipolar scale is appropriate for the weighted portion of the equation. This also eliminates the problem of the double negative in the composite equation if both bipolar scales are used.

The Perceived Behavioral Control (PBC) construct represents the subjects' perceived self-efficacy towards the behavior in question, how much they feel that they can control the behavior (internal) and locus of control (external), how much is actually within their control or out of their control (Ajzen, 2003). Those are weighted by the strength of that belief to promote the behavior in question. Francis, *et al.* (2004b, p. 61) regard the control belief strength (the internal and the external beliefs) to be a "matter of probability" and therefore requiring a unipolar scale.

The *power* (see Table CC.3 below) of those beliefs reflects a "bidirectional judgment" thus should be measured using a bipolar scale (less likely or more likely). The following is an example from the questionnaire:

[Control Beliefs]
I think that having sufficient time to do research is a main factor to my doing research in the next 1-2 years. (*external factor)* Strongly disagree: 1 : 2 : 3 : 4 : 5 : 6 : 7 : Strongly agree
[Control Belief Power]
Having enough time to do research would make doing research in the next 1-2 years Less likely : -3 : -2 : -1 : 0 : +1 : +2 : +3 : More likely.

Table CC.3 Unipolar and bipolar scales used in measurement of PBC

In summary, some of the TpB literature (e.g., French & Hankins, 2003) has challenged the multiplicative composite approach for obtaining a participant's overall score for her or his expectancy-value beliefs regarding engagement in the target behavior. Based on Francis, et al., (2004b) this appendix has presented the debate and the solution, which lies in the choice of scales and the overall conception of the value of "0". The choice of scales in the pilot and main studies has conformed to the solution suggested.

APPENDIX DD: MAIN STUDY SPSS VARIABLES CODEBOOK

VARIABLE	SPSS VAR NAME	CODING INSTRUCTIONS	Score ranges
Identification number	ID	Number assigned to each questionnaire	
Research active	RESACT	1=yes 2=no	Categorical
A. Years teaching	YT	Enter number of years	Continuous
B. Years in HE	YHE	Enter number of years	Continuous
C. Gender	GENDER	1= Females 2= Males	Categorical
D. Educational level	EDLEVEL	1=PhD 2=Masters	Categorical
E. Classroom hours per week	CHPW	Enter number of hours	Continuous
F. Employment status	EMPST	1=full time tenured 2=full time non tenured 3=part time tenured 4=part time non tenured	Categorical
G. Perfil Promep	PROMEP	1=yes 2=no	Categorical
H. SNI	SNI	1=yes 2=no	Categorical
I. padrón de inv	PDI	1=yes 2=no	Categorical
J. cuerpo academic	CA	1=yes 2=no	Categorical
K. Research obligation opinion – do you consider research as part of your job at the university?	ROO	1=yes 2=no	Categorical
L. research / teaching orientation	RESTEA	1=TEACHING 2=RESEARCH 3=BOTH	Categorical
M. Job promotion – research should be a deciding factor	JOBPROM	1=not at all 2 3 4 5 6 7=should be a factor	Continuous 1 to 7 (or categorical)

DIRECT MEASURES			
IDENTITY FACTORS	IDENT1 TO IDENT4	NUMBER CIRCLED	1 TO 7
TOTAL IDENTITY FACTORS	SUMTID	AVERAGES FOUR IDENTITY FACTORS	4-28
INTENTION	INT1 TO INT3	NUMBER CIRCLED	1 TO 7
TOTAL INTENTION	SUMINT	AVERAGES OF INTENTIONS	3-21
BEHAVIORAL BELIEF	BB1 TO BB4	NUMBER CIRCLED	1 TO 7
TOTAL BEHAVIORAL BELIEF	SUMBB	AVERAGES OF BEHAVIORAL BELIEFS	4-28
NORMATIVE BELIEF	NB1 TO NB4	NUMBER CIRCLED	1 TO 7
TOTAL NORMATIVE BELIEF	SUMNB	AVERAGES OF SN	4-28
CONTROL BELIEF	CB1 TO CB 5	NUMBER CIRCLED	1 TO 7
TOTAL CONTROL BELIEFS	SUMCB	AVERAGES OF CONTROL BELIEFS *(cb1,2,4,5)*	5-35
TOTAL SCORE DIRECT MEASURES	TSDM	TOTALS OF ALL THREE DIRECT MEASUREMENTS	20-140
INDIRECT MEASURES			
ATTITUDE	ATT1 TO ATT6		1 TO 7
OUTCOME EVALUATION	OUT1 TO OUT6		-3 TO 3
WEIGHTED ATTITUDE INDIVIDUAL	WATT1 TO WATT6		-21 TO 21
WEIGHTED ATTITUDE	WATTITUDE	COMPOSITE ATTITUDES	-126 TO +126[80]
SUBJECTIVE NORM	SUB1,3,4,6		-3 TO 3
MOTIVATION TO COMPLY	MOT1,3,4,6		1 TO 7
WEIGHTED SUB NORM	WSUB1 TO WSUB4		-21 TO 21
WEIGHTED SUBNORM	WSUBNORM	COMPOSITE NORMS	-147 TO +147[81]
PERCEIVED BEHAVIORAL CONTROL	PBC1, PBC3 TO PBC6		1 TO 7
CONTROL BELIEF POWER	CBP1, CBP3 TO CBP6		-3 TO 3
WEIGHTED PBC	WPBC1, WPBC3 TO WPBC6		-21 TO 21
WEIGHTED CONTROL	WCONTROL	COMPOSITE CONTROL	-126 TO + 126[82]

[80] (7 x ±3) x 6 = 126
[81] (7 x ±3) x 7 = 147
[82] (7 x ±3) x 6 = 126

APPENDIX EE: MAIN STUDY INDEPENDENT SAMPLES T-TESTS AND CHI SQUARE TESTS FOR INDEPENDENCE

Group Statistics

	RESEARCH ACTIVE	N	Mean	Std. Deviation	Std. Error Mean
YEARS IN HIGHER EDUCATION	YES	44	17.05	9.321	1.405
	NO	22	15.36	8.671	1.849

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
YEARS IN HIGHER EDUCATION	Equal variances assumed	.098	.755	.707	64	.482	1.682	2.380	-3.072	6.436
	Equal variances not assumed			.724	44.947	.473	1.682	2.322	-2.995	6.359

Table group EE.1 Independent samples t-test RA NRA and Years in higher education

Group Statistics

	RESEARCH ACTIVE	N	Mean	Std. Deviation	Std. Error Mean
CLASS HOURS PER WEEK	YES	43	12.98	5.792	.883
	NO	22	17.64	7.371	1.572

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
CLASS HOURS PER WEEK	Equal variances assumed	.160	.690	-2.794	63	.007	-4.660	1.668	-7.992	-1.327
	Equal variances not assumed			-2.585	34.634	.014	-4.660	1.803	-8.321	-.998

Table group EE.2 Independent sample t- test RA NRA and class hours per week

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
GENDER * RESEARCH ACTIVE	67	100.0%	0	.0%	67	100.0%

GENDER * RESEARCH ACTIVE Crosstabulation

			RESEARCH ACTIVE		
			YES	NO	Total
GENDER	FEMALE	Count	17	12	29
		% within GENDER	58.6%	41.4%	100.0%
		% within RESEARCH ACTIVE	37.8%	54.5%	43.3%
		% of Total	25.4%	17.9%	43.3%
	MALE	Count	28	10	38
		% within GENDER	73.7%	26.3%	100.0%
		% within RESEARCH ACTIVE	62.2%	45.5%	56.7%
		% of Total	41.8%	14.9%	56.7%
Total		Count	45	22	67
		% within GENDER	67.2%	32.8%	100.0%
		% within RESEARCH ACTIVE	100.0%	100.0%	100.0%
		% of Total	67.2%	32.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.692[b]	1	.193		
Continuity Correction[a]	1.078	1	.299		
Likelihood Ratio	1.686	1	.194		
Fisher's Exact Test				.294	.150
Linear-by-Linear Association	1.667	1	.197		
N of Valid Cases	67				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9. 52.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.159	.193
	Cramer's V	.159	.193
	Contingency Coefficient	.157	.193
N of Valid Cases		67	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table group EE.3 Chi-square test for independence RA NRA and Gender

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
EDUCATIONAL LEVEL * RESEARCH ACTIVE	67	100.0%	0	.0%	67	100.0%

EDUCATIONAL LEVEL * RESEARCH ACTIVE Crosstabulation

			RESEARCH ACTIVE		
			YES	NO	Total
EDUCATIONAL LEVEL	PHD	Count	36	0	36
		% within EDUCATIONAL LEVEL	100.0%	.0%	100.0%
		% within RESEARCH ACTIVE	80.0%	.0%	53.7%
		% of Total	53.7%	.0%	53.7%
	MASTERS	Count	9	22	31
		% within EDUCATIONAL LEVEL	29.0%	71.0%	100.0%
		% within RESEARCH ACTIVE	20.0%	100.0%	46.3%
		% of Total	13.4%	32.8%	46.3%
Total		Count	45	22	67
		% within EDUCATIONAL LEVEL	67.2%	32.8%	100.0%
		% within RESEARCH ACTIVE	100.0%	100.0%	100.0%
		% of Total	67.2%	32.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	38.039[b]	1	.000		
Continuity Correction [a]	34.889	1	.000		
Likelihood Ratio	47.472	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	37.471	1	.000		
N of Valid Cases	67				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10. 18.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.753	.000
	Cramer's V	.753	.000
	Contingency Coefficient	.602	.000
N of Valid Cases		67	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table group EE.4 Chi-square test for independence RA/NRA and educational level

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
EMPLOYMENT STATUS * RESEARCH ACTIVE	63	94.0%	4	6.0%	67	100.0%

EMPLOYMENT STATUS * RESEARCH ACTIVE Crosstabulation

			RESEARCH ACTIVE		
			YES	NO	Total
EMPLOYMENT STATUS	FULL TIME TENURED	Count	37	14	51
		% within EMPLOYMENT STATUS	72.5%	27.5%	100.0%
		% within RESEARCH ACTIVE	84.1%	73.7%	81.0%
		% of Total	58.7%	22.2%	81.0%
	FULL TIME NON TENURED	Count	7	5	12
		% within EMPLOYMENT STATUS	58.3%	41.7%	100.0%
		% within RESEARCH ACTIVE	15.9%	26.3%	19.0%
		% of Total	11.1%	7.9%	19.0%
Total		Count	44	19	63
		% within EMPLOYMENT STATUS	69.8%	30.2%	100.0%
		% within RESEARCH ACTIVE	100.0%	100.0%	100.0%
		% of Total	69.8%	30.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.932[b]	1	.334		
Continuity Correction[a]	.379	1	.538		
Likelihood Ratio	.892	1	.345		
Fisher's Exact Test				.485	.264
Linear-by-Linear Association	.917	1	.338		
N of Valid Cases	63				

a. Computed only for a 2x2 table

b. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3. 62.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.122	.334
	Cramer's V	.122	.334
	Contingency Coefficient	.121	.334
N of Valid Cases		63	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table group EE.5 Chi-square test for independence RA/NRA and employment status

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
RESEARCH TEACHING BOTH * RESEARCH ACTIVE	67	100.0%	0	.0%	67	100.0%

RESEARCH TEACHING BOTH * RESEARCH ACTIVE Crosstabulation

			RESEARCH ACTIVE		
			YES	NO	Total
RESEARCH TEACHING BOTH	TEACHING	Count	7	15	22
		Expected Count	14.8	7.2	22.0
		% within RESEARCH TEACHING BOTH	31.8%	68.2%	100.0%
		% within RESEARCH ACTIVE	15.6%	68.2%	32.8%
		% of Total	10.4%	22.4%	32.8%
	RESEARCH	Count	32	5	37
		Expected Count	24.9	12.1	37.0
		% within RESEARCH TEACHING BOTH	86.5%	13.5%	100.0%
		% within RESEARCH ACTIVE	71.1%	22.7%	55.2%
		% of Total	47.8%	7.5%	55.2%
	BOTH	Count	6	2	8
		Expected Count	5.4	2.6	8.0
		% within RESEARCH TEACHING BOTH	75.0%	25.0%	100.0%
		% within RESEARCH ACTIVE	13.3%	9.1%	11.9%
		% of Total	9.0%	3.0%	11.9%
Total		Count	45	22	67
		Expected Count	45.0	22.0	67.0
		% within RESEARCH TEACHING BOTH	67.2%	32.8%	100.0%
		% within RESEARCH ACTIVE	100.0%	100.0%	100.0%
		% of Total	67.2%	32.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.949[a]	2	.000
Likelihood Ratio	18.998	2	.000
Linear-by-Linear Association	11.649	1	.001
N of Valid Cases	67		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 2.63.

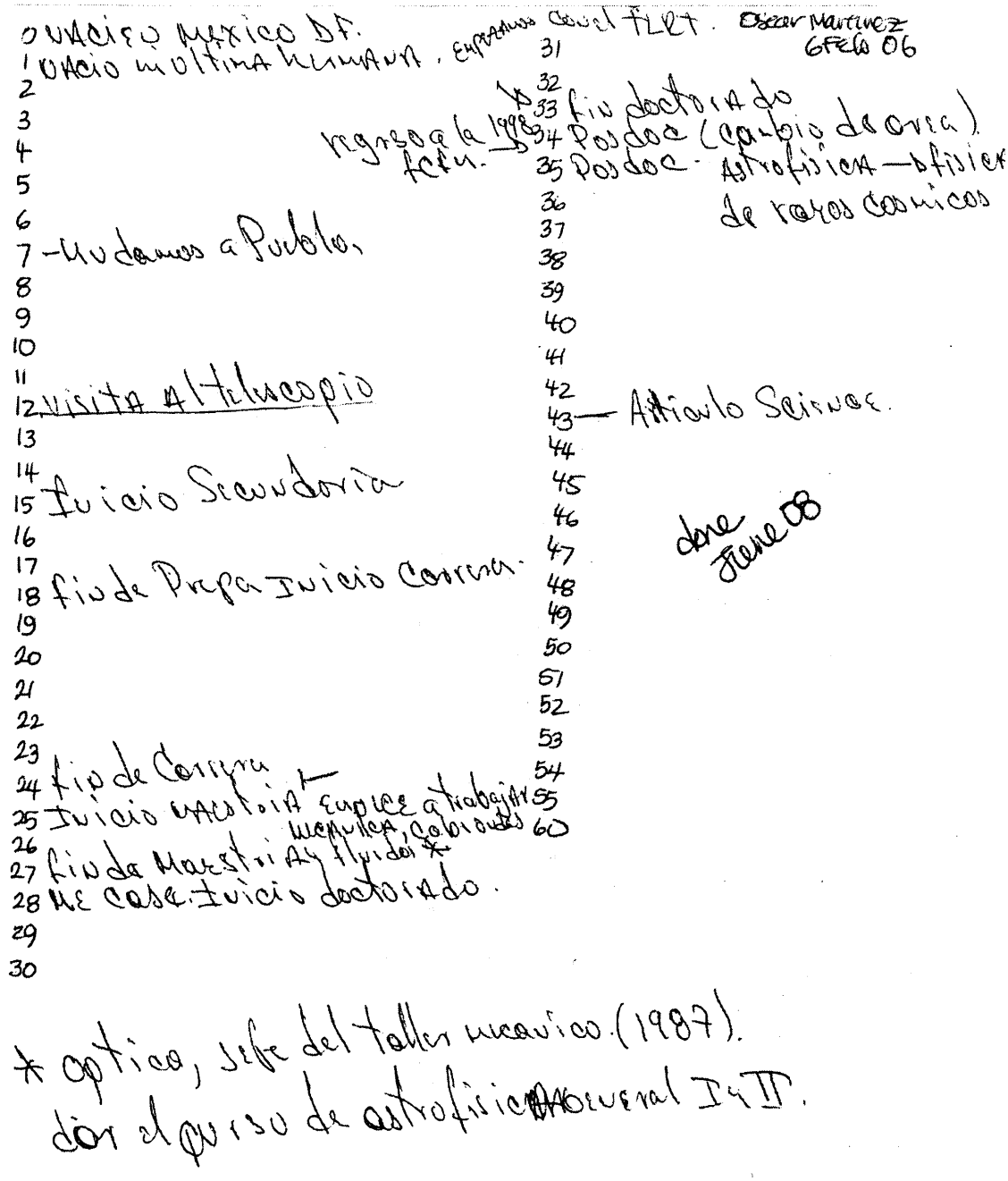
Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.532	.000
	Cramer's V	.532	.000
	Contingency Coefficient	.470	.000
N of Valid Cases		67	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Table group EE.6 Chi-square research / teaching orientation and RA/NRA



* optico, jefe del taller mecanico (1987). dar el curso de astrofisica observacional I y II.

APPENDIX GG: SAMPLE LIFE STORY INTERVIEW TRANSCRIPTION

TRANSCRIPCION "Jean-Luc"
I=Interviewer
JL= Jean-Luc

I-voy a grabarlos, esta bien? Yo no tengo memoria

JL- esta bien, es mejor dicen una cosas de estas, que una memoria fotográfica. 15 inicio secundaria, 18 fui a la prepa, inicio carrera 24 fui de carrera, inicio maestría, me case, fui a la maestría, inicie doctorado, de 33 fui doctorado. Bueno esa es la parte académica, solamente esta para mi es muy importante porque yo tuve la fortuna de tener un profesor de primaria que se le ocurrió una idea que ahora para mi es genial y era que nos llevara como niños al INAOE instituto nacional de astrofísica cultura y electrónica a una visita a ese lugar que en esa época era el observatorio de Tonanzintla y entonces yo vi la primera vez atreves de un telescopio las lunas de Júpiter y entonces yo en esa época fue cuando me preguntaba si se podía vivir de ser astrónomo y resulta que si

I-a los 12 años

JL- si, justo digamos que para mi es por eso para mi es como muy memorable porque como lo hago ahora esto de l a observación atraves de un telescopio es una experiencia vivencial puedo ver lo que sea..fotos maravillosas en la red, en la tele o en lo que sea pero uno propiamente ver algo atraves de un telescopio sobre todo cosas como la luna Júpiter, Saturno, lo que sea yo creo que le cambian un poco la vida es uno no se si sensible o que demonios pero en ese momento yo me incline por dedicarme esto de la astronomía y ya todo lo demás es consecuencia de eso

I-

JL-por ejemplo esto es la parte digamos académica, luego cuando empecé a trabajar aquí, cuando empecé la maestría yo empecé a trabajar aquí de auxiliar de laboratorio entonces tenia la oportunidad de estudia r y trabajar en los laboratorio de aquí a mi me ha gustado mucho siempre meter las manos en las cosas y también toda la parte que yo he hecho ha sido orientada hacia la parte experimental

I-es ese laboratorio de que?

JL-empecé a trabajar en los laboratorios, como auxiliar de laboratorio

I-en que área?

JL-en las cuatro que eran mecánica, calor, ondas y fluidos y óptica y aparte fui jefe de l taller mecánico, en esa época aquí en la facultad no habia casi equipo comprado, entonces uno tenia que diseñar y construir muchos prototipos de equipo para hacer practicas en los laboratorios entonces el tener acceso al taller mecánico, implicaba que teníamos que hacer muchas cositas, era divertido

I-mas o menos que año es ese?

JL-estos es mas o menos en el 86,87, 1987, entonces todavía la facultad no estaba tan favorecida por los programas estos de apoyo institucional, era mucho mas limitada en recursos, los laboratorios eran menos y además no había equipo además tampoco había todas las facilidades electrónicas que hay ahora, todavía no eran tan populares, era de difícil acceso. Bueno, que mas puedo decir de esta maravilla? Por ejemplo una parte q no es muy interesante, bueno es que en el doctorado siempre estuve casi afuera pero la parte del post doct es interesante porque..... Cambie de área

I-ohh

JL- hice mi doctorado en astrofísica observacional, espectroscopia y en el posdoct, cuando me integró de nuevo en la xfm, regreso en el 98

I-y el doctorado estaba en el instituto?

JL-si lo que pasa es que yo soy el segundo doctorado de ahí, y entonces..ehh... justo digamos por cuestiones un poco de prestigio, que les interesaba a ellos mantener u obtener . Ir generando una especie de prestigio solo había dos lugares en donde obtener el doctorado de astrofísica en México, ahora hay mas ahora hay cuatro...cinco, pero en esa época solo era el instituto de astronomía de la UNAM y el instituto el INAOE, y entonces a todos los que hicimos el doctorado en esa época, digamos en los primeros cinco pasamos mucho tiempo en el extranjero...entonces además siempre teníamos dos asesores uno interno y uno internacional y entonces mi asesor internacional era italiano entonces yo casi siempre estuve en Italia, bueno en Europa y para garantizar que no se quede, tenias que salir no se como entonces cuando me reintegro a la facultad lo mas parecido a lo que yo hacia era la física de rayos cósmicos o astroparticulas, entonces cambie de área de aquí de astrofísica a física de rayos cósmicos. Y entonces en lugar de andar en Europa me fui a argentina, allá, estuve en servicio en Europa oriental sobre física de rayos cósmicos y digamos me resulto bastante mas simple porque ya tenia como que la digamos adaptación a la sociedad de por allá y ya entonces aquí con mis amigotes resulta que, aquí en la facultad, el área mas desarrollada en cuanto a la física era la física de altas energías y entonces justo también en esa época, hay un gran estancamiento en la física de altas energías, ferolac tiene muchos problemas y empieza a retrasar experimentos y entonces las personas que se dedicaban a la física de partículas elementales, nos movemos hacia la física de rayos cósmicos que es una mezcla entre física de partículas elementales experimental y astrofísica entonces es como empezamos a convivir los físicos y esa digamos convivencia ha yo creo que fructificado hasta la fecha, seguimos trabajando juntos. Que mas podre decir...por ejemplo una cosa que me parece interesante es que también acá, cuando regrese a trabajar, di mi primer curso de astrofísica general i y ii, porque para mi es importante eso? Porque cuando yo regrese del posdoc, mi primer alumno se estaba doctorando después de que yo le di un curso aquí, el termino su licenciatura , se fue a hacer su maestría y cuando yo regrese el se estaba doctorando, se fue a doctorar a chile y entonces, digamos a mi una de las cosas que mas me ha motivado para estar en la universidad, es justamente que cuando yo empecé no había astrónomos de la universidad y entonces siempre me ha sabido, cuando uno les pregunta a los muchacho de primer ingreso que quieren estudiar , porque se meten a física y una buena parte el 60 o 70 por cierto quiere estudiar astronomía, después en el transcurso de la carrera ellos conocen mas cosas o se enamoran de otras cosas y ya no se logra, pero cuando yo empecé a estudiar no había astrónomos ni en puebla, solo había un astrónomo, era Octavio Carduño, y entonces digamos que yo me puse como meta personal, cambiar un poco esa situación aunque no fuera un astrónomo conocido, es decir, yo no quise quedarme en un instituto de investigación como el INAOE, justo porque no tienen conexión con los muchachos jóvenes o no al grado que se tiene aquí en la facultad, por ejemplo entonces este hecho para mi es importante porque digamos que fue el primer de los primeros muchachos que gracias a esta nueva opcion real, o digamos presente ya en la facultad tuvo su primer fruto, que es un astrónomo profesional y ya ahora van como diez, mas o menos unos diez muchachos que hemos empezado a trabajar aquí en la facultad o se estan doctorando o ya se van a doctorar y para mi eso es mucho mas estimulante que tal vez pertenecer a la elite de astrónomos conocidos en México, digamos esa es una de las principales razones por las que yo estoy aquí. Y prefiero andar haciendo talleres para astrónomos aficionados y hago difusión o divulgación de la astronomía en secundarias, en prepas, en primarias que digas eso..volverme puramente un investigador de física ..aunque y hay una parte digamos que mas me hace sentir bien o mas me es gratificante es que aunque dedique mucho tiempo o buena parte de ese tiempo o de mi tiempo a ese tipo de cosas, también hemos podido avanzar en la parte de la física de rayos cósmicos y por ejemplo, participamos en el experimento mas importante del área en el mundo, ósea es como mucha suerte o como no se que pero...digamos que fue una elección muy atinada el involucrarnos en esta área

a tal grado que el año pasado tuvimos un articulo en *Science* de la portada , ósea donde se refiere a nuestro experimento nos dieron la portada

I-guau

JL- entonces eso es muy padre, es como..

I- increíble

JL- exactamente, digamos que hemos tenido suerte , entonces a pesar de que no era explícitamente mi objetivo, lograr este tipo de cosas en lo que estoy haciendo..la participación de este grupo en particular pues ah redituado en algo interesante, tan es así que el año pasado en diciembre fuimos a Washington a la NCF, para contribuir o exponer la parte de experiencia ganada por todo esto y que unos colegas de Los Alamos y Washington, Maryland y otras universidades, hayan escogido instalar un experimento conjuntamente con nosotros aquí...ellos tenían como opción primera...china y entonces platicamos como teníamos conocimiento de su grupo y de nuestro grupo y el año pasado hubo un congreso muy importante del área, en Maryland y entonces fue ahí donde se concreto que podíamos trabajar conjuntamente y dos veces fue que se logro conseguir la sede de este nuevo experimento que va a ser también algo bastante interesante en el área , entonces todo ese tipo de cosas digamos para mi es importante mencionarlas justo porque son producto solo de una elección de campo, un campo con oportunidad donde uno a pesar de no estar en la frontera ni con la mayor cantidad de recursos, si puede en poco tiempo volverse competitivo y esa es la parte mas notable de esta historia, no. Y eso es lo divertido, ya tenemos diez años en esto y entonces aquí digamos en los 43

I- guau, ok. Ahora vamos a hablar sobre la familia: hermanos, hermanas, los padres que hacen?

JL-mmmhu

I- que tipo de niño estabas?

JL- era el de en medio, bueno aquí naci en el d.f.

I- ok, no eres poblano

JL-bueno en realidad naci en monterrey, pero luego me llevaron al d.f., al año nacio mi ultima hermana, a los siete años nos mudamos a puebla

I- oh, ok. Tienes hermanos mayores?

JL- si,

I- cuantos son?

JL- dos, somos cuatro

I- y los padres que hacen?

JL- mi papa es ingeniero industrial, trabajaba en Hylsa de México que nacería que esta llegando de México para acá, es una fabrica de acero. Entonces el estaba en monterrey y me gustaba mas en México. y mi mama tenia una cafetería en el hospital general en Tlatelolco y mi papa vendía casas , entonces tenia un negocio de bienes raíces

I- también trabajaba como ingeniero y en bienes raíces al mismo tiempo ?

JL- no, en esa época solo vendía casas y no se si sepas pero en el D.F., en el 68, aquí hubo una matanza de estudiantes muy fea

I- ah, si, si

JL- bueno, entonces nosotros estuvimos en la cafetería de mi mama, en ese hospital esta justo frente a la plaza donde hubo la matanza de los estudiantes y al otro día amanecimos en monterrey, mis papas quedaron tan impresionados como todos nosotros nos tuvimos que quedar ahí esa noche y dejamos el D.F. y nos fuimos a monterrey y ahí tuvo que reiniciar su vida mi familia y mi papa empezó a trabajar como ingeniero industrial en Hylsa de México, ojalata en lana.

I-ahh

JL- ahí en la planta de monterrey, pero estaban en construcción la fabrica de puebla, entonces le dijeron:; ok, si tienes el trabajo si te vas a puebla, y en el 70, el se vino después del 2 de octubre del 68, en noviembre estaba en puebla, nosotros nos quedamos en monterrey y para el 1ero. De enero de 1970 mando por nosotros y entonces ya nos venimos a puebla.

I-ok, entonces ustedes se fueron a monterrey porque hubo ese problema en el d.f.

JL- mis padres dijeron: no queremos seguir aquí porque la situación estaba muy fea, entonces dejamos todo y nos fuimos a monterrey, y empezó ahí la vida otra vez de la familia

I- fue algo muy riesgoso, no?

JL-si, pero fue una cosa muy fea

I- cuantos años tenias?, eras un bebe?

JL- yo naci en el 63, entonces en el 69 tenia 6 años

I- y como afecta?

JL-feo!!

I- si?

JL- es muy feo, porque de vez en cuando uno recuerda ese tipo de cosas , pero bueno entonces logramos rehacer nuestra vida por decirlo de alguna manera y nosotros llegamos a puebla y yo empiezo a estudiar aquí. Primero yo vivía en el pueblito donde esta la gaseria y venia a puebla a la primaria y luego nos mudamos todos a la ciudad, y así es mi vida la escuela aquí en puebla

I- que tipo de estudiante eras, muy estudioso?

JL- yo creo que si, vivía castigado, porque no era muy social y a partir de tercero de primaria, yo estudie en la normal del estado que es una escuela que estaba

I- es para maestros no?

JL- no, es la primaria anexa al instituto normal del estado,

I- ok

JL- hacen las practicas los que están estudiando para maestros, entonces tienen los salones cámaras con espejito y no podías hacer nada porque siempre te están viendo, y en tercero de primaria yo vivía muy castigado porque bueno, era muy latoso y entonces antes de salir al recreo dejaban una tarea y yo la acababa pronto y me salía y habían campos de futbol, y yo me iba a los campos y como no me hablaban mucho los compañeros yo iba enfrente de las porterías y amarraba la hierba, hacia nudos con la hierba, que crecía enfrente de las porterías de los campos de futbol y no faltaba quien iba corriendo y se atoraba, y se caía, y yo estaba muy lejitos viendo todo muy contento como se caían

I- aaaahhh

JL- entonces alguien se dio cuenta que yo era y entonces me castigaron, y mi castigo siempre era ir a leer con la directora a la hora del recreo, y entonces a partir de eso empecé a leer mucho, mucho, mucho, mucho, y luego le agarre la aficion a la lectura y ya, y entonces así fue que yo me hice mucho mas aficionado que los niños promedio a la lectura, y entonces como tenia que leer en voz alta, digamos que mejor mi vocabulario y empezaba a leer mas cosas y todo eso por el estilo, entonces, después de todo no me fue tan mal, y ya.

I- y como estabas en la secundaria?

JL- en la secundaria yo era un chavo bastante tranquilo, por decirlo de alguna manera, el problema cuando uno es el hijo de en medio siempre va a la escuela que fue el hermano mayor y si el hijo grande hizo bien o mal las cosas, te etiqueta, pero ni hermano tuvo ha bien portarse decentemente en la secundaria, y lo recordaba muy bien el director, y entonces cuando yo fui a esa secundaria, que era una secundaria socialista

I- es publica?

JL- si,

I- de la BUAP?

JL- no, era la secundaria socialista Venustiano Carranza, ya ahora no es así, no hombre, se comen vivos a los niños sin sal, era una secundaria bastante avanzada en el siguiente sentido no solo que fuera socialista o no si no que como parte integrante de los cursos de la secundaria, se llevaba filosofía de la ciencia, economía política, civismo, cosas bastante raras para la época, y a demás los cursos eran muy serios, a tal grado que mira, por ejemplo, con la química que yo aprendí en la secundaria, me seguí hasta el doctorado, entonces eran profesores muy..., el profesor bautista, todavía me acuerdo, eran profesores muy dedicados a su materia , muy serios, y bueno, entonces era una parte eso, y la otra parte que pues creo que me dedicaba a leer, eso era mi principal diversión, a pesar de que estaba en la selección de ping pon, me gustaba jugar ping pon, un poco extraño pero jugaba ping pon en la secundaria y estaba en la selección de atletismo, yo corría diez kilómetros, entonces fue una época muy tranquila, como muy relajada, te dejaban hacer mas o menos lo que querías en el sentido de que si eras alguien que respondías académicamente y hacías algo de deporte entonces no te molestaban, y ya.

I- en este periodo como describes la personalidad, mas introvertido?

JL- si yo creo que muy introvertido, siempre tuve pocos amigos, aunque mas, yo creo que profundos los lazos, de hecho hasta hace unos cinco años uno de los cinco amigos de la secundaria, nos seguíamos frecuentando pero murió, y otro amigo se fue a vivir a , digamos que esa era la otra parte, no tenia

muchos amigos , pero eso es lo mas cercano, lo mas profundo, luego la prepa fue una época un poco extraña, porque era metodista, después de estar en una secundaria socialista, voy a una prepa metodista y esa fue una locura porque en la secundaria una muchacha, ella era metodista y para poder seguir viéndola me tuve que ir a la prepa que ella estaba, y ella escogió una prepa metodista, y entonces ya me fui a la prepa metodista, lo cual fue bastante extraño porque justo por el antecedente no me querían admitir, como!, ay, horroroso! Pero luego ya que me admitieron y me dejaron ahí digamos pues que me porte bien, porque esta preparatoria estaba, digamos que, principalmente dedicada a la educación de mujeres, estaba junto a una normal, digamos anexa a una normal de maestras, entonces por alguna razón le caía bien a todos los profes, también me portaba bien y me encargaban el laboratorio de física, química y luego la biblioteca en la tarde, entonces como yo siempre estaba ahí metido, me decían oye te encargas de la biblioteca? Si no hay bronca, acá me estoy, y ya entonces tenia como privilegios, como para poder andar por ahí

I- un poco de responsabilidad

JL- exacto, entonces fue muy curioso por que la muchacha por la que me fui a esa prepa a los dos meses se salió y ahí me quede yo, y entonces ya la deje de ver y toda esa historia, pero valió la pena porque empecé a ver digamos otros aspectos, al menos a empezar a ver la parte, no se como decirla, pero hasta me metí en la escuela dominica, y luego ya estaba dando clases y no se que tanto, entonces digamos que descubrí ese otro pedazo de la actividad humana, entonces, no es que nos obligaran a leer la biblia, pero te empicas a preguntar, bueno, estos que hacen? Y entonces, pues me aficione un poco a eso y fue una época digamos interesante porque empecé a conocer a gente de muchos mas lugares, y en este internado llegaban muchas muchachas, particularmente del sureste, digamos de Veracruz, de tabasco, Chiapas, Oaxaca, Tamaulipas, y entonces ellas tenían una forma de ser y de ver las cosas, eran un poco mas desinhibidas, mas que yo por ejemplo,

I- en que periodo sucedió, en la prepa?

JL- si en la prepa

I- esa visita estabas?

JL- tercero de primaria

I- pero eso es en la normal

JL- en la normal del estado, si, si, en tercero de primaria, por eso digo que,

I- es algo fundamental

JL- si, es algo fundamental, pero a parte de que sea fundamental, yo trato de hacer lo mismo, es decir, tengo un grupito de astrónomos aficionados, hicimos dos telescopios que están ahí entrando, bueno uno es un telescopio moderno y el otro es un telescopio antiguo de finales del siglo xix, pero el otro es moderno, ese lo hicimos aquí, cuando yo acabe el doctorado empezamos a hacerlo

I- cuando empezaron hacerlo?

JL- en el 98, cuando yo regrese acá, cuando yo regrese de mi doctorado, empezamos hacer el telescopio tlrt que era como nuestro ídolo, pero bueno, justo yo trato de reproducir esta experiencia la mayor cantidad de veces y con la mayor cantidad de muchachos, por eso yo lo llamo curso ambulante de astronomía, y entonces ando en los pueblitos, voy a las primaria o secundarias, le pido permiso al

director y hacemos ese tipo de cursos, entonces ya saldrán muchos mas astrónomos, no se cuando, pero algún día, y ya, eso es algo que digamos yo sigo haciendo

I- ese invento muy importante, pasa cuando estas un estudiante, como dice , latoso, pero algo se entra en ese momento

JL- si, a partir después de esto de me empican a castigar, y el castigo era por un año completo, entonces no quedaba mas que ponerme a leer, y entonces la ventaja que yo tenia es que yo podía escoger en que leer y sobre que leer, y entonces yo empecé a estudiar cosas de astronomía y cuentos, entonces por eso sirvió todo eso,

I- ok, estamos aquí en la prepa, que estudiaste aquí en la prepa?

JL- en la prepa tuve también digamos la fortuna de conocer a una psicóloga que era la que nos daba la clase, y entonces mis papas también tuvieron la atinada visión de mandarme hacer un estudio de orientación vocacional, para saber para que servía yo, porque mi hermano ya en esa época estaba estudiando electrónica, el es ingeniero en electrónica y comunicación, pero yo no sabia ni que onda, yo seguía con que quería astronomía, pero no sabia ni como, ni a donde, ni a que hora y entonces con el estudio de orientación vocacional que fue muy grande, mas o menos extenso, resulta que si funcionaba para eso, que si tenia las habilidades los intereses y la motivación, pero no había en México, y entonces en esa época esta muchacha que era psicóloga resulta que tenia su hermana que era física, y entonces la física acababa de regresar de Alemania de hacer su doctorado, y entonces platicamos y le dije: fíjate que yo quiero ser astrónomo, ha pues que padre, yo soy física, pero tu sabes como puedo ser astrónomo? Pues primero estudia física, ya después investigas todo y cuando acabes física seguramente vas a aprender algo y a donde, y ya, y en aquel entonces estaba la escuela de físico matemáticas, y entonces me di cuenta que este tipo de intereses eran mas o menos comunes pero que estaban igual que yo, que nadie sabia ni donde ni como, y en realidad no había ni donde ni como, que esa era la parte mas fea, porque en esa época el instituto de astronomía en la UNAM, no podía otorgar grados, no podía dar cursos, no daba la facultad de ciencias, pero cuando termine la licenciatura

I- la licenciatura la estudiaste aquí en la buap?

JL- si aquí en la buap,

I- en física? Ok

JL- si en física, entonces teníamos un problema, que solo había un astrónomo ahí en la INAOE y que era muy rejego para dirigir tesis, entonces los tres que éramos del salón, en ese entonces éramos tres los físicos queríamos hacerla en eso, y nos dijo que no, que no podía, no tenia tiempo y no se cuanto, y entonces yo me fui hacer una tesis en matemáticas en una cosa un poco teórica en Cuernavaca, solo que en ese periodo en México a finales digamos entre septiembre, agosto y octubre se hace el congreso nacional de física en ese intervalo del año, y entonces toco que llego el congreso nacional de física que tuvo lugar en monterrey casualmente, y entonces deje terminada la tesis de licenciatura en esta cosa teórica y fui al congreso y resulta que me encontré a Ricardo Cardona y a otros cuatitos del instituto de astronomía que venían a digamos a establecer un programa piloto de astronomía y física en el INAOE, y entonces allá, me dijo: oye no estas interesado en estudiar astrofísica, le digo si, pero no hay donde, te interesaría entrar al INAOE, le digo, pero no hay astrofisica, me dice no pero lo vamos a instaurar, que no se que, que no se cuanto, y entonces fuimos la generación como de conejillo de indias, y entonces nos dieron cursos, era todavia un poco irregular todo, pero yo creo que le ponían mucho entusiasmo y yo también le ponía mucho entusiasmo de hecho yo y los otros cuatro, cinco que estábamos en el programa vivíamos en el INAOE y entonces siempre estábamos haciendo cosas de astronomía, luego teníamos clase me acuerdo de una, empezaba a las diez y acababa a las tres cuatro de la mañana por que

ra observacional, porque era con el telescopio, pero bueno, el truco esta en que luego yo me fui a hacer mi tesis de maestría a paris en esa época, porque no había muchos profesores que estuvieran dispuestos a dirigir la tesis de maestría, el único problema es que eso les pareció bastante osado, bastante irrespetuoso y entonces nunca pude presentar esa tesis de maestría allá y salí del programa, nunca me pude graduar de esa maestría hasta que cambio la administración y entonces regrese con mi escrito te y dije: oiga no, es que yo la quiero hacer en astronomía pero no pude por alguna razón acabar antes y quiero que se reconsidere mi caso. Porque en esa época el reglamento era tajante, si uno era expulsado del programa, no había reingreso, ni nada entonces por fin logre hacer la reconsideración y fue un poco extraño porque el que fue el director de esa época: Alfonso Pérez serrano, Pérez Grovas, era un cuate que impulso el gtm, el era el director entonces me dijo: si, pero te voy a poner dos condiciones : una es que lleves un curso conmigo y la otra es que hagas la tesis de maestría conmigo, bueno entonces el curso es este libro, tei. Cuando lo termines vienes me lo platicas, haces dos o tres cosas de las que están aquí y tienes tres meses para eso y la otra es la tesis, aquí hay un montón de cintas, hay un montón de datos, quiero ver un problema astrofísico, una determinación de masas en tipo particular, cuando termines vienes y entonces vemos. lo cual a mi me dio un gusto fenomenal, porque se me volvía a abrir la posibilidad de hacer atrófica en serio, a pesar de que era bajo mi cuenta y riesgo, la ventaja de todo esto es que, por toda esta historia yo he sido un poquito... obligado a ser autosuficiente y en ese sentido, no fue una cosa demasiado extraña, estaba mas o menos acostumbrado a poder hacer las cosas por mi mismo, entonces cuando regrese con todo eso hecho me gradué y digamos...ingrese al doctorado, en esa época fuimos cinco personas las que hicimos los exámenes generales para poder ingresar al doctorado y nadamos quede yo, y entonces ya estaba uno –Raúl-, luego estaba yo y luego empezaron a llegar mas personas y bueno, de ahí en adelante..

I- el doctorado, donde fue?

JL-en el INAOE y en el observatorio de Hebrera, en la universidad de Milán, entonces desafortunadamente en cuanto acabe mi doctorado y me regrese para acá y empecé a dejar un poco todo eso al lado y empecé a hacer esto de los rayos cósmicos, y ya.

I- y por parte de la maestría, fuiste a Francia, dices?

JL-si,

I-para que?

JL- a hacer la tesis

I-en la universidad?

JL-en el observatorio

I-pero solo la tesis?

JL-si, solamente la tesis, conseguí una beca para hacer la tesis en el observatorio de parís, en Niza y en otros lados , es que era un estudiante bueno y porque habia un convenio mexico-francia, particularmente en el área de astrofisica, no había muchos candidatos, no se ahora, pero seguramente no hay muchísimos candidatos, entonces te daban seis meses para hacer una tesis de maestría.

I-seis meses no es mucho tiempo

JL-no, pero tampoco te van a decir otra cosa y entonces estuve ahí en el observatorio de parís, viaje a Niza e hice mis observaciones en ¿?????, regrese a parís y luego ya me vine para México.

I- con la tesis regresa aquí?

JL-pero ya no la pude presentar, porque las personas con las que trabaje yo allá, no estaban relacionadas con las cosas que hacían aquí, lo que yo hice en aquella época eran estrellas tempranas y aquí hacían estrellas variables, es otro tipo de estrellas, la variabilidad como cambian, etc. Y entonces a ellos no les pareció, que hubiera alguien que hubiera hecho algo ajeno a su área, todos teníamos que haber hecho lo que ellos hacen, bueno en fin por eso a fin de cuentas todo esta bien.

I-y ese cambio es aceptable?

JL-yo renegaba mucho porque a pesar de que mi formación siempre fue experimental, mucho por los laboratorios y por que en mi tesis siempre anduve metido en cosas experimentales, no me costaba mucho trabajo, pero si renegaba porque comparativamente la física de los rayos cósmicos es mucho mas primitiva, que la astrofísica a la que yo estaba acostumbrado a hacer. Hasta apenas es que se empieza a vislumbrar la relación entre cosas astrofísicas y la física de los rayos cósmicos, articulo science es justo el reporte de eso y es diez años después, es como un intermedio un poco oscuro un poco gris en el sentido de lo que a mi me gustaba dedicarme quedo metido en un cajón porque había que hacer cosas mas como elementales de instrumentación, de ver como podríamos medir tal o cual cosa y es egresar un poquito, pero bueno afortunadamente estoy justo en este momento estoy empezando la parte mas importante de la astrofísica en donde empieza a haber una relación mas clara, digamos que estamos regresando a la parte emocional de esta área.

I- y en que época empezaste a saber que vas a ser investigador?

JL-bueno aquí a lo mejor falta platicar un poco de la licenciatura, porque nosotros demostramos un interés inusual y mas permanente, no solo de "hay vamos a hacer esto", si no que en el segundo año de la licenciatura, nosotros, y por eso es para mi una cosa digna de contar empezamos a ver la cúpula del observatorio que esta en el carolino, no se que tanto tiempo tengas tu de conocer puebla, pero cuando bajabas por analco había una cúpula arriba en el carolino, y entonces empezamos a preguntar ¿y ahí que?, y entonces cuando empezamos a ver esos edificios se vuelven como imán, una cosa muy atrayente, y entonces empezamos a preguntar y nos dimos cuenta que estaba comisionada a una gente que estaba en la macoteca que estaba en el primer patio, conocimos a René Méndez, entonces nos dejaron a empezar a usar su telescopio, pero no solo eso, sino que como éramos una serie de chamacos fastidiosos que "y ahora vamos hacer esto, y ahora vamos hacer el otro", empezamos a preguntar quien nos puede dar mas cursos de astronomía, y entonces empezamos a contactar a Octavio Cardona y al lic. Cornejo, que eran digamos los únicos que tenían alguna relación con la astrofísica en el estado, entonces empezaban a ir a la facultad y empezaban a dar cursos introductores, medio irregular en todo pero con mas entusiasmo.

I- y cuantos estaban en el grupo de estudiantes?

JL- tres

I-tres?

JL- si, y entonces digamos que a mediados de la licenciatura empezamos a hacer eso, y entonces empezamos a participar en la restauracion de ese telescopio, por que habia estado abandonado un buen tiempo, y se habia deteriorado, le habian robado cosas y entonces empezamos a limpiarlo y dejarlo como nuevo, y eso yo supongo que les parecia gracioso ver a esos tres monos, ademas la otra semana viene y me preguntan otra cosa, y luego empezamos a hacer practicas tambien en el inao, entonces se dieron cuenta de que no despareciamos, nos decian que nos veiamos la proxima semana en la siguiente

clase, y ahí estabamos, entonces eso no se si les parecio gracioso o que, porque digamos que demostramos un interes genuino, una ocacion estando en el inaoe el lic. Octavio nos corrio una vez, nos dijo "ustedes chamacos horrorosos, que andan haciendo aquí, este es un lugar serio!!", desafortunadamente cuando se empezaron a dar los tiempos, donde ya uno podia dedicarse mas en serio a esto, mis dos compañeros, uno tuvo un problema familiar muy serio, se murio su papa y tuvo que irse a trabajar a coatzacoalcos, pues para sostener a su mama, y el otro se volvio restaurador de obras de arte, y ya, de eso vivie, anda por ahí restaurando cuadros, entonces el unico que se dedico de manera seria a la astrofisica fui yo.

I- pero estuvo bien, te aostumbras.

JL-.si, tampoco todos los que quieren van a poder llegar al final, cuando nos llegamos a juntar los tres, que no es tan seguido como yo quisiera, ellos todavia tienen digamos intereses, lo siguen cultivando en la medida de sus posibilidades, entonces yo les platico lo que hago, les platico como van las cosas, yo creo que he tenido la fortuna de contar con personas a mi alrededor que comparten ese tipo de gustos y que les interesa.

I- y los padres que piensan?

JL- los mios?

I- si

JL-no me creian, creian que estaba loco, por que no conocian ningun astronomo, para empezar no conocian ni a un astrofisico, mi hermano electronico era como algo esperado, pero justo cuando yo les digo que voy a estudiar astrofisica pues ellos dicen quien sabe que sea eso, y empezo haber digamos, siempre me apollo mucho mi familia, eso era indudable, solo que no tenian conciencia, no habia digamos una buena imagen social de un cientifico, entonces ellos estaban basicamente basados en la mitologia popular de los cientificos, entonces decian: no, te vas a morir de hambre, que vas hacer, te vas a volvver loco, entonces me dejaron hacer lo que yo quise que es astrofisica, y despues cuando yo termine mi papa tuvo un accidente y entonces se retiro del trabajo y se regresaron a vivir a monterrey, tuvo un problema cardiaco y me recomendaron que me lo llevara a vivr a un lugar mas bajo que puebla para que respirara mas tranquilamente, y entonces ellos dijeron: pues a donde vamos; pues para donde somos, para monterrey, y entonces alla viven ellos y yo a partir de la maestria me quede aquí, ya aquí estaba casi toda mi vida.

I- como sentiste cuando salen ellos?

JL-pues feo pero digamos que de alguna manera ya habia escogido un poco lo que queria hacer, entonces mi hermano, bueno es que la historia tambie es un poco estraña por que mi hermano a pesar de que etabamos aquí, el estudio en monterrey en el tec de monterrey, entonces pues nunca tuve hermano, por que el desde la prepa se fue a una prepa en monterrey y luego a la carrera en monterrey y luego hizo la maestria en el inaoe tambien, nadamas que el estudio electronica y luega se caso y se independizo como todos, entonces digamos que esto de los hermanos y las hermanas nunca fue algo muy marcado, llevamos una vida familiar de muchos hermanos y a la fecha pues todos vivimos en todos lados, en varios lugares de la republica y solo nos juntamos pues contadas veces,

I- y según yo, que es un factor, cual es factor de influencia en la produccion de investigacioncuando esta trabajando y que tiempo para escribir articulos y trabajar en proyectos de investigacion, hay un factor que es mas responsable o mas motivante para esa actividad.

JL- yo no se, yo creo, ahí es donde mi punto particular de vista es como poco comun, es medio poco ortodoxo, pero yo no lo habia identificado hasta que platico con un amigo, y el me decia: bueno eso de que le pongan un horario a la investigacion es como mentira, por que uno investiga por gusto, entonces es como si dijeras, me voy a poner un horario para hacer algo que me divierte, me giusta, me emociona, y ahí es donde esta la discrepancia por que justamente el tiempo que uno le dedica a la investigacion, yo por ejemplo, que leo cosas o hacer cosas relacionadas con eso normalmente no esta definido, osea la otra parte , digamos que estoy en esta oficina haciendo estupideses, es la que modula la otra parte, pero cuando estoy de profe comun y corriente entonces son mis clases las que interrumpen la otra parte, o cosas familiares, pero es algo que uno vive haciendo, osea es como la gente que se levanta, toma un café y lee el periodico, uno puede leer las noticias del dia, y entonces dicen: " hay a poco puede leer el periodico todos los dias y tomarteel café todos los dias, y cuanto tiempo te tardas, si es productivo o no es productivo, si te deja algo o no te deja algo" para mi es mas o menos lo mismo, o el que la gente vea la television o las novelas, o no se, que se tome una cerveza con sus amigos, esta muy bien, y asi como no le pesa a la gente hacer eso, pues a uno no le pesa hacer lo otro, ppor que es algo emocionante, bueno yo creo que es algo muy absorvente, algo que deveras te emocuona, esa es la parte que desafortunadamente creo que se pierde con el tiempo. Me acuerdo mucho de uno de mis amigos franceses que decia siempre al final de cualquier correo "pues vamos a seguir estudiando estas estrellas que tanto nos gustan", entonces eso de "tanto te gusta" como que se pierde la profesionalizacion, uno ya no sabe, al menos asi lo mencionaba con algunos colegas que uno hace investigacion en buena medida por gusto, por que le parece interesante ese campo, ese fenomeno, entonces si ya no es asi, si no que "tengo que sacar eso, por que eso representa dinero" entonces como que las cosa ya vuelven a ser obligatoria, y para mi ese tipo de cosas no son asi, es como en las reuniones, osea, no puede ser una reunion tan agradable como una reunion obligatoria, como con una con amigos, entonces cuando esta uno con amigos ni cuenta se da uno del tiempo y dice. "hay ya son las tres de la mañana" o lo que sea, pero cuando es obligatoria es un martirio, entonces por eso, no se si conteste la pregunta, es que no es algo a lo que tu le puedes poner como "hoy me voy a dedicar tres horas a investigar" no, hasta suena raro no?, normalmente no es asi, porque si hay algo que lo intriga a uno, que no le sale, que le cuestaq a uno trabajo o que le falta algo, entonces uno esta dandole vueltas en la cabez y tratando de averiguar como hacerlo de alguna forma diferente o preguntas, o lo que sea, esa es la cosa como yo lo veo.

I-ciertamente la mayoria de la gente tambien en la escuela, en la universidad, no tienen esa pasion.

JL- los italianos dicen una cosa muy cierta desde mi punto de vista: "que el objetivo de la vida de uno es encontrar su misterio, la cosa que te enciende, la cosa que te apasiona, la cosa con la que de a deveras tu te sientes vivo, puede ser albañil, puedes ser jugador de foot boal, puedes ser, cientifico, puedes ser hasta ratero, hasta para ser ratero tambien necesitas sentir eso, y entonses cuando uno ha creido q lo ha podido encontrar, creo que; no es que destaques o no en la actividad que realices, no es lo que uno persibe, si no que, yo creo es la que disfrutas sin pensarlo, la vives, a pesar de que puedas o no tener reconocimientos, resultados o retribuciones, si no que tu, al hacer ese tipo de actividades sientes eso, digamos confort, retribucion, digamos, enriquesimiento propio, es una satisfaccion interior, independientemente de lo demas, osea, ves que hay que cumplir con formatos con cosas de rigor, entonces asi, esta eso para la investigacion y yo creo tambien que debe haber cierta pasion por enseñar, y entonces ahí es donde yo veo que se refleja la pasion por la profesion, en ese sentido yo creo que se noda cuando alguien da una clase y sigue apasionadamente enamorado de su profesion, o ya no, y se nota, digamos es justamente una de las partes centrales, la apreciasion de uno cuando realiza cosas se nota que tan entregado esta hacia eso, o si solo es una forma de ganar dinero, y pues, sigo diciendo que los cientificos apasionados, o digamos convencidos de que lo que hacen es interesante, importante, gratificante, entonces, no se como, pero se nota, cuando doy una clase o una conferencia y me encuentro con una gente que me transmite esta intensidad, esta emocion, entonces justamente da hasta mas gusto, meterse o platicar o introdusirce a su tema, cuando es demasiado, cuando te das cuenta de que si es tecnico o no tecnico, simplemente en esta actitud de interes, yo creo que de pasion, se vuelven las cosa muy grises, se vuelve menos atractiva para uno.

I- estoy pensando en la facultad, ahora no tenemos actividad, y eso es parte de mi investigacion, hay una supersticion, cuando estoy trabajando en una universidad que estoy haciendeo una investigacion, eso es gran parte de la universidad, pero no tenemos esa cultura, lo que yo quiero entender es por que no, factores, y yo estoy buscando en el nivel individual con estas entrevistas, que tienes.

JL- mira, te voy a platicar una experiencia un poco marginal, pero a mi me parecio muy ilustrativa, hace cuatro años tuve una platica con una profesora de historia, una de las cosas que a mi mas me gustan es que en cuestion de formacion es la astronomia, vivimos en un lugar tan rico, es una pequeña anécdota acerca de esto; una vez estaba en un telerife, y entonces anunciaron en el instuto, que es donde yo estaba trabajando una gran conferencia de los vestigios gastroastronomicos en la isla de telerife, y entonces todo el mundo estaba feliz de la vida, y fuimos, y entonces la platica que fue de una hora y media fue sobre tres circulitos y una cruz, entonces para ellos era algo muy importante por que era de los vestigios de las culturas nativas de la isla, pero yo lo que sali diciendo fue: es que eso, en mexico en cualquier esquina lo encuentro y no necesitamos hacer una super conferencia para estudiar, entonces cuando yo empece a platicar con el profe con el que yo estaba trabajando alla, le dije que por que entonces se conoce tan poco, ustedes no conocen, pero hay muchisimo, entonces a partir de eso yo empece hacer cosas en astronomia, a tal grado que pude despues contactarme con esta maestra en alguna conferencia que yo di, ella estaba y me dijo que por que no les das un curso a los muchachos de historia, seria como interesante, por que ven agua, ven algo de las culturas prehispanicas, pero nunca se ve la relacion o la parte un poco mas cientificas de las cosas, son unos buenazos en matematicas y en astronomia, pero nunca se sabe que, como y en que, y dije bueno, di un curso, y en base a ese curso hice una tesis en astronomia en el colegio de historia y entonces cuando estuvimos en el examen de esta tesis, que fue un cuate muy brilante en historia, la parte del examen fue una experiencia bastante amarga, justo porque aquí los examenes son la defensa del trabajo, lo que hace el trabajo del comote, es una exhibicion como la sapiencia del comité, ante digamos al mismo expositor: y si como le he venido diciendo, en mi articulo no se que, si per de eso no se trata, osea, yo no quiero saber que tan erudito eres tu, si no que te des cuenta que el chavo esta haciendo algo y aprendio algo, entonces es una cuestion, mas de conocimiento, que si es un erudito!, por que no me reconoces como erudito, ve que tan erudito soy, soy una persona cultisima, entonces chin! Por que yo estoy acostumbrado a otra cosa y justamente esos eran los disque mas avanzados del colegio de historia de la facultad de filosofia y letras, la doctora no que, el doctor no se cual, y entonces a partir de esa experiencia ya nunca mas he vuelto hacer nada de eso, entonces digamos que se van mas por la forma que por el fondo, es un poco mas el lucimiento personal, el nivel academico que la sustanciacion, es de que deveras vamos hacer que esta cosa avance, que no solo se vea el movimiento del ferrocarril de historia, si no como te decia hace rato, vivimos en un lugar tan rico en tantas cosas, que es una pena que sigamos perdiendo el tiempo revisando en una esquina el empolvado en nuestro cuarto, y bueno, para finalizar ese comentario el muchacho que hizo esa tesis consiguio una beca para irse a china a aprender cultura china, eso fue el año pasado, tiene cuatro años para estar alla, osea, si hay listos, si hay gente apasionada, si hay interes, si hay capacidad, si hay todo, ahora, justamente la parte penosa es que no son los que estan ahí, uno lo que podria decir es que deberia irse gente mas apasionada, mas no se si comprometida sea la palabra mas adecuada, pero mas compenetrada en su area, que la sientan mas, que la disfruten mas, que la vivan mas, entonces ahí es donde ya las cosas no estan bien, entonces muchos de ellos desafortunadamente son gente que lo toma como forma de vida, punto, ya para no hacer mas comentarios, eso sucedió hace veinte años, por ejemplo la comoposicion de la planta docente, hace veinte años eran unos cuantos doctores y la mayoria con menos calificacion academica, licenciados, ahora el ochenta porciento somos doctores, y la parte minoritaria ya media vieja, ya digamos de salida, somos a parte que tenemos experiencia en esto de la investigacion, que para sacar tu doctorado hiciste algo, entonces esa experiencia digamos no la pueden transmitir quienes no la han hecho y es una pena, por que no solo es el titulo nobiliario, el doctor no se que, si no que es la riqueza en la experiencia academica de alguien, esa es la diferencia entre tomar clases con alguien que ha hecho algo aunque sea pequeño, y alguien que solo transmite las cosas de alguna otra manera. Ya, ya heble mucho,

I- si, yo creo que es algo...

JL- y esa es la diferencia entre los paises que a mi me parecen culturalmente mas atractivos, en donde que para ser profe, al menos tienes que ser doctor, la minima situacion academica es ser doctor y luego ya de ahí, para arriba, entonces aquí es el desafortunado hecho de que no habia suficiente gente con altas califcaciones academicas, permitio, bueno a mi me permitio hacer el doctorado en esa universidad, pero a la larga se nota que no es tan bueno, a lo mejor ya en estas epocas al emnos en el area de la astrofisica y matematicas, empieza haber el numero suficiente como para poder solicitar el numero de ingreso, entonces a lo mejor estamos es ese momento de transicion, y bueno entonces estamos un poco en esta parte de cómo un poco arcaica, como muy rigida, y ya dentro algunos años tengamos unacosa un poco mas buena.

I- mas interesante, una cosa mas, si se puede resumir

JL- si, sintetizar

I- en unas palabras, como son los factores mas importantes, que cosa puede influenciar mas,

JL- mas influyentes?

I- si

JL- yo creo que es justamente eso, el gusto por algo.

I- de donde viene el gusto?

JL- yo creo que es una cosa interior en el sentido de que, yo creo que en algun momento de la vida joven, digamos, todos la niñez y la juventud de las personas uno empieza a explorar lo que hay, actividades deportivas, academicas, empiezan a meter las manos en algunas cosas, empiezas a pensar en otras cosas, tal vez a escribir a pintar a lo que sea, entonces yo lo que creo que en esa epoca de la niñez y la juventud lo que se nesecita es una exploracion mas panoramica acerca del quehacer humano para poder identificar justamente eso, que es lo que me emociona, el arte, la ciencia, lo que sea, entonces desafortunadamente eso es lo que no se me hace, por que me encasillo en dos o tres canales de informacion bastante limitados, bastante restringidos, bastante convencionales, entonces por eso te digo que el hecho de que al haber leido tanto hacer por fuerza, por gusto, hace que tu tengas digamos la posibilidad de contemplar opciones poco comunes, no esta en la tele, osea, cualquier tipo de actividad academica no esta emitida por la television, entonces ya por ahí si uno de mis principales canales de informacion o adquisicion es la tele entonces es poco probable que yo me dedique a la ciencia o al arte bueno un arte desente, no cosa medio extrañas, luego yo creo que la otra cosa es el ambiente, si yo no veo a mis papas leer nunca, pues menos se me va a ocurri a mi leer y entonces es un poco extraño pero yo creo que mi falia tiene esa costumbre, mi papa yo recuerdo que leia y entonces eso ya es una direccion, que empieces a tenr experiencias cotidianas hacia eso, a adquirir informacion no solo por los medios convencionales, ahora el internet, cuando yo era chico ni existia esa mugre, entonces yo creo que las dos crean el ambiente para poder tener una vision maas panoramica del quehacer humano y la segúnda es que tengas apoyo, apoyo en el sentido de que si te interesas sinceramente a algo te permita explorarlo, entonces, igual y te pueden mandar a clases de karate o de cocina thailandesa o lo que sea, pero si lo tuyo es el patinaje entonces que te dejen hacer eso, y ya se vera que tan profundo tu quieres involucrarte en esa actividad o lo que sea, mas alla de los prejuicios, por ejemplo, a pesar de que mi familia no sabia para que demonios servia un fisico, no se opusieron a que fuera fisico, por que seguramente tu tienes tus razones para haber escogido eso y sabras si llevas todo eso a un termino o no pero tu siente que apoyo de nosotros tendras, esa es una parte comun, no se que tan comun sea pereo al

menos para mi si es algo que fornma parte de este todo que es de las partes mas fundamentales sin tanto cuestionamiento, si tampoco es de que como mi papa es ingeniero entonces yo tambien y ese tipo de cosas, eso es lo que yo creo mas o menos

I- y si esas cosas no pasan?

JL- yo creo que es mas dificil, por que a pesar de que uno siempre tiene la posibilidad de la eleccion, tiene la posibilidad de escoger que hacer y como hacerlo desafortunadamente no tiene el panorama para escoger, las opciones son pues las mas obvias, las mas comunes y que desafortunadamente son las mas desgastadas, entonces es donde digamos que entra una buena medida de frustacion justo porque es una avenida bastante trillada, entonces la competencia es muy grande y por lo mismo la posibilidad de éxito es muy muy reducida

I- muy interesante

JL- no se, pero bueno, eso es lo que yo creo

I- unas razones, la mayoria de la gente no tiene esa oportunidad en ese periodo de esa panoramica, es como dices es muy raro

JL- no, es muy comodo

I- es comodo?

JL- si por que si yo digo que tu educacion corre a cargo de la escuela y en la escuela sepa dios quien se pare enfrente de ti todos los dias, yo cumplo, yo te llevo a la escuela yo llevo tus utiles, alla tu si tu escoges mal, como que no, entonces, que tal si te sientas y platicas, oye que te gusta, o como ves esto, vamos a ver, te llevo a tal lado o lo que sea, un poco mas, igual a lo mejo en la epoca que yo era joven las familias eran diferentes ahora a lo mejor seria muy dificil hacer todo eso pues por que todo es diferente, por que, es mas dificil ganarce la vida, las familias estan un poco mas desintegradas, los chamacos estan un poco mas yo creo que apaticos o menos receptivos, entonces como viene de una figura de autoridad entonces como que hacerle caso es como aceptar su jerarquia o aceptar su autoridad y yo como soy rebelde no acepto a ninguna autoridad, pero bueno ya son otras cosas, no se a lomejor para mi es una especie de justificacion de que he llegado a donde he llegado pero yo siento que la constitucion de la sociedad es diferente ahora que cuando yo era un chamaco

I- que tan importante según tu es la autoridad

JL- pues es muy importante porque digamos la demostracion, desde mi punto de vista buena de la personalidad es justamente ejercer la capacidad de ello y desafortunadamente es de las cosas que menos promovidas son, de las cosaas que yo pueda disernir, del que pueda no aceptar o el que pueda explorar una cosa diferente ahí es donde yo creo que justamente no es lo socialmente lo mas promovido, si no que uno tiene que integrarse, aceptar, participar de una manera digamos armonica, en determinadas cosas, en determinadas actividades que no necesariamente son lo que yo quiero, yo creo que el permitirse escoger sinceramente desde el fondo del corazon de alguien hace la diferencia eso es, a lo mejor es un poco romantica pero yo creo que el secreto de una carrera exitosa digamos el plan de vida exitoso en el sentido de satisfecho y frustrado o insatisfecho es esa introspeccion, yo que quiero y ya al saber veo como es lo que quiero, en el caso este digamos de la investigacion cientifica es yo quiero saber algo, no se en algun area del conocimiento humano y luego ya la otra es una cosa de consecuencia de la otra, pero es primero identificar si tengo esa sed de conocimiento esa necesidad de estar averiguando cosa, pues ya esta la mayor parte de la carrera ganada, esa es mi apreciacion esa es la parte que se tiene que estar digamos impulsando, pronoviendo, espero que no sientas que estoy alucinando o

haciendo feo, pero tenemos un problema muy serio nosotros en cuanto a la enseñanza de la fisica justo porq ue cuando uno es pequeño uno es curioso digamos, cuando uno sale de la universidad es apatico es rigido y solo acepta lo que le dicen y entonces le dicen lo que tiene que contestar, y mucho de esta inquietud inicial, en la secundaria y particularmente en la preparatoria parece que el objetivo fundamental es aniquilarla y luego lo que queremos nosotros es volverla a revivir a despertarla a reanimarla, entonces los muchachos ven que la naturaleza es maravillo sa, que no se que, que no se cuanto, entonces es casi imposible, eso se empieza a dar en la maestria y mas en el doctorado, pero regresando al mismo punto el asunto aquí es la competencia entre lo que uno quiere y esta convencido de que lo quiere es una cuestion ambiental que modula muy fuertemente digamos la posibilidad de lograr ese objetivo, entonces para la parte cientifica que es loq ue estamos tratando de circunscribirnos se necesitaria no matar la curiosidad de los muchachos, como? Todavia no lo sabemos y eso estamos discute y discute, pero en algun momento el ambiente el sistema educativo tradicional logra violar esa capacidad de curiosidad de los niños o de nosotros o de todos, entonces como revertirlo no sabemos, hay muchas actividades pero no hemos logrado establecer una estrategia para poder ayudarnos enfrentar este hecho, ahorita que estamos revisando el programa de estudios de las carreras, digamos este punto la falta de creatividad el miedo a la autoridad la aceptacion incuestionable de las verdades establecidas, todo esto, estamos tomandolo en cuenta y tratando de averiguar como enfrentarlo, hemos estado pasando un buen tiempo discutiendolo justo por lo mismo, estaba ayer platicando en una comida con un compañero que es desafortunadamente uno puede tener muy clara la estrategia, es decir necesito fomentar la curiosida de investigacion, la creatividad de los muchachos, sin embargo la congruencia de que yo sea participativo, curioso, no se da al nivel necesario yo me la puedo pasar dice y dice esto y sin embargo en mi clase si hay una pregunta la reprimo o la esquivo o me burlo o lo que sea, entonces que sucede acaban por dejar de participar, por dejar de preguntar de cuetionar y entonces caemos en el comodisimo esquema, como ve?

I- interesante

JL- bueno te estoy platicando de lo que estamos haciendo y como es que esto pareciera un ejercicio academico, esta arraigado en nuestra realidad mucho mas profundamente de lo que estamos suponiendo, de lo que pensamos, y es un problema que es subyacente, ahí esta el maldito y nos come todos los dias y no sabemos como ni siquiera enfrentarlo por que justamente es tan omnipresente que no nos damos cuenta que estamos inmersos en el. Bueno ya te dije muchas cosas, no se que mas decirte, no se si sea cierto. Es algo que se necesita abordar ya como donde cuantos no se ve claro

I- y se pone mucho esfuerzo y mucha intencion

JL- no hay mucha gente comprometida, ese es el punto, pero yo no quiero poner la cosa como muy negra o por el estilo pero yo digo que esta clara mas o menos la problemática, esta claro que tenemos un problema, sin embargo la forma de enfrentar ese problema nos rebasa por mucho, es dificil, mira ya para acabar para que no te me duermas, en el caso particular de la facultad en matematicas los profesores de matematicas dicen cuando llegan los alumnos aquí los muchahcos que llegan a la carrera de matematicas son son los mas preparados ni los mas motivados ni con mayor interes, entonces estamos leyendo un articulo sobre el señor nobel sobre el metodo de enseñanza, el hace un estudiuo en harvard, y dice vamos a ver que pasa con los muchachos que yestan en matematicas y fisica, primer cosa no podemos decir que son burros son muchachos altamente capaces, y la otra cosa no pueden decir que estan desmotivados vienen con un entusiamo fenomenal, con unas ganas de trabajar con un nivel muy por encima del promedio a los dos años digamos un setenta porciento abandonan laas carreras por que? Pues porque se enfrentan con profesores tradicionales en donde ese entusiasmo, curiosidad zaz! Lo matan, ahí tienes una super muestra de entrada y el resultado es el mismo, acabas desbaratado, entonces como que deberia ser suficiente evidencia de que la cosa no va por ahí, en fisica hay una revista que se llama price fisic, hay una nueva seccion, todo en la enseñanza de la fisica es tan grave la situcion que en metodos de enseñanza particularmente fisica y matematicas digamos que le esta llamando la atencion a mucha gente, no somos los unicos pero tambien tenemos que enfrentar la cosa de manera cientifica dejarnos del " creo, a mi se me hàce, yo supongo" en fin, empezamos con investigacion y acabamos con la enseñanza, bueno desde mi punto de vista

I- si eso es parte aquí, yo estoy formando mi teoria eso es una respuesta, toda esa hstoria de ustedes, y me esto acercando

JL- muy bien entonces cuando tengas los resultados me avisas o me los amndas por correo, espero haber ayudado

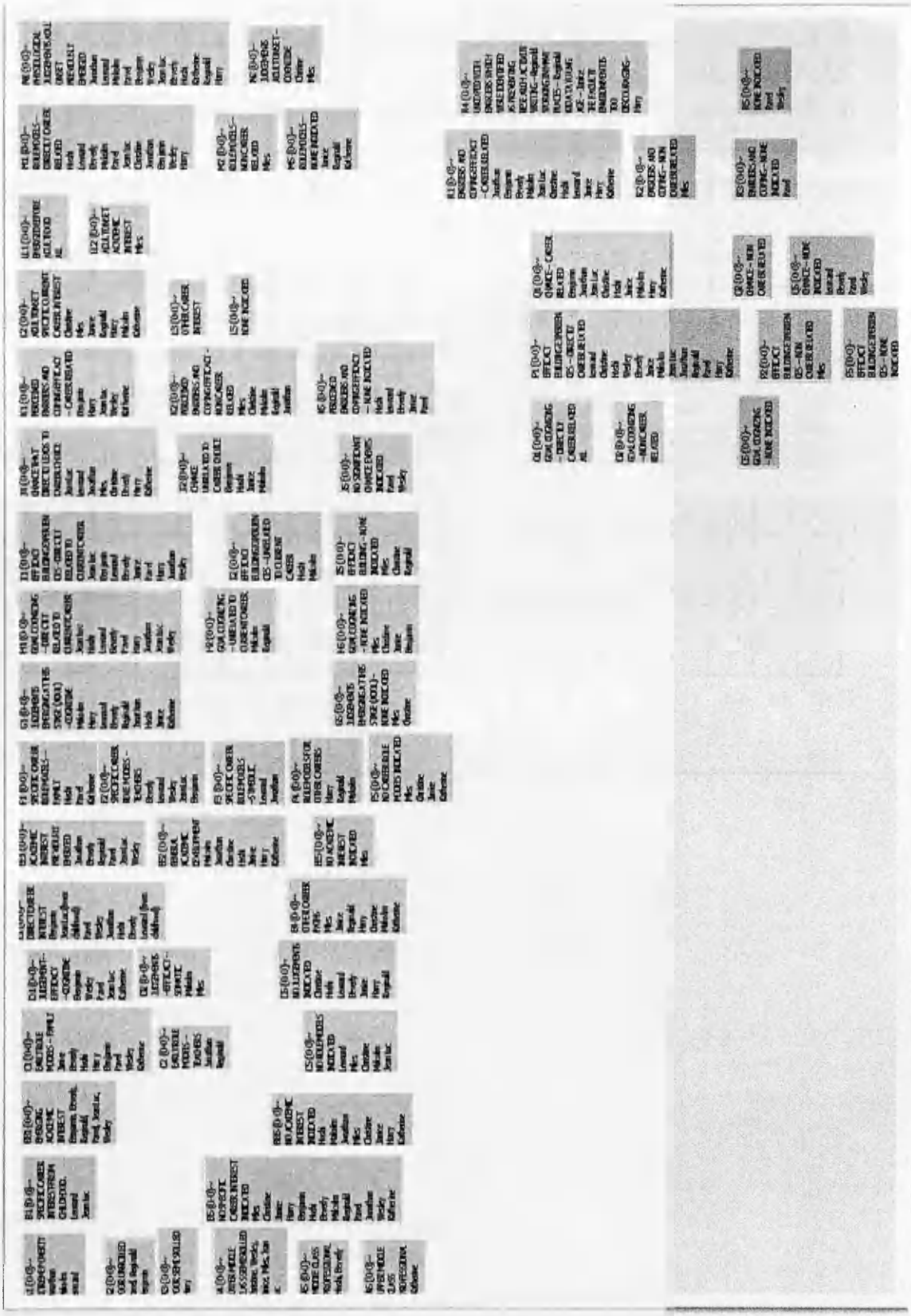
I- gracias

APPENDIX HH: MAIN STUDY QUALITATIVE DATA TYPOLOGY

CHILDHOOD (0-11) Formation of academic and career interests					ADOLESCENCE (12-17) Career selection and pursuit							
RUBRIC A	RUBRIC B	RUBRIC BB	RUBRIC C	RUBRIC D	RUBRIC E	RUBRIC EE	RUBRIC F	RUBRIC G	RUBRIC H	RUBRIC I	RUBRIC J	RUBRIC K
SOCIO ECONOMIC FAMILY STATUS	EARY CAREER INTERESTS	ACADEMIC INTERESTS	EARLY ROLE MODELS	PHYSIOLOGICAL JUDGMENTS (efficacy beliefs)	CAREER INTERESTS	ACADEMIC INTEREST	ROLE MODELS	PHYSIOLOGICAL JUDGMENTS (emerging at adolescence)	CAREER GOAL COGNIZING	EFFICACY BUILDING EXPERIENCES	CHANCE	PERCEIVED BARRIERS AND COPING EFFICACY
A1 Extreme poverty	B1 Specific career interest	BB1 General academic interest	C1 Family	D1 Cognitive	E1 Career interest (current career)	EE1 (previously emerged)	F1 Specific current career role models – family	G1 (emerged in childhood)	H1 Directly related to current career	I1 Directly related to current career	J1 Directly related to current career	K1 Directly related to current career
A2 Poor - unskilled			C2 Teachers	D2 Somatic		EE2 Academic interest (emerging in adol.)	F2 Specific current career role models – teachers	G2 Emerging in adolescence – cognitive	H2 Unrelated to current career	I2 Unrelated to current career	J2 Unrelated to current career	K2 Unrelated to current career
A3 Poor – semi skilled							F3 Specific current career role models – symbolic					
A4 Lower middle class – skilled					E4 Other career interest		F4 Role models for other careers					
A5 Middle class – professional	B5 No career interest indicated	BB5 No academic interest indicated	C5 None indicated	D5 None indicated	E5 None indicated	EE5 None indicated	F5 No career role models indicated	G5 None indicated	H5 None indicated	I5 None indicated	J5 None indicated	K5 none indicated
A6 Upper middle class - professional												

ADULTHOOD (18+) Career performance and persistence							
RUBRIC L	RUBRIC LL	RUBRIC M	RUBRIC N	RUBRIC O	RUBRIC P	RUBRIC Q	RUBRIC R
CURRENT CAREER INTEREST ADULT ONSET	ACADEMIC INTEREST ADULT ONSET	ROLE MODELS	PHYSIOLOGICAL JUDGEMENTS ADULT ONSET	CAREER GOAL COGNIZING	EFFICACY BUILDING EXPERIENCES	CHANCE	PERCEIVED BARRIERS AND COPING EFFICACY
L1 (emerged before adulthood)	LL1 (emerged before adulthood)	M1 Specific current career role models	N1 (previously indicated)	O1 Directly related to current career	P1 Directly related to current career	Q1 Directly related to current career	R1 Directly related to current career
L2 Current career interest	LL2 Academic interest adult onset	M2 Non current career related	N2 Cognitive – adult onset	O2 Unrelated to current career	P2 Unrelated to current career	Q2 Unrelated to current career	R2 Unrelated to current career
L3 Other career interest							R4 Barriers which prevent research activity Writing / Time / Child care / Faculty atmosphere
L5 None indicated	LL5 None indicated	M5 None indicated	N5 None indicated	O5 None indicated	P5 None indicated	Q5 None indicated	R5 None indicated

APPENDIX II: TYPOLOGY WITH NAMES



APPENDIX JJ: EXCEL SCT DATA

		A	B	BB	C	D	E	EE	F	G	H	I	J	K	L	LL	M	N	O	P	Q	R
RA1		1	5	5	2	5	1	2	3	2	1	1	1	2	1	1	1	1	1	1	1	1
RA2		1	1	1	5	5	1	1	3	2	1	1	1	5	1	1	1	1	1	1	5	1
RA3		1	5	5	5	2	4	2	4	2	2	2	2	2	2	1	1	1	1	1	1	1
RA4		2	5	1	1	1	1	1	1	1	1	1	5	5	1	1	1	1	1	1	5	5
RA5		3	5	1	1	1	1	1	2	1	5	1	2	1	1	1	1	1	1	1	1	1
RA6		4	5	1	1	1	1	1	2	1	1	1	5	1	1	1	1	1	1	1	5	5
RA7		4	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
RA8		5	5	1	1	5	1	1	2	2	1	1	1	5	1	1	1	1	1	1	5	1
RA9		5	5	5	1	5	1	2	1	2	1	1	2	5	1	1	1	1	1	1	1	1
RA10		6	5	5	1	1	5	2	5	1	2	2	1	1	1	1	5	1	1	1	1	1
		2.89	4.11	2.33	2.11	2.89	1.33	1.33	2.22	1.56	1.56	1.11	2.22	3.00	1.11	1.00	1.00	1.00	1.00	1.00	2.78	1.89

NRA1		2	5	1	2	5	4	1	4	2	2	5	5	2	2	1	5	1	1	1	5	4
NRA2		3	5	5	1	5	4	2	4	2	1	1	1	1	2	1	1	1	1	1	1	1
NRA3		4	5	5	5	5	4	2	5	5	5	5	1	2	2	1	1	2	1	1	1	1
NRA4		4	5	5	5	2	4	5	5	5	5	5	1	2	2	1	2	2	1	2	1	2
NRA5		4	5	5	1	5	4	2	5	2	5	1	2	1	2	1	5	2	1	1	1	4
		3.4	5	4.2	2.8	4.4	4	2.4	4.6	3.2	3.6	3.4	2	1.6	2	1	2.8	1.6	1	1.2	1.8	2.4
		A	B	BB	C	D	E	EE	F	G	H	I	L	LL	M	N	O	P				

APPENDIX KK: SAMPLE PARTICIPANT NETWORK VIEW