

**Age Differences in the Underlying Mechanisms of Product Placement Influence.**

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September 2017

This thesis is submitted in fulfilment of the requirements for the degree of Doctor of Philosophy.

## Declaration

I declare that the thesis has been composed by myself and that the work has not be submitted for any other degree or professional qualification. I confirm that the work submitted is my own, except work which has formed part of co-authored journal articles. My contribution to the work and that of the co-author has been explicitly stated below.

The manuscripts titled, *Are all measures equal? A comparison of product placement effects using stimulus based and text choice tasks* (Paper One, Chapter Two), *The serendipitous decline of memory in aging. An age-related dissociation in the mechanisms of product placement influence* (Paper Two, Chapter Three), and *The serendipity of the decline of self-control in ageing. Are older adults less susceptible to ego depletion and product placement influence?* (Paper Three, Chapter Four) were co-authored by Prof. Charlie Lewis. I designed and conducted the research reported in the articles. In addition I wrote the accompanying Appendix sections.

## **Acknowledgements**

I would like to thank my supervisor, Charlie Lewis for his continued advice and support. I would also like to express my gratitude to Dermot Lynott for his guidance.

Thanks to all the amazing staff of Lancaster Library, Morecambe Library, Carnforth Library, Halton Library, Heysham Library, Starbeck Library, Knaresborough Library, Ripon Library and the Campus in the City. Without their support, endless cooperation and patience I could not have completed this thesis.

Finally, I would like to give the biggest and best thank you to my partner Iain. Without his endless support, motivation, infinite trips between Harrogate and Lancaster, and morning cups of coffee, I could not have accomplished this achievement.

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## **Introduction to Thesis**

In an increasingly media-rich society, we are ever exposed to more varied marketing techniques. Advertising is no longer limited to traditional outlets such as print and television commercials. Consumers are moving away from watching television on a traditional TV set in favour of new technologies. The development of portable electronic devices such as tablet computers and smartphones has provided new platforms for commercial messages. These products not only increase the number of ways in which advertisers can use to target us, but also change the way we interact with the media. We increasingly use these devices on the go, even attending to multiple screens at the same time. These habits have become increasingly common, yet they may inadvertently increase our susceptibility to advertising communications. Changes in media consumption and government legislation had led advertisers to seek out new ways to target consumers and we need to consider two issues (Ofcom, 2011; Ofcom, 2017a). First, product placements have become increasingly prevalent and are regularly featured in television programs and movies. So, their influence needs to be examined further. Secondly, the existing research tends to neglect large sections of the population. Older adults account for almost one quarter of the UK (Office for National Statistics, 2017) population and watch more television than any other age group (Ofcom, 2013). Yet, little is known about how ageing mediates susceptibility to product placements.

This thesis will integrate three areas of existing research and address questions which have emerged from the literature. The literature review (Chapter 1) initially provides an overview of prevalence of product placements. The role of consumer awareness and attitude toward this form of advertising in facilitating susceptibility is discussed in terms of the psychological theories proposed to explain how product placement works. I then debate whether variability in placement stimuli and

measures may contribute to inconsistencies within this area of research. Next, I explore how implicit and explicit memory processes may shift in terms of the much-debated age cognitive decline. I consider how such changes might mediate placement impact. By way of example, the theory of ego depletion is evaluated and discussed in relation to ageing effects and product placement research. Finally, I consider how cognitive resource and ego depletion may interact with consumer viewing habits to mediate placement efficacy.

In this thesis key issues which have emerged from the literature will be explored in three experimental chapters.

Following the replication crisis in psychology research I will initially investigate whether product placement effects can be replicated. The assumption that implicit measures of placement influence are equivalent will be assessed through a comparison of two methods (see Chapter Two). The validity of frequently used measures will be discussed and the more methodologically sound method is put forward. The contribution of the methodological investigation will be discussed in relation to the replication crisis.

Second, I will address the paucity of research exploring the impact which product placement has on older adults (see Chapter 3). Though older adults are becoming one of the largest groups in the population, it is not known whether cognitive decline increases vulnerability to this form of advertising. It is assumed within the literature that the mechanisms of placement influence are consistent in different age groups, yet this presumption has not previously been investigated. The impact which cognitive ageing may have on the underlying mechanisms of placement effects will be examined.

The third issue to be addressed by this thesis is the role of ego depletion in product placement effects (see Chapter 4). The contribution of ego depletion to placement vulnerability will be assessed. In

addition, we will consider a key debate in the ego depletion literature, of whether older adults are susceptible to resource depletion.

The thesis will be concluded by the General Discussion (Chapter 5). This section evaluates key findings in relation to existing research. The contribution of the current research will be discussed in relation to the mechanisms of product placement, the effect of ageing on placement vulnerability and methodological considerations for future research. The observations from the thesis will be discussed in relation to theoretical models of memory, ageing and ego depletion. Finally, marketing implications based on the findings of the thesis are proposed.

The thesis is presented in five chapters. Chapter 1 provides a literature review of research relevant to product placements. Chapter 2 presents the first paper of the thesis (Experiments 1 and 2), *Are all measures equal? A comparison of product placement effects using stimulus based and text choice tasks*, and an Appendix. The appendix reports additional analyses exploring order effects of implicit and explicit measures in product placement research. Though these analyses are relevant to the thesis they are beyond the scope of the main paper. Chapter 3 contains the second paper of the thesis (Experiments 3 and 4), *The serendipitous decline of memory in aging: An age-related dissociation in the mechanisms of product placement influence*, and an Appendix. The appendix reports additional analyses exploring age difference in the decision making process. Though these analyses are relevant to the thesis they are beyond the scope of the main paper. Chapter 4 presents the third paper of the thesis (Experiment 5), *The serendipity of the decline of self-control in ageing. Are older adults less susceptible to ego depletion and product placement influence?* and an Appendix. The appendix reports exploratory analyses which assess the extent to which COLT performance, time of day, fatigue and hunger mediate ego depletion effects. Though these analyses are relevant to the thesis they are beyond the focus of the main paper. Chapter 5 concludes the thesis with the General Discussion.

## **Chapter One**

### **Literature Review**

#### **Introduction**

In this chapter I will analyse the theoretical accounts of how product placements work and how these processes may interact with age related cognitive decline. This chapter will be presented in a series of six sections.

First, I will provide an overview of the prevalence of product placements and identify that they are of relevance to psychological research and theory. I will consider how placements can influence a consumer's brand preference, without their awareness. Second, I consider the theoretical models which attempt to explain this phenomenon. The real-world issue of product placement is discussed in relation to theoretical accounts of memory and the factors that might inhibit our defences against persuasive communications. The three competing accounts of priming, The Perceptual Fluency/ Misattribution hypothesis, Affect Theory and Intersensory Interaction Account of priming will be debated in relation to the insight which they can offer of product placement effects. Third, I will discuss how ageing may influence cognitive processing mechanisms. Age related changes in memory will be discussed in relation to the effect which they may have on product placement susceptibility. Existing literature will be used to debate the structure of 'implicit' and 'explicit' memory. The fourth section discusses how consumers protect themselves from persuasive communications. The contributions to The Persuasion Knowledge Model to understanding product placement effects will be discussed. In the fifth section will examine the widely debated theory of ego depletion. The nature of ego depletion and experimental support are debated. The final section draws together theoretical models of memory, age related cognitive decline, accounts of priming and consumer habits. The interaction and contribution of these variables to products placement vulnerability will be discussed.



## **The Prevalence of Product Placements**

The first product placement occurred in 1896 (Gregorio & Sung, 2010) and this form of advertising became increasingly common throughout the 1920s and 1930s (Ferraro & Avery, 2000; Fristoe, 2005). Brand placements experienced a surge in popularity following *Reese's Pieces* being featured in the movie *E.T.: The Extra Terrestrial*. The placement led to undeniable success for *Reese's* with a 65% increase in the sales of the featured item (Balasubramanian, Karrh & Patwardhan, 2006; Russell & Belch, 2005; Sung & Gregorio, 2008). Following the demonstration of how lucrative this form of advertising could be, brand placements became increasingly more common throughout the 1980s (Lipman, 1991; Rothenberg, 1991). It was not until the 1990s when consumers were regularly exposed to placements in their own homes, as brands and products became common within TV shows (Warner, 1995). Television is now the most popular medium for what has become a billion-dollar industry (PQ Media, 2012; PQ Media, 2015; Tessitore & Geuens, 2013).

The number of placements aired on television is increasing (PQ Media, 2015), yet the average viewer now watches less TV than in previous years (Ofcom, 2017a). In 2004 the average viewer watched 3 hours and 42 minutes of television per day, this rose to 4 hours by 2012 (Ofcom, 2013). Though this trend was predicted to continue, a recent report has shown that the typical viewer is watching less television than in previous years. British viewers now watch an average of 3 hours and 32 minutes of television per day (Ofcom, 2017a). However, the trend to watch less TV has not been adopted by all age groups. Older adults (65+ years) are the only age group to have increased their viewing time in the last year. This age group typically watching 3 hours and 44 minutes of television per day, almost double that of younger adults (16-25 years) who watch an average of 1 hour and 54 minutes per day (Ofcom, 2017b).

Though older adults watch more TV than any other age group, no research to date has investigated how product placements influence this age group.

Eighty-seven per cent of the UK population watch TV on a daily basis, though not necessarily using a traditional television set. It is increasingly common to watch TV on a variety of non-traditional devices such as smartphones, laptops and tablet computers (Ofcom, 2013). The increase in platforms which allow media consumption is occurring in parallel with a growth in the use of placements. Consequently, a typical British viewer is being exposed to a greater number of placements than ever before.

In recent years there has been a surge in the use of technologies which allow access to media and advertising while on the move. Over half of the UK population own smartphones (Ofcom, 2013) and 66% of UK consumers now access the internet using their phone. The average person is now more likely to use their phone to access the internet than a computer (Ofcom, 2017b). Smartphone ownership is steadily increasing, though between 2015 and 2016 older adults (60-75 years) have the sharpest uptake of the technology, with ownership increasing from 28% to 39% in a single year (Ofcom, 2017b). This indicates that the growing trend for mobile advertising is not limited to younger adults. Older adults growing use of smartphone technology may be inadvertently increasing their exposure to online and mobile advertising.

In addition to the growing use of smartphones, the possession of tablet computers has also increased. Ownership of tablets doubled between 2012 and 2013, from 12% to 24% (Ofcom, 2013). Over half (59%) of adults now own a tablet computer (Ofcom, 2017b). Consumers typically purchase the item with the primary intention of using it for entertainment. The average user spends 1 hour and 45 minutes a day using their device (Ofcom, 2013). The increase in ownership has not only increased the accessibility of media but also changed how we watch television. Though this type of computer can be used for a variety of tasks, a third of consumers use their device to watch TV or movies (35%).

Consumers are moving away from the traditional television set to other technologies to watch TV programmes and movies (Ofcom, 2013). This is especially prevalent in younger adults and those accessing on-demand or catch-up services (Ofcom, 2017b).

Advertising has evolved, adapting to the new technologies available. The increasing popularity of advertising via new technologies is evident in the amount spent on different marketing platforms. Mobile advertising is now the fastest growing area in marketing spend, increasing 148% between 2011 and 2012 and accounting for over half of the digital advertising spend in 2012 (Ofcom, 2013). Global spend on product placement across all media increased by almost fourteen per cent in between 2013 and 2014. This trend is predicted to continue with the global placement industry being estimated to reach a value of \$21.04 billion dollars by 2019 (PQ Media, 2015). Television programmes are still the most common media for placements, accounting for 64% of spend. However, new technologies are increasingly used as a new avenue for product placements, increasingly being used in the 'new media' of 'webisodes', podcasts and mobile apps (PQ Media, 2012). With increasing access to media both on the move and at home the marketing community have ever increasing opportunities to target consumers. As increasing popularity and advances in technologies though the last decade set to continue it is likely that this will be reflected in the marketing world. This shows that consumers are being exposed to advertising more frequently via a greater range of media devices.

In 2012 the UK product placement market was estimated to be worth between £9.7 and £29.1 million (New Media Group, 2012) and is predicted to reach £120 million by 2020 (Chan, 2013). Though a large increase in the UK market value was predicted following the legalisation of placements in UK produced programming (Ofcom, 2011), this is overshadowed by the established US market, with a predicted value of \$6 billion dollars (Chan, 2013). The research suggests that product placements are likely to become increasingly common. As the value of the placement industry grows it is likely that

advertisers will aim to target consumer groups more effectively and develop increasingly complex strategies to do so.

### **Attitudes Toward Advertising and Awareness of Product Placements**

In addition to the role which media consumption habits and the prevalence of product placements can have on the extent to which viewers are exposed to advertising, consumer attitudes toward advertising techniques and awareness of product placements can also mediate the success of marketing strategies.

A national survey gauged the opinion of UK consumers toward advertising and sponsorship (Ofcom, 2013). Unfortunately attitudes toward the use of product placement were overlooked. The survey revealed a polarisation in attitudes toward the frequency of advertising. Forty-six percent of viewers indicated that they are happy with the current level of adverts and sponsorship on TV, whereas 40% considered that the frequency of adverts and sponsorship currently on TV to be too often. An interesting relationship between age and attitude toward advertising prevalence was revealed. Both younger (16-24 years) and older viewers (45+ years) were least satisfied with the number of adverts and sponsorships on TV. However, those who fell between these groups (aged 25-45) were happy with the current frequency of advertising. These findings offer a clear age related divide in viewers' attitudes toward advertising. Yet, the survey (Ofcom, 2013) did not address what may have contributed to the age related difference in opinion of adverts and sponsorship on TV. Though there is generally some dissatisfaction with the amount of advertising on TV it is unlikely that this will change consumer viewing habits, with UK consumers indicating that watching TV would be their most missed media activity, if it were removed (Ofcom, 2013). Consequently, younger and older viewers appear to be unhappy with the amount of adverts and sponsorship on TV. As negative attitudes toward advertising techniques can

result in a less favourable impression of the featured brand (Campbell & Kirmani, 2000; Friestad & Wright, 1994), it is proposed that viewer age may mediate the success of an advert.

In addition the exploration of attitudes toward the frequency of adverts and sponsorship on TV, the Ofcom (2013) survey also addressed product placement. Opinions regarding the use of brand placement were not specifically examined, but knowledge of this form of advertising was reported. Though product placement awareness was not reported for each age group, the difference in attitude toward advertising of younger and older adults suggests that knowledge of product placement may also vary. As knowledge and acceptance of a marketing technique can mediate whether an advert is successful or not (Friestad & Wright, 1994), (see the Persuasive Defences section for further discussion), it is important to consider these factors when exploring product placement influence in any given population.

Following the legalisation of product placement in 2011, UK viewers became increasingly aware of featured brands. In 2010, 39% of viewers knew of this marketing technique which increased to 50% by 2012 (Ofcom, 2013). Paradoxically, the most recent figures indicate that consumers are now less conscious of product placements, by 2016 only 34% of consumers indicated that they knew about this form of advertising (Ofcom, 2017a). The decline in awareness of this marketing practice may increase the vulnerability of consumers to brand influence. Alternative figures report a greater knowledge of brand placements, increasing from 31% in 2010 to 71% in 2011. Yet, when respondents were asked to name a brand which they had seen within a TV programme 87% were unable to do so (Costa, 2011). This shows that viewers may be conceptually aware of this marketing method, yet are unable to recall specific incidences when they have been exposed to. Consequently, viewers may be regularly viewing placements without their knowledge. As UK consumers appear to be less conscious of a product placements than in previous this may increase their susceptibility to this form of advertising. This issue may be especially prevalent with older adults as they watch more television than any other age group

(Ofcom, 2017a) and are therefore likely to observe more placements than those who watch less TV. It is important to consider the mechanism by which product placements influence consumers. This will be discussed below.

### **The Role of Implicit and Explicit Memory in Product Placement**

Product placements can influence consumer attitude and brand choice with or without awareness (Law & Braun, 2000; Russell & Stern, 2006). This demonstrates that brand placements can impact consumers through two systems, implicit and explicit memory. In this section the contributions of implicit and explicit processing will be discussed in relation to the mechanisms and measures of product placement influence.

Historically, the success of an advert was assessed by the level of recall which it achieved. The 'day after recall test' assumed that higher levels of advert recall equated to greater advert success (Wells, Burn & Moriarty, 1998). Early research exploring product placement effect observed some seemingly successful results, with product placements showing high levels of recall (Ong & Merri, 1994). Based on the premise of the 'day after recall' test, featured brands which showed high levels of recall were considered to be successful (Wells et al., 1998). Conversely, placements which were not recalled were claimed to be unsuccessful (Karrh, McKee, Britain & Pardun, 2003).

Based upon this rationale, a handful of studies demonstrated that exposure and recall of a featured product led to consumers having a more positive brand judgement (e.g. Zimmer & DeLorme, 1997). This research proposed a seemingly simple relationship between advertising, recall and brand attitude, suggesting that exposure to an advert or placement is likely to result in a positive impression. Yet, the majority of research offers conflicting observations. Prominent placements which showed high levels of recall often fail to have a positive influence on consumer brand opinion, and can result in a

more negative attitude toward the featured brand (Babin & Carter, 1996; Cowley & Barron, 2008; Russell, 2002; Vollmers & Mizerski, 1994). This shows that exposure to product placements may not always have the intended effect on brand attitude.

The use of explicit measures such as brand recall and recognition can be of use to investigate effects some aspects of placement effects. Yet, the use of such tasks, in isolation, offers a limited insight into product placement influence. Numerous studies have suggested that there is a double dissociation between implicit (how our actions or perceptions are recalled) and explicit (what we can explicitly and consciously recall) memory (Graf & Schacter, 1985; Jacoby, 1984; Law & Braun-Latour, 2004). As implicit and explicit memory may be different, even separate, abilities, recall of a placement may not be a valid indicator of a placement's efficacy. A consumer may be unable to recall observing a product placement, yet their subsequent behaviour and attitudes toward the brand may be influenced (Graf & Schacter, 1985; Jacoby, 1984; Schacter, 1996). Consequently, a consumer's purchase decision may be influenced by brand placements which they do not know they have observed and by attitudes which they are not aware of (Russell, 2002). These findings highlight the importance of using both implicit and explicit measures when exploring product placement effects.

A double dissociation between implicit and explicit memory offers potential opportunities for the advertising world. Exposure to subtle adverts has been shown to result in a more positive brand attitude than prominent features. This effect was particularly noticeable when consumers are unable to recall the seeing the advert (Janiszewski, 1993; Sharp, MacInnis & Heckler, 1997). This phenomenon has been demonstrated in consumer research across a variety of media (Law & Braun, 2000; Law, Schimmack & Braun, 2003). Consequently, advertisers may be able to target consumers more effectively by using subtle placements which are less likely to be recalled.

The role of implicit memory in placement influence highlights that explicit measures such as the 'day after recall test' cannot be used in isolation. The underlying rationale of the measure proposes that blatant placements, which have high levels of recall, are more successful than subtle placements, which are less likely to be recalled. Yet, placements which are considered to be unsuccessful by the 'day after recall' measure are paradoxically more likely to influence consumers than those which are judged as successful (Janiszewski, 1993; Law & Braun, 2000; Law et al., 2003; Sharpiro et al., 1997). These findings highlight the importance of using appropriate measures and the significance of using both implicit and explicit measures when addressing the impact of advertising communications.

Implicit memory plays a key role in understanding how product placements can influence consumers (Law & Braun, 2000; Russell, 2002). Implicit exposure to brand placements has been shown to have a positive influence upon brand attitude, awareness (Russell, 2002; Russell & Stern, 2006) and increase choice for the featured brand in both imaginary (Law & Braun, 2000) and real choice tasks (Auty & Lewis, 2004). Numerous studies have observed that consumer attitude and product choice can be influenced by product placements without their awareness (Law & Braun, 2000; Russell & Stern, 2006). Consequently, it is essential that implicit measures are used when exploring the impact of placement exposure.

In addition to the debate concerning which measures can account for the dissociation between implicit and explicit memory, the selection of product placement priming stimuli has also been examined. It was suggested that the use of existing footage introduces an unknown quantity of confounding variables (Law et al., 2002). Research has demonstrated that numerous variables within a programme clip can influence the success of a placement. These can include presentation mode, product prominence, congruity and program liking (Cowley & Barron, 2008; Gupta & Lord, 1998; Russell, 2002; Karrh, 1994), amongst others. This criticism was directly addressed by a study which created original stimuli, which controlled variables of the product placement. Law et al. (2003) created two



versions of the same performance; one contained a product placement and the other did not. All other aspects to the scenes in the video were the same. This study replicated previous research, confirming the relationship between placement exposure, recall and attitude. In addition, a double dissociation of implicit and explicit memory was observed in the absence of the proposed confounding variables. This finding suggests that existing footage can be validly used within placement research. Consequently, it has been assumed that clips from aired television shows and movies which contain brand placements can offer an effective and ecologically valid priming stimuli.

### **Theoretical Accounts of Product Placement Influence**

The influence of product placement exposure on brand attitude and product choice has been widely documented (Auty & Lewis, 2004; Law & Braun, 2000; Russell, 2002; Russell & Stern, 2006). It is important to consider the underlying mechanism which causes this phenomenon. The nature of memory systems are widely debated (Fang, Singh & Ahluwalia, 2007; Whittlesea & Price, 2001). In this section three theoretical accounts of priming will be discussed. The Perceptual Fluency/ Misattribution hypothesis (Whittlesea, 1993), Affect Theory (Monahan, Murphy & Zajonc, 2000) and Intersensory Interaction Account (Klatzky & Creswell, 2014) of priming will be debated in relation to the insight which they can offer of product placement effects.

A seminal study demonstrated that repeatedly observing a prime resulted in a more positive attitude toward the stimuli, regardless of whether the prime could be remembered (Zajonc, 1968). This led to the proposal that familiarity was the element underlying the 'mere exposure effect'. The concept of mere exposure was developed by Whittlesea (1993), who suggested that the observed effects were due to increased perceptual fluency, the ease with which a stimulus can be processed. It is hypothesized that stimuli which can easily be processed (high perceptual fluency) will generate a feeling of familiarity

toward the item. Conversely, novel stimuli which are slow or difficult to process (low perceptual fluency) will not induce a feeling of familiarity. This account proposes the observed effects are due to the increase in perceptual fluency and associated feeling of familiarity being mistakenly interpreted as a preference for the stimuli (Bornstien & D'Agostino 1994; Lee, 2001; Whittlesea, 1993; Whittlesea & Price, 2001).

The Perceptual Fluency/ Misattribution (PF/M) hypothesis predicts observed effects of product placement exposure (e.g. Auty & Lewis, 2004). For example, if a consumer views a television programme which features a placement they would experience an increase in perceptual fluency of the product. The individual would not need to be aware that they had seen the placement for an increase in fluency to occur. If the featured product is seen later, the viewer will be able to process the stimuli more quickly. This would result in a feeling of familiarity toward the product. The familiarity would be mistaken for the consumer's own preference for the item, increasing the chance of the featured brand being chosen over alternative options. Though no studies to date have directly assessed this in the retail environment, sales figures of items which have been featured in programs or movies clearly reflect this trend (Balasubramanian, Karrh & Patwardhan, 2006; Law & Braun, 2000; Russell & Belch, 2005; Sung & Gregorio, 2008). Although the PF/M hypothesis can explain the positive effects which placement exposure can have on brand attitude, it fails to account for the negative effects which have been observed (e.g. Cowley & Baron, 2008; Russell, 2002). The detrimental effects of placements are predicted and explained by the activation of persuasive defences (Friestad & Wright, 1994). The impact of persuasive defences on placement effects will be discussed in the Defence against Product Placement section of the literature review.

Following the initial dominance of the PF/M theory (Whittlesea, 1993), an alternative explanation of mere exposure effects was put forward. In line with the PF/M hypothesis, the Affect Theory suggests that observing a prime increases perceptual fluency. However, this model proposes that

the increase in processing fluency produces a general increase in positive affect. The increase in affect results in more favourable judgements of all stimuli, whether they have been previously seen or not (Fang et al., 2007).

Though the Affect Theory has become increasingly popular within literature debating the underlying mechanism of mere exposure (e.g. Fang et al., 2007; Monahan et al., 2000) it may not account for effects observed in product placement research. When applied to the example was discussed above, the theory does not predict the documented effect of product placement exposure (Balasubramanian, et al., 2006; Sung & Gregorio, 2008). The model proposes that a consumer who observes a placement would experience an increase in perceptual fluency, leading to a rise in positive affect. Thus the hypothesis predicts a general increase in affect. This would result in a more favourable judgements for all products, rather than just the placed item. The consumer would experience a greater desire to purchase all the products on offer, not just the featured brand. Consequently, the Affect model fails to account for the greater preference for specific products (Auty & Lewis, 2004) or the increase in sales of products which have been featured in movies or television programs (Law & Braun, 2000; Russell & Belch, 2005). In addition to the Affect model (Fang et al., 2007; Monahan et al., 2000) failing to account for the positive effects which product placements can have on consumer preference, the hypothesis also fails to account for the damaging consequences which have been observed (e.g. Cowley & Baron, 2008; Russell, 2002), notably, the negative effects which placements can have on brand attitude and preference can be attributed to the activation of persuasive defences (Friestad & Wright, 1994).

In conclusion, the PF/M account of mere exposure offers a more comprehensive explanation of product placement effects which have been observed in academic research and by sales figures. Though the Affect Theory proposes a similar underlying mechanism, the hypothesis fails to account for reported

placement effects. Consequently, the PF/M description of mere exposure is supported in favour of the Affect theory.

The PF/M model proposes that perceptual fluency underlies mere exposure effects. This approach limits priming effects to specific modalities, e.g. verbal or visual. Though priming effects are typically stronger if the prime and measure stimuli are presented in the same modality (Butler & Berry, 2001; Chung & Szymanski, 1997; Weldon & Roedinger, 1987), placement effects are commonly observed when the prime and measurement stimuli differ (e.g. Gillespie, Joireman & Muehling, 2012). The Intersensory Interaction Account (IIA), (Klatzky & Creswell, 2014) provides an alternative explanation of the mere exposure effect and may offer an insight into the cross-modal priming effects of product placements (Law & Braun-LaTour, 2004; Russell, 2002).

Contrasting with the PF/M explanation of priming effects, which predicts that increased fluency is specific to a sensory input, the IIA (Klatzky & Creswell 2014) proposes that stimuli from multiple sensory sources can be combined. This activates memory-based knowledge and associations to the stimuli. Accordingly, multiple sensory inputs from a prime and existing knowledge are combined and interact to create a stronger network of activation. The network creates a 'bid' for behavior. The hypothesis fails to explain how the 'bids' are weighted and integrated to influence behaviour. Yet, the explanation implies that the greater a network and subsequent 'bid', the more likely that behavior will be influenced by the prime. For example, an audio-visual placement for Pepsi may be more likely to influence consumer choice than a visual placement. The audio-visual placement would provide two sensory inputs to combine with existing knowledge associated with the brand Pepsi, creating a strong network of activation and behavior 'bid'. The visual placement would provide one sensory input to combine with existing knowledge associated with the brand Pepsi, creating a network of activation and comparatively weaker behavior 'bid'. Conversely, an audio-visual placement for an unknown brand may be less likely to influence consumer choice than an audio-visual placement for Pepsi. The audio-visual

placement would provide two sensory inputs to combine with each other but there would be little or no existing knowledge associated with the unknown brand. This would create a smaller network of activation and weaker behavior 'bid' than the Pepsi audio-visual placement. Therefore, an audio-visual placement of an unknown brand would be less likely to influence the behavior of a consumer. Based on the rationale of the IIA, a brand which does not possess memory-based knowledge would produce a weaker bid than a familiar brand, which does. Yet, research has shown the choice for fictional brands is greater when the brand logo has been seen, than when the logo has not previously been seen (Stafford & Grimes, 2012). This effect would be predicted by the PF/M model due to the increase in processing fluency of the observed logo. As fictional brands do not possess any associated knowledge and the sensory inputs are identical for the observed and novel brands, the IIA would predict an equal preference for both logos. Consequently, the IIA hypothesis fails to account for priming of novel stimuli.

It has been claimed that the IIA offers a top-down approach (Klatzky & Creswell, 2014), as it combines sensory input and existing knowledge activation. This proposal contrasts with the bottom-up PF/M account of priming. The IIA provides a more robust explanation of priming effects which have been observed when the prime and test stimuli differ in modality, an effect which the bottom-up models cannot easily account for. For example, when applying the rationale of IIA to product placement influence, the model predicts that an audio placement for Coca-Cola would combine the sensory input with the existing knowledge of the brand. This may include the distinct brand font, pack colour, size shape, taste of the soda, and the sound of the can opening. Hence, the IIA proposes that an audio placement can act as a multi-sensory prime. This predicts that priming effects could be observed when the prime and measure are incongruent in modality. Conversely, the PF/M account of priming implies that mere exposure effects are limited to the modality in which the prime is presented. Based on this assumption, an audio placement for Coca-Cola would not increase the preference for Coca-Cola in a product choice task. Although the PF/M hypothesis fails to account for cross-modal effects, which are

predicted by the IIA account, this model fails to explain the limited or absent priming observed when the stimuli differ in modality (Butler & Berry, 2001; Chung & Szymanski, 1997).

As discussed above, the PF/M, Affect and IIA models each have limitations in explaining observed priming effects. The Affect model claims that perceptual fluency results in a general increase in positive affect and consequently fails to account for widely reported effects of product placement. Though the IIA offers some insight into cross-modal priming effects, it fails to explain priming effects of fictitious brands and relies on a 'black-box' to explain how 'bids' are weighted and integrated. The PF/M hypothesis predicts the findings of existing research, including brand novelty affects, the benefit of congruous prime-test stimuli and the greater choice of a primed object over alternatives. Consequently, it is proposed that the PF/M offers a more comprehensive theoretical account of priming effects.

### **The Effects of Ageing on Implicit and Explicit Memory**

In this section I will discuss how ageing may influence cognitive processing mechanisms. Next, the age related changes in processing will be discussed in relation to the effect which they may have on product placement influences.

The success of a product placement is mediated by whether the featured brand is implicitly or explicitly processed (Vollmers & Mizerski, 1994; Russell, 2002) and if persuasive defences are activated (Friestad & Wright, 1994), amongst others. These processes are dependent upon the availability and application of sufficient cognitive resource (Cowley & Baron, 2008; Friestad & Wright 1994). Theoretical analysis and experimental support for age related cognitive decline have been the focus of debate (Rabbitt & Goward, 1994; Yoon, Cole & Lee, 2009). Changes in cognitive processing of older adults may mediate placement susceptibility, yet, there is no research which directly addresses the effects of ageing

on the processing of product placements. Therefore, it is essential to consider the effects of ageing on cognitive processes before exploring whether older adults are more susceptible to placement influence.

Ageing is commonly associated with cognitive decline (Tun & Wingfield, 1994; Yoon et al., 2009), yet opinion is divided over whether older adults are susceptible to a decrease in ability (Fleischman et al., 2004; Ward, Berry & Shanks, 2013a). Numerous studies have observed that older adults display a reduced performance on recall, recognition and IQ tests (Light & Anderson, 1985; Light, 1992; Salthouse, 1985). This has led some researchers to conclude that ageing is linked to a global reduction in cognitive proficiency (Yoon et al., 2009). Yet, an alternative body of research suggests that the diminished performance of this age group is due to specific functions, such as inhibition (Holland & Rabbitt, 1992; Rabbitt & Goward, 1994). It is argued that much of the age related reduction performance can be attributed to a decline in speed of processing, which mediates impaired inhibition and working memory functions (Rozas, Juncos-Rabadán & González, 2008). These studies indicate that age related decline may be attributed to a specific function, rather than a universal decline in ability. It is claimed that many of the apparent differences observed between younger and older adults are due to methodological issues, such as the use of dual-task paradigms, which exacerbate small ageing effects (Rabbitt, Lowe & Val Shilling, 2001).

Dual-task paradigms (i.e. Two tasks, such as a visual target detection and word recall tasks, are performed simultaneously) are a commonly used method to explore ageing effects, yet the use of this method and subsequent conclusions have been questioned (Riby, Perfect & Stollery, 2004). Age related impairment has been observed in several dual-task paradigms which measure various aspects of cognitive function, such as speech processing and text recall. This led researchers to conclude that ageing is associated with a general decline in executive functioning (Tun & Wingfield, 1991; Tun & Wingfield, 1994). Yet, this conclusion has been criticized. It is proposed that studies which observed a decline did not take account of the necessary methodical variables such as baseline performance and

slowed motor skills (Riby et al., 2004). A meta-analysis of older adults' performance on dual-task paradigms revealed that when the baseline performance of the age group and specific demands of the tasks are considered, the proposed cognitive deficits are accounted for by two factors (Riby et al., 2004). First, a reduced baseline performance on single tasks is often due to other factors such as declining motor skills, which result in an increase in reaction time. Secondly, measures which require controlled processing, such as recall tasks, show age related impairment. Yet, methods which rely on automatic processing, such as perceptual tasks, are unaffected by age (Riby et al., 2004). This observation brings into to question the validity of the dual-task deficit observed in elderly adults, yet paradoxically it highlights that older adults do experience a decline in aspects of cognitive performance. Another study observed that performance on dual tasks is reduced even when taking into account baseline performance. This led the authors to conclude that the deficit is due to reduced executive function performance (Tun & Wingfield, 1991; Tun & Wingfield, 1994). Though opinion is divided over whether older adults experience a general age related decline in cognitive ability, the research discussed above indicates a reduction in specific functions even when methodological factors, such as increased reaction time, are taken into account. The abilities which decline with ageing, such as recall, may increase the likelihood of placements being processed implicitly. As placements which are not recalled are more likely to have a positive influence on brand attitude (Law & Braun, 2000; Russell & Stern, 2006), it is proposed that the age related decline in cognitive function could increase susceptibility to placement influence.

In addition to the issues surrounding the implementation and interpretation of dual-task paradigms, the validity of laboratory based measures has been questioned. It is argued that the deficit in dual task performance in laboratory studies do not reflect 'real life' dual task experiences (Fraser & Bherer, 2013). The questions surrounding the employment of dual-tasks and subsequent conclusions highlight issues for consideration when selecting this method. First, it is advised that tasks and stimuli



chosen are similar to those which an older adult would experience in 'real-life', rather than using abstract materials. Second, the baseline performance of older adults must be taken into consideration. This is particularly evident when comparing the dual-task performance of older and younger adults.

Contrary to the research which has observed an age related decline in memory (Light & Anderson, 1985; Light, 1992; Salthouse, 1985), several studies have shown that the observed deficits can be minimized if older adults are sufficiently motivated (Touron, Swaim & Hertzog, 2007). Performance incentives have been shown to increase word recall of younger and older adults (Hill, Storandt & Simeone, 1990). Yet, the effect of motivation on recall performance is particularly evident for older adults. Castel, Farb and Craik (2007) demonstrated the extent to which motivation can mediate recall of more aged participants. Older and younger adults were asked to recall words which had been allocated either a high or low value. Younger adults showed significantly higher levels of recall for low-value words, though recall of high-value words was comparable for younger and older adults. This finding suggests that older adults may possess sufficient cognitive ability to perform at a similar level to younger adults, yet typically lack the motivation to do so (or they know their limitations). Consequently, the age related decline in cognitive performance may be reduced by providing adequate motivation.

Further to the debate of whether older adults experience a reduction in cognitive performance, the nature of the deficit is also disputed (Drury, Kinsella & Ong, 2000; Fleischman et al., 2004). Insight into how ageing affects cognitive performance can offer an insight into the underlying mechanisms of memory and subsequent product placement vulnerability. Numerous studies have observed that explicit memory declines with age and that implicit memory remains stable (Fleischman et al., 2004; Light, 1991). The dissociation between implicit and explicit memory has been interpreted as support for multiple component models of memory (e.g. Baddeley, Lewis, Eldridge & Thomson, 1984; Baddeley & Wilson, 2002). However, as discussed below, the differential impairment of explicit and implicit memory has been questioned (Poldrack & Foerde, 2008; Shanks & Berry, 2012).

An increasing body of research has indicated that implicit memory may decline with age (La Voie & Light, 1994; Ward, Berry & Shanks, 2013b). The corresponding deterioration of explicit and implicit memory has been proposed as support for a single-system model of memory (Berry, Shanks, Speekenbrink & Henson, 2012; Shanks & Berry, 2012; Ward et al., 2013a). In light of several studies which observed a deterioration in both the implicit and explicit memory of older adults (Drury et al., 2000; La Voie & Light, 1994) the single system (SS) model of memory was proposed (Shanks & Berry, 2012). The SS model suggests that a single memory trace underlays both implicit and explicit memory. Based on Signal Detection Theory (SDT) the theory explains that the strength of a memory trace for previously seen items should be greater than that for new items, resulting in priming or explicit recognition. It is suggested that memory traces are weaker for older adult. Consequently, this age group would experience impaired explicit memory and priming effects.

The majority of studies which have observed a decline in memory in older people have employed verbal or numerically based tasks ( Craik, Anderson, Kerr & Li, 1995). Yet, it has been proposed that age related impairment of implicit memory may be effects may be specific to particular tasks (La Voie & Light, 1994). As the majority of featured brands are visually presented (La Ferle & Edwards, 2006), limitations in the ability to process visually presented information could mediate implicit placement influence. In order to identify whether the observed deficits are task specific, an investigation examined whether ageing affected explicit and implicit memory for nonverbal materials (Drury et al., 2000). Older (65-81 years) and younger adults (22-33 years) observed a number of images. Participants then attempted to identify the picture from an image fragment (implicit measure) or a recall the pictures which they were shown (explicit measure). Older adults exhibited lower levels of recall and priming than younger adults. It was concluded that both explicit and implicit memory decline with age (Drury et al., 2000). This finding is predicted by the SS model of memory (Shanks & Berry, 2012), yet cannot easily be accounted for by the multiple-system theories, which argue that implicit memory

remains stable with age (Baddeley et al, 1984; Baddeley & Wilson, 2002). Consequently, SS and multiple-system theoretical models offer conflicting accounts of how ageing may impact priming effects. Though both theories (Baddeley & Wilson, 2002; Shanks & Berry, 2012) predict that older adults will be less likely to recall a placement, it is unknown whether this age group will be susceptible to implicit placement influence.

### **Product Placement, Purchase Intent and Product Choice**

Numerous studies have shown the impact of placement exposure upon consumer attitude and memory (Janiszewski, 1993; Law & Braun, 2000; Law et al., 2003; Sharpiro et al., 1997). It is necessary to consider whether the changes in brand attitude influence consumer product choices and purchase decisions. There is a multitude of anecdotal evidence which suggests relationship between product placement and market impact (Sauer, 2011; Williams, 2001). The impact of placements upon sales has been shown in a variety of products and media. The sales of Singer sewing machines and condoms peaked after the products were featured in soap operas (Williams, 2001), similarly the sales of Barbie dolls increased by 6% following the placement within *Toy Story 3* (2010), (Sauer, 2011). Contrary to the academic literature which suggests subtle placements have a more positive impact upon brand liking (Ong & Meri, 1994; Russell, 2002; Russell & Stern, 2006) the more commonly cited examples of successful placements within the media tend to feature more prominent placements (Sauer, 2011; Williams, 2001). Yet, the media has not reported whether subtle placement have similar effects on consumer habits.

As discussed in the literature cited above, there is a double dissociation between implicit and explicit memory. Being able to recall a placement does not necessarily result in a more positive attitude toward the brand (Cowley & Baron, 2004; Russell, 2002). It cannot be assumed that recalling a

placement or showing an increase liking of the brand on a scale will translate to an increased choice for the item. Yet, few studies have explored whether placements influence product choice.

Initial research suggested that product placements failed to increase purchase intent (Karrh, 1998; Ong & Meri, 1994). However, the increase in sales following prominent placements (Sauer, 2011; Williams, 2001) and subtle placements (Russell, 2002; Russell & Stern, 2006) present a challenge in understanding the variables which mediate purchase decisions. Chung and Szymanski (1997) demonstrated that the choice of visually primed chewing gum brands was greater than that for alternative brands. This effect was stronger when participants made their choice under pressure, having 3 seconds rather than 10 seconds to make their selection. In limiting the time for the product choice, the participants' decision making processes defaulted to their implicit preference, led by increased perceptual fluency. Vargas, von Hippel and Petty (2001) furthered understanding of how implicit and explicit preference influence purchase decisions. As with previous research (Chung & Szymanski, 1997), Vargas et al. (2001) observed that implicit preferences lead to impulsive choices and conversely explicit opinions are dominant when making important, considered decisions. Though the studies cited above clearly demonstrate the impact of implicit preference on product choice, the items which participants were asked to select from were presented on a computer screen rather than being physically present. This method brings into question whether the implicit preferences will remain dominant when the products are physically present, with the participant picking a snack they would actually rather than hypothetically eat. Only a handful of investigations have investigated the impact of brand exposure on product choice (e.g. Auty & Lewis, 2004).

Several studies have demonstrated that the influence of implicit preference upon choice is particularly prevalent when food is being chosen (Cervellon, Dube & Knauper, 2007; Friese, Wanke & Plessner, 2006; Perugini, 2005). Having assessed participants' implicit and explicit attitude towards a selection of foods, Perugini (2005) spontaneously offered participants to choose a snack from a selection

of healthy and unhealthy items. When participants were given limited time to choose a snack, their choice was implicitly led. Conversely, when participants were given sufficient time to consider the decision, their choice reflected explicit preferences. These findings were replicated by the subsequent research, supporting the proposal that impulse choices are led by implicit preferences (Cervellon et al., 2007; Friese et al., 2006). Though these studies do not assess the impact of product placement upon choice, it is clear that impulsive choices are led by implicit preferences, as implicit preferences are relatively resistant to decay (Shapiro & Krishnan, 2001). Consequently, a subtle placement of snack foods could result in a strong and long-standing preference for the featured item.

In addition to the role which product type and the experimental methods may have on observed placement effects, ageing may also mediate placement vulnerability. As discussed above, mere exposure effects are due to the misattribution of product familiarity (Whittlesea & Price, 2001; Winkelman, Schwarz, Fazenderio & Reber, 2003). This effect is particularly evident when the brand choice is not reflected on by the consumer, for example when making an impulse purchase (Whittlesea & Price, 2001). It has been observed that older adults are less likely to remember the source of newly acquired information than young adults (Skurnik, Yoon, Park & Schwarz, 2005) and more led by feelings of familiarity when making purchase decisions than younger adults (Yoon et al., 2009). Consequently, it is proposed that if the older adults have been successfully primed by a placement, their product choices will be more susceptible to influence than the choices of younger adults.

### **Defence against Product Placements**

The Persuasion Knowledge Model (PKM) offers the leading account of how consumers are able to protect themselves against advertising attempts. In this section I will discuss the how consumers develop appropriate strategies and employ them to defend against persuasive communications. This

theory offers an account of why some placements can have a negative impact on the featured brand (e.g. Cowley & Baron, 2008; Russell, 2002).

Product placement can influence consumers with and without their awareness. Yet, this form of advertising is not always successful and some placements can have a negative impact on brand attitude. The Persuasion Knowledge Model (PKM) offers a theoretical account of how and why persuasive attempts, such as product placements, can be successful while others fail. The model explains how consumers' persuasion knowledge (PK) is acquired, how this knowledge is triggered and the result of consumers using persuasion defences (Friestad & Wright, 1994). Since the PKM was developed, it has become dominant account of how consumers resist influence within consumer research.

The PKM describes the consumer as the 'target', the instigator of the message as the 'agent' and the 'attempt' describes both the advertising message such as an advert, as well as the consumers' perception of the agents' strategy. PK is acquired by the consumer through experience as well as 'folk wisdom', including talking with friends and family as well as following commentary of advertising in the media (Friestad & Wright, 1994). This proposal of 'folk wisdom' as a source of PK has been supported by research which indicated that peer communication is a dominant factor in consumers' attitude toward brand placements (de Gregorio & Sung, 2010). In addition, a consumer may reflect on their PK out of interest or seek out related information and media. For example, a consumer interested in the use of this form of advertising may watch Morgan Spurlock's 'The Greatest Movie Ever Sold', a documentary movie which explores the product placement industry. As a result, these consumers may have greater awareness of tactics which agents may employ, which would in turn influence the consumers' knowledge, goals and coping behaviours (Campbell & Kirmani, 2000; Friestad & Wright, 1994).

The acquisition of PK enables consumers to anticipate and identify marketing messages as well as the tactics used. The information acquired includes topic knowledge, persuasion knowledge, agent

knowledge and coping behaviours. Coping behaviours enable consumers to identify, analyse and evaluate persuasive attempts and can be employed preceding, during or post persuasion attempt. In addition, coping behaviours can perform schema like functions, such as guiding consumer attention to specific elements of the persuasive attempt. A consumer's reaction to an attempt can be influenced by their own goals as well as PK and an evaluation of the attempt itself. A consumer's goal is to cope with persuasion attempts effectively, through the maintenance of self-control and competency, rather than to resist all persuasion attempts. Therefore, an attempt which is considered to be appropriate, effective and does not conflict a consumer's goals could be highly effective in modifying their attitudes or behaviours toward the brand/product featured in the message (Campbell & Kirmani, 2000; Friestad & Wright, 1994).

A persuasive attempt may be evaluated in terms of perceived appropriateness and perceived effectiveness. If a message is judged as inappropriate, this will have a negative impact on the consumer's opinion of the product or service featured in the message. This may also adversely reflect upon the company or brand which the message represents. A consumer's belief about how effective a message has been in communicating a message may mediate an advert's success. If the advert is considered to be unsuccessful a consumer will be less likely to be influenced by the communication. The judgement of whether an advert is appropriate and effective may depend on many factors including the context in which it is presented and the target audience of the message (Campbell & Kirmani, 2000). Consequently, it can be difficult to predict whether a consumer will accept or reject a persuasive attempt.

The PKM (Friestad & Wright, 1994) proposed that a consumers' mental resource can be focused upon one or more areas of available information, in turn this suggests that mental resources are required to activate knowledge and coping behaviours. Therefore, if mental resources are otherwise allocated it may not be possible for a consumer to activate relevant knowledge and behaviours in the

face of a persuasion attempt. Subsequently, a cognitively demanding environment may not allow the activation of relevant behaviours, leaving the consumer vulnerable to the persuasion attempt.

Though the PKM provides a comprehensive account of how consumers can protect themselves against product placement influence, there are many factors which must be considered in the development and application of defences. It is necessary for consumers to hold relevant defences and activate them in order to protect from influence. As product placements are not always remembered or considered to be a persuasive attempt, a consumer's PK may not be activated. Consequently, individual differences may play a large part in whether a consumer is able to defend themselves against a placement.

### **The Development of Persuasion Knowledge: Children, Adults and Older Adults**

In this section the development of persuasive defences will be discussed. It is important to consider how cognitive resource and experience, or lack of, contributes to the development of persuasive defences. Consequently, the acquisition of defences in children will be discussed before debating how cognitive ageing and advertising awareness may mediate the persuasive defences of older adults.

The PKM states that PK is acquired through experience and folk knowledge. Those with less exposure to advertising may hold less knowledge and coping behaviours which can be employed (Friestad & Wright, 1994). Research into children's understanding of advertising and the consequences upon children's product choices has become a popular area of study (e.g. Auty & Lewis, 2004; Owen, Lewis, Auty & Buijzen, 2013).

Younger children (6-7 years) have been shown to hold less understanding of the nature of traditional advertising compared to older (9-10 years) children (Owen et al., 2013). This finding reflects



the pattern of understanding proposed by the PKM (Friestad & Wright, 1994), with older children being likely to have more experience of advertising and therefore a greater understanding than younger children. However, comparatively lower levels of understanding were observed in both ages groups for non-traditional methods of advertising such as advergames and programme sponsorship. It was proposed that this discrepancy in children's understanding of advertising techniques is due to the non-traditional advertising being more difficult for children to identify and therefore understand (Owen et al., 2013).

It has been suggested that the difficulty in identifying the message as one of persuasive intent is contributed to by the limited cognitive resources available to process the messages, which are usually presented in cognitively demanding contexts such as advergames. Interestingly it was demonstrated that through the use of pictorial cues, children were better able to express their understanding of non-traditional advertising (Owen et al., 2013). In line with the PKM (Friestad & Wright, 1994), these findings indicate that older children hold more knowledge about advertising motivation and tactics than younger children. This observation could be interpreted as support for the PKM proposal of PK acquisition, assuming that older children have had more exposure to advertising than younger children.

Though an age difference in understanding of advertising has been demonstrated (Owen et al., 2013), earlier research showed that the influence of product placement exposure upon product choice and recall did not differ between younger (6-7 years) and older children (11-12 years). Recall of the placement did not influence product choice (Auty & Lewis, 2004). These findings suggest that although children develop greater understanding of advertising with age, it appears that the placements do not trigger PK or coping behaviours, leaving children vulnerable to placements.

Both adults and children have been shown to have their choice for a product increased following exposure to product placements (Armstrong & Lewis, 2014; Auty & Lewis, 2004). Yet, it is presumed that

adults hold a clear understanding of the purpose of advertising, with developed PK and coping behaviours (Friestad & Wright, 1994). It is well documented that the mode, prominence and connectivity of a placement can greatly influence whether the placement is recalled and PK triggered (Cowley & Baron, 2008; Russell, 2002). A placement which is not seen is unlikely to activate persuasive defences. Failure to prompt PK would negate the defensive advantage which adults have above children. Consequently, it is proposed that adults may be as vulnerable as children when being exposed to subtle product placements. It would be interesting to assess whether a 'mere exposure' placement which activates PK in adults would have the same effect in older children, who hold an understanding of advertising.

These findings are reflected in several studies which look at the impact of product placement upon product choice in adults (e.g. Armstrong & Lewis, 2014). While some advertising attempts triggered PK and coping behaviours, others successfully bypass consumers' defences. Though adults are likely to hold more PK regarding advertisers' tactics and motives, this does not necessarily result in the activation of coping behaviours. If consumers can be exposed to advertising messages without the activation of coping behaviours, are adults effectively as vulnerable as children?

The PKM also proposes that adults are able to constantly develop their PK through experience and folk knowledge, including media commentary of advertising tactics. The use of product placement in the UK was covered in the media following its legalisation in 2011. This raises the question of whether this publicity provided consumers with increased awareness of placements and consequently allowed consumers to develop additional PK and coping behaviours. In turn, this proposition suggests that with time, product placements may become less effective as consumers develop more knowledge and coping behaviours to combat the placements' effects. Alternatively, consumers come to accept the placements as a typical part of a programme, therefore may judge the placements as 'acceptable' therefore

although they would hold sufficient PK to protect themselves against the placement, they would not do so.

A national survey (Ofcom, 2013) gauged the attitudes and awareness of UK consumer toward advertising and sponsorship. As discussed above, the findings indicate an increase in the awareness of product placements following the legalisation of this form of advertising. However, more recent figures indicate that knowledge of placements is declining. Only one third of the UK population are aware that product placements are shown on television (Ofcom, 2017a). Considering product placement was legalised in 2011 it is suggested that the figures are still lower than expected.

Beyond the level of placement knowledge in the general population, Ofcom investigated whether demographic factors mediated in the awareness of this form of advertising. An age-related difference in placement knowledge was observed. Those aged 25-34 years (59%) are more likely to be aware of product placements compared to those over 65 years (34%), (Ofcom, 2013). This lack of knowledge in older consumers could be an issue of concern for policy makers, as this group are significantly less knowledgeable about the use of placements than the general population before the legalisation of placement. As older consumers are generally less aware of the placements and also exposed to them more frequently (Ofcom, 2013; Ofcom, 2017a). Hence, the lack of awareness or experience of a persuasive technique may result in the lack of relevant defensive strategies (Friestad & Wright, 1994). It is argued that these factors may contribute to placement vulnerability in older adults.

### **Ego Depletion**

Ego depletion research had rocketed in the last two decades with over four hundred studies being listed in Web of Science since 1998. The work of Baumeister, Bratslavsky, Muraven and Tice (1998) brought ego depletion to the forefront of popular research with their original article being cited over eight

hundred times to date. Within their seminal article Baumeister et al. (1998) proposed that acts of self-control such as making a choice, an active response, or engaging in an act of self-regulation, to prevent such a response, all draw upon a common internal resource. The process of drawing upon this resource through these acts is referred to as ego depletion. This concept was developed from Freud's theory of personality amongst other more recent research (Baumeister et al., 1998). Following a review of existing literature Baumeister et al. (1994) concluded that past research provided support for the proposal that self-regulation could be interpreted in terms of a model of strength, or ego depletion. A key aspect of the theory is that self-control is likened to the strength of a muscle. Following exertion a muscle can be left weakened, though can recover following a period of rest. Similarly, through acts of self-control an individual's self-regulation can be deteriorated, though can regain strength following rest.

The original study demonstrating the impact of ego depletion used a simple dual task paradigm (Baumeister et al., 1998), a method which is still being used in recent work (e.g. Hagger & Chatzisarantis, 2013). It was proposed that a state of depletion can be induced through the completion of various activities that require self-control. Participants were asked to eat radishes and resist eating chocolate cookies. This task is proposed to have depleted self-control compared to those who were permitted to eat cookies. Baumeister et al. (1998) explained that such acts of self-control would weaken the self-control resource. Following the initial task participants completed a secondary activity. The subsequent exercise required the use of the previously weakened self-control resources. The task included activities such as solving anagrams or unsolvable puzzles. A reduced performance was observed in the second measure. This finding was interpreted as support for the ego depletion hypothesis (Baumeister et al., 1998).

## **Aging and Ego Depletion**

Ego depletion has been widely studied though only a handful have assessed the phenomenon within the general population, with the majority of researchers using students (11 general population studies vs 187 undergraduate population studies) as participants. Three factors have been proposed which would result in an age bias should depletion research be conducted primarily with young adults (Dahm, 2011). First, self-control improves with practice, second, self-control improves with age, and third, areas of the frontal lobes associated with inhibition and therefore self-control do not reach maturity until early adulthood. Hence, it appears that the dominant use of students as participants has resulted in a skewed age of participants as a likely source of bias with ego depletion research. The suspected bias was demonstrated using the classic dual task paradigm featuring the Stroop task. It was concluded that young adults (18-25 years) were susceptible to depletion, whereas the performance of older adults (40-64 years) appeared to be unaffected (Dahm, 2011). These findings bring into question the widely stated phenomenon of ego depletion. As few studies have explored age differences in ego depletion effects further investigation is required to investigate potential ageing effects.

The effect of ageing on Stroop task performance has been explored (Comalli, Wapner & Werner, 1962). Participants aged 7 to 80 years completed the measure. Children and elderly adults had a poorer performance on the task compared to older children and adults. It was highlighted that the youngest children, who were learning to read did not experience the interference expected with the Stroop. Comalli et al. (1962) proposed that this was due to a lack of familiarity with text, as the children had not yet developed the automaticity which is overridden in the task. Though the performance of children and older adults was comparable, the authors proposed that this similarity was unlikely to be due to the same underlying mechanism. It was argued that the deficit in older adults was due to the difficulty in colour naming. Conversely, young children were observed more to experience delays with word reading

(Comalli et al., 1962). This study highlights that ageing differences may be observed in the Stroop task, yet such effects may not necessarily be attributed to ego depletion.

### **Flawed Assumptions? Disregarding the Schema and Skill Models.**

In addition to the debate of whether older adults are susceptible to ego depletion, the nature of self-control is also disputed (Baumeister et al., 1998; Dahm, 2011; Vohs, Baumeister & Schmeichel, 2012). It is important to consider how the concept of ego depletion has developed and the conflicting accounts of depletion before deliberating how depletion may be mediated by ageing and the subsequent impact of product placement effects.

In the process of introducing the concept of ego depletion, Baumeister et al. (1998) initially proposed several models of self-control. These include self-control being either skill based, a knowledge structure that can be 'turned on' or an energy based resource. The first two models are swept aside in favour of the energy based model, however the models are disregarded on the basis of several assumptions.

The 'skill' based model of self-control which Baumeister et al. (1998) described portrays self-control as an ability which is gradually developed over time, with the skill level becoming relatively stable through a series of tasks. This approach suggests that if self-regulation is skill based the performance on the second stage of the dual task paradigm would not be greatly depleted. This model may be supported in the development aspect as children develop greater self-control with age (Mischel & Metzner, 1962) and older adults are less affected by (and possibly resistant to) ego depletion (Dahm, 2011). However, the assumption that skills do not show a reduction in performance over several tasks may be false. Davey, Thorpe and Williams (2002) demonstrated that following numerous repetitions of a task, tennis players showed a significant reduction in skill. The tennis players did not lose their abilities

and were not fatigued, yet were still unable to perform at the same level. It was concluded that a tennis player can develop skills over time yet performance may vary. Similarly, it is argued that an individual's self-control skills may be learnt and fluctuate. This would permit self-control to be skill rather than resource based, yet still be susceptible to performance fluctuations.

As with the skill based model, the strength model disregards the proposal that self-control may be a schema or knowledge based function. Baumeister et al. (1998) stated that self-control is not a knowledge structure that can be 'turned on'. Yet, recent findings have explored the effects of oral glucose and motivation on depletion tasks have indicated that self-control can indeed be activated or 'turned on' if the correct method is employed. Motivation has been shown to have a greater influence on self-regulation than ego depletion (Vohs et al., 2012), indicating that the strength model fails to account for a dominant mediator of self-control.

As the field of ego depletion has developed, the role of motivation has been highlighted. Baumeister and Vohs (2007) discussed the role of motivation and self-control, a factor which had not previously been brought to the forefront of the field. It is proposed that the activation of motivation can result in a temporary boost in self-regulation resources, overcoming the depleted state. Motivation appears to be the overdraft facility of self-control, meaning that additional resource is available if its use is essential. Curiously, the term ego depletion is becoming less focused upon by the leaders of the field (e.g. Baumeister, 1998) with other factors such as motivation (Vohs et al., 2012), personality (Imhoff, Schmidt & Gerstenberg, 2013) and will power (Gailliot et al., 2007) becoming more prominent.

This shift in focus from ego depletion toward other factors follows increasing criticism of the theory. A meta-analysis of 83 studies which explored the ego depletion effect using dual-task studies observed a significant effect of depletion (Hagger, Wood & Chatzisarantis, 2010). Ego depletion was demonstrated to impact on additional dependent variables including perceived effort, negative affect,

fatigue, and blood glucose. Consequently, the meta-analysis was initially interpreted as support for the ego depletion theory. Yet, the methods and conclusions of the meta-analysis were criticised effects (Carter, Kofler, Forster & McCullough, 2015). Carter et al. (2015) highlighted that Hagger et al. (2010) had not included the results of unpublished studies, proposed the inclusion criteria were too generous (which allowed for studies which were only loosely related to the theory to be included), and did not employ statistical techniques which account for small-study effects. Consequently, Carter et al (2015) conducted a subsequent meta-analysis, controlling for small-study effects, publication bias and employed more stringent inclusion criteria. It was demonstrated that small study effects and publication bias account for a large proportion of effects which have previously been interpreted as evidence of ego depletion. Having accounted for these factors within the analyses, Carter et al. (2015) concluded that there was little evidence to support the ego depletion theory. However, the methods employed, such as including unpublished research, and subsequent conclusions of the meta-analysis, were criticised by Cunningham and Baumeister (2016).

In an attempt to address the controversy surround the validity of meta-analyses a Registered Replication Report of the ego depletion effect was conducted (Hagger & Chatzisarantis, 2016). Using a pre-registered and standardised protocol, twenty-three laboratories conducted a dual-task paradigm ego depletion study. A meta-analysis of the data observed a small effect of ego depletion, with the confidence intervals encompassing zero. Consequently, the authors concluded that there was little, if any, evidence for the ego depletion effect (Hagger & Chatzisarantis, 2016).

It is proposed that the undeniable lack of support for ego depletion from the Registered Replication Report (Hagger & Chatzisarantis, 2016) and meta-analysis (Carter et al., 2015) have contributed to the decreasing focus upon ego depletion (Gailliot et al., 2007; Imhoff et al., 2013; Vohs et al., 2012).



Motivational influence upon self-control has been demonstrated with a wide variety of concepts. Thinking about money (Boucher & Kofos, 2011), feedback on performance (Wan & Sternthal, 2008) and even prayer (Frieze & Wanke, 2014) have been shown to combat the effects of depletion. Imhoff et al. (2013) offered an alternative theory for the proposed depletion in performance following self-regulation. The influence of trait self-control (TSC) upon self-regulation was considered. Participants completed either an easy or difficult version of the Stroop task and completed measures of TSC, amongst others. This suggests that self-control is not based on strength like resource.

The studies cited above combine to offer several alternatives to the concept of ego depletion, each being theoretically and experimentally supported. This brings into question what exactly defines ego depletion as an alternative to other conceptualisations of self-control?

### **What is classified as conscious self-regulation?**

Within the conceptualisation of ego depletion Baumeister et al. (1998) highlights that not all decisions are conscious or deliberate. This element of the depletion concept resonates with the implicit and explicit dissociation which mediates consumer choice (Cervellon et al., 2007; Frieze et al., 2006; Vargus et al., 2001). Baumeister et al. (1998) uses a car metaphor to explain the division between conscious decision and automatic behaviours. Using the analogy that a car is driven in a straight line 95% of the time and not driven in a straight line for the remaining 5% of the journey. This 5% allows drivers to reach their destination, which would not be possible if a car was always driven in the same direction. Yet, this raises the question of how we distinguish 'deliberate' acts from the automatic acts.

The deliberate decisions are described as ones which require the violation of automatic processing or passive behaviours such as overriding an automatic response or resisting a temptation. The temptations could be weaker or stronger. An individual may be able to resist some urges more

easily than others, though resources are consumed relative to the temptation. A stronger urge will require more resource to resist than a lesser temptation. The hypothesis explains that the resource can be regained after a period of rest (Baumeister et al., 1998). This suggests that if the second task (as described above) was performed after a period of rest there would be little evidence of the depleted resource.

Using the car analogy in relation to the current thesis, the car being driven in a straight line 95% of the time represents the automatic behaviours and decisions which are led by implicit attitudes. Such behaviours and decisions would be susceptible to implicit product placement influence. The 5% in which the car is not driven in a straight line required for a driver to reach their destination, represents the conscious or deliberate choices which a consumer may make. A deliberate choice may override implicit attitudes which have been induced by nonconscious product placement exposure. Yet, if an implicit preference is strong it may override the explicit decision. Applying this analogy to the current thesis suggests that implicit placement influence could have a dramatic impact upon consumer purchase decisions, without conscious awareness.

### **Is Ego Depletion just Cognitive Load?**

The concept of ego depletion has been widely cited, yet the nature of self-control and experimental support for the strength model is debated (see Baumeister & Vohs, 2016; Hagger & Chatzisarantis, 2016). It has been proposed that research used to support the ego depletion theory, actually represents the effects of cognitive load manipulations on performance (Macleod, 1991). The measures and consequence of self-control studies often reflect those of cognitive load research (Hagger et al., 2010). This criticism that depletion effects are actually a result of cognitive load was addressed directly by Vosgerau, Bruyneel, Dhar and Wertenbroch (2008), who intended to clearly demonstrate the difference

between the two constructs. The effect of cognitive load (digit recall) and ego depletion (a Stroop task) was assessed upon recognition and recall of holiday resort features. Both the depletion and cognitive load manipulation had a negative effect upon performance, however cognitive load had a greater impact. As self-regulation and cognitive resources were shown to have a similar effect upon memory tasks, it was concluded that both constructs must rely upon the same underlying resource. Following these findings, Vosgerau et al. (2008) concluded that depletion is not self-control specific but is a more common underlying resource.

The observations described above are tentatively proposed as support for a modified concept of ego depletion. It is clear that the direct comparison of the two constructs demonstrate comparable effects upon performance. However, it is possible that that tasks chosen may be a factor in the similarity of findings (Vosgerau et al., 2008), with the Stroop historically being considered a cognitive task (Macleod, 1991) rather than a self-control measure. The difference in performance may therefore be due to differing cognitive demands of the digit recall and Stroop task, with the more demanding digit recall task consuming more cognitive resource and therefore resulting in greater impairment of subsequent task performance. The debated similarities of ego depletion and cognitive load research were later explored by Schmeichel (2008). Persistence on a pain tolerance measure was shown to increase following a cognitive load task, whereas completion of an ego depletion task reduced persistence. Due to the differing performance on the tolerance measure following completion of the cognitive load and ego depletion tasks, it was proposed that cognitive load and ego depletion are different constructs (Schmeichel, 2008). It was observed that both manipulations mediated performance on the persistence task. Consequently, it is argued that this finding indicates that ego depletion and cognitive load rely on a mutual resource, though can differentially affect performance.

The studies cited above offer a reply to the criticism that ego depletion is simply a redressed conceptualization of cognitive resource. However, further research is required to replicate the proposed

dissociation between concepts. In the next section the validity of the dual task paradigm as a measure of ego depletion and assumptions of the methodology will be debated.

### **More radishes please?**

The dual task paradigm is typically used to demonstrate that a common resource is being used (e.g. Baumeister et al., 1998; Hagger & Chatzisarantis, 2013). In the case of ego depletion, it is assumed that the reduction in performance shown on the second task is due to consumption of the self-control resource during the first task, however this may not necessarily be the case.

Though it is suggested that the depletion shown in the dual task paradigm demonstrate ego depletion, it may be the case that the observed effect may occur due to cognitive fatigue, novelty effects or other factors that may be present if two unrelated tasks were run as a dual task paradigm. Task switching has been observed to reduce mental fatigue (Brzezicka, Kaminski & Wrobel, 2013). Conversely, alternating between different tasks can also induce fatigue, resulting in a reduction in performance (Lorist et al., 2000). By introducing a new task to participants on every second trial it was demonstrated that the process of switching trials resulted in an increase in reaction time to the stimuli and an increase in errors. Though this task-switching paradigm was conducted over a period of two hours, it is clear that the process of switching tasks can in some cases have an impact on performance.

The majority of ego depletion research has relied on the dual task paradigm with the assumption that the same underlying resource is being used. Yet, this assumption raises the question, could we use the same task twice or more? In presenting the same self-control task twice it could be assessed whether the self-control resource is in fact being depleted. On the assumption that the second repetition of the task demonstrates a reduced performance it could be assumed that the weakened

performance is in fact due to depletion of resources. There are no studies to date which repeat the same task twice or more, investigating this issue directly.

### **Glucose levels and self-control, a sticky subject.**

Numerous studies have investigated the link between self-control and glucose consumption with the findings being interpreted as support for the ego depletion theory (e.g. Gailliot et al., 2007; Muraven et al., 2003). However, the validity of glucose as a mediator of self-control and assumptions of the methodology is questioned. In this section the research which claims a link between glucose and ego depletion will be discussed.

It has been claimed (Gailliot et al., 2007) that self-control causes reductions in blood glucose, which result in poorer self-control. It was proposed that the consumption of glucose following depletion can counteract the effects, rendering self-control unaffected by the formally depleted state. However, the significance of the relationship between glucose level and self-control can be brought into question when the relationship between glucose and performance is taken out of the field of self-regulation. Previous research has demonstrated that the completion of various cognitive tasks results in a drop in blood glucose levels (Scholey, Harper & O'Kennedy, 2001). The Serial Sevens subtraction task, which is a relatively taxing cognitive task, led to greater reductions in glucose compared to a less taxing key pressing task. In addition, the consumption of a glucose drink aided the performance on the Serial Sevens task more than that of the less demanding cognitive task. These findings demonstrate that the blood-glucose and self-control link which has been cited (Gailliot et al., 2007; Muraven et al., 2003) are not specific to self-control tasks, but cognitive tasks in general. This suggests that the relationship between self-control and glucose is not specific to ego depletion, but is an artefact of all cognitive performance tasks.

Being widely considered as a cognitive resource task (e.g. Lavie, Hirst, de Fockert & Viding, 2004), the use of the Stroop as a task of self-control has been debated. Contributing further to the debate of the nature of ego depletion, the link between blood glucose levels and self-control is also questioned. The link between Stroop performance and glucose level has been made outside the realm of ego depletion (Gluck et al., 2013). Having demonstrated that individuals with impairment of glucose regulation exhibit a poorer performance on the Stroop, Gluck et al. (2013) concluded that lower levels of glucose result in a reduced performance on executive function and information processing tasks. This interpretation offers an alternative explanation for the relationship between task performance and glucose, raising the question of whether the process of task completion rather than ego depletion, per se, that causes the changes in glucose levels.

Recent work addressing the link between ego depletion and glucose has brought into question the relationship on a functional level. Hagger and Chatzisarantis (2013) indicated that consumption of glucose is not necessary to be compensative for the taxing effect of self-control exertion upon resources. Using a battery of commonly used self-control measures such as anagram persistence and handgrip duration it was shown that using a glucose drink as a mouth rinse rather than consuming it, as with typical glucose-ego depletion studies (e.g. Gailliot et al., 2007), counteracted the proposed ego depletion effects. It was argued that glucose levels do not mediate self-control resources. Instead, it was proposed that the action of tasting but not consuming the glucose may activate neural areas related to reward and motivation, rather than causing a physiological change in the glucose resource available (Hagger & Chatzisarantis, 2013).

Glucose does not only deplete during cognitive tasks in the lab, not surprisingly research has demonstrated that a tennis player shows a reduction in performance and lower blood glucose levels following physical exertion (Davey et al., 2002). Further to this and reflecting the compensatory effect of glucose on self-control (Gailliot et al., 2007), it has been demonstrated that the consumption of glucose

can improve cyclists' performance, counteracting drops in blood glucose levels following exertion (Chong, Guelfi & Furnier, 2014).

Interestingly, within the classic Baumeister (1998) study which provides support for ego depletion, participants who consumed chocolate or cookies showed an increase in persistence on a subsequent task. Yet, participants who consumed radishes demonstrated comparatively less persistence. Though this is just once of a selection of studies which were used to demonstrate the effects of ego depletion it is tentatively proposed that the consumption of the cookies and chocolate, both high sugar products may be aided performance.

### **Ego Depletion and Purchase Decisions**

Few studies have assessed the effect of ego depletion within the area of consumer research. In this I will discuss depletion research which may provide insight into how self-control may mediate consumer behavior. Self-control resource is claimed to mediate consumer decisions, with a depleted consumer being more likely to make impulse purchases than a consumer with sufficient resource (Baumeister, 2002).

The theory of ego depletion has been used to interpret findings in product placement research. Exposure to a clip containing a subtle placement results in lower levels of placement recognition and a more positive attitude toward the placed product was observed (Gillespie et al., 2012). As subtle placements are less likely to activate persuasion knowledge (Cowley & Baron, 2008; Friestad & Wright 1994) it is likely that placements presented under depleted conditions will bypass a consumer's PK, which itself requires cognitive resource (Friestad & Wright, 1994). Consequently, it is proposed that subtle placements can bypass the defences of depleted viewers, resulting in an increased implicit placement influence.

In addition to the consideration of cognitive resource upon advert exposure a handful of studies have considered the effects of ego depletion (Baumeister et al., 1998; Gillespie et al., 2012) upon consumers (Boland, Connell & Vallen, 2013). Boland et al. (2013) proposed that the time of day can mediate the level of self-control resource available to a consumer, with the resource being depleted through the course of a day. As a result, self-control resources tend to be lower on an evening (Gillespie et al., 2012). Ego depletion not only leads to a reduced ability to exert self-control but also reduces the ability to evaluate new information effectively (Fischer, Greitemeyer & Frey, 2008) and increases passivity when watching TV (Baumeister, 1998). Consequently, consumers may be more susceptible to placement influence when watching television at the end of a day.

### **Divided Attention and Cognitive Load**

The impact of divided attention upon memory and behavior has been investigated extensively since the 1950's (Verwijmeren, Karremans, Bernritter, Strobe & Wigboldus, 2013). Numerous studies have demonstrated negative impact of divided attention upon memory (Baddeley, Lewis, Eldridge & Thompson, 1984; Craik, Govoni, Naveh-Benjamin & Anderson, 1996). Cognitive resources are required to attend to, process and encode visual information (Anderson et al., 1996; Baddeley et al., 1984; Carasco, 2011). By dividing attention, either through performing multiple tasks or distraction the cognitive resource available is limited, being allocated the multiple task. As a result, there can be insufficient resource available to successfully process and encode new information (Spataro et al., 2011) subsequently resulting in deficits in encoding, recall and recognition (Anderson et al., 1996; Baddeley et al., 1984). Though divided attention and limited resource have a negative impact on explicit memory, this deficit is not generally observed in implicit memory (Mulligan & Brown, 2003). The differences observed between implicit and explicit memory are proposed to be to encoding differences, implicit



memory is automatically encoded, whereas explicit memory requires attentional resource (Bentin, Kutas & Hillyard, 1995). Consequently, implicit placement effects may be inflated when cognitive resources are limited.

Several studies have concluded that elderly adults show an impairment in dual task performance with the conclusion that the observed reduction in performance is due to a decline in executive functioning (Tun & Wingfield, 1993). This conclusion has been criticized (Riby et al., 2004) as many studies which support this view did not take account of the baseline performance or specific demands of the tasks completed. When taking into account these factors it was revealed that the previously observed age-related deficit in dual task performance is due to two factors. First, a reduced baseline performance on single tasks due factors such as declining motor skills which are often reflected as an increase in reaction time. Secondly, tasks which required controlled processing showed age related impairment however tasks which relied on automatic processing were unaffected by age. Even with practice the seemingly impaired dual task performance of elderly adults remains (Gothe, Oberauer & Kliegl, 2007). However, in simplifying the individual tasks the impairment can be removed (Stroback, Frensch, Muller & Schubert, 2012). This again supports the proposal that the deficit in elderly performance on dual task paradigms may be due to the baseline task performance rather than the process of completing tasks in parallel.

Though the research above brings into to question the validity of the dual task deficit observed in elderly adults, this impairment has been demonstrated in Alzheimer's patients. Logie, Cocchini, Delia Sala and Baddeley (2004) showed that performance on dual tasks as reduced even when taking into account baseline performance. This led the authors to conclude that the deficit is due to reduced executive function performance associated with the development with Alzheimer's. In addition of the criticisms above for the implementation of dual task studies the use of laboratory based dual tasks have

been questions, as the deficit in dual task performance in lab based studies is not reflected in 'real life' dual task paradigms (Fraser & Bherer, 2013).

### **Subliminal Adverts**

In this section I will consider how subliminal adverts are processed and influence consumers. As subliminal adverts are processed with very little resource allocated, this can give an insight into how placement processed under conditions of divided attention or limited cognitive resource may impact brand preferences.

The impact of subliminal advert exposure demonstrates the influence which primes can have when very little resource is allocated (Karreman, Stroebe & Claus, 2006; Verwijmeren et al., 2013). Though the impact of subliminal advertising has been questioned over the decades, several studies have demonstrated that subliminal exposure to a brand increases choice for the product, without conscious awareness (Karreman et al., 2006; Verwijmeren et al., 2013). These findings hint at the effects which divided attention could potentially have in the case of subtle placement exposure, when resources are limited.

There are however other factors which can further mediate the impact of a subliminally presented prime. Karreman et al. (2006) demonstrated that if the product is goal-relevant to the consumer (e.g. drink advert while thirsty) subliminal adverts can have an even greater influence on product choice, though even with this exaggerated effect the participant remains unaware of the prime exposure. In addition, research suggests that familiarity with a product or brand may influence the success of brand exposure. Loersch and Payne (2011) proposed that subliminal priming is only effective in the case that the primed construct already exists, this reflects the conclusion of Auty and Lewis (2004) who observed a 'reminder effect' in children who were shown a movie clip containing a product

placement. Children who had previously seen the movie showed a stronger influence of placement exposure on product choice.

The research discussed above indicates that product placements which are processed under conditions of divided attention or limited cognitive resource may influence consumer preference without awareness. Yet, susceptibility to brand influence may be increased if the product is related to the viewers' current needs and they are already familiar with the featured brand.

### **Product Placement and Divided Attention**

This section will draw together the literature which has been discussed above. The impact and interaction of variables which mediate placement processing and effects will be debated. Next, I will discuss how the consumer habit of multi-tasking while watching television may increase susceptibility to placement influence.

The traditional view of divided attention proposes that limited resource availability has a negative impact upon memory encoding, resulting in a subsequently poorer performance on recall and recognition task (Anderson et al., 1996; Baddeley et al., 1984). Though a deficit in explicit memory would normally be considered as a negative, when applied to the field of consumer research this deficit in explicit memory could be beneficial to the advertisers (e.g. Karreman et al., 2006; Verwijmeren et al., 2013). The influence of product placement upon brand liking (Cowley & Barron, 2008) and product choice (Auty & Lewis, 2004) is well documented. The majority of research in this area indicates that subtle placements that are not explicitly observed have the most beneficial influence upon consumers (Ong & Meri, 1994; Russell, 2002; Russell & Stern, 2006).

A meta-analysis of research investigated the relationship between divided attention and implicit memory. It was concluded that divided attention during exposure can actually improve implicit memory, improving recognition to a level above that of full attention (Spataro, Cestari & Rossi-Arnaud, 2011). This would suggest that viewers who multi-task while watching television may increase their susceptibility to implicit placement influence. Conversely, Choi, Lee and Li (2013) demonstrated that implicit memory for brands presented during a video game was actually impaired, rather than strengthened implicit memory for brands. This finding suggests that multi-tasking while watching television would reduce viewers' susceptibility to implicit influence. These findings (Choi et al., 2013; Spataro et al., 2011) raise the question of whether divided attention has a positive or negative impact on implicit memory. Resolution of this debate could offer insight into the effects which multi-tasking may have on television viewers' susceptibility to placement influence.

In addition to the impact which divided attention may have on implicit processing, it is argued that multi-tasking may also mediate a viewers' ability to engage defences against placement influence. Persuasive defences are resource dependent, requiring resources to be available and engaged to employ persuasive strategies (Friestad & Wright 1994). Multi-tasking while watching television increases cognitive load which results in lower available cognitive resources. Consequently, multi-tasking can increase vulnerability to product placement effects (Gillespie et al., 2012). It is argued that age related cognitive decline may exacerbate the depleting effect which multi-tasking has on cognitive resource, and subsequently persuasive defences. Aging can negatively affect performance on cognitive tasks (Yoon et al., 2009), particularly when processing new information or performing on tasks when distracted by other activities (Moscovitch & Winocur, 1995). This suggests that watching television while multi-tasking may significantly diminish the cognitive resource of older adults. It is proposed that the deficit of cognitive resources may inhibit the activation and application of persuasive defences (Friestad & Wright, 1994). As lowered cognitive resources have been shown to increase vulnerability to product

placements (Gillespie et al., 2012) it is argued that this effect will be exaggerated with older consumers. Several studies have assessed the impact of product placement upon product choice with children taking into consideration processing skills (e.g. Auty & Lewis, 2004). This factor has not been assessed in older adults.

### **Divided Attention in the Home**

Over half of UK consumers regularly multi-task when watching TV, carrying out a secondary activity whilst watching TV. This habit is particularly pronounced in younger consumers with 74% of those aged 16-24 multi-tasking on a regular basis. Similarly, almost half of TV viewers regularly 'media-stack', engaging in a second media based task is engaged in while watching TV. Though this habit is more prevalent in younger adults, older adults regularly multi-tasking while watching TV (Voorveld & van der Goot, 2013). The most popular secondary task while watching TV is to browse the web though sending emails, using social network sites and online shopping are also common. Interestingly, a number of consumers (6%) watch a media content on a secondary device whilst watching TV. This habit is particularly prevalent in tablet (81%) and smart phone (74%) owners with the vast majority regularly use a second screen while watching TV (Ofcom, 2013). These figures indicate the prevalence of multitasking while watching TV.

The impact of divided attention or low cognitive resource can increase the likelihood that placements will be implicitly processed (Shapiro & Krishnan, 2001), therefore increasing vulnerability to placement exposure (Russell, 2002; Russell & Stern, 2006). It is proposed that the increasing trend to 'media-stack' (Ofcom, 2013) increases consumer vulnerability to placement exposure. As consumers tend to be influenced by their implicit preferences when cognitive capacity is limited (Shiv & Fedorkin, 1999) or when making an impulse choice (Shapiro & Krishnan, 2001) this may increase the impact of

brand placements on unplanned purchases. As implicit preferences are relatively resistant to decay (Shapiro & Krishnan, 2001) the placement of snack foods could result in a strong and long-standing preference for the featured item without the consumer being aware they have been influenced.

## Chapter Two

### Introduction

The use of product placement has rapidly increased over recent years (PQ Media, 2012) and the use of this form of advertising is predicated to increase (PQ Media, 2015). A growing body of research aims to explore the impact of product placement on consumer memory and brand attitude (e.g. Auty & Lewis, 2004; Boerman, Van Reijmersdal & Neijens, 2014; Noguti & Russell, 2014). Though existing research has identified a number of variables which can mediate the efficacy of a product placement (see Russell, 2002), some placement can have unexpected effects (see Yang & Roskos-Ewoldensen, 2007). Hence, it is necessary to explore the effect of viewing a product placement before investigating further hypotheses. In addition to the range stimuli used in previous research (Law & Braun, 2002; Morton & Friedman, 2002; Northup & Mulligan, 2013), the measures employed to investigate these effects can vary. Existing research primarily uses text based measures of placement influence, such as purchase intention scales, with only a small number of studies using stimulus based choice tasks (e.g. Auty & Lewis, 2004; Yang & Roskos-Ewoldensen, 2007).

As television is now the most common media for product placement (PQ Media, 2012) we propose this is the most appropriate and ecologically valid platform for investigating placement effects. Consequently, we selected a product placement clip from a soap-opera, *Coronation Street*, a television program which is regularly aired in the UK.

Three scenes from *Coronation Street* which featured a branded product were considered for the study. First, a scene which featured Big D peanuts was considered. The snack was shown in the background of a scene set in the *Rovers Return Inn*, the *Coronation Street* pub. However, Trigon Snacks, owner of Big D nuts, went into administration (Addy, 2013) during the stimuli section phase. Hence, it was decided that this placement would be unsuitable as the future availability of the product was uncertain.

Second, a scene set in *D&S Alahan's*, the Coronation Street corner shop. The scene featured a can of orange flavour Fanta in a fridge unit. The product was briefly shown in the background of the scene, however, there was no verbal mention of the brand. As placements which are shown in a visual modality are not as effective as those which are both visual and verbal, (Chung & Szymanski, 1997; Russell, 2002) and the product was very briefly shown, it was decided that this scene may not have enough of an impact on participant brand choice.

The final scene considered was set in the home of a character. The scene featured an orange Kit-Kat biscuit. The Kit-Kat featured as an audio-visual placement, and was relatively prominent within the scene. In addition, as Kit-Kat is a common brand in the UK it was unlikely that the placement would trigger novelty effects, which could result in the brand attracting a disproportionate level of attention (Choi, Lee & Li, 2013). Consequently, the scene which featured the orange Kit-Kat was considered the most suitable to use in the current research.

In this chapter I will explore the effect of viewing a product placement on brand choice, and if this effect can be replicated. Two methods of measuring product placement effects, a stimulus based brand choice task and a text based Shopping list task. The methods will be discussed in relation to mere exposure theory, allowing the most suitable measure to be identified. This will ensure the product placement clip and measure are valid before I investigate subsequent hypotheses.

The chapter is presented in two sections. First, the main paper outlines and investigates key hypotheses which assesses the effect of viewing a product placement on brand choice, investigates whether the effect can be replicated and compares the placement efficacy observed by two different measures of product placement effects. The Appendix contains a series of supplementary analyses which investigate whether using a repeated measures design can mediate observed placement effects.



The additional analyses provide an insight into potential issues of a design which is commonly used in placement research.

The current chapter examines the efficacy of a real-world product placement clip on brand recall and choice. We examine whether a choice task or shopping list measure is more appropriate as a measure of product placement effects.

## **Paper One**

**Are all measures equal? A comparison of product placement effects using stimulus based and text choice tasks.**

## Abstract

Product placements influence consumer brand attitude and product choice, even without awareness. In Study 1, we explored the effect of viewing a product placement clip on brand choice. Twenty-nine adults viewed a clip which featured a product placement or an alternative control clip. Observing the product placement significantly increased choice of the featured brand compared to an unprimed choice. Recalling the placement did not mediate brand choice. Study 2 explored the replicability of the placement influence observed in Study 1 and compared two methods of measuring product placement influence. Participants viewed a clip which featured a product placement or a control clip. Those who viewed the placement clip indicated their preferred brand via a Product Choice Task or a text based Shopping List task. The placement influence observed in Study 1 was replicated, with choice of the featured product being significantly greater for those who viewed the placement clip. We observed that that The Shopping List Task revealed a significantly greater preference for the featured brand than the Brand Choice Task. We conclude that measures employed may mediate observed placement efficacy. We suggest that existing research which used text based measures may have observed magnified placement effects.

## Introduction

Product placement has increased rapidly over the last decade (AVMS, 2009; Tessitore & Geuens, 2013). It is now a billion-dollar industry (PQ Media, 2012) and many studies have explored its effects (Janiszewski, 1993; Lee & Labroo, 2004, Russell, 2002; Law, Schimmack, & Braun, 2003). Yet the measures used to gauge the efficacy of a placement vary and different measures to compare the same influence have not been sufficiently compared. Initial research which explored product placement effects relied on explicit methods. Measures of recall or recognition were once considered to be effective means of assessing the success of product placements (see Karrh, McKee, Britain & Pardun, 2003; Russell, 2002; Wells, Burnett & Moriarty, 1998). However, implicit and explicit attitudes do not always correlate (Russell, 2002) and, consequently, implicit measures have become increasingly prevalent. Testing an assumption in the literature that implicit measures are interchangeable when assessing priming effects, this study will compare the efficacy of two 'implicit' forced choice procedures - a text based Shopping List task (Northup & Mulligan, 2013) versus a product choice (Auty & Lewis, 2004; Yang & Roskos-Ewoldsen, 2007).

Implicit and explicit attitudes can differ from one another (Russell, 2002) and may independently influence consumer choice. Spontaneous and impulsive choices tend to be guided by implicit preference whereas considered choices are led by explicit attitudes (Perugini, 2005; Rydell & McConnell, 2006). The majority of shopping choices are led by implicit or automatically activated attitudes (Dijksterhuis, Smith, van Baaren, & Wigboldus, 2005). Food choices are particularly susceptible to implicit influence, especially when made under time pressure or on impulse (Pavlovic, Zezeil, Marinkovic & Suaevic 2016; Shiv & Fedorikin, 2002). Chocolate is one of the most common items spontaneously purchased (Neilson, 2016). As self-report behavior of eating habits and anticipated food choices rarely predict the actual item chosen (Cervellon, Dube, Knauper & McGill, 2007; Perugini, 2005),

implicit measures may be more appropriate when assessing the efficacy of food brand placements. The method used to gauge a priming effect and the element of memory which drives the decision-making process may mediate the observed efficacy of a product placement. Hence, it is essential that appropriate methods are used when assessing whether a placement influences product choice.

Several studies have used brand attitude scales or other abstract measures rather than product choice (e.g. Auty & Lewis, 2004; Cevellon et al., 2007) to assess the effects of placement exposure (e.g. Gillespie, Joireman, & Muehling, 2012; Law & Braun-LaTour, 2004; Russell, 2002). Text based measures such as purchase intention scales (Law & Braun, 2002; Morton & Friedman, 2002) and Shopping List tasks (Manzano, 2010; Northup & Mulligan, 2013) have shown the priming effects of placement exposure. However, an implicit measure must be carefully selected as the incorrect method may result in a placement mistakenly being considered ineffective. Though commonly used, text based procedures lack the perceptual features which underlay the mere exposure effect (Zajonc, 2001) and may show a deflated preference for product placement brands. Conversely, offering the featured brand during a choice task presents the perceptual features of the product. Viewing the product may increase the likelihood of consumer choice being influenced by mere exposure effects during the choice task. However, few studies have used product choice (e.g. Auty & Lewis, 2004; Yang & Roskos-Ewoldensen, 2007) to measure to effects of placement exposure. It is not known whether text based measures are comparable to product choice. Yet, the choice task may offer a more ecologically valid measure than text based preferences. The current research will explore the underlying assumption that implicit measures are interchangeable when assessing priming effects.

An initial investigation considered whether the method used to gauge product preference could mediate the observed priming effects. It was proposed that a dissociation between memory-based choice and scale measures of brand placement may transpire (Nedungadi, 1990). A difference in priming effects was observed between the two measures. Paradoxically, the memory-based choice task revealed

a greater preference of the featured brand whereas preference scales show no difference in brand attitude. This observation indicates that 'equivalent' measures can produce different results. As the generalizability of this finding may be limited to the measures used. Hence, different measures of product placement effects must be systematically investigated. In Experiment 1, participants were primed with brand names which were shown as text on a computer screen (Nedungadi, 1990). Next, they were asked to think of brands which they would purchase and consider purchasing from a given product category. As the choice task was memory-based, no branded stimuli were presented. Having completed the choice measure, brand evaluation scales were completed. It was observed that the primed brands were more likely to be chosen over alternative brands, yet there was no increase in brand attitude shown on the scale measures. Nedungadi (1990) concluded that there was a dissociation between the choice and scale measures. However, only two of four primed brands were significantly more likely to be chosen than the unprimed option. Though this finding demonstrates some effect of priming on memory-based brand choice, it also shows the unpredictable nature of brand priming.

Nedungadi (1990) conducted a second experiment which primed participants with a magazine advert for *St. Huberts*, a chicken fast-food outlet. Participants were then asked to write down (on a blank page) the name of a fast-food outlet which they would like to receive a \$1 discount voucher for. Brand attitude scales were then completed. Echoing the findings from Experiment 1, the prime for *St. Huberts* increased awareness of the brand and attitude toward the brand was unaffected. The prime did not increase choice of the featured brand, yet resulted in greater choice for *Swiss Chalet* vouchers, a market competitor. Though this research demonstrates some dissociation between choice and scale measure, we suggest that a stimulus-based choice task may reveal in greater priming effects (see Zajonc, 2001).

A later study offered further insight into the importance of selecting appropriate measures when assessing the efficacy of brand placements. Manzano (2010) demonstrated product placement effects of multiple brands which were featured in a short story when using brand generation and word

stem completion tasks. Participants completed a two-alternative forced choice task (2AFC) to assess purchase intention, in which one of two brands were chosen from product images shown on a projector, but no priming effects were shown. As an increased preference for the featured brand was observed with the brand generation and word stem measures it is clear the priming stimulus was effective. Yet, the lack of priming effects shown by the 2AFC purchase intention task suggest that the measure is not representative of the of placement effects which were induced by the brand prime. This finding seems to indicate that purchase intention task may lack validity as a measurement of product placement effects.

A subsequent study (Barnhardt et al., 2016) aimed to explore the absence of priming effects on the 2AFC purchase intention task (Manzano, 2010) and determine why influence was observed with some measures and not others. A series of experiments was conducted which employed materials and procedures based on those described by Manzano (2010). The first study (Experiment 1a & 1b) which primed participants with brand names in a short story failed to demonstrate any product placement influence. No priming effects were observed on either brand attitude or the image based 2AFC purchase intention task. Their final study (Experiment 3) used a text based rather than image based, 2AFC purchase intention task. Using the text based measure it was observed that the featured brands were significantly more likely to be chosen than the alternative products. Hence, a priming effect was revealed using a text based but not an image based 2AFC measure. Barnhardt et al. (2016) concluded that it is essential to present the brand prime and measure in the same modality to observe a priming effect. These findings demonstrate that the conclusions regarding the efficacy of a placement can vary depending upon the measures chosen.

Several experiments have used text based measures to assess the efficacy of visual or verbal product placements (e.g. Gillespie et al., 2013; Law & Braun, 2002). Yet, previous studies have highlighted the importance in the congruity of priming stimuli and method of measurement. Early

research observed that a greater priming effect was shown for a pre-exposed picture when the priming measure used a picture naming task, rather than a word-fragment task (Weldon & Roedinger, 1987). This finding suggests that when assessing the priming effects of visually presented product placements, image based methods would be more appropriate than text based tasks. Modality effects have also been observed in the priming of brand names. Chung and Szymanski, (1997) highlighted how the congruency of the prime and test stimuli can mediate observed priming effects. When a brand name was presented in the same modality, either as text or aurally, priming effects were observed. Yet, when the presentation and measure modality differed, priming effects were reduced or absent. These findings suggest that priming effects may operate within the modality in which they are presented.

A subsequent study observed modality effects in the priming of brand labels (Coates, Butler & Berry, 2006). Again, priming effects were strongest when the brand was presented in the same mode (audio or visual) for the priming and test stages, with cross-modal methods showing weaker or an absence of influence. Yet, the visual labels used were created on a computer and all brand labels featured the same Arial font black text. Consequently, none of the perceptual cues of the branded products were presented at either the priming or test phase of the study. We suggest that if a choice task presenting the branded product is used, a greater number of perceptual features would be presented which distinguish the primed brand from alternative products. This may result in greater perceptual fluency and consequently greater priming effects (Zajonc, 2001) may be observed.

Several studies have investigated the effect of brand primes or product placements on consumer preference, yet few have used priming and test measures of the same modality (e.g. Gillespie et al., 2012). As perceptual fluency underlies product placement effects on brand choice (Shapiro & Krishnan, 2001) and numerous studies have shown that priming effects are sensitive to changes in modality (Butler & Berry, 2001; Fransen, Fennis & Pruyn, 2010) and perceptual features (Barnhardt et al., 2016; Mulligan, 2004; Lee, 2002). We suggest that when investigating the impact of TV product



placements it is more appropriate to use a choice task where branded products are presented rather than text or memory based measures which do not include perceptual features of the placed product. In addition, as television is now the most common media to feature product placements (PQ Media, 2012) it may be the most appropriate medium when investigating product placement effects.

## **Experiment 1**

### **Introduction**

Television is the most common medium for product placements (PQ Media, 2012). As snacks, particularly chocolate bars are most commonly bought on impulse (Neilson, 2016). Consequently, the priming stimulus we have chosen for the current study is a soap-opera clip which features a chocolate bar.

We predict that viewing the product placement clip will influence brand choice, yet such effects have not been consistently observed in previous research. Placement prominence, congruency to the plot and modality, amongst other factors, can mediate brand recall and attitude (Russell, 2002). Though such insights can provide guidance in the identification of placement which may influence brand memory and choice, unforeseen effects have been observed in previous research.

Previous research explored how different features of movie product placements effect brand memory and choice (Yang & Roskos-Ewoldensen, 2007). Though the movie clips selected were expected to show high levels of brand recognition, this was not observed for all placements. The majority of placement brands showed higher levels of recognition and choice compared to alternative brands. However, this effect was not observed for all a placement of *Pepsi* in the movie *Twister*. The placement was shown on screen for a comparable length of time to other placements, had a similar level of prominence and congruity, yet showed chance levels of recognition. Yang and Roskos-Ewoldensen (2007) proposed several factors which may have contributed to the low recognition levels, yet were

unable to confirm the cause. Conversely, Auty and Lewis (2004) observed that participants who watched a clip from *Home Alone* which featured *Pepsi*, showed both higher levels of brand recall and were significantly more likely to choose the featured brand over an alternative.

Though product placements can positively influence brand preference, some placements may have to opposite effect to that which advertisers intended. Prominent placements are more likely to be remembered yet can activate persuasive defenses (Friestad & Wright, 1994) and result in a negative attitude toward the featured brand (Van Reijmersdal, 2009). Hence, it is necessary to explore the effect of a product placement on brand choice before investigating further hypotheses.

As the efficacy of each product placement varies and depends upon various features of the placement (Russell, 2002) and potential activation of persuasive defenses (Friestad & Wright, 1994), it is essential that each placement is assessed before being used to investigate further hypotheses. Consequently, before investigating the main purpose of the study we will explore the efficacy of the chosen product placement clip.

The aim of Experiment 1 is to explore the effect of chosen product placement clip on brand choice. We will compare the brand choice of those who view the product placement and the unprimed choice of brand. This will ensure the placement in the chosen clip is sufficiently prominent to influence product choice but not so intrusive that it has a negative effect on the featured brand (Russell, 2002; Van Reijmersdal, 2009). As priming effects are most effectively observed when the prime and measure are presented in the same modality (Barnhardt et al., 2016), we will explore whether placement effects are specific to, or best represented by measures of the same modality. A product choice task presents the perceptual features of the featured product and provides an ecologically valid measure, so we will use such a task to gauge the efficacy of the product placement. We predict that viewing the placement clip will induce mere exposure effects (Zajonc, 2001), which will result in a greater choice of the featured

brand (H1). Conversely, explicit processing of the placement may activate persuasive defenses and result in a negative attitude toward the brand (Friestad & Wright, 1994; Van Reijmersdal, 2009). We hypothesize that placement recall may result in a lower choice of the featured brand (H2).

## Method

**Participants.** Twenty-nine adults<sup>1</sup> (18-44 years,  $M=23.27$ ,  $SD=8.02$ ) were recruited from a university campus in northern England. As Club biscuits are only available in the UK and Ireland it was necessary for participants to be British or Irish to avoid brand novelty effects. Unfamiliar brands can attract greater levels of attention than familiar brands (Choi, Lee & Li, 2013). Participants took part in the study on a voluntary basis, no payment or incentive was offered.

**Design and materials.** A between subjects design (Condition: Control clip vs Placement clip) was employed. Placement recall (recall vs. no recall) was the independent variable for those who viewed the product placement clip. Brand choice was the dependent variable for all participants.

To avoid compromising the implicit element of the study a foil purpose of the study was presented. The foil explained that the study aimed to investigate how the number of adverts watched before a television show influence content recall. Participants were shown one of two clips from *Coronation Street*, a version which featured a product placement (orange Kit-Kat) or the control clip which was taken from the same episode yet did not feature the placement. Participants were randomly allocated to a condition. The TV soap *Coronation Street* was chosen as it is popular within the UK (YouGov, 2011). Both clips featured three recently aired non-food ads and three typical scenes from *Coronation Street*. The second scene differed between the experimental and control videos. The experimental clip product placement scene featured a family sitting in their lounge. A teenager emerges

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<sup>1</sup> Sample size determined before data collection using Gravetter and Wallnau (2014) calculations;  $\pi=.8$ ,  $df=1$ ,  $\alpha=.05$ ,  $\phi=.5$ , target  $N=31$ .

from the kitchen holding an orange Kit-kit (candy bar) and says, "Orange Kit-Kat? They're your favourite." The Kit-Kat is held so the wrapper can be seen on screen for four seconds. The control clip featured an alternative scene with a similar tone and setting. The scene featured a mother, son and his partner are sat in the family lounge discussing some recent events. Both clips were approximately six minutes and fifteen seconds in length.

After viewing the clip all participants were offered one of two biscuits. *Jacobs Club* was selected as an alternative snack as orange *Club* has similar perceptual features e.g. size, shape and packaging (silver foil in an orange paper sleeve) to orange *Kit-Kat*, with the brand being the only prominent distinguishing feature.

Twenty-four survey questions were compiled. The Stanford Brief Activity Survey, (Taylor-Piliae et al., 2006) was included to assess physical activity levels. The following section consisted of the demographics and TV viewing habits questions from the Ofcom Media Tracker (2011). In addition, scales of hunger and fatigue were included as control variables (10: Extremely hungry/tired – 1: Not hungry/tired at all, reverse).

**Procedure.** (see Figure 1) Participants completed the study on an individual basis in a quiet room. To avoid compromising the implicit element of the study a foil purpose of the study was presented. Participants then viewed either the Control or Placement clip. Once participants had viewed a Coronation Street clip they were asked if they would like to select (and eat) a biscuit as a 'thank-you' for taking part. Two of each biscuit brand were presented on a small plate, the presentation order of the brands was rotated. Once the preferred brand had been chosen the experimenter used the series of prompts below (adapted from Auty & Lewis, 2004) to establish whether the participant recalled seeing the featured brand.

- What was happening in the second scene?

- Was anything else happening?
- Did you notice any food or drinks?
- What were the snacks shown?
- What was the biscuit shown?
- What was the colour of the packet?
- What brand was the biscuit?

Once the experimenter established whether the participant could recall the placement the survey was completed. Participation in the study took approximately fifteen minutes.

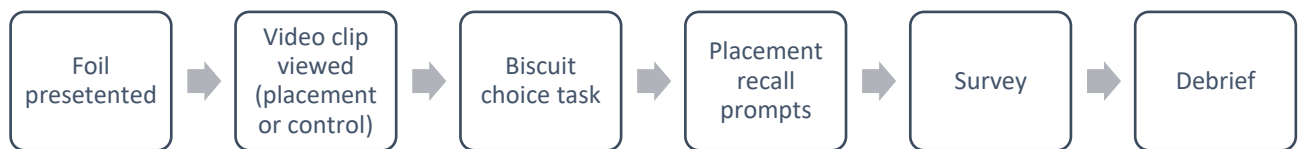


Figure 1. Presentation order of tasks.

## Results

To investigate H1 we conducted a chi-square analysis assessing the difference in brand choice between those who had and had not seen the product placement (see Table 1). Choice of the featured product was significantly greater for those who had viewed the product placement than those who viewed the control clip ( $\chi^2 (1, n=29) = 4.14, p=.04, \phi = .38$ ). H1 is supported. Participants who viewed the product placement were twice as likely to choose the Kit-Kat over the alternative brand, whereas those who viewed the control clip were twice as likely to choose the Club as the placement brand. The results indicate that viewing product placement resulted in a greater choice for the featured product compared to the unprimed choice.

Table 1. Condition and Brand Choice

Condition	Control (n=13)	Brand Choice (%)	
		Kit-Kat	Club
		4 (31)	9 (69)

Placement (n=16)	11 (69)	5 (31)
Total	15 (52)	14 (48)

We next assessed whether placement recall influenced the brand choice of those who viewed the placement clip. Almost a third (31%) of participants who viewed the product placement were able to recall the featured brand. There was no significant difference in brand choice of those who recalled the featured product (Kit-Kat 60%; Club 40%) and those who did not remember (Kit-Kat 73%; Club 27%) seeing the placement ( $\chi^2(1, n=16) = .26, p = .61, \phi = .13$ ). We observe that explicitly processing the placement did not have a negative, or positive influence, on brand choice. H2 is not supported.

### Discussion

We predicted that viewing the *Coronation Street* clip would increase choice of the featured product. Yet, as some product placement clips have successfully increased choice of the featured product (Auty & Lewis, 2004; Yang and Roskos-Ewoldensen, 2007), others may negatively affect brand preference (Friestad & Wright, 1994; Russell, 2002; Van Reijmersdal, 2009), have limited effects (Nedungadi, 1990) or no effect due to incongruent measures (Barnhardt et al., 2016; Butler & Berry, 2001). It was essential to explore the effect of the clip and measures selected before investigating further hypotheses.

Viewing the *Coronation Street* clip significantly increased choice of the featured brand compared to an unprimed choice. The placement can be processed at either an implicit or explicit level to increase brand preference (Zajonc, 2001). As recall of the placement does not negatively affect brand choice we conclude that the placement is sufficiently prominent to be recalled without activating persuasive defenses (Friestad & Wright, 1994; Russell, 2002).

In addition, the priming effects of the product placement were observed using a biscuit choice task. This echoes the findings of previous research, that priming effects are best represented when the

stimuli and measure are the same modality (Barnhardt et al., 2016; Butler & Berry, 2001). Hence, we conclude that choice tasks are effective and ecologically valid measure of television placements for low involvement goods, such as snack foods.

## **Experiment 2**

### **Introduction**

In this study we will assess whether the product placement effect on brand choice, observed in Experiment 1 can be replicated (Open Science Collaboration, 2015). Based on the findings from Experiment 1, we hypothesize that viewing the product placement will result in a greater choice of the featured product (H1). In addition to confirming the reliability of the chosen placement clip on brand choice, we will assess the methods which are commonly used to measure the efficacy of product placements.

The mere exposure effect relies upon familiarity with the perceptual features of an item. This familiarity results in a greater preference of the previously seen item (Zajonc, 2001). However, the majority of studies which explore the impact of product placement exposure use text based brand preference or purchase intention scales. As these measures do not present the product the measure lacks the perceptual features of the underlay the mere exposure effect.

In this experiment we will compare the brand preference shown by a text based brand preference task (Shopping List task) against the preference of a choice task, in which the product are presented to the participant. We suggest that the presence of the featured product will result in greater feelings of familiarity, and consequently liking of the brand (Shapiro & Krishnan, 2001; Whittlesea, 1993). Conversely, the Shopping List task lacks the perceptual features of the featured brand which may not trigger mere exposure effects. In addition, priming effects have been shown to be modally sensitive, with correlating modalities showing stronger priming effects (Barnhardt et al., 2016; Butler & Berry, 2001). As the product placement used in the current study is visually presented we suggest that the

product choice task will demonstrate a stronger priming effect than the text based Shopping List task. Applying this principle, we hypothesize that biscuit choice will reveal a greater preference for the featured brand than the Shopping List task (H2). In addition to the negative effect which stimuli and test modality can have on product choice (Barnhardt et al., 2016; Fransen et al., 2010), a mismatch between modality at the presentation and test stimuli can decrease brand recall (Roedinger & McDermott, 1993). Hence, we hypothesize that placement recall will be greater for those who choose their preferred brand compared to those who complete the Shopping List task (H3).

## Method

**Participants.** Sixty-three participants<sup>2</sup> (18-25 years, M=20.59, SD=1.97) were recruited at Lancaster University. To avoid brand novelty effects (Choi et al., 2013), all participants were from the UK or Ireland. All participants received payment for participating in the study.

**Design and materials.** A between subjects design was employed. Placement exposure (placement vs alternate clip) and preference measure (Choice task vs Shopping List task) were the independent variables. Brand recall and choice were the dependent variables.

To avoid compromising the implicit element of the study a foil purpose of the study was presented. The foil explained that the study aimed to investigate how the number of adverts watched before a television show influence content recall. Participants were randomly allocated to one of the three conditions; Control clip with Choice task, Placement clip with Choice task or Placement clip with Shopping List task. Participants were shown one of two clips from Coronation Street, a version which featured a product placement (orange Kit-Kat) or the control clip which was taken from the same

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<sup>2</sup> Sample size determined before data collection using Gravetter and Wallnau (2014) calculations;  $\pi = .8$ ,  $df=2$ ,  $\alpha=.05$ ,  $\phi=.4$ , target  $N = 60$ .



episode yet did not feature the placement. Participants were randomly allocated to a condition. The TV soap *Coronation Street* was chosen as it is popular within the UK (YouGov, 2011). Both clips featured three recently aired non-food ads and three typical scenes from *Coronation Street*. The second scene differed between the experimental and control videos. The experimental clip product placement scene featured a family sitting in their lounge. A teenager emerges from the kitchen holding an orange Kit-kit (candy bar) and says, "Orange Kit-Kat? They're your favourite." The Kit-Kat is held so the wrapper can be seen on screen for four seconds. The control clip featured an alternative scene with a similar tone and setting. The scene featured a mother, son and his partner sat in the family lounge discussing some recent events. Both clips were approximately six minutes and fifteen seconds in length.

After viewing a clip participants either completed the Shopping List task or were offered a choice of biscuit as a 'thank-you' for taking part. A choice of *Jacobs Club* and orange *Kit-Kat* biscuits were offered. *Jacobs Club* was selected as an alternative snack as orange *Club* has similar perceptual features e.g. size, shape and packaging (silver foil in an orange paper sleeve) to orange *Kit-Kat*, with the brand being the only prominent distinguishing feature.

Participants in the Shopping List task were presented with a white sheet of A4 paper with black text, no images of the brands were shown. The instructions asked participants to imagine they were shopping for groceries and needed to choose one of two brands from each product category. A list of ten food items were displayed, each with two relevant brands. The brands for the 'Chocolate Biscuits' product category were Kit-Kat and Club. All participants were presented with the series of prompts and completed the survey as described in Experiment 1.

**Procedure.** (see Figure 2) Following ethical approval from the university, participants were seated in a quiet room and presented with the foil for the study to avoid compromising the implicit

aspect of the research. Participants were tested individually. The participant viewed a Coronation Street clip then completed either the brand choice or Shopping List task.

Those in the choice task condition were offered to choose a biscuit as a ‘thank-you’ for taking part (as described in Experiment 1). Participants allocated to the Shopping List task were given the task instructions and brand list. The participant was asked to read the instructions, complete the task and indicate when they were happy with their responses. The experimenter then used the series of prompts from Experiment 1 (see Auty & Lewis, 2004) to establish whether the placement could be recalled. All participants then completed the survey (outlined in Experiment 1)<sup>3</sup> and were debriefed. The study took approximately fifteen minutes to complete.



Figure 2. Presentation order of tasks.

## Results

To ensure the positive effect of viewing the product placement on brand choice could be replicated, we initially compared the biscuit choice of those who viewed the product placement and control clip (see Table 1). As observed in Experiment 1, those who viewed the product placement were significantly more likely to choose the featured brand than the alternative ( $\chi^2 (1, n=43) = 3.94, p=.047, \Phi=.30$ ). The results indicate the positive effect of viewing the product placement on brand choice is replicable.

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<sup>3</sup> Participants completed the alternate choice task before debrief. Phase two preference measures are reported in the appendix.

Table 1. *Primed vs. unprimed brand choice*

		<u>Brand choice N (%)</u>	
		Featured	Alternative
Condition	Control (n=21)	9 (43)	12 (57)
	Choice (n=22)	16 (73)	6 (27)
	Scale (n=21)	20 (95)	1(5)

We next investigated whether the method used to assess product placement effects revealed a difference in brand preference. A frequency analysis compared (see Table 1) the brand preference shown by the biscuit choice task and Shopping List task (H2). Contrary to our hypothesis, participants in the Shopping List task condition had a significantly greater choice of the featured product than those in the brand choice condition, ( $\chi^2_{MH} (1, n=43) = 3.90, p=.048, \Phi=.31$ )<sup>4</sup>, a medium effect size was observed. This finding indicates that the method used to gauge brand preference can suggest significant differences in the efficacy of a product placement.

Table 2. *Placement recall and brand choice*

Condition	<u>Placement Recall N (%)</u>	
	Yes	No
Choice (n=22)	10 (45)	12 (55)
Scale (n=21)	10 (48)	11 (52)

<sup>4</sup> As the observed frequencies were below 5, the Linear-by-Linear Association test was used to calculate 'N-1' chi squared (see Campbell, 2006; Weaver, 2013).

Total (n=43)	20 (47)	23 (53)
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We then assessed whether the preference measure mediates placement recall (see Table 2). The analysis indicated that recall did not differ significantly between those who indicated their preferred brand by either a choice or Shopping List task ( $\chi^2(1, n=43) = .02, p = .89, \Phi = .02$ ). The data suggest that the presence of a biscuit during choice does not provide a reminder effect of the placement, increasing recall of the featured product. H3 is not supported.

## Discussion

This experiment had two aims: first to assess whether the priming effect observed in Experiment 1 was reliable; second, to compare the priming effects revealed by a text based measure and brand choice task. We replicated the main finding from Experiment 1, viewing the product placement resulted in a significantly greater choice of the featured product than the alternative brand. As the placement successfully primed the brand choice of in both experiments we are relatively confident that the same effect would be observed if the clip were used in future research. We will examine these observations further in the General Discussion.

We predicted that the brand choice would reveal a greater placement effects than the Shopping List task. Paradoxically, those who completed the Shopping List task had a significantly greater preference for the featured product than those who chose their favoured brand. This finding conflicts with previous research which observed that priming effects were best represented when the stimuli and measure were presented in the same modality (Barnhardt et al., 2016; Fransen et al., 2010). In addition, we observe that placement recall was not influenced by the measure used. Again, this finding conflicts with previous research which indicated that modality congruence between the stimuli and measure could mediate recall (Roedinger & McDermott, 1993).

## General Discussion

These studies aimed to assess both the reliability of product placement influence on brand choice and the efficacy of two methods which measure product placement effects on consumer brand choice. We anticipated that viewing the product placement would reliably increase choice of the featured product (Auty & Lewis, 2004; Russell, 2002; Yang & Roskos-Ewoldensen, 2007). From previous research we predicted that that the product choice task would result in a greater preference and recall of the featured product than the Shopping List task (Barnhardt et al., 2016; Zajonc, 2001). We will discuss two key observations from the results; first, viewing the product placement can reliably increase choice of the featured brand; second, the Shopping List task showed a greater preference for the featured product than those who chose their preferred brand.

Given the unpredictable nature of product placements on brand recall and choice (see Russell, 2002; Yang & Roskos-Ewoldensen, 2007), it was necessary to validate the effect of the *Coronation Street* clip before investigating further hypotheses. As predicted, viewing the placement consistently increased choice of the featured product, indicating that the visibility of the placement is sufficient to induce mere exposure effects (Zajonc, 2000).

We observe that viewing the placement influenced brand choice whether the placement is recalled or not, indicating that mere exposure effects were induced whether the placement was implicitly or explicitly processed. In addition, recall of the placement does not appear to have a negative impact on brand choice. We propose two alternative explanations of this effect. The features of the placement used in the current study may not have been considered sufficiently incongruent or intrusive to active persuasive defences (Cowley & Barron, 2008; Russell, 2002), which could have resulted in a negative influence of recall on choice of the featured product. Conversely, the negative impact which explicit recall can have upon priming effects may raise more prevalent issues with conceptual than

perceptual measures (Northup & Mulligan, 2013). The current study employed a perceptual prime and choice measure, so the stimulus modality may have also contributed to absence of negative effects of recall on choice.

As recall of the placement did not negatively affect brand choice, the *Coronation street* clip and task could be used to explore both implicit and explicit mere exposure effects, without contamination of persuasive defences or associated decrease in available cognitive resource (Friestad & Wright, 1994). We propose that the *Coronation Street* clip and choice task provide a validated toolkit for future research. The stimuli could be employed in research which aims to investigate factors which mediate placement influence such as cognitive resource, disclosure effects and individual differences.

The most intriguing current finding is that the Shopping List task revealed a greater preference for the featured product than the choice task. Hence, the cross-modal measure revealed a stronger priming effect than when a measure of the same modality was used. This finding conflicts with numerous studies which observed greater priming effects when the stimuli and measure were congruent in modality (Barnhardt et al., 2016; Butler & Berry, 2001; Coates et al., 2006; Chung & Szymanski, 1997).

There are two alternative explanations for this unexpected observation. First, the product placement may have induced mere exposure effects for both brands. The orange *Club* biscuit was chosen as a suitable alternative to the orange *Kit-Kat* as the biscuits were the same size, colour and packing (paper wrapper over foil) with the brand name being the only distinguishing feature. Hence, viewing the *Kit-Kat* placement may have increased the perceptual fluency for the shared visual features (see Gordon & Holyoak, 1983; Monahan, Murphy & Zajonc, 2000). This might have created 'noise' in the preference task, increasing fluency for the features present in both the *Kit-Kat* and *Club* biscuits. The preference for the featured product may not have been as great as if a visually distinct alternative

product had been chosen. In addition, the Shopping List task did not present the common perceptual features of the product, with the brand name being shown in isolation. Hence, the Shopping List decision would not have been subject to competing perceptual fluency between the two brands.

Alternatively, the verbal element of the product placement may have conceptually primed participants. Conceptual priming is less susceptible to changes in modality, unlike perceptual priming (see Barnhardt et al., 2016; Mulligan, 2004), allowing the verbal prime to be observed using a text based measure. Northup and Mulligan (2013) observed that branded products presented as static images can conceptually prime a brand, increasing awareness of the primed brand on a conceptual measure (memory-based brand generation task). The conceptual priming element of the placement could have been revealed by the Shopping List task. Conversely, research which specifically explored the priming effects of visually and verbally brand names observed that priming effects were weaker or absent when the prime and measure modality were incongruent (Coates et al., 2006; Chung & Szymanski, 1997). These studies suggest it is less likely that the inflated priming effects observed on the Shopping List task are due to the verbal element of the placement. Alternatively, greater perceptual fluency of the featured brand may have also resulted in greater fluency for the Club biscuit. The competing perceptual features of the Club biscuit may have indicated a lower, but more ecologically valid measure product placement effects.

Several studies have investigated the effect of product placement on measures which are defined as choice tasks (e.g. Law & Braun, 2000; Lee, 2002; Nedungadi, 1990). Yet, the branded products were not presented during the preference task. The current study and previous research (Barnhardt et al., 2016) indicate that the stimulus use for brand choice tasks can mediate the observed effect of the product placement. As mere exposure underlies visual product placement effects the findings suggest that a product based choice tasks would be the most suitable measure for exploring impulse purchases. This result highlights the importance of selecting the most ecologically valid prime and measure to

investigate product placement influence, as changes in modality of either stimuli may result in an inflated placement effects.

The absence of a negative effect of placement recall on brand choice suggests that the placement was not sufficiently prominent or incongruent to activate persuasive defences. Yet, this effect may also be mediated by the nature of the prime and measures used. It has been proposed that the negative influence which placement recall can have on subsequent brand attitude is more prominent in conceptual than perceptual measures (Northup & Mulligan, 2013). Placement recall has been shown negatively to influence brand attitude when using text based measures (e.g. Russell, 2002; Van Reijmersdal, 2009). Should this effect be replicated with choice measures, this would support the hypothesis that both text based and choice measures are susceptible to negative effects of placement recall. Conversely, a dissociation may be revealed with negative effects of placement recall being observed when using text based but not choice tasks. Such a dissociation would offer a novel contribution to the Persuasion Knowledge Model (Friestad & Wright, 1994), indicating that the activation of persuasive defences may be dependent upon the modality of the measures employed, rather than the persuasive attempt in isolation. In addition, this could provide a need to reflect of previous research which observed a negative effect of placement recall when using text based measures.

In summary, the current research offers a key novel finding regarding the efficacy of measures of product placement effects on consumer brand choice. Paradoxically, we observed that a text based task indicated a greater preference for the placed brand than a product choice task. Given the differences in the product placement effects observed between the measures, we suggest that existing research which used text based tasks of brand placements may have observed magnified priming effects. Consequently, the existing research which have used text based measure of priming and subsequent conclusions may not be representative of influence which brand placements have on



product choice when making impulse purchases in store. As television is now the most common form of media for product placements (PQ Media, 2012) and snack foods are frequently purchased on impulse (Neilson, 2016), we suggest that the impact of television placements on brand choice should be re-examined using corresponding prime-test measures.

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## Appendix

### Order Effects of Implicit and Explicit Measures in Product Placement Research.

#### Introduction

Product placements can influence brand attitude and choice through both implicit and explicit processes (Auty & Lewis, 2004; Law & Braun, 2004). As implicit and explicit attitudes can differ (Russell, 2002) it is key that research evaluating the impact of a placement on consumer behaviour takes both attitudes into consideration. Though numerous studies have explored product placement effects (Law & Braun-LaTour, 2004; Law, Schimmack, & Braun, 2003; Yang & Roskos-Ewoldsen, 2007) the measures used and the order in which tasks are presented differ.

The main paper investigated the efficacy of two measures of consumer brand preference, a Shopping list task and brand choice. We observed that both measures showed an increased choice of the featured product. Contrary to our predications, the preference shown by the Shopping list task was significantly greater than that of the choice task. The first phase of preference measures were conducted before the placement recall task. This appendix will investigate whether the product placement effects indicated by the first phase of choice tasks will be observed in the second phase, which follows the explicit element of the study. In addition, we will explore whether the difference in brand preference indicated by the two measures which was observed in the first phase of preference tasks is replicated in the second phase.

Product placement exposure can influence consumers through implicit and explicit memory (Law & Braun, 2004). Mere exposure effects underlie the positive effect which observing a brand can have on brand preference and choice (Karremans, Stroebe & Claus, 2006; Zajonc, 2001). As discussed in the main

paper, viewing TV program clip which showed a product placement resulted in a significantly greater choice of the featured brand compared to unprimed choice. As mere exposure effects are relatively stable and resistant to decay (Shapiro & Krishnan, 2001) we suggest that product placement exposure could create a long lasting preference for the featured brand. Based on the observations of the first brand choice phase and literature discussed above, we hypothesize that viewing the placement clip will result in a greater choice of the featured brand (H1).

Numerous studies have investigated the role of product placements on consumer behavior, yet a variety of measures have been used to gauge the impact of a placement exposure. Text based measures such as purchase intention and brand attitude scales are employed to assess the efficacy of placements featured in TV shows and movies (e.g. Gillespie et al., 2012; Law & Braun, 2000). Though greater priming effects are observed if the exposure and prime stimuli are the same modality (Berry & Butler, 2004), few studies investigating TV and movie product placement effects have used perceptually based measures of priming, such as product choice.

A large body of research has observed that perceptual features underlay product placement effects (Shapiro & Krishnan, 2001; Zajonc, 2001) and that greater priming effects are observed when the prime and test stimuli are presented in the same modality (Coates, Butler & Berry, 2006; Fransen, Fennis & Pruyn, 2010). Consequently, we predicted (see main paper) that the choice task, would demonstrate a significantly greater preference for the featured brand than the Shopping list task, which lacks perceptual features of the product. Yet, the first phase of preference measures revealed a Shopping list task a significantly greater preference for the featured brand than the product choice task (see main paper). Based on the research discussed above and observations from the first choice phase, we propose that a significantly greater choice of the featured product will be observed on the Shopping list than the brand choice measure (H2).



Studies which investigate the product placement effects often use multiple measures of brand attitude and purchase intention. However, the number of measures and order in which they are presented can differ between studies. To explore potential order effects of task presentation on brand preference we will compare the first and second brand preference for each condition.

Previous research used multiple measures to investigate how priming can influence purchase intention (Coates et al., 2006). Participants were primed with several familiar brand names which were presented as coupons. Rather than using a forced choice measure, participants were asked to identify the brand which they would purchase followed by those which they would consider. Brands were ranked in order of preference. Priming effects were observed in the first brand choice, with featured brands being chosen over the alternatives. Yet, no priming effects were observed in the second or third ranked choices, even though primed brands were still 'available' for selection. This finding indicates that multiple choice tasks may reduce or nullify priming effects. We suggest that the first choice was impulse led, yet subsequent choices were considered more carefully. Based on this finding we suggest that the implicit influence on brand choices may be comprised if multiple measures are used. Conversely, several studies have suggested that mere exposure effects are stable and long lasting (Shapiro & Krishnan, 2001). This would suggest that the positive influence of brand exposure should be consistent, regardless of the number of measures used to explore the effect. Given the research discussed above we suggest that the use of multiple measures may reduce the priming effect observed for the second choice task. Hence, we propose that the second choice tasks may show a lower choice of the featured product compared to the observed first choice (H3).

Studies which investigate the product placement exposure often assess memory for the placement in addition to brand attitude or choice. However, the order in which the implicit and explicit measures are conducted can vary. Barnhard et al. (2016) aimed to investigate how the modality of placement stimuli and measures influence the observed efficacy of a placement. Yet, the study offers

insight into the implications of conducting explicit tasks before implicit measures of brand preference. The authors initially (Study 1) observed null effects of a text brand prime on brand image choice and attitude. A subsequent study was employed to explore the null effects (Study 2). Pictorial primes were used in place of the text based primes of Study 1. Following prime exposure placement recognition and attitude were assessed. A negative correlation between placement recognition and brand attitude was observed, with recognition resulting in a less positive evaluation of the brand. Based on this finding we suggest that conducting a recognition task before an attitudinal measure may have resulted in the activation of persuasive defences, mimicking the effect which a placement warning could have on brand attitude (Campbell, Mohr & Verlegh, 2013; Tessitore & Geuens, 2013).

A further study (Study 3) aimed to understand whether the negative correlation between awareness of the placement and brand attitude was due to the modality of the prime-test stimuli or a consequence of recognition (Barnhard et al., 2016). Participants were primed with text based brand names, then completed 2AFC text task, brand recognition and attitude measures. Choice of the featured brand was greater, yet brand attitude was unaffected by observing the brand placement. Hence, priming effects were observed before but not after the recognition task. The authors (Barnhard et al., 2016) proposed that explicit recall of the placement did contaminate the implicit tasks. Yet, we query this conclusion, given the negative correlation between placement recognition and brand attitude observed in Study 2, and the numerous studies which has observed the negative effects which placement recognition can have on brand attitude (Russell, 2002; Van Reijmersdal, 2009). Due to the differing modalities of the prime-measure stimuli used by Barnhard et al. (2016) it is not possible to confirm whether the negative correlation between brand attitude and recognition were mediated by changes in the stimuli or explicit contamination, leading the activation of persuasive defences (Friestad & Wright, 1994). We aim to address this question with the analyses below.

In addition to the influence which the repetition of measures may have on priming effects, the form of the prime and demands of subsequent tasks could mediate the observed effects and susceptibility to explicit contamination. Northup and Mulligan (2013) proposed that conceptual priming is more susceptible to explicit contamination than perceptual priming. As the current employed a perceptual prime and choice measure the stimulus modality may have contributed to the absence of potential negative effects of placement recall (see Study 1 in main paper). The first phase of brand preference measures before the brand recognition task. We suggest those that recalled the placement may be less likely to select the featured product on the subsequent choice task. Recalling the brand may highlight the persuasive intent of the placement, mimicking the effect of a placement disclosure (Campbell, 2013; Tessitore & Geuens, 2013). This may activate persuasive defences, resulting in a less favourable attitude toward the featured product. In the current paper we aim to explore whether the order in which the implicit and explicit measures are presented can mediate priming effects. We suggest that preference of the featured brand will be lower when the placement is recalled (H4).

## Method

**Participants.** Sixty-three participants (18-25 years,  $M=20.59$ ,  $SD=1.97$ )<sup>5</sup> were recruited at Lancaster University. To avoid brand novelty effects (Choi et al., 2013), all participants were from the UK or Ireland. All participants received payment for participating in the study.

**Design and materials.** A repeated measures design was employed. Task order (choice-shopping list vs shopping list-choice) and placement recall (recall vs. no recall) formed the independent variables. Brand choice was the dependent variable for all participants.

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<sup>5</sup> Sample size determined before data collection using Gravetter and Wallnau (2014) calculations for PaperOne Experiment Two ;  $\pi = .8$ ,  $df=2$ ,  $\alpha=.05$ ,  $\phi=.4$ , target  $N = 60$ .

Participants were randomly allocated to one of the three conditions; Control clip with Choice task, Placement clip with Choice task or Placement clip with Shopping List task.

The TV soap *Coronation Street* was chosen as it is popular within the UK (YouGov, 2011). Both clips featured three recently aired non-food ads and three typical scenes from *Coronation Street*. The second scene differed between the experimental and control videos. The experimental clip product placement scene featured a family sitting in their lounge. A teenager emerges from the kitchen holding an orange Kit-kit (candy bar) and says, "Orange Kit-Kat? They're your favourite." The Kit-Kat is held so the wrapper can be seen on screen for four seconds. The control clip featured an alternative scene with a similar tone and setting. The scene featured a mother, son and his partner sat in the family lounge discussing some recent events. Both clips were approximately six minutes and fifteen seconds in length.

After viewing a clip participants either completed the Shopping List task or were offered a choice of biscuit as a 'thank-you' for taking part. Participants in the Shopping List task group were presented with a white sheet of A4 paper with black text, no images of the brands were shown. The instructions asked participants to imagine they were shopping for groceries and needed to choose one of two brands from each product category. A list of ten food items was displayed, each with two relevant brands. The brands for the 'Chocolate Biscuits' product category were Kit-Kat and Club. Participants in the Choice task group were offered to pick a *Jacobs Club* or orange *Kit-Kat* biscuit. *Jacobs Club* was selected as an alternative snack as orange *Club* has similar perceptual features e.g. size, shape and packaging (silver foil in an orange paper sleeve) to orange *Kit-Kat*, with the brand being the only prominent distinguishing feature.

Twenty-four survey questions were compiled. The Stanford Brief Activity Survey, (Taylor-Piliae et al., 2006) was included to assess physical activity levels. The following section consisted of the

demographics and TV viewing habits questions from the Ofcom Media Tracker (2011). In addition, scales of hunger and fatigue were included as control variables (10: Extremely hungry/tired – 1: Not hungry/tired at all, reverse).

**Procedure.** (see Figure 1) Following ethical approval from the university, participants were seated in a quiet room and completed the study on an individual basis. To avoid compromising the implicit element of the study a foil purpose of the study was presented. The foil explained that the study aimed to investigate how the number of adverts watched before a television show influence content recall. Participants were tested individually. The participant viewed a Coronation Street clip then completed either the Brand Choice or Shopping List task.

Those in the choice task condition were offered to choose a biscuit as a ‘thank-you’ for taking part. Participants allocated to the Shopping List task were given the task instructions and brand list. The participant was asked to read the instructions, complete the task and indicate when they were happy with their responses. Once the first phase of preference tasks had been completed the experimenter used the series of prompts below (adapted from Auty & Lewis, 2004) to establish whether the participant recalled seeing the featured brand.

- What was happening in the second scene?
- Was anything else happening?
- Did you notice any food or drinks?
- What were the snacks shown?
- What was the biscuit shown?
- What was the colour of the packet?
- What brand was the biscuit?

A second phase of preference tasks was conducted after the explicit recall task. Participants who had previously completed the Shopping List task completed the biscuit Choice task. Those who had

previously completed the biscuit Choice task completed the Shopping List task. All participants then completed the survey and were debriefed. The study took approximately fifteen minutes to complete.

## Results

We will conduct a series of analyses to investigate whether the product placement effects observed in the first brand preference measures (see Experiment 2, Paper 2) are replicated in the second preference measures. Additional analyses explore order effects and the impact of placement recall on subsequent brand preference.

Table 1. *Preference task order and biscuit choice*

		Biscuit choice N (%)			
		<u>First</u>		<u>Second</u>	
		<u>Kit-Kat</u>	<u>Club</u>	<u>Kit-Kat</u>	<u>Club</u>
Condition	Choice-List (N=22)	16 (73)	6 (27)	18 (82)	4 (18)
	List -Choice (N=21)	20 (95)	1 (5)	12 (57)	9(43)
	Control (unprimed) (N=21)	9 (43)	12 (57)		

We initially used a chi square to examine whether viewing the product placement increased the second brand preference task. The brand preference of those who completed the choice task as their second implicit preference task (List-Choice condition) was compared against the choice of those who viewed the control clip (see Table 1). There was no significant difference in the brand choice of those who did and did not view the product placement ( $\chi^2 (1, n=42) = .09, p=.36$ ). Contrary to the increase in preference for the featured product observed in the first choice measure (see H1 main paper), the results indicate viewing the product placement did not influence biscuit choice for the second choice task. H1 is not supported.

Previous analysis (see H2 main paper) show that the measure used can moderate reported brand preference. We observed that the shopping list task indicated in a greater preference of the featured brand than the choice task. To investigate whether the measure used indicated a difference in the second preference task (see Table 1) we compared brand preference of those who completed the shopping list and choice tasks. There was no significant difference in the brand preference of those who completed the brand choice or list task, ( $\chi^2 (1, n=43) = 3.10, p = .08, \Phi = .27$ ). Contrary to the observation from the first preference task, the second assessment of brand preference does not reveal a measure dependent difference in the efficacy of a product placement. H2 is not supported.

To explore potential order effects of task presentation on brand preference (H3) we compared the first and second brand preference for each condition. Participants in the choice-list group showed no significant difference in brand preference between the first (choice) and second (list) measure, (McNemar,  $p = .50$ ). The finding indicates that order effects do not influence brand preference. Yet, the brand preference of those in the list-choice group significantly differed between the two measures, (McNemar,  $p < .01$ ). Preference for the featured product was significantly greater on the shopping list task than the subsequent brand choice task. The results indicate that order effects can moderate brand preference, yet this does not appear to affect all orders of presentation.

To examine whether recall of the placement influenced the brand preference on subsequent choice tasks (H4) we conducted a series of chi square analyses. We initially looked at the relationship between recall and brand preference of all participants, regardless of condition. The results indicate that recall does not influence brand preference ( $\chi^2 (1, n=43) = .04, p = .53, \Phi = .10$ ). The analysis was repeated for each condition to investigate whether the proposed negative effect of placement recall on placement was observed in the choice or list measure. Placement recall did not affect brand preference in either the choice-scale ( $\chi^2 (1, n=22) = .04, p = .84, \Phi = .04$ ) or the scale-choice ( $\chi^2 (1, n=21) = .40, p = .53,$

$\Phi=.14$ ) condition. The results indicate that placement recall does not mediate subsequent brand preference of either measure.

## **Discussion**

The current analyses aim to explore the effect of using multiple measures of placement effects and whether the order in which implicit and explicit measures are presented can mediate priming influence. We will discuss four observations; first, the increased choice of the featured product observed in the first phase choice were not replicated in the second phase choice; second, contrary to the observations in the first phase of preference tasks, preference of the featured product did not significantly differ between those who completed the choice and Shopping list task; third, we observe order effects of implicit measures, the choice-list group showed no significant difference in brand preference between the first (choice) and second (list) measure, yet the list-choice group had a significantly lower choice of the featured product in the second phase of preference measures; fourth, recall of the placement did not mediate subsequent brand choice. Based on these findings we propose that the order in which measures of placement effects are conducted can result in significant differences in the observed efficacy placement. In addition, we cautiously propose that administering the explicit recall task before the preference measure does not appear to negatively affect brand preference.

Contrary to prediction the priming effects were not evident in the second phase choice task (list-choice group). In isolation this would suggest that the priming effects can rapidly decay. Yet, the priming effects were observed by the second phase Shopping list task (choice-list group). The contrasting effects suggest that priming can resist (short term) decline, as indicated by existing research (Shapiro & Krishnan, 2001; Zajonc, 2001). However, we suggest that the longevity of the priming effects are mediated by other variables.



We observe that recall of the placement did not negatively affect placement influence. The placement used in the current study did not appear to activate persuasive defences, either during initial viewing (as indicated by the first phase of measures) or when recalled (indicated by the second phase of measures). We highlight that it is possible for a placement to be recalled without activating persuasive defences (Van Reijmersdal, 2009). Yet, should a placement be considered intrusive, incongruent or overly prominent it is likely to activate persuasive defences (Russell, 2002). We suggest that explicit measures of prominent placements could inflate persuasive defences on subsequent implicit measures. This proposal may account for a negative correlation between brand attitude and recognition (Study 2), and that priming effects being observed before but not after a placement recognition task (Study 3, Barnhard et al., 2016). Consequently, we recommend that implicit tasks are conducted before explicit measures.

The most intriguing result is that priming effects were revealed by the second preference task for the choice-list group but not the list-choice group. Contrary to our predictions, the decline in placement influence is specific to the order in which measures are presented, rather than the use of multiple measures. We propose three alternative explanations for this unexpected finding. First, while completing the Shopping list task participants read the *Kit-Kat* and *Club* brand names. Text based brand primes have been shown to influence brand preference, particularly when presented in a list rather than in sentences (Lee, 2002), as in the current study. The Shopping list task presented a list of product categories with two associated brand names, which included *Kit-Kat* and *Club*. We suggest that the list measure may have “re-primed” participants, simultaneously increasing preference of both brands. Thus, choice of the featured and alternative brand was equal following completion of the Shopping list task.

Second, we suggest that completion of the Shopping list task could have activated persuasive defences. This could have resulted in lower choice of the featured brand observed in the current study. Completion of the Shopping list task may have required a greater allocation of attentional resource,

whereas the choice task choice task stimulate a smaller amount of attentional resource so would be unlikely to activate persuasive defences. Hence, those in the list-choice group would hold a less positive opinion of the featured brand during the choice task. Conversely, those in the choice-list group would not have persuasive defences activated until the list task. Yet, as placement recall did not negatively correlate with choice of the featured brand in the list-choice group this rationale cannot account for the observed effects.

Third, completion of the Shopping list task may have acted as a conceptual prime, as the brands were presented within the context of a shopping activity. The category of “chocolate biscuits” may have been activated. This may have minimised the impact of the perceptual fluency which was induced by the product placement, resulting in reduced choice of the featured product following the Shopping list task. Based on the existing literature and observed results we suggest that the first proposal offers the most probable explanation for the unexpected findings.

The current research has demonstrated that using multiple implicit measures of placement influence may decrease or remove priming effects of successive tasks. This could result in the efficacy of placements being underestimated. An interaction between the Shopping list and choice task was observed. However, it is unknown whether this effect would be present in other measures or if this effect is specific to the current study. This observation provides a stimulating point of reflection for existing research which has employed multiple measures of implicit influence. We propose that multiple implicit measures should be avoided when exploring the effects of product placement exposure. Yet, identification of measures which do and do not interact may provide a fruitful area of research.

## **Conclusion**

Chapter Two address two main aims. First, to investigate whether product placement effects can be replicated. Second, to investigate the assumption that implicit measures of placement influence are

equivalent. The appendix reports a series of analyses exploring order effects of implicit and explicit measures. These analyses are relevant to the thesis but were considered to be beyond the scope of the main paper.

Study 1 indicated that observing the product placement significantly increased choice of the featured brand compared to an unprimed choice. However, recalling the placement did not influence brand choice. Study 2 reproduced these findings, indicating that the influence of product placement on product choice can be reproduced. A comparison of the two implicit measures of preference revealed that the Shopping List Task suggested a greater preference for the featured brand compared to the Brand Choice Task. Hence, the measure chosen to gauge the efficacy of a placement may inadvertently influence the observed placement influence. The analyses presented in the Appendix demonstrate the order in which tasks employed may further impact the observed placement effect. Yet, the order effects may be specific to the measures employed.

We conclude that product placement influence can be replicated, however the diverse range of measures used and order of tasks presentation may have contributed to the lack of consistency in existing placement research.

## Chapter Three

### Introduction

The previous chapters introduced variables which may contribute to product placement vulnerability and analysed methodological methods of placement research. Within this chapter we investigate the effect of ageing and TV viewing behaviours mediate product placement effects. The chapter is presented in two sections. First, the main paper outlines and investigates key hypotheses which explore how multi-tasking, motivation, and cognitive differences associated with ageing influence placement effects. The Appendix contains a series of supplementary analyses which investigate eye movements during the decision making process following product placement exposure. The additional analyses provide an initial insight into the effects of ageing and placement influence on the decision making process.

Numerous studies have investigated how this product placement influence consumer memory and brand preference (e.g. Boerman, Van Reijmersdal & Neijens, 2014, Noguti & Russell, 2014). However, research in this area has primarily been conducted with younger adults and children (Auty & Lewis, 2004; Chan, Lowe, & Petrovici, 2017). Older adults watch more television than any other age group (Ofcom, 2015) and account for almost one quarter of the population of the USA (U.S. Census Bureau, 2011-2015). Yet, the impact of product placement exposure on this age group is relatively understudied. In this chapter we explore whether cognitive differences associated with ageing mediate vulnerability to placement influence.

In addition, we investigate the extent to which multi-tasking or focusing on mediates the efficacy of placement exposure. Multi-tasking while watching TV has become an increasingly common habit for both younger (Ofcom, 2013) and older adults (Voorveld & van der Goot, 2013). Multi-tasking while watching TV reduces available cognitive resource (Lang, 2000) may inadvertently inflate consumers'

susceptibility to advertising (Gillespie, Joireman & Muehling, 2012). As ageing is associated with a reduction in cognitive resource (Yoon, Lee & Cole, 2009) we investigate how this common habit may mediate placement vulnerability in older adults.

The current chapter uses the real-world method of product placement to examine whether cognitive ageing and TV viewing behaviours impact product placement recall and brand choice. We examine whether multi-tasking and focusing on a TV program influences susceptibility product placement effects. In addition, we use eye-tracking data to explore age differences in the decision making process following placement exposure.

## **Paper Two**

**The serendipitous decline of memory in aging.**

**An age-related dissociation in the mechanisms of product placement influence.**

## **Abstract**

Product placements influence consumer brand attitude and product choice, though explicit and implicit processing. Aging can decrease explicit memory yet priming remains stable, potentially increasing vulnerability to placement influence. Multi-tasking and motivation may also mediate vulnerability. In Study 1, 260 older and younger adults viewed a product placement clip with either increased motivation or divided attention. Placement recall had no influence on the brand choice of younger adults. Older adults who recalled the placement were more likely to choose the featured product. Yet, those who did not recall the placement showed no evidence of implicit influence. Eye-tracking data from Study 2 (N=60) indicated that older adults require longer to explicitly process product placements, and if the placement was not recalled, fixation time on the placement was negatively associated with choice of the featured brand. We propose that aging may offer a serendipitous protection from implicit product placement influence.

## Introduction

The use of product placements has rapidly increased dramatically over recent years, particularly in TV shows, in what has become a billion dollar industry (PQ Media, 2012; Tessitore & Geuens, 2013). Product placements can influence consumer brand attitude and preference (Russell, 2002; Russell, Stern & Stern, 2006; Noguti & Russell, 2014), without the viewer's awareness (Yang & Roskos-Ewoldsen, 2007) and are known to be influenced by a range of contextual factors. For example, multi-tasking while watching TV can reduce the ability to remember the content of a TV show (Zhang, Jeong & Fishbein, 2010). It has become increasingly common, with over half of viewers performing an additional task while viewing TV (Intel, 2011). Though a placement may receive less attention than the advertiser intended, this increasingly common habit may inadvertently inflate consumers' susceptibility to advertising (Gillespie, Joireman & Muehling, 2012). Several studies have investigated how product placement influence younger adults (Chan, Lowe & Petrovici, 2015) and children (Auty & Lewis, 2004), yet the elderly have been neglected. As older adults (65+ years) watch more television than any other age group (Ofcom, 2015), it is important to investigate the effect of this form of advertising on this age group. We are not aware of any studies to date which have explored the impact of placement exposure on the brand recall and choice of older adults. In this paper we will address two issues which emerge from the product placement literature: first, whether cognitive differences associated with aging increase vulnerability to placement influence; second, the extent to which multi-tasking or focusing on a TV program which featured a product will mediate the efficacy of the placement.

Product placements can influence brand attitude either with or without the awareness of the viewer (Auty & Lewis, 2004; van Reijmersdal, Neijens & Smit, 2007). A subtle placement is less likely to be remembered, yet can result in a more positive attitude toward the featured product (Gillespie et al., 2012). Conversely, prominent placements are likely to be recalled by a viewer but can result in a less



positive attitude toward the featured brand (Cowley & Baron, 2008; Russell, 2002) due to the activation of persuasive defences (Friestad & Wright 1994). Consequently, placements which are not explicitly observed can positively influence brand attitude while bypassing the potentially negative effects of persuasive defences (Ong & Meri, 1994; Russell et al., 2006). As a decline in recall is commonly associated with aging (Ballesteros & Mayas, 2014; Geraci & Hamilton, 2009), we suggest that older adults are less likely to recall a placement (H1).

Older consumers may not only be less likely to recall a placement, but are also less aware of product placement than any other age group (Ofcom, 2013). Thus, this age group may lack the relevant persuasive defences to identify and protect against placement influence (see Campbell & Kirmani, 2000; de Gregorio & Sung, 2010). In addition, aging consumers have been reported to rely more upon feelings of familiarity (Whittlesea & Price, 2001) and heuristic processing (Yoon, Cole & Lee, 2009) when making purchase decisions. Based on these findings, we suggest that older adults will have greater vulnerability to placement influence. We hypothesize that older adults will be more likely to choose the featured product than younger adults (H2). As priming remains relatively stable in older adults, yet explicit memory declines (Ballesteros & Mayas, 2014; Wiggs, Weisberg & Martin, 2006) we suggest that older adults will exhibit a greater implicit susceptibility to placement influence than younger adults (H3).

Although a decline in explicit memory is commonly associated with aging (Yoon et al., 2009), numerous studies have demonstrated that deficits in memory can be reduced if older adults are sufficiently motivated (Touron, Swaim & Hertzog, 2007). Early research showed that a performance incentive, being entered into a lottery for each correctly recalled word, significantly improved recall in older adults (Hill, Storandt & Simeone, 1990). Motivation has also been shown to increase the performance of younger adults. Allocating high-or low values to words has been demonstrated to provide sufficient incentive to improve the recall of both younger and older adults (Castel, Farb & Craik 2007).

Though the recall of low-value words was significantly greater for younger adults, the recall of high-value words in older adults equalled that of younger adults. This suggests that older adults may respond to motivational prompts more than young adults and this might minimise the effects of cognitive decline. We suggest that increasing motivation to focus on the program clip will increase the recall rate of a featured product (H4a). However, given that placement recall can activate persuasive defences and result in a less positive attitude toward the featured brand (Russell, 2002), we suggest that those in the motivation condition will have a lower choice of the featured product (H4b).

Over half of UK consumers regularly multi-task when watching TV, this is particularly pronounced in younger consumers with 74% of those aged 16-24 carrying out a secondary task on a regular basis (Ofcom, 2013). Older adults also multi-task while watching TV. Secondary activities are age specific with younger adults commonly using a second screen, laptop or mobile phone, whereas older adults are more inclined to check emails or read newspapers (Voorveld & van der Goot, 2013).

As attention is a limited resource, viewers must divide their focus between viewing the TV and their secondary task (Lang, 2006). This may result in having insufficient cognitive resource to attend to both tasks successfully. Subsequently, deficits in encoding, recall and recognition are observed (Anderson & Craik, 2000; Baddeley, 2000; Baddeley, Lewis, Eldridge, & Thomson, 1984; Spataro et al., 2011). Though divided attention and limited resource can have a negative impact on explicit memory, this effect is not generally observed in implicit recall (Mulligan & Brown, 2003), as implicit memory is automatically encoded, whereas explicit memory requires attentional resource (Lang, 2006). Multi-tasking has been shown to reduce the recall and comprehension of TV shows (Angell, Gorton, Sauer, Bottomley, & White, 2016; Zhang et al., 2010) and have a positive impact on brand attitude (Jeong & Hwang, 2016).

Increased cognitive load and reduced availability of cognitive resource can increase younger adults' susceptibility to product placement influence (Jeong & Hwang, 2012). However, aging is associated with a decline in the availability of cognitive resource (Yoon et al., 2009) and drop in performance on cognitive tasks. Deficits can be particularly pronounced when processing new information or performing tasks when distracted by other activities (Moscovitch & Winocur, 1995; Yoon et al., 2009). The decline of cognitive resources observed in older adults may inhibit the activation and application of any persuasive defences (Friestad & Wright, 1994). As lowered cognitive resources have been shown to increase vulnerability to product placements in younger adults (Jeong & Hwang, 2012), we suggest the effect being will increase with age. We hypothesize that divided attention will decrease placement recall (H5a) and increase choice of the featured product (H5b).

## **Study 1**

### **Introduction**

Study 1 investigates the impact of aging on product placement effects. Given the age related decline in explicit memory (Ballesteros & Mayas, 2014; Geraci & Hamilton, 2009), we predict that older adults will be less able to recall seeing a placement. As being aware of a product placement is a key element of preventing influence (Russell, 2002), we propose that older adults will more susceptible to placement influence, particularly when the placement is implicitly processed. Research has shown that motivation can improve recall, especially in older adults (Castel et al., 2007), while multi-tasking can negatively impact recall, yet increase placement vulnerability of younger adults (Jeong & Hwang, 2016). Hence, the role of motivation and divided attention on product placement effects in younger and older adults will be explored. Implicit and explicit measures will be used to test the hypotheses outline above.

In addition to the main hypothesis, we will investigate the role of hunger and fatigue as mediators of placement effects. Age differences and time of day effects can influence levels of fatigue

(Dahm et al., 2011) and hunger (Lowden, et al., 2001; McKiernan, Houchins & Mattes, 2008), both of which can mediate product placement vulnerability (Bermeitinger et al., 2009; Gillespie et al., 2012; Karremans, Strobe & Klaus, 2006). We investigate the role of hunger and tiredness on the placement vulnerability of older and younger adults.

## Method

**Participants.** Two hundred and sixty older ( $N=137$ ; 60+ years,  $M=70.59$ ,  $SD=6.71$ ) and younger ( $N=123$ ; 18-25 years,  $M=19.18$ ,  $SD=1.87$ )<sup>6</sup> adults were recruited through local clubs and organizations across the north of England or via Lancaster University. Participants took part on a voluntary basis or received course credit. As Club biscuits are only available in the UK and Ireland it was necessary for participants to be British or Irish to avoid brand novelty effects. Unfamiliar brands can attract greater levels of attention than familiar brands (Choi, Lee & Li, 2013).

**Design and Materials.** A 3 (Divided Attention vs Motivation vs Control) X 2 (Age group: 18-25 vs 60+ years) factorial design was employed. Brand choice and placement recall were the dependent variables. Participants within each age group were randomly allocated to one of the conditions.<sup>7</sup>

As primes or prompts activate the goals of consumers (e.g. Bargh, 2006; Janiszewski & Cunha, 2008), a prompt was developed to increase participant motivation in one group. The experimenter informed participants in this condition that they might receive a small prize following the study if they performed well. In fact, all participants were told they had done well and were offered to select one of two snacks offered (the product choice described below), but the 'motivation group' was unaware of this. Participants allocated to the Divided Attention condition were informed that they would be

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<sup>6</sup> Sample size was determined before data analysis using Soper (2006) calculations;  $\pi = .8$ ,  $\alpha = .05$ ,  $df = 6$ ,  $f^2 = .07$ , minimum required  $N = 200$ .

<sup>7</sup> Demographic details and TV viewing habit measures are not reported.

presented with a series of numbers which they would be asked to recall when prompted. A series of eight digits was read out to the participant at a rate of one digit every 2 seconds (Van Dillen, Papies & Hofmann, 2013). Digit recall performance was an additional variable for participants who were assigned to the Divided Attention condition. Those assigned to the Control condition were not asked complete an additional task.

The TV soap *Coronation Street* was chosen as it is popular with both age groups (YouGov, 2011). All participants saw a short clip (6min 10sec) consisting of three recently aired non-food advertisements (Three Mobile, Royal Navy, Nivea) and three typical scenes from *Coronation Street*. The second scene featured a family sitting in their lounge. The characters are consoling their complaining auntie at which point one of the teenage children emerges from the kitchen holding an orange chocolate cookie, and says, "Orange Kit-Kat? They're your favourite." Approximately four minutes into the clip the boy holds the Kit-Kat so the wrapper can be seen on screen for four seconds. Previous research observed that viewing the Coronation Street clip significantly increased choice of the Kit-Kat compared to unprimed brand choice, a medium effect size was reported (Armstrong & Lewis, *in preparation*).

The screen was moved to one side and all participants were offered one of two biscuit options, either an orange *Kit-Kat* or an orange *Club*. *Jacobs Club* was selected as an alternative snack to demonstrate preference shift as orange *Club* is the market leader for orange flavoured biscuits and has similar perceptual features e.g. size, shape and packaging (silver foil in an orange paper sleeve) to *Kit-Kat*. We assessed physical activity levels by compiling a survey of 24 questions adapted from the Stanford Brief Activity Survey (Taylor-Piliae et al., 2006), and included demographics and TV viewing habits (based on Ofcom Media Tracker, 2011), and control two scales, of hunger and fatigue (10: Extremely hungry/tired – 1: Not hungry/tired at all).

**Procedure.** (see Figure 1) Ethical clearance was obtained from the Faculty of Science and Technology Ethics Committee of Lancaster University. Participants were tested individually in a quiet

room. The foil for the study, an investigation of how the number of adverts watched before a TV show influenced recall, was presented to avoid compromising the implicit aspect of the research. Having been allocated to group each completed the respective task manipulation (Divided Attention, Motivation or Control), then viewed the Coronation Street clip and ads. Participants in the cognitive resource condition were then asked to recall the digits that they had been presented with which were noted by the experimenter. All participants were then asked if they would like to select (and eat) a biscuit as a 'thank-you' for taking part. Two of each brand were presented side by side on a small plate and the order was counterbalanced. Once the preferred brand had been selected the experimenter used the prompts below (adapted from Auty & Lewis, 2004) to establish if the placement could be recalled.

- What was happening in the second scene?
- Was anything else happening?
- Did you notice any food or drinks?
- What were the snacks shown?
- What was the biscuit shown?
- What was the colour of the packet?
- What brand was the biscuit?

Once the experimenter established whether the placement could be recalled, the survey was completed.

Participation in the study took approximately twenty minutes.

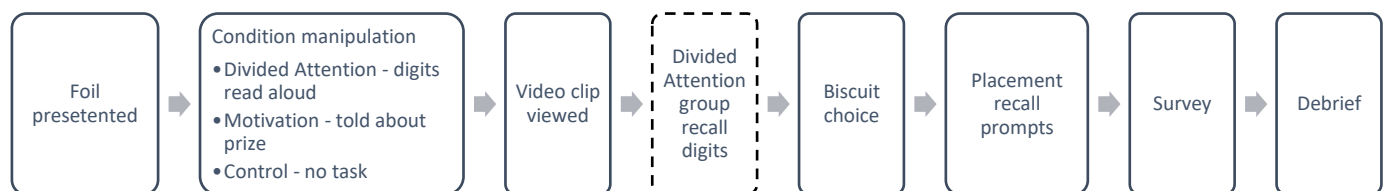


Figure 1. Presentation order of tasks.

## Results

**Control Scales.** Age differences and time of day effects can influence levels of fatigue (Dahm et al., 2011) and hunger (Lowden et al., 2001; McKiernan et al., 2008) both of which can mediate placement vulnerability (Gillespie et al., 2012; Karremans et al., 2006). We initially conducted a series of analyses to investigate whether the time of day and age influence levels of hunger and fatigue. A 2 (Age group: 18-25 vs 60+ years) X 2 (Time of day: a.m. vs p.m.) ANOVA was conducted to investigate the effect of age and time of day on fatigue and hunger (DVs). A main effect of age on fatigue was observed ( $F(1,256)=46.41$ ,  $p<.001$ ,  $\eta_p^2=.15$ ) with older participants reporting a lower levels of tiredness than young adults. Neither the main effect of time of day ( $F(1,256)=.84$ ,  $p=.36$ ,  $\eta_p^2=.003$ ) nor interaction between time of day and age ( $F(1,256)=.01$ ,  $p=.96$ ,  $\eta_p^2<.001$ ) were significant. A main effect of age group on hunger was observed ( $F(1,256)=17.38$ ,  $p<.001$ ,  $\eta_p^2=.06$ ) with older adults reporting significantly lower levels of hunger than young adults. Neither the main effect of time of day ( $F(1,256)=2.37$ ,  $p=.13$ ,  $\eta_p^2=.01$ ) nor interaction between time of day and age ( $F(1,256)=.63$ ,  $p=.43$ ,  $\eta_p^2<.002$ ) on fatigue were significant. Thus, need-states do not appear to change significantly through the day, but older adults report a lower baseline of both hunger and fatigue than younger adults (see Table 1).

Table 1. *Control scales by age group.*

Age Group	Time of Day	<u>Tired</u>		<u>Hunger</u>	
		Mean	S.D.	Mean	S.D.
Younger (n=123)	AM	4.62	2.15	5.18	1.88
	PM	5.01	2.22	5.48	2.41
	Total	4.90	2.20	5.40	2.27
Older (n=137)	AM	7.25	2.32	6.56	2.94
	PM	7.55	2.34	7.52	2.58
	Total	7.52	2.33	7.41	2.63
Total	AM	5.46	2.51	5.62	2.34

(n=260)	PM	6.47	2.61	6.66	2.70
	Total	6.28	2.62	6.46	2.66

Table 2 displays the Placement Recall and Biscuit Choice (DVs) for each age group and condition (IV). The data suggest that older adults recalled the product less than the younger group, although note that choice was asked first.

Table 2. Placement Recall and Brand Choice of Age Group and Condition

	Condition	Recall N(%)		Brand Choice N(%)		
		Yes	No	Kit-Kat	Club	
Age group (years)	18-25 (n=123)	Control	24 (59)	17 (41)	26 (63)	15 (37)
		Motivation	25 (61)	16 (39)	30 (73)	11 (27)
		Divided Attention	29 (71)	12 (29)	27 (66)	14 (34)
		Total	78 (63)	45 (37)	83 (67)	40 (33)
60+ (n=136)		Control	9 (20)	37 (80)	28 (61)	18 (39)
		Motivation	9 (20)	36 (80)	25 (56)	20 (44)
		Divided Attention	19 (41)	27 (59)	31 (67)	15 (33)
		Total	37 (27)	100 (73)	84 (61)	53 (39)

To investigate H1 we conducted a chi square analysis assessing the impact of age (younger vs older adults) on placement recall (placement recalled vs. not recalled). The analysis was significant ( $\chi^2 (1, n=260) = 34.83, p < .001, \Phi = .37$ ). Table 2 (see the Recall column) indicates that the younger participants were twice as likely to remember seeing the placement. Hence, H1 is supported.

To ensure that viewing the product placement clip influenced primed participants we compared choice in the current study against the unprimed preference established by a previous study (see (Armstrong & Lewis, *in preparation*). We observe that viewing the placement significantly increased the choice of the featured product for younger ( $\chi^2 (1, n=143) = 6.68, p = .01, \Phi = .22$ ) and older adults ( $\chi^2 (1, n=149) = 4.47, p = .03, \Phi = .17$ ).



To examine whether the brand choice of older adults was more likely to be influenced by viewing a product placement than that of younger adults (H2) we conducted a chi square analysis. The analysis was not significant ( $\chi^2(1, n=260) = 1.07, p = .30, \Phi = .06$ ) indicating that older adults were equally as likely to choose the featured product as younger adults (see the Brand Choice column in Table 2). H2 is not supported.

We next conducted a logistic regression to investigate which variables predict brand choice. To find the model which best fitted the data, we initially conducted a saturated model which included the main effects and interactions of the independent variables (Recall, Age Group, Condition) and controls (Time of Day, Hunger, Tired). The saturated model was highly significant ( $\chi^2(44, n=137) = 83.90, p < .001$ , Nagelkerke  $R^2 = .38$ ). However, it produced very large standard errors on several variables (e.g. Recall x Time of Day, S.E. = 125850.49) and this suggested that the model did not converge sufficiently well. In order to avoid type I errors we proceeded to conduct an analysis to test each hypothesis. Due to significant age differences in the control variables and recall of the placement, which mediate placement vulnerability, we conducted separate regression models for each age group.

Informed by the initial analyses above and existing literature (Study 1; Auty & Lewis, 2004; Cowley & Baron, 2008) the first analysis assessed whether placement recall influenced the brand choice of younger and older adults. Younger adults were equally as likely to pick the featured product, whether the placement was recalled or not ( $\chi^2(1, n=123) = .06, p = .80, \Phi = .02$ ). Contrary to our prediction, older adults who recalled the placement were more likely to select the featured product ( $\chi^2(1, n=137) = 6.22, p = .01, \Phi = .21$ ). However, those who did not recall the placement did not show an increased implicit preference for the featured product (see Figure 2).

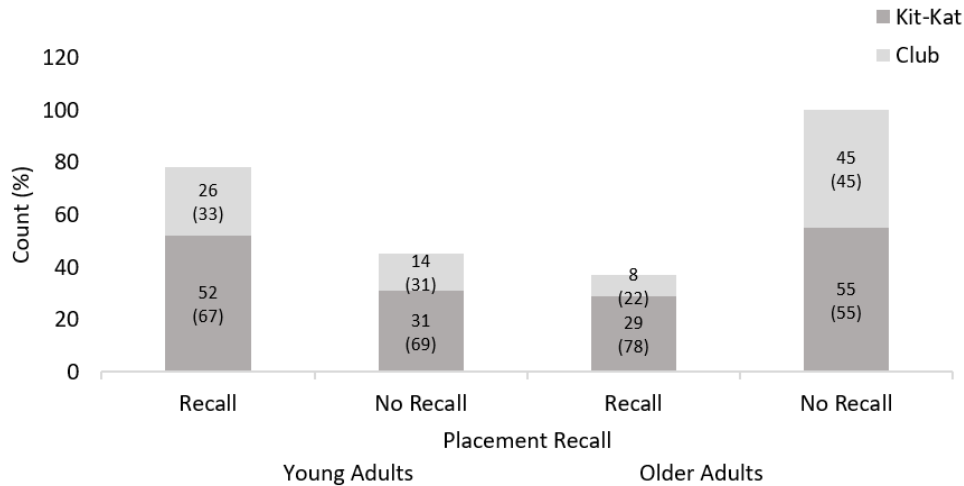


Figure 2. Brand Choice of Younger and Older Adults by Placement Recall

Table 3. Summary of Logistic Regression Analysis for Variables Predicting Placement Recall.

Variable	Younger Adults				Older Adults			
	B	SE	Wald	OR	B	SE	Wald	OR
Condition			1.46				6.92	
Control vs Motivation	-.10	.45	.05	.90	-.03	.53	.003	.97
Control vs Divided Attention	-.54	.47	1.32	.58	-1.06	.48	4.95	.35*
Constant	-.35	.32	1.18	.71	1.41	.37	14.47	4.11

\*p<.05, \*\*p<.001

To examine whether the ability to remember a product placement is mediated by the viewers' attention to the clip, we assessed the impact of motivation and divided attention on placement recall of younger and older adults (see Table 3). We observed that neither increased motivation nor divided attention significantly influence placement recall of younger adults ( $\chi^2(2, n=123) = 1.50, p = .47, \text{Nagelkerke } R^2 = .02$ ). We repeated the analysis with the data from older adults. The model was significant ( $\chi^2(2, n=137) = 6.95, p = .03, \text{Nagelkerke } R^2 = .07$ ). As Table 3 shows, increased motivation did not significantly influence the placement recall of older adults H4a is not supported. However, those in the Divided Attention condition were almost three times more likely to recall the placement than those in the Control group (see Table 3). Divided attention significantly influenced placement recall, however placement recall was increased rather than decreased as predicted. Hence, H5a is not supported.

Table 4. *Summary of Logistic Regression Analysis for Variables Predicting Product Choice.*

Variable	Younger Adults				Older Adults			
	B	SE	Wald	OR	B	SE	Wald	OR
Condition			.96				1.34	
Control vs Motivation	-.45	.48	.90	.64	.22	.43	.26	1.24
Control vs Divided Attention	-.11	.46	.05	.90	-.28	.44	.42	.75
Constant	-.55	.32	2.88	.58	-.44	.30	2.14	.64

\*p<.05, \*\*p<.001

To examine whether a viewer's attention to a TV show influences the impact of a product placement on brand choice, we assessed the impact of motivation and divided attention on product choice of younger and older adults (see Table 4). We observed that neither increased motivation nor divided attention significantly mediate the product choice of younger adults ( $\chi^2 (2, n=123) = .98, p=.61$ , Nagelkerke  $R^2=.01$ ) or older adults ( $\chi^2 (2, n=137) = 1.36, p=.01$ , Nagelkerke  $R^2=.01$ ). Hence, H4b and H5b are not supported (see Table 4).

Table 5. *Interaction between Condition and Placement Recall on Product Choice.*

Variable	Younger Adults				Older Adults			
	B	SE	Wald	OR	B	SE	Wald	OR
Condition x Recall			2.75				6.27	
Control vs Motivation x Recall	-.69	.56	1.52	.50	-.45	.73	.38	.64
Control vs Divided Attention x Recall	.35	.46	.57	1.41	-1.90	.77	6.06	.15*
Constant	-.69	.26	7.37	.50	-.24	.19	1.54	.79

\*p<.05, \*\*p<.001

### Exploratory Analyses

Informed by the analyses above which demonstrated that the Divided Attention condition can increase placement recall (see Table 3) and that Placement Recall can mediate product choice of older adults (see Figure 2) we investigated the interaction between placement recall and condition on product choice. The model was not significant for younger adults ( $\chi^2 (2, n=123) = 2.96, p=.23$ , Nagelkerke  $R^2=.03$ ), indicating that condition and placement recall did not significantly interact to mediate product choice. We repeated the analysis using the data from older adults. A significant model was obtained ( $\chi^2 (2, n=137) = 9.05, p=.01$ , Nagelkerke  $R^2=.09$ ). Table 5 shows that increased Motivation and Recall did not

significantly interact to mediate placement recall. However, a significant interaction between Divided Attention and Placement Recall appears to explain the significance of the model. Older adults in the Divided Attention condition who recalled the placement were approximately six times more likely to choose the featured product than those in the Control group (see Table 5).

## **Discussion**

Three key issues emerge from the results. First, older adults are less likely to remember seeing a product placement than younger adults. Second, a dissociation of placement influence was observed in the older participants. Placement exposure only increases the product choice of older adults when the placement was recalled, yet those who did not recall the product show no influence of implicit processing. Conversely, younger adults are equally as likely to choose the featured product whether implicitly or explicitly processed. Third, paradoxically, divided attention increased placement recall and subsequently choice of the featured product in older adults only. We defer further analysis of these issues until the General Discussion.

Before this, we conducted a second study to establish the robustness of the absence of implicit influence in older adults and investigate whether the absence of influence is due to differences in attention toward the placement or to impaired implicit processes.

## **Study 2**

### **Introduction**

In Study 2 we investigate the paradoxical effect that older adults are explicitly but not implicitly influenced by placement exposure, whereas younger adults exhibit both implicit and explicit susceptibility. To examine these effect we repeated the Control procedure from Study 1, both older and

younger adults wore Tobii eye-tracking glasses while observing the Coronation Street clip featuring the product placement. No additional task manipulations were implemented.

In this study we will assess the robustness of the dissociation of product placement influence in older adults. Based on the findings from Study 1, we hypothesize that older adults who recall the placement will have a greater choice of the featured product than those who do not recall the placement (H1a). Yet, the product choice of younger adults will not be mediated by placement recall (H1b). Greater visual attention to a print advertisement is associated with increased advert recognition (Pieters, Warlop, & Wedel 2002). Applying this principle, we hypothesize that longer fixation time on the product placement will result in greater recall (H2). As attention to a brand can increase subsequent preference (Chandon, 2002; Pieters & Warlop 1999), we predict that a longer fixation time on the product placement will result in a greater choice of the featured product (H3).

## Method

**Participants.** Sixty-five older (60-83 years, S.D= 6.47, n=32) and younger (18-25 years, S.D= 1.57, n=33)<sup>8</sup> adults were recruited via Lancaster University and social groups in the North West of England. Five older adults were removed from the analysis as they declined a biscuit<sup>9</sup>. Participants took part in the study on a voluntary basis or received a course credit. Three participants were removed from the latter analysis due to incomplete eye-tracking data. All participants were British or Irish to avoid brand novelty effects (Choi et al., 2013).

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<sup>8</sup> Sample size was determined before data analysis using Soper (2006) calculations;  $\pi = .8$ ,  $\alpha = .05$ ,  $df = 3$ ,  $f^2 = .15$ , minimum required  $N = 67$ .

<sup>9</sup> Due to the small number of participants in the category it was not possible to perform robust analyses with the group data.

**Design and Materials.** Age group formed the independent variable with biscuit choice and placement recall being the dependent variables.<sup>10</sup> Tobii Pro 2 eye-tracking glasses were used to record visual attention of the participant while watching the video clip and choice task. Tobii Glasses Controller software was used to calibrate each participant before being shown the video clip. Windows Movie Maker was used to analyse the data. The frequency and duration of fixations toward the featured product during the video clip and choice task were recorded and analysed. Participants viewed the Coronation Street clip and were offered the choice of one of two biscuit options, either an orange *Kit-Kat* or an orange *Club*, as described in Experiment 1. The survey and control scales (Experiment 1) were completed.

**Procedure.** Following ethical approval, the study was conducted in quiet room on an individual basis. To avoid compromising the implicit element of the study a foil purpose of the study was presented (see Study 1). Participants were informed that they would be asked watch a clip of Coronation Street while wearing eye-tracking glasses, answer some questions about the clip and complete a short questionnaire. Participants were asked to put on the Tobii eye-tracking glasses and the experimenter calibrated the glasses before showing the video. Having viewed the clip the participant was asked if they would like to select (and eat) one of the two biscuits (see Study 1). Participants were asked to wear the eye-tracking glasses while the experimenter occupied herself with closing the eye-tracking software, however the purpose of this instruction was to ensure the participant wore the glasses while selecting a biscuit. The series of prompts from Experiment 1 (adapted from Auty & Lewis, 2004) were used as required to establish whether the participant could recall the placement.

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<sup>10</sup> Demographic details and TV viewing habit measures not reported. We report all other exclusions and manipulations in the study.

Participants completed the survey then were debriefed and thanked for their time. The study took approximately twenty-five minutes to complete.

## Results

To ensure the novel observation of a dissociation between placement recall and the product choice of older adults could be replicated, we initially assessed whether recall mediated choice. Informed by the analyses above we conducted an analysis for each age group. As predicted, placement recall did not significantly mediate the product choice of younger adults ( $\chi (1, n=30) = .07, p = .80, \Phi = .05$ ). However, a significant effect was observed for older adults ( $\chi (1, n=27) = 3.91, p = .048, \Phi = .38$ ). Replicating the finding observed in Experiment 1, older adults who recalled the placement were more likely to choose the featured product than those that did not recall the product (see Table 6).

Table 6. *Control scales by age group.*

Age Group	Recall	Brand Choice N(%)	
		Kit-Kat	Club
Younger (n=30)	Yes	11 (55)	9 (45)
	No	5 (50)	5(50)
	Total	16 (53)	14 (47)
Older (n=27)	Yes	9 (82)	1 (18)
	No	7 (44)	9 (56)
	Total	16 (59)	11 (41)

We used eye-tracking metrics to explore the two elements of the dissociation observed in older adults. First, the absence of product placement influence on older adults who did not recall the featured product. Second, whether the low placement recall observed in older adults was due to the placement

not being attended to or cognitive processing differences. Table 7 shows the mean number of fixations and total time which the placement was fixated on. The data are shown for each age group, by placement recall (yes vs no) and brand choice (Kit-Kat vs Club).

Table 7. Mean number of fixations and total fixation time on placement by age group, recall and choice.

	Age	Recall		Brand choice	
		Yes	No	Kit-Kat	Club
Number of Fixations	Young	1.55 (.87)	1.90 (1.10)	1.31 (.79)	2.07 (1.00)
	Old	1.55 (.82)	1.13 (.81)	1.38 (.96)	1.18 (.60)
Total fixation time (ss.ms)	Young	.48 (.46)	.70 (.51)	.52 (.43)	.59 (.55)
	Old	.77 (.57)	.49 (.56)	.46 (.55)	.82 (.56)

Standard deviations shown in parentheses.

We conducted a logistic regression for each age group to explore how attention toward the placement influenced recall (see Table 8). The number of fixations and total time attending to the placement did not mediate the placement recall of younger adults ( $\chi^2 (3, n=30) = 2.03, p=.57$ , Nagelkerke  $R^2=.09$ ). The saturated model was significant for older adults ( $\chi^2 (3, n=27) = 10.98, p=.01$ , Nagelkerke  $R^2=.45$ ). However, a subsequent model offered a better fit of the data. The model showed older adults who had a higher number of fixations and looked at the placement for longer were more likely to recall the placement ( $\chi^2 (1, n=27) = 6.32, p=.01$ , Nagelkerke  $R^2=.28$ ). We conclude that older adults require greater attention to the product placement to enable recall of the item, while younger adults' recall of the placement is not mediated by the length time which they focus on the product. H2 is supported.

Table 8. Summary of Variables Predicting Placement Recall.

Variable	Younger Adults				Older Adults			
	B	SE	Wald	OR	B	SE	Wald	OR
Number of Fixations	.13	.70	.04	1.14				
Total Fixation Time	.00	.002	.04	1.00				
No. of Fixations x Total Fixation Time	-.001	.001	.44	1.00	.001	.001	3.94	1.001
Constant	.96	1.13	.73	2.62	-1.35	.62	4.80	.26

\* $p < .05$ , \*\* $p < .001$



Informed by the analyses (see Table 8) and to investigate the predication that fixating on the placement for longer will increase choice of the product (H3), we conducted a regression to examine the impact of placement recall and attention to the placement on product choice. To find the model which best fitted the data, we initially conducted a saturated model which included the main effects and interactions of placement recall, number of fixations and total fixation time.

Recall and attention to the product placement did not predict product choice of younger adults ( $\chi^2 (6, n=30) = 6.48, p=.37, \text{Nagelkerke } R^2=.26$ ), (Table 9). Conversely, a significant model was observed for older adults ( $\chi^2 (6, n=27) = 17.70, p=.01, \text{Nagelkerke } R^2=.65$ ). In order to identify the model which best fit the data we removed the variables which were furthest from significance. The model which best fitted the data ( $\chi^2 (1, n=27) = 13.86, p<.001, \text{Nagelkerke } R^2=.54$ ) indicated an interaction between placement recall and fixation time on product choice (see Table 9). Contrary to prediction, fixation time did not mediate product choice for older adults who recalled the placement. Paradoxically, those who did not recall the placement showed a negative effect of fixation time on choice, with a longer fixation time resulting in a lower choice of the featured product.

Table 9. *Summary of Variable Predicting Brand Choice.*

Variable	Younger Adults				Older Adults			
	B	SE	Wald	OR	B	SE	Wald	OR
Number of Fixations	1.49	.79	3.61	4.45				
Total Fixation Time (ms)	-.001	.001	.38	1.00				
Recall	1.26	2.17	.34	3.53				
Recall x Total Fixation Time	-.001	.004	.03	1.00	.01	.003	4.86	1.01*
Recall x Number of Fixations	-.71	1.60	.20	.49				
Recall x Total Fixation Time x Number of Fixations	<.001	.002	.02	1.00				
Constant	-2.11	1.14	3.45	.12	-1.60	.62	6.63	.20

\* $p<.05$ , \*\* $p<.001$

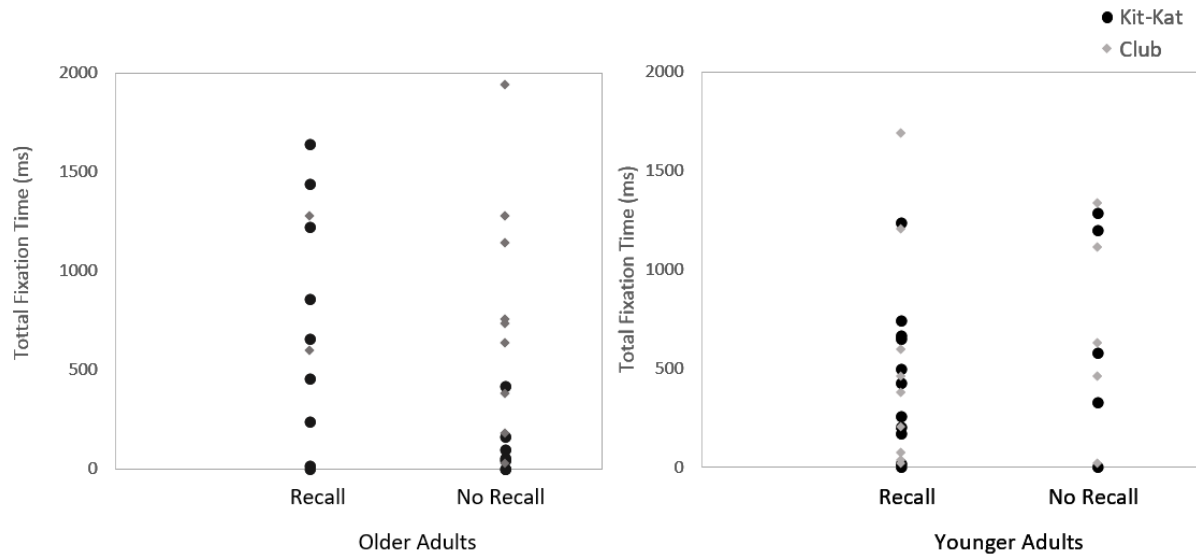


Figure 3. Brand Choice and Fixation time by Age Group, Placement Recall

### Exploratory Analyses

In order to understand the negative relationship between fixation time and choice for the featured product better we conducted a series of t-tests. Older adults who did not recall the placement and chose the featured product fixated on the placement for significantly less time ( $M=111.43\text{ms}$ ,  $SD=147.36$ ) than those who chose the alternative product ( $M=786.67\text{ms}$ ,  $SD=594.75$ ), degrees of freedom were adjusted accordingly [ $t(9.24)=3.28$ ,  $p=.01$ ,  $d=1.56$ ]. However, the number of fixations upon the placement did not differ between the two groups [ $t(7.89)=.63$ ,  $p=.55$ ], indicating that those who chose the featured product displayed multiple short fixations on the placement. *Figure 3* shows that of the older adults who did not recall the placement and chose the featured product, fixated on the placement for less than 500ms.

### Discussion

Replicating the dissociation observed in Study 1, the product choice of older adults was only influenced if the placement was explicitly processed. Conversely, selection by younger adults was equally

influenced, whether it was implicitly or explicitly processed. Those who did not recall the placement showed no evidence of implicit influence. The replication of the dissociation supports our proposal that older and younger adults have differing mechanisms which mediate product placement effects. In addition, the eye-tracking data revealed differences in the viewing patterns and subsequent placement effects of older and younger adults. We observe that fixation time did not mediate recall of younger adults, indicating that this group do not necessarily require longer to explicitly process the placement. Yet, greater attention to the product placement increased recall in older adults, suggesting that older adults require longer to process the featured product explicitly. Brand choice of older adults who recalled the placement was not influenced by fixation time on the placement. Paradoxically, those who did not recall the placement were less likely to pick the featured product, with greater fixation time resulting in a greater choice for the alternative product. The results suggest that unless the placement is implicitly processed in the first 500ms of being observed, the placement will have no influence on brand preference, regardless of an extended fixation period. Based on the findings of the current study we suggest that older and younger adults are both influenced by product placement exposure. Yet, the age-related differences in cognitive processing result in distinct effects on placement recall and brand choice.

### **General Discussion**

This is the first study to investigate the impact of placement exposure upon product choice of older adults. Based on previous research we predicted that older adults would be less able to recall the placement (Ballesteros & Mayas, 2014; Fleischman et al., 2004; Geraci & Hamilton, 2009), which would result in greater susceptibility to implicit influence. We observe four key issues from the results which we will discuss; first, older adults are less likely to remember seeing a product placement on TV; second,

an age-related dissociation of implicit and explicit processing of placements mediate vulnerability to placement influence; third, an age-related dissociation of placement fixation time on brand recall and choice; fourth, divided attention appears to increase explicit processing and placement susceptibility of older adults. We propose that different mechanisms underlay product placement effects of younger and older adults.

The findings of the current study demonstrate that older adults are less likely to recall the product placement than younger adults. This observation contributes to the existing literature which associates aging with a decline in explicit memory (Fleischman et al., 2004). We extend current understanding by demonstrating that the age related decline in explicit memory is not limited to laboratory based cognitive tasks (Ballesteros & Mayas, 2014; Geraci & Hamilton, 2009) but can also be extended to ecologically valid stimuli, such as a TV program. We suggest that older adults will be less likely to remember seeing a product placement and may be relatively unaware of the advertising which they are being exposed to when watching TV in their homes.

Though older adults may be less aware of the advertising which they are see while watching TV programs, this may inadvertently provide protection from placement influence. In line with previous research (Armstrong & Lewis, *in preparation*; Gillespie et al., 2012; van Reijmersdal et al., 2007; Russell, 2002; Yang & Roskos-Ewoldsen, 2007), we observed that the brand choice of younger adults can be influenced whether the product placement was recalled or not. Yet, the product choice of older adults was only influenced when the placement was recalled. This finding challenges existing research and key theoretical principles underlying current understanding of product placement effects, including the role of placement prominence, congruency and placement recognition (see Russell, 2002; Russell et al., 2006; Noguti & Russell, 2014). In addition, the absence of implicit processing in older adults does not align with the majority of aging research, which proposes that implicit memory remains stable with age

(Fleischman et al., 2004; Wiggs et al., 2006). This novel finding demonstrates age related differences in underlying mechanisms of placement effects.

The second study revealed an additional age related dissociation in the effect of product placement viewing patterns on brand recall and choice. The placement recall of younger adults was not dependent on the length of time which they looked at the featured product. Conversely, older adults who looked at the product placement for longer were more likely to recall it. We suggest that the explicit processing of younger adults was sufficiently fast to not be impaired by a shorter fixation time. Yet, older adults required longer to explicitly process the placement. We propose that older adults required longer to explicit process the placement due an age related slowing of cognitive processes (see Anderson & Craik, 2000).

In line with the findings on recall, we observe that fixation time on the placement is only associated with the brand choice of older adults and is not related to the product choice of younger adults. Paradoxically, fixation time only mediated the brand choice of older adults who did not recall the featured product. Older adults who did not recall the placement and failed to implicitly process the featured product in the first 500ms do not appear to encode the placement, regardless of a longer fixation time. This indicates that older adults who do not explicitly process the placement generally exhibit an additional decline in implicit processing. Hence, the age-related decline in cognitive systems can exhibit in both the absence and slowing of encoding processes (see Anderson & Craik, 2000). The results of the second study offer further insight into to contrasting models of implicit and explicit processing between younger and older adults. Specifically, the age-related decline in speed of processing appears to mediate the implicit and explicit memory of older adults, yet these processes are not observed as time sensitive in younger adults.

Our findings indicate older adults are less likely to recall seeing the placement and did not show evidence of implicit influence. Hence, we observe age related decline in both implicit and explicit memory. The theoretical analysis and experimental support for the multiple systems of memory (e.g. Baddeley, 2000; Baddeley, 1984), which permit a differential decline in implicit and explicit memory, have increasingly become the focus of debate (Poldrack & Foerde, 2008; Shanks & Berry, 2012). Several studies have observed an age-related decline of in implicit memory (La Voie & Light, 1994; Ward, Shanks & Berry, 2013). The single-system model of memory predicts an age-related decline in both implicit and explicit memory (Berry, Shanks, Speekenbrink & Henson, 2012; Shanks & Berry, 2012; Ward et al., 2013), as observed in the current study. We suggest that the findings of the current study could offer support for the single system model of memory (Berry et al., 2012; Ward et al., 2013).

The extent to which multi-tasking or focusing on a TV program which featured a product will mediate the efficacy of the placement. Considering that older adults watch more TV than any other age group (Ofcom, 2013) and often multi-task (Voorveld & van der Goot, 2013) while doing so, we suggest that older adults are inadvertently increasing their susceptibility to product placements. Paradoxically, we observe that an increased cognitive load improved the placement recall of older adults.

Though this finding contradicts the majority of research investigating the effect of divided attention on memory (Anderson & Craik, 2000; Baddeley, 2000; Lang, 2006), an increasing body of research has shown that under certain circumstances divided attention can improve recognition memory beyond that of full attention (Spartato, Mulligan & Rossi-Arnaud, 2013). Swallow and Jiang (2010) demonstrated that the recognition of background scenes was greater when an image was paired with a target shape. Swallow and Jiang (2010) proposed this was due to an increase in attention to task resulting in greater visual encoding of task-irrelevant information (Attentional Boost Effect, ABE). The ABE has been shown to increase explicit memory (Spartato, Mulligan, Gabrielli & Rossi-Arund, 2017) and

cross-modal stimuli (Swallow & Jiang, 2010), as used in the current study. However, research investigating this phenomenon has only demonstrated the ABE with briefly presented stimuli.

We suggest that rehearsal of the digit span task induced a period of increased attention, resulting in greater visual encoding of the product placement and improved explicit recall of the featured product. The findings of the current study develop the ABE (Swallow & Jiang, 2010, 2011) demonstrating that the increase in attention is not just limited to a single instance. In addition, the ABE may offer greater benefits for older adults than younger adults, as aging is associated with a decline in explicit memory (Ballesteros & Mayas, 2014; Geraci & Hamilton, 2009) and perceptual priming (Drury, Kinsella & Ong, 2000), both of which have been shown to benefit from the ABE (Spataro et al., 2017; Swallow & Jiang, 2010, 2011).

Contrary to previous research (Castel et al., 2007; Hill et al., 1990; Touron et al., 2007) we observe that motivation did not increase the placement recall of older or younger adults. We propose the difference in stimuli used account for the variance in effect. The current study used a video clip, whereas previous studies which have demonstrated that motivation can increase recall, have used lists of words or strings of numbers (Castel et al., 2007; Hill et al., 1990; Touron et al., 2007). We suggest that motivation can increase recall yet the effect is limited to small amounts of information, such as a word list. The amount of information presented in a richer stimulus exceeds the small increase in memory. Though the increase in memory can be beneficial, especially in older adults, we suggest that the application of this strategy to improve memory are limited.

The current research offers several novel insights and theoretical contributions to the age-related differences in product placement effects. We propose that the existing principles which underlay current understanding of product placement (see Cowley & Barron, 2008; Russell, 2002; Russell et al., 2006; Yang & Roskos-Ewoldsen, 2007) may not be applicable to older adults. We recommend that these

key principles and assumptions which underpin the understanding of placement influence are re-visited, taking into consideration the effects of aging on cognitive processes.

In addition, persuasive defences (Friestad & Wright, 1994) play an important role in the efficacy of a product placement. Existing research has shown that blatant and incongruent placements have a negative influence on the brand preference of younger adults (Cowley & Barron, 2008; Russell, 2002). Yet, the role of persuasive defences in the placement susceptibility of older adults is unknown. The placement used in the current research did not appear to activate persuasive defences of either age group. The activation of persuasive defences is dependent upon awareness of the advertising and availability of cognitive resource (Campbell & Kirmani, 2000; Friestad & Wright, 1994). As a decline in cognitive resource is associated with aging (Ballesteros & Mayas, 2014; Fleischman et al., 2004) and older adults are less aware of product placement as a form of advertising (Ofcom, 2015). We suggest that this age group may not possess the relevant persuasive defences to reject placement influence.

In summary, the present research offers several novel findings regarding the effect of aging on product placement vulnerability, demonstrating that older adults are less likely to recall a placement, yet brand choice is only influenced when the placement is explicitly processed. We propose that different mechanisms underlay the product placement effect of younger and older adults. Furthermore, we show that divided attention may increase the placement susceptibility of older adults. Due to the differences in the underlying mechanisms which mediate placement influence of younger and older adults, we suggest that the existing research and subsequent conclusions regarding product placement effects cannot be generalised to older adults. As almost one quarter of the US (U.S. Census Bureau, 2015) and UK (Office for National Statistics, 2017) populations are over sixty, and older adults watch more TV than any other age group (Ofcom, 2015), these findings could allow advertisers to optimise campaigns aimed at a larger proportion of the consumer market.



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## Appendix

### Age difference in the decision making process.

#### Introduction

Eye-tracking has become an increasingly popular method to assess the efficacy of adverts (Lee & Ahn, 2012; Scott, Green, & Fairley, 2015). Studies often monitor eye movements during brand exposure yet assess the efficacy of the placement using preference scales (Boerman, Van Reijmersdal & Neijens, 2014). A separate body of research has investigated eye movements during the decision making process (Rasch, Louviere & Teichert, 2015; Spinks & Mortimor, 2016; Van der Laan, Hooge, Ridder & Viergever, 2015). Only small number of studies have connected the two areas of research to investigate how the pre-exposure of an image can affect eye movements and attention when choosing a preferred item (Bird, Lauwereyns & Crawford, 2012; Glaholt & Reingold, 2009). Previous research used images of scenes (Bird et al., 2012) and faces (Glaholt & Reingold, 2009) to assess the influence of pre-exposure on eye-movements. However, as the effect of mere exposure on attention and eye movements can differ depending on the stimuli (Park, Shimojo & Shimojo, 2010), it would not be possible to generalize these findings to product placement research. It is not known how exposure to product placements will affect attention and eye-movements toward the pre-exposed brand. I am not aware of any studies to date which have analysed the gaze allocation during choice decisions following product placement exposure.

Product placement exposure can influence consumers through implicit and explicit memory (Law & Braun, 2004) with mere exposure accounting for the positive effect on brand preference and choice (Karremans, Stroebe & Claus, 2006; Zajonc, 2001). In addition, mere exposure can influence the eye movements and attention during decision making process. Pre-exposure to an item or image can increase the likelihood of it being preferred (Zajonc, 2001), which in turn increases the probability it will

be looked at on subsequent occasions. This further increases the mere exposure effect (Birch, Shimojo & Held, 1985; Simion & Shimojo, 2007). We suggest that exposure to a brand via product placement will create mere exposure effects. Subsequently, the featured brand is more likely to be looked at than an alternative brand during the product choice task.

Research has demonstrated that during a choice task, the first alternative which is looked at increases the likelihood of the mere exposure effect and is most likely to be chosen as the preferred item (Simion & Shimojo, 2006). The positive effect of the first fixation on an image during choice tasks has been replicated in several studies (Glaholt & Reingold, 2012; Schotter, Berry, McKenzie & Rayner, 2010). However, subsequent research has contradicted this finding. Van der Laan et al. (2015) explored whether the first fixation influenced product preference. In order to investigate whether product preference could be influenced, the first fixation of participants was either natural or manipulated using fixation points. Neither the natural or manipulated first fixation influenced product preference. Given the opposing conclusions of these studies it is unclear what role the first fixation has in preference formation. Yet, the majority of studies exploring this area of research (Glaholt & Reingold, 2012; Schotter et al., 2010) use a novel rather than primed products. Novel stimuli would not be subject to mere exposure effects on which may guide fixation patterns. Conversely, previously seen stimuli have a greater likelihood of being subject to mere exposure effects and greater preference over the alternative. Hence, we suggest that the use of pre exposed stimuli could mediate the fixations during a choice task.

The effect of first fixation on the preference of pre-exposed products suggests that a product which is fixated on first is more likely to be chosen over alternative items. However, it has been proposed that the visual saliency of a brand mediated the first fixation, rather than existing brand preference which in turn increases the chance of the product being chosen (Chandon, Hutchinson & Bradlow, 2009; Milosavljevic, Navalpakkam, Koch & Rangel, 2012). These findings indicate that a pre-existing brand preference does not ensure that the product is fixated on before an alternative brand. As

the first fixation on an alternative brand may result in an increased choice for the item, we suggest that the first fixation during a choice task may mediate brand choice to a greater extent than product placement effects. We hypothesize that the first brand which is fixated on during the choice task is significantly more likely to be chosen than the alternative brand (H1).

In addition to the role which the first fixation has on product choice (Milosavljevic et al., 2012; Van der Laan et al., 2015), the number of times which an image is looked at may also influence preference (Shimojo, Simion, Shimojo & Scheier, 2003). During a choice task, the chosen item is increasingly fixated upon until the preferred item is selected (Glaholt & Reingold, 2011; Simion & Shimojo 2006, 2007). The chosen item is likely to receive a greater number of fixations than the alternative items. However, the number of times which an image is fixated on can reflect and influence preference. Shimojo et al. (2003) demonstrated that manipulating gaze toward one of two images resulted in a greater preference for the image which was looked at most often. These findings indicate that existing preferences could potentially be overcome if the alternative item is looked at on more occasions than the pre-exposed item. We suggest that existing preferences could potentially be overcome if the alternative item is looked at on more occasions than the pre-exposed item. Consequently, the number of times which a product is fixated on during a choice task may increase the preference for the item, beyond that of the preference created from mere exposure effects through placement exposure. We propose that the brand which receives the most fixations will be chosen over the alternative item (H2).

The role of the first fixation and the number of times which an item is looked at have been shown to form and mediate preference (Milosavljevic et al., 2012; Shimojo et al., 2003). Glaholt and Reingold (2012) agreed that the first fixation during a choice task does contribute toward preference formation. However, having observed that items which are looked at for longer are significantly more likely to be

chosen than alternatives (Glaholt & Reingold, 2009a, 2009b). The authors proposed that the total fixation time on an image was the most significant factor for image preference and choice.

In addition, it has been suggested that the positive effect of fixation frequency on preference formation was not due to the number of fixations, but instead the total time which the images was looked at for (Bird et al., 2012; Nittono & Wada, 2009; Schotter et al., 2010). As a greater fixation time increases the preference for images we suggest that this positive effect will also be observed in product choice tasks. Hence, we propose that the brand which is fixated on for longest total time will be chosen significantly more than the alternative product (H3).

The current research will assess the eye movements during the decision making process following product placement exposure. We investigate how the first fixation, the number of fixations and the total duration on a product mediate brand choice. In addition, we will explore whether there are age differences present in the visual attention of decision making processes.

## **Method**

**Participants.** Sixty-five older (60-83 years, S.D= 6.47, n=32) and younger (18-25 years, S.D= 1.57, n=33)<sup>11</sup> adults were recruited via Lancaster University and social groups in the North West of England. Participants took part in the study on a voluntary basis or received a course credit. Five older adults were removed from the analysis as they declined a biscuit<sup>12</sup>. Three participants were removed from the initial analysis due to incomplete eye-tracking data. In addition, the Brand Choice task of fourteen participants had not been captured by the eye-tracker. Hence, seventeen participants were not included

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<sup>11</sup> Sample size was determined before data analysis using Soper (2006) calculations;  $\pi = .8$ ,  $\alpha = .05$ ,  $df = 3$ ,  $f^2 = .15$ , minimum required  $N = 67$ .

<sup>12</sup> Due to the small number of participants in the category it was not possible to perform robust analyses with the group data.

in the analyses below. All participants were British or Irish to avoid brand novelty effects (Choi et al., 2013).

**Design and Materials.** Age group, first brand fixation, longest brand fixation, number of fixations and the total fixation time (ms) formed the independent variables with biscuit choice and placement recall being the dependent variables.

The TV soap *Coronation Street* was chosen as it is popular with both age groups (YouGov, 2011). All participants saw a short clip (6min 10sec) consisting of three recently aired non-food advertisements (Three Mobile, Royal Navy, Nivea) and three typical scenes from *Coronation Street*. The second scene featured a family sitting in their lounge. The characters are consoling their complaining auntie at which point one of the teenage children emerges from the kitchen holding an orange chocolate cookie, and says, "Orange Kit-Kat? They're your favourite." Approximately four minutes into the clip the boy holds the Kit-Kat so the wrapper can be seen on screen for four seconds. Previous research observed that viewing the Coronation Street clip significantly increased choice of the Kit-Kat compared to unprimed brand choice, a medium effect size was reported (Armstrong & Lewis, *in preparation*).

*Jacobs Club* was selected as an alternative snack to demonstrate preference shift as orange *Club* is the market leader for orange flavoured biscuits and has similar perceptual features e.g. size, shape and packaging (silver foil in an orange paper sleeve) to *Kit-Kat*. We assessed physical activity levels by compiling a survey of 24 questions adapted from the Stanford Brief Activity Survey (Taylor-Piliae et al., 2006), included demographics and TV viewing habits (based on Ofcom Media Tracker, 2011), and two control scales, of hunger and fatigue (10: Extremely hungry/tired – 1: Not hungry/tired at all).

Tobii Pro 2 eye-tracking glasses were used to record visual attention of the participant while watching the video clip and choice task. Tobii Glasses Controller software was used to calibrate each

participant before being shown the video clip. Windows Movie Maker was used to analyse the data. The frequency and duration of fixations toward the featured product during the video clip and choice task were recorded and analysed.

**Procedure.** Following ethical approval, the study was conducted in quiet room on an individual basis. The foil for the study, an investigation of how the number of adverts watched before a TV show influenced recall, was presented to avoid compromising the implicit aspect of the research. Participants were informed that they would be asked to watch a clip of Coronation Street while wearing eye-tracking glasses, answer some questions about the clip and complete a short questionnaire. Participants were asked to put on the Tobii eye-tracking glasses and the experimenter calibrated the glasses before showing the video.

Participants then viewed a Coronation Street clip. Having viewed the clip the participant was asked if they would like to select (and eat) one of the two biscuits. Two of each brand were presented side by side on a small plate and the order was counterbalanced. Participants were asked to wear the eye-tracking glasses while the experimenter occupied herself with closing the eye-tracking software, however the purpose of this instruction was to ensure the participant wore the glasses while selecting a biscuit. Once the preferred brand had been selected the experimenter used the prompts below (adapted from Auty & Lewis, 2004) to establish if the placement could be recalled.

- What was happening in the second scene?
- Was anything else happening?
- Did you notice any food or drinks?
- What were the snacks shown?
- What was the biscuit shown?
- What was the colour of the packet?

- What brand was the biscuit?

Once the experimenter established whether the placement could be recalled, participants completed the survey and were debriefed. Participation in the study took approximately twenty-five minutes. See Figure 1 for a summary of the procedure.



Figure 1. Presentation order of tasks.

## Results

We initially investigated whether there was an age difference in the eye-tracking data of the decision making process. A series of t-tests were conducted on the total number of fixations made while participants chose their preferred product, the number of fixations made on the featured product and the total time which the featured brand was fixated on. We observe that older adults ( $m=20.48$ ,  $s.d.=12.41$ ) make significantly more fixations during the decision process than younger adults. Degrees of freedom were adjusted accordingly due to unequal variance ( $m=8.04$ ,  $s.d.=3.16$ ), ( $t(24.83)=-4.66$ ,  $p<.001$ ). Subsequently, older adults make significantly more fixations toward the featured product (young,  $m=3.61$ ,  $s.d.=1.27$  old,  $m=9.65$ ,  $s.d.=6.19$ ), ( $t(23.85)=-4.59$ ,  $p<.001$ ), and have a greater cumulative fixation time (total time which the placement was looked at) toward the featured brand (young,  $m=.60$ ,  $s.d=.52$  old,  $m=1.44$ ,  $s.d.=1.32$ ), ( $t(28.57)=-2.85$ ,  $p=.01$ ). The results indicate age differences in the decision-making process, with older adults taking longer to choose their preferred brand.

We next explored whether participant eye movements during the decision-making process indicate which brand will be chosen. As the main paper identified significant age differences in the variables which mediate placement vulnerability, we conducted separate regression models for each

age group. To find the model which best fitted the data, we initially tested a saturated model which included the main effects and interactions of the independent variables; first brand fixation, brand with longest look, number of fixations and total fixation time. The model was highly significant for older adults ( $\chi^2 (21, n=23) = 35.43, p=.04$ , Nagelkerke  $R^2=1.00$ ). However, it produced very large standard errors on several variables (e.g. Brand Longest Look, S.E. = 3962733.56) which indicated that the model did not converge sufficiently well. In order to avoid type I errors we proceeded to conduct a regression model to test each hypothesis.

To investigate H1 we conducted a logistic regression assessing how the first brand fixated on influenced product choice. The model was not significant for either younger ( $\chi^2 (1, n=23) = .36, p=.55$ , Nagelkerke  $R^2=.02$ ) or older adults ( $\chi^2 (1, n=23) = .53, p=.47$ , Nagelkerke  $R^2=.03$ ), (see Table 1), suggesting that first fixation did not indicate product choice. H1 is not supported.

Table 1. First fixation during decision and brand choice

Variable	Model 1 (18-25)				Model 2 (60+)			
	B	SE	Wald	OR	B	SE	Wald	OR
First Fixation Brand	-.51	.86	.35	.60	-.64	.90	.52	.53
Constant	.22	.67	.11	1.25	.98	.68	2.10	2.67
Nagelkerke $R^2$			.02				.03	
$\chi^2$			.36				.74	

As first fixation did not influence brand choice we conducted a subsequent analysis to explore whether the featured product was more likely to be initially fixated on. A chi-square analysis indicated that the featured product was no more likely to be fixated on than the alternative product for either younger ( $\chi^2 (1, n=23) = 1.09, p=.30$ ) or older ( $\chi^2 (1, n=23) = .04, p=.84$ ) adults. We suggest that first fixation may not be influenced by pre-exposure of a product or indicate product choice.

Table 2. Number of fixations on the featured product as a prediction of Brand Choice

Variable	Model 3 (18-25)				Model 4 (60+)			
	B	SE	Wald	OR	B	SE	Wald	OR



Number of Fixations KK	.67	.40	2.85	1.96	.06	.08	.64	1.07
Constant	-2.52	1.52	2.77	.08	.04	.83	.003	1.04
Nagelkerke R <sup>2</sup>			.18				.04	
$\chi^2$		3.36, df=1, p=.07				.69, df=1, p=.41		

We next investigated whether the number of times which a brand was fixated on during the decision making process influenced brand choice (H2). The model was not significant for younger ( $\chi^2$  (1, n=23) =3.36, p=.07, Nagelkerke R<sup>2</sup>=.18) or older adults ( $\chi^2$  (1, n=23) =.69, p=.41, Nagelkerke R<sup>2</sup>=.04) indicating that the number of fixations on a brand during the decision making process does not indicate which brand will be chosen (see Table 2).

A planned logistic regression was conducted to investigate the proposed effect of a longer fixation time on brand choice (H3). To account for the difference in decision time we converted the cumulative fixation time for each brand (milliseconds) to a proportion of the total fixation time. The longest single fixation and cumulative fixation time were included as variables in the model. Due to zero counts in the data for the longest single fixation variable the model would not converge (see Table 3). We subsequently conducted separate chi-square analysis which indicated that older (Fishers Exact, p=.02,  $\Phi$ =.50) and younger adults ( $\chi^2$  (1, n=23) =.7.43, p=.01,  $\Phi$ =.57) were significantly more likely to choose the brand which was focused on during the longest single fixation.

Table 3. Longest Fixation Brand and Brand Choice

Age Group	Longest Fixation Brand	Brand Choice N(%)	
		Kit-Kat	Club
18-25	Kit-Kat	9 (75)	3 (25)
	Club	2 (18)	9 (82)
60+	Kit-Kat	8 (100)	0 (0)
	Club	8 (50)	8 (50)

	Kit-Kat	17 (85)	3 (15)
Total	Club	10 (37)	17 (63)

A logistic regression was conducted to investigate the effect of the proportional fixation time on brand choice<sup>13</sup>. A significant model was observed for older adults ( $\chi^2 (1, n=23)= 5.81, p=.02$ , Nagelkerke  $R^2=.31$ ) and younger adults ( $\chi^2 (1, n=23)= 16.53, p<.001$ , Nagelkerke  $R^2=.68$ ). The models for both younger and older adults produced a very large odds ratio which indicated that the model did not converge sufficiently well (see Table 4).

Table 4. Proportional Fixation time as a prediction of Brand Choice

Variable	Model 5 (18-25)				Model 6 (60+)			
	B	SE	Wald	OR	B	SE	Wald	OR
Proportion Choice Fixation	17.94	7.67	5.48	61579077.42*	-.99	2.85	.12	1113.96*
Constant	-8.20	3.64	5.07	.00	.57	1.05	1.03	1.77
Nagelkerke $R^2$			.68				.31	
$\chi^2$			16.53, df=1, p<.001				5.81, df=1, p=.02	

As the models above (Table 4) did not converge we conducted a subsequent analysis which substituted Proportional fixation time with Cumulative fixation time (ms). The model was significant for younger adults ( $\chi^2 (1, n=23) =8.94, p=.003$ , Nagelkerke  $R^2=.43$ ) but not for older adults ( $\chi^2 (1, n=23) =1.73, p=.19$ , Nagelkerke  $R^2=.10$ ), (see Table 5). Younger adults who fixated on the Kit-Kat for a longer time were almost thirty times more likely to choose the Kit-Kat over the alternative product. The data indicate that younger adults are likely to pick the brand which is fixated on for the greatest cumulative time and longest single fixation. However, we observe a dissociation between the cumulative fixation

<sup>13</sup> Proportional Fixation Time = Cumulative Fixation time/Total Decision Making Time.

time and the longest single fixation of older adults. Biscuit choice was not indicated by the cumulative fixation time on a brand, but only by the longest single fixation. Hence, H3 is partially supported.

Table 5. Cumulative Fixation time as a prediction of Brand Choice

Variable	Model 7 (18-25)				Model 8 (60+)			
	B	SE	Wald	OR	B	SE	Wald	OR
Choice Fixation (ms)	3.39	1.44	5.50	29.53*	.52	.44	1.38	1.68
Constant	-2.00	.92	4.68	.14	-.04	.67	.003	.96
Nagelkerke R <sup>2</sup>			.43				.10	
$\chi^2$			8.94, df=1, p=.003				1.73, df=1, p=.19	

## Discussion

The current analysis investigated eye movements while participants chose a biscuit brand following product placement exposure. We observed four key issues from the results which we will discuss in relation of existing research; first, older adults spend significantly longer deciding which brand they prefer compared to younger adults; second, younger adults are significantly more likely to pick the product which they looked at longest. However, the cumulative fixation time did not indicate the product choice in older adults; third, the longest single fixation does not indicate product choice; fourth, the brand which is fixated on first during the decision making process does not appear to be influenced by pre-exposure or mediate product choice.

Previous research indicated that pre-exposure to an item can increase the likelihood of the item being preferred (Zajonc, 2001), which in turn increases the probability the item will be looked at on subsequent occasions (Birch et al., 1985; Simion & Shimojo, 2007). We observed that the featured product was more likely to be chosen (as discussed in the main paper), demonstrating the mere exposure effect. However, the featured product was not more likely to be initially or subsequently looked more often than the alternative product.

Contrary to existing research, (Simion & Shimojo, 2006), the product which was fixated on first was not more likely to be chosen than an alternative. Though the benefit of first fixation has been replicated with novel stimuli (Glaholt & Reingold, 2012; Schotter et al., 2010) and products with existing preferences (Chandon et al., 2009; Milosavljevic et al., 2012) we did not observe this effect in the current study. We suggest that mere exposure effects of the product placement were greater than the preference which would be induced by the initial fixation of the choice task. Hence, the first fixation failed to influence choice.

Differences in the visual saliency of the products in the choice task may account for the conflicting results. Previous research which concluded that visual saliency could override existing brand preferences used visually distinct products (Chandon et al., 2009; Milosavljevic et al., 2012). However, the products used in the current study were visually similar, the biscuits were the same size, shape, and colour with the branding being the only major distinguishing feature. As a result neither product held greater visual saliency, which may have overridden pre-existing preference for the featured product.

Based the research discussed above and the findings of the current research, we suggest that the mere exposure effects from placement exposure do not influence fixation patterns. In addition, positive effects which may be induced by first fixation in a choice task do not appear to outweigh existing brand preferences. However, the positive effect visual saliency on product choice could potentially be greater than that of product placement exposure.

In addition to the null effect of first fixation on product choice, we observed that the number times which a brand was fixated on did not predict brand choice. Though initial research assessing the impact of fixation frequency on preference observed a positive effect on images of faces (Glaholt & Reingold, 2011; Shimojo et al., 2003; Simion & Shimojo 2006, 2007), this effect was not replicated when images of scenes or items were used (Bird, 2012; Schotter et al., 2010). Our findings support the

proposal that fixation frequency is not indicative of existing preferences or in the preference formation of non-human stimuli (Nittono & Wada, 2009). Further to previous research, we demonstrate that fixation frequency does not appear to indicate preference or exhibit product placement effects.

We observed that younger adults are more likely to choose the brand which they looked at longest. Conversely, the cumulative fixation time on a brand does not predict the product choice of older adults. Our findings indicate an age related dissociation in the effect of cumulative fixation time on brand choice. In addition, we observed that older adults spent significantly longer choosing their preferred brand and only exhibited placement influence when the product was recalled, yet show no evidence of implicit influence (see the main paper). These findings conflict with existing research which observed that individuals with a lower working memory resource tend to exhibit more impulse based (Hinson, Jameson, Whitney & Thomas, 2003) and implicitly led decisions (Frieze, Hofmann & Wanke, 2008) from we would expect older adults to make faster decisions and be more susceptible to product placement effects.

Need-states such as hunger can mediate susceptibility to placement influence (Karremans, Stroebe & Claus, 2006). The current study indicated that younger adults indicated higher levels of hunger than older adults. In addition, younger adults were faster to choose their preferred brand than older adults. It is possible that the faster decision time was influence by hunger, resulting in younger adults deciding on their preferred brand faster than older adults. Hence, age related differences in both need-states and working memory may contribute to the observed age difference in decision making processes. The findings of the current research indicate that older and younger adults rely on different decision making processes to choose their preferred brand.

The current research provides support for the existence of age related dissociations in the product placement influence (see the main paper) and decision making processes. As older adults are relatively

understudied population it is not possible to apply the conclusions of existing research which was conducted with younger adults to the current findings. Hence, we propose that future research explores whether the principles which underlay the product placement vulnerability and brand choices of younger adults (e.g. Friese et al., 2008; Karremans et al., 2006; Law & Braun, 2004) can also be applied to older adults. As almost one quarter of the USA (U.S. Census Bureau, 2011-2015) and UK (Office for National Statistics, 2017) population is over sixty years old, it is essential that the effects of product placement on this demographic group are understood.

## **Conclusion**

The previous Chapter (Chapter Two) explored whether product placement effects can be replicated, investigated the assumption that implicit measures of placement influence are equivalent and explored whether the order effects of implicit and explicit measures influence observed placement efficacy. It was concluded that product placement influence can be replicated, however both the measure employed and order in which tasks are presented may influence the observed placement effects.

Within the current chapter we explore the impact of placement exposure on older adults. The first study investigates how multi-tasking, motivation, and age-related cognitive differences influence placement effects. As predicted, older adults were less likely to recall the placement than younger adults. Paradoxically, we observed that older adults were only influenced by placements when the product was recalled. This unexpected observation was further investigated by the second study using eye-tracking. The eye-tracking data revealed age differences in the effect of placement fixation time on brand recall and choice. The brand recall and choice of younger adults does not appear to be influenced

by attention to the placement. Conversely, both placement recall and choice is influenced by attention in older adults.

The Appendix explored age differences in attention during the decision making process following product placement exposure. The additional analyses provide an initial insight into the effects of ageing and placement influence on the decision making process.

In summary, based on the observations of this chapter we suggest that age-related changes in cognitive processes influence if, and how, older adults are influenced by product placement exposure.

## Chapter Four

### Introduction

In previous chapters we have introduced and analysed several variables which may contribute to product placement vulnerability. Within this chapter we investigate the effect of Ego Depletion on product placement effects. The chapter is presented in two sections. First, the main paper outlines and investigates key hypotheses in relation to the susceptibility of younger and older adults to ego depletion and product placement influence. The Appendix contains a series of supplementary analyses. By examining the impact of a series of control variables on depletion effects, we aim to gain insight into the underlying mechanisms of depletion effects.

Ego depletion has been the focus of numerous studies in the last two decades. The strength model of ego depletion proposes that self-control is a limited resource which can be depleted (Baumeister, Bratslavsky, Muraven, & Tice, 1998). However, the conceptualization and experimental support for the theory has recently become the focus of debate (see Baumeister & Vohs, 2016; Hagger & Chatzisarantis, 2016).

The ongoing debate surrounding ego depletion includes the validity and impact of tasks which are proposed to deplete self-control (Gluck et al., 2013; Lavie, Hirst, de Fockert & Viding, 2004). Within the meta-analysis of ego depletion research, Hagger et al. (2010) calculated the effect size for commonly use ego depletion tasks. The tasks addressed in the meta-analysis include; the crossing out letters task (COLT) in which participants cross out either all instances or specific instances of the letter 'e'; the White Bear task, in which participants are asked to verbalise their stream of consciousness while either talking about, or suppressing thoughts of, a white bear; the modified Stroop task, in which participants are presented with colour nouns, and asked to either name the font colour or read the word (see Hagger et al., 2010); video watching regulation tasks, in which participants view an evocative video and are asked



to either suppress emotional expression or are free to express their emotions; and video watching attentional control tasks, in which participants are asked to ignore a specific element of the video, or are able to watch the video naturally.

The meta-analysis revealed that all tasks but the modified Stroop ( $d=.40$ ) had medium to large effect sizes (video watching regulation task  $d=.55$ ; video watching attention control task  $d=.55$ ), with the COLT ( $d=.77$ ) and White Bear task ( $d=.65$ ) having the largest effect sizes. Hence, the COLT and White Bear task were considered for the current research. Though the White Bear task revealed a medium-large effect size, implementing the task presents difficulties to the researcher. When a participant is completing the depletion version of the White Bear task (not thinking of the bear) it is unclear to the researcher whether the instruction has been violated or not. There is no way to identify, or quantify, whether the participants did 'think' of the white bear, or for how long, unless it was explicitly stated within the verbalised stream of consciousness. Consequently, the researcher is unable to ascertain the extent to which the participant completed the depletion task. Conversely, the COLT provides a clear and explicit measure of task performance. The depletion version of the task instructs participants to cross out every instance of the letter 'e' in a passage of text, unless it is adjacent to, or one letter away from, another vowel. Hence, by calculating the number of times an 'e' was correctly (not adjacent to, or one letter away from another vowel), or incorrectly crossed out (adjacent to, or one letter away from another vowel), the researcher can quantify to extent to which the participant adhered to the depletion task. Further, this element of the COLT allows the researcher to explore how initial performance on a depletion task relates to subsequent performance on self-control tasks. As the COLT offers a clear and quantifiable measure of task adherence, and permits analyses to explore how initial performance relates to subsequent self-control, the COLT was chosen over the White Bear task for the current research.

An extensive number of studies have investigated the impact of depletion on younger adults (see Hagger, Wood, Stiff & Chatzisarantis, 2010), including product placement research (Gillespie,

Joireman & Muehling, 2012). However, the susceptibility of older adults to depletion effects is relatively under studied, with existing research presenting a divided opinion over whether older adults are susceptible to depletion (Bray, Martin-Ginnis, & Woodgate, 2011; Dahm et al., 2011).

The current chapter uses the real-world method of product placement to examine whether ego depletion effects are mediated by age and the extent to which depletion impacts memory and brand choice. We examine whether needs-states influence susceptibility to both depletion and product placement effects. In addition, we explore how performance on the depletion task mediates the control variables which are commonly used to validate experimental procedures and subsequent self-control resource.

## **Paper Three**

**The serendipity of the decline of self-control in ageing.  
Are older adults less susceptible to ego depletion and product placement influence?**

## Abstract

Ego depletion has been the focus of several studies in the last decade, yet opinion is divided over whether older adults are susceptible to depletion. The current study assesses whether older adults are susceptible to ego depletion, if choice for a primed brand is mediated by depletion, and whether this effect is moderated by hunger. Sixty-six older (60+ years) and sixty-two younger adults (18-25 years) completed the Ego Depletion or Control Crossing Out Letters Task (COLT) then viewed a clip from a soap opera (*Coronation Street*) which contained a product placement (Kit-Kat). All participants were offered a choice of a Kit-Kat or Club biscuit then asked to describe the video clip. We report three key findings: Ageing offers a serendipitous protection from ego depletion mediated product placement vulnerability. Depleted younger adults who recall the placement show an increased choice for the featured product. Cognitive effort may be associated with greater hunger of depleted younger adults, and subsequently a greater choice for the featured brand.

Keywords: Product Placement, Ego Depletion, Self-control, Ageing

## Introduction

Theoretical analysis and experimental support for ego depletion have been the focus of much lively debate (see Baumeister & Vohs, 2016; Hagger & Chatzisarantis, 2016). Young adults, in particular (see Hagger, Wood, Stiff & Chatzisarantis, 2010), show ego depletion can increase product placement vulnerability (Gillespie, Joireman & Muehling, 2012). Older adults are relatively neglected, yet they can offer critical insights into ego depletion and its effects on cognitive processing. Product placement research offers a real-world method to measure the extent to which ego depletion affects both implicit and explicit memory, and the influences of need states on self-control

Although the strength model of ego depletion has become central to analyses of self-control, the proposal of a limited resource (Baumeister, Bratslavsky, Muraven & Tice, 1998) has become increasingly criticised. A meta-analysis, controlling for small-study effects (Carter, Kofler, Forster & McCullough, 2015), and a subsequent multi-laboratory replication (Hagger & Chatzisarantis, 2016) observed a small effect of ego depletion. As the procedures used to assess depletion have become a point of contention (Baumeister & Vohs, 2016) we selected the Crossing Out Letters Task (COLT) for the current research. The COLT is commonly employed with a medium-large effect size (Hagger et al., 2010), though performance metrics are seldom reported. We suggest the overlooked data may offer an insight into depletion, by indicating whether a participant was able to complete the COLT (correct answers) or struggled to engage self-control (indicated by errors).

The nature of ego depletion has been widely debated. However, the effect of ageing upon resource depletion is rarely discussed. The majority of studies which observed the ego depletion effect (e.g. Baumeister et al., 1998) have used college student samples, while older adults are a somewhat understudied population. Bray, Martin-Ginnis, and Woodgate (2011) initially suggested that older adults are susceptible to depletion. However, subsequent research found no evidence of depletion effects in older adults (Dahm et al., 2011). In addition, Dahm et al., (2011) conducted an analysis on the meta-

analytic data from Hagger et al., (2010) and observed that the ego depletion effect was significantly smaller for older than younger adults. Hence, we propose that older adults are not susceptible to the effect of ego depletion.

Product placement is a billion dollar industry with television being the most common media (PQ Media, 2012). Brand choice can be influenced via implicit or explicit processing (Auty & Lewis, 2004). As decline in explicit memory is observed in healthy ageing, with implicit memory and priming remaining relatively stable (Moscovitch & Winocur, 1995) older adults may be less likely to recall seeing a brand but still be susceptible to implicit influence, bypassing any persuasive defences (Friestad & Wright, 1994). Ego depletion can decrease brand recall and benefit brand attitude in younger adults (Gillespie et al., 2012). We suggest that the self-control resource of older adults will not be reduced following the depletion task and, hence, they will not be more susceptible to placement influence. We hypothesize that completion of the depletion task will decrease brand recall (H1) and an increased choice of the featured product (H2) in younger adults, yet recall and product choice of older adults will remain stable.

We will assess placement influence using product choice rather than preference scales and similar abstract methods. Though these methods are common within product placement research (e.g. Gillespie et al., 2012; Law & Braun-LaTour, 2004) they lack the perceptual features of a product, which underlay the mere exposure effect (Zajonc, 2001). In addition, choice offers an impulse based behavioural measure, which may be a more effective measure of depletion than a purely cognitive task (Inzlicht, Gervais & Berkman, 2016). We hypothesize that while depleted younger adults will show a reduced recall and increased choice of the featured product, this will not be the case for older adults (H3).

In addition to the proposed age-related placement vulnerability, primary needs can also increase susceptibility. Karremans, Stroebe and Claus (2006) demonstrated that vulnerability to a

subliminally presented brand (Lipton Iced Tea) could be increased when the brand prime is need-related (thirst). We suggest that depleted consumers may have a reduced ability to regulate need-related impulses and subsequently display increased vulnerability to primes related to their need-state. We hypothesize that hunger will increase choice for the featured product. This will be greater in the ego depletion condition for younger adults but not older adults (H4).

## Method

**Participants and Design.** One hundred and thirty-one<sup>14</sup> older (N=71; 60+ years,  $M=69.79$ ,  $SD=8.09$ ) and younger (N= 62; 18-25 years,  $M=18.60$ ,  $SD=1.18$ ) adults were recruited via Lancaster University and local clubs and organisations across the North of England. Five participants were removed from the analysis as they declined to take a biscuit<sup>15</sup>. Participants received course credit or took part on a voluntary basis. A 2 (Ego Depletion vs Control) x 2 (Age group: 18-25 vs 60+ years) between subjects design was employed. Brand choice and placement recall were the dependent variables.

**Materials.** The TV soap *Coronation Street* was chosen as it is popular with both age groups (YouGov, 2011). All participants saw a short clip (6min 10sec) consisting of three recently aired ads and three typical scenes from *Coronation Street*. The second scene featured a family sitting in their lounge, a teenager emerges from the kitchen holding an orange Kit-kit (candy bar) and says, "Orange Kit-Kat? They're your favourite." The Kit-Kat can be seen on screen for four seconds.

After viewing the clip all participants were offered one of two biscuit options, either an orange *Kit-Kat* or an orange *Club*. *Jacobs Club* has similar perceptual features e.g. size, shape and packaging

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<sup>14</sup> Sample size was determined before data analysis using Soper (2006) calculations  $\pi = .8$ ,  $\alpha = .05$ ,  $df = 5$ ,  $f = .15$ , minimum required N=91.

<sup>15</sup> Due to the small sample size of this group it was not possible to perform additional analyses.

(silver foil in an orange paper sleeve) to *Kit-Kat*, hence the brand would be the only prominent distinguishing feature.

**Procedure.** To avoid compromising the implicit element of the study a foil purpose of the study was presented. The foil explained that the study aimed to investigate how the number of adverts watched before a television show influence content recall. Participants were informed that they would be asked to complete a task, watch a clip of Coronation Street and answer some questions. All participants were presented with a 493 word passage from a textbook (Multilevel Modelling: Methodological Advances, Issues and Applications) and randomly assigned to either the Control or Ego Depletion condition. Those in the control condition were instructed to cross out every 'e' in the text. This task does not require the use of self-control resource. Participants in the Ego Depletion condition were asked to cross out every 'e', except if the letter was adjacent to or one letter away from another vowel. As this requires inhibition of the simple rule, self-control resource should be depleted. There was no time restriction of the task.

Once a participant had completed the COLT, they watched the Coronation Street clip, which was shown on a laptop. Having viewed the clip the participant was asked if they would like to select (and eat) one of the two biscuits. The snack was offered as gesture of thanks for taking part in the study. To assess explicit recall of the placement, participants were asked to describe the clip. A series of prompts (adapted from Auty & Lewis, 2004) was used as required.

- What was happening in the second scene?
- Was anything else happening?
- Did you notice any food or drinks?
- What were the snacks shown?
- What was the biscuit shown?



- What was the colour of the packet?
- What brand was the biscuit?

Hunger and fatigue control scales (10: Extremely hungry/tired – 1: Not hungry at all) were completed.

## Results

**Control Scales.** We initially investigated whether there was an age difference in COLT performance. A 2 (Age group: Young vs Old) x (Condition: Control vs Ego Depletion) ANOVA was conducted on the number of correct and incorrect responses. There was no main effect of age ( $F(1, 117) = 1.61, p = .21$ ) or interaction ( $F(1, 117) = 1.81, p = .18$ ) on the number of correct answers. A significant interaction between Age group and Condition ( $F(1, 117) = 4.17, p = .04, \eta_p^2 = .03$ ) on the number of errors was observed. There was no significant difference in the number of errors between the age groups on the Control COLT ( $t(58) = 1.18, p = .24$ ). However, older adults made significantly more errors on the depletion COLT (Table 1), degrees of freedom were adjusted accordingly due to unequal variance ( $t(31.99) = 2.14, p = .04, d = .54$ ).

Table 1. COLT performance of age group and condition.

Condition	Age group	COLT Performance			
		<u>Correct</u>		<u>Errors</u>	
		Mean	S.D.	Mean	S.D.
Control	Younger	252.89	45.93	.54	1.20
	Older	253.47	40.88	.25	.62
	Total	253.20	42.94	.38	.94
Ego Depletion	Younger	99.76	33.17	6.72	10.23
	Older	80.44	41.46	39.19	85.00 <sub>1</sub>

	Total	89.62	38.68	23.75	63.63
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<sup>1</sup> Removing outliers did not change to statistical analysis but changed the SD to 19.97.

We conducted an ANOVA to investigate the effect of age and condition on fatigue (see Table 2). No main effect was observed but a significant interaction between Age group and Condition ( $F(3,120) = 8.69, p < .001, \eta_p^2 = .19$ ) replicated previous research that older adults reported less tiredness following the depletion task than younger adults (Dahm et al., 2011). Further analysis revealed that the depletion task did not significantly increase fatigue for either younger ( $F(1,56) = 1.03, p = .32, \eta_p^2 = .02$ ) or older adults ( $F(1, 64) = 3.65, p = .06, \eta_p^2 = .05$ ) with the apparent interaction being driven by an age difference in reported baseline of tiredness ( $F(1,120) = 21.22, p < .001, \eta_p^2 = .15$ ). The final control scale showed a main effect of age on hunger, with older adults reporting lower level of hunger than young adults ( $F(1,120) = 16.16, p < .001, \eta_p^2 = .12$ ). There was no main effect of condition ( $F(1,120) = 0.03, p = .96$ ) or interaction between condition and age ( $F(1,120) = 3.19, p = .08, \eta_p^2 = .03$ ) on hunger.

Table 2. *Control scales by age group and condition.*

Age Group	Condition	Tired		Hunger	
		Mean	S.D.	Mean	S.D.
Younger (n=58)	Control	5.75	1.74	6.14	2.45
	Ego Depletion	5.23	2.11	5.43	2.18
	Total	5.48	1.94	5.78	2.32
Older (n=66)	Control	6.71	2.51	7.06	2.39
	Ego Depletion	7.75	1.87	7.81	2.09
	Total	7.21	2.26	7.42	2.26

**Placement Recall.** To investigate H1, we conducted a logistic regression assessing the relationship between age group and condition on placement recall. The model was not significant ( $\chi^2(1, n=128) = .85$ ,

$p=.36$ ) indicating that depletion does not mediate placement recall in younger (Ego depletion 56.3%, Control 56.7%) or older adults (Ego depletion 43.8%, Control 41.2%). H1 is not supported.

**Brand Choice.** A second analysis was conducted to investigate the proposed interaction between Age Group and Condition on brand choice (H2). Contrary to prediction the interaction was not significant (Table 3). Further analysis confirmed that condition did not mediate the brand choice of younger (depletion 75%, control 63%), ( $\chi^2 (1, n=62) = .99, p=.32, \Phi=.13.$ ) or older adults (depletion 59%, control 62%), ( $\chi^2 (1, n=66) = .04, p=.84, \Phi=.02$ ). The results suggest that ego depletion and ageing do not influence vulnerability to placement exposure. H2 is not supported.

We next conducted a planned logistic regression to investigate the impact of age, recall and condition on brand choice (H3). A significant model was observed ( $\chi^2 (1, n=128) = 6.22, p=.01$ , Nagelkerke  $R^2=.07$ ). Subsequent frequency analyses revealed there was no effect of recall upon the brand choice of either depleted ( $\chi^2 (1, n=32) = .05, p=.82, \phi = .04$ ) or control older adults ( $\chi^2 (1, n=34) = .94, p=.33, \phi = .17$ ), (Figure I). Depleted younger adults who recalled the placement were significantly ( $\chi^2 (1, n=32) = 4.23, p=.04, \phi = .36$ ) more likely to choose the featured brand (89%) than those who did not recall the placement (57%), indicating an increase in vulnerability of depleted younger adults only when the placement is explicitly processed. Placement recall did not mediate choice of control young adults ( $\chi^2 (1, n=30) = .36, p=.59, \phi = -.11$ ). The placement recall and choice of older adults does not appear to be influenced by depletion. However, younger adults display increased vulnerability when self-control resources are depleted and the placement is explicitly processed.

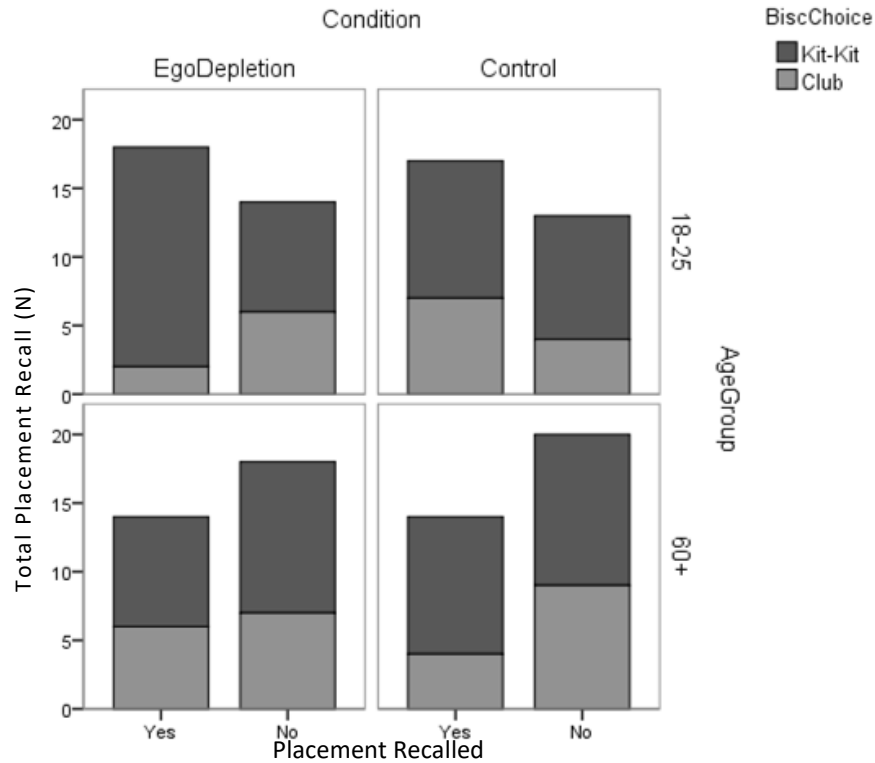


Figure 1. Brand Choice by Product Placement Recall, Age Group and Condition.

As the analyses above indicate a main effect of age on hunger analyses we conducted a logistic regression for each age group to investigate the interaction between hunger and condition on choice (H4). The model was not significant for older adults ( $\chi^2(1, n=66) = .02, p = .88$ ). We repeated this model with the data from young adults. Due to zero counts in the data the models would not converge, so we conducted separate models for each condition. Hunger was associated with increased choice of the featured product in the depleted group ( $\chi^2(1, n=30) = 4.11, p = .04, \text{Nagelkerke } R^2 = .19$ ) but did not mediate choice in the control group ( $\chi^2(1, n=28) = .84, p = .36, \text{Nagelkerke } R^2 = .04$ ), hence H4 is partially supported. A subsequent analysis revealed that depleted young adults who struggled with the task (fewer correct responses) reported greater hunger than those who gave more correct answers ( $r(29) = .41, p = .03$ ).

Table 3. Summary of Logistic Regression Analysis for Variables Predicting Product Choice.

Variable	Model 1 (H2)				Model 2 (H3)				Model 3 (H4) 18-25				Model 4 (H4) 60+			
	B	SE	Wald	OR	B	SE	Wald	OR	β	SE	Wald	OR	β	SE	Wald	OR
Age Group x Condition	-0.63	.46	1.90	.53												
Age Group x Condition x Recall					-1.64	.76	4.46*	.20								
Condition x Hunger									.00	.09	.00	1.00	.01	.06	.02	1.01
Constant	-0.47	.21	4.95	.63	-0.44	.20	5.15	.64	-0.89	.39	5.20	.41	-0.47	.34	1.86	.63
Nagelkerke R <sup>2</sup>			.02				.07				.00				.00	
χ <sup>2</sup>			2.01, df=1, p=.16				6.22, df=1, p=.01				.00, df=1, p=.98				.02, df=1, p=.88	

\*p<.05

### Discussion

Three issues emerge from the results: first, that ageing offers serendipitous protection from ego depletion mediated product placement vulnerability; secondly, the paradoxical effect that ego depletion only increases placement vulnerability in younger adults when a placement is explicitly processed; thirdly, cognitive exertion may be associated with a need-state (hunger) and subsequent vulnerability to a relevant need-state prime (food), resulting in greater choice of the featured product.

Within the critical debate within ego depletion research, the findings of this study demonstrate that completion of the COLT does not deplete the self-control resource of older adults. We considered this result in relation to the strength model of ego depletion (Baumeister, 1998) which offers two interpretations. Either older adults are not affected by ego depletion as they hold unlimited self-control resource, or they may have plateaued below the point of further depletion. Given their significantly greater number of errors on the ego depletion COLT, we suggest that older adults displayed a reduced ability to inhibit their behavior. The context processing deficit theory (Braver et al., 2001) accounts for the high number of errors made by older adults on the depletion COLT, as the group was not able to

maintain the context specific demands required for the task. Neurobiology may offer an insight into the observed age related decline of self-control resource. Given that the pre-frontal cortex (PFC) does not fully develop until 25 years old (Figner et al., 2010; Sowell, Thompson, Holmes, Jernigan, & Toga, 1999) younger adults may be more vulnerable to self-control fatigue. Similarly, an age-related decline in PFC functioning (Braver et al., 2001) may reduce inhibition. Hence, we suggest that depletion research conducted with younger adults cannot be generalised to the older population and that further research of the developmental trajectory of depletion may offer insight into the underlying mechanisms.

We observed that depleted young adults only demonstrate an increased placement vulnerability when the brand is explicitly processed. Conversely, the mere exposure effect is absent when the brand is implicitly processed. This finding implies an implicit-explicit dissociation in the impact of depletion upon product placement influence. We suggest that resource depletion impairs persuasive defences (Friestad & Wright, 1994) which would otherwise lessen the impact of brand exposure. Conversely, depleted younger adults who do not recall the product show an absence of mere exposure influence, indicating that the brand was not implicitly processed. We suggest that the resource required to process the brand exposure implicitly was impaired. Hence, persuasion knowledge resources and implicit processing systems have a mutual finite resource.

While older adults seem to be protected from ego depletion and product placement, we extend the finding (Karremans et al., 2006) that young adults' vulnerability to a subliminal advert (Lipton Iced Tea) can be increased when the brand is related to current needs (thirst). We have observed that such needs can mediate product choice when the brand is explicitly processed. Thus placement vulnerability may be mediated by numerous desires including hunger and thirst. We tentatively suggest that self-control effort may increase susceptibility to, and influence of, need states. A taxing day of work may leave consumers with greater hunger which in turn increases product placement vulnerability. As over half of featured brands shown on prime time television in the USA consist of soda, candy, convenience foods

and quick serve restaurants (Nielsen, 2015 as cited by Elsy & Harris, 2015), consumers could be unknowingly nudged toward poor food choices.

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## Appendix

### Does COLT performance, time of day, fatigue, and hunger mediate ego depletion effects?

#### Introduction

The paper examined the effect of ego depletion on the product placement vulnerability of older and younger adults. We identified three key findings. First, ageing offers a serendipitous protection from ego depletion mediated product placement vulnerability. Secondly, depleted younger adults who recall the placement show an increased choice for the featured product. Thirdly, cognitive effort may be associated with greater hunger of depleted younger adults, and subsequently a greater choice for the featured brand. Further to the main hypotheses which were investigated in the paper, we will establish whether insight into the mechanisms underlying the observed depletion effects can be found. For reasons I explain below, we investigate the impact of time of day, fatigue and hunger on susceptibility to product placement exposure of younger and older adults. A series of follow-up analyses investigate whether COLT performance is associated with fatigue, hunger and vulnerability to placement influence. We include these analyses in the appendix rather than the paper as they are secondary to the main hypotheses and intended to explore previously understudied relationship between the variables.

As discussed in the paper, ego depletion has been shown to increase vulnerability to product placement exposure (Gillespie, Joireman & Muehling, 2012). Based on the premise that resources are depleted through the day (Baumeister, Bratslavsky, Muraven & Tice, 1998), Gillespie et al (2012) proposed that consumer vulnerability to placement influence would increase later in the day. However, the time of day was not assessed directly. Subsequently, Gillespie et al. (2012) suggested that future research should investigate how depletion which occurs through the day mediates vulnerability to product placements. We address this proposal in the current research.

The strength model of ego depletion suggests that people use up self-control resource through the day by exerting self-control to make numerous decisions. Hence, toward the end of the day consumers have less self-control resource and are more susceptible to impulses (Baumeister, 2002; Vohs et al., 2008). It has been observed that people report feeling more tired and are less able to regulate their behavior later in the day (Baumeister, 1994; Kochaki & Smith, 2014). In addition, the decrease in self-control resource can lead to an increase in impulsive and unhealthy food choices later in the day (Baumeister, 2002). The effect of depletion on consumer decisions has been demonstrated in several studies (e.g. Gillepie et al., 2012; Vohs & Faber, 2007).

Subsequent research offered support for the proposal that time of day may increase vulnerability to influence. Boland, Connell and Vallen (2013) investigated whether time of day and advert primes (non-food, healthy food or indulgent food adverts) interact to influence how much of an unhealthy snack is eaten. While watching a video clip which contained an advert prime, participants were given a bowl of M&M's, they could eat as much or as little as they wanted. Significantly more M&Ms were eaten in the afternoon than the morning, suggesting a time of day effect. This finding supports the proposal that consumers make increasing unhealthy food choices through the day, as self-control resources are depleted (Baumeister, 2002). There was no effect of prime type on the amount of M&Ms eaten in the morning (Boland et al., 2013). However, participants consumed more M&Ms in afternoon following indulgent prime and non-food prime, but the amount of M&Ms consumed was reduced following the healthy prime. This finding suggests that healthy adverts may increase self-control, reducing the amount of M&Ms consumed. Yet, as consumption was equal for those who saw the non-food and indulgent adverts, we propose that the indulgent advert failed to prime participants and increase consumption of M&Ms beyond the baseline level. Though there appears to be a time of day effect for overall consumption, it is unclear whether time of day mediates vulnerability to primes.

Based on the evidence described above, we suggest that younger adults will be susceptible to time of day effects of ego depletion, with the impact of depletion being greater in the afternoon than in the morning. As discussed in the main paper, older adults do not appear to be susceptible to ego depletion (Dahm, Neshat-Doost, Golden, Horn, Hagger & Danglish, 2011). Consequently, we suggest this age group will not be susceptible to the time of day effects of ego depletion. We propose that the depletion COLT will decrease brand recall (H1) and increase choice of the featured product (H2) in younger adults, with the impact of the depletion task being greater in the afternoon. Placement recall and product choice of older adults will remain stable through the day. In addition, depleted younger adults will show a greater reduction in recall and increase in choice of the featured product in the afternoon, yet the performance of older adults will remain stable through the day (H3).

Time of day can influence various aspects of human performance. Circadian rhythms mediate perceived fatigue and performance on cognitive tasks, with cognitive performance and alertness generally being higher in the morning and decrease later in the evening (Dijk, Duffy & Czeisler, 1992). However, not all age groups are equally affected by circadian rhythms. Sagaspe et al. (2012) observed that reaction times of younger adults on a Go/NoGo task are significantly faster than those of older adults during the day. The reaction times for younger adults are comparable with older adults during the night. It appears that younger adults are more susceptible to the negative effects of fatigue than older adults. As fatigue is considered to act as an indicator of self-control depletion (Baumeister, 1994), we propose that younger adults may show greater vulnerability to depletion and product placement exposure later in the day, conversely the vulnerability of older adults will remain relatively consistent through the day (H4).

In addition to the impact which circadian rhythms have on fatigue, the time of day can mediate hunger levels. Hunger shows a bimodal pattern, being at its greatest in the early afternoon and early evening and lowest levels in the early morning (Lowden, Holmback, Akerstedt, Forslund, Forslung &

Lennernas, 2001; McKiernan, Houchins & Mattes, 2008). As the effectiveness of primes (e.g. beverage prime) can be mediated by the relevant need-state (e.g. thirst) (Karremans, Strobe & Klaus, 2006), we suggest that need-state related primes may be mediated by the time of day. Hence, we propose that a greater vulnerability to the placement will be shown in afternoon, when hunger levels are higher (H5).

The COLT task is commonly used in ego depletion research (Hagger et al., 2010) however the relationship between COLT performance and subsequent ego depletion effects are rarely discussed. We suggest the performance data may offer an insight into depletion. By exploring whether performance on the COLT is related to the control scales (hunger and fatigue) and dependent variables (placement recall and product choice) we aim to offer insight into how the COLT task induces a depleted state in participants.

## Method

**Participants and Design.** One hundred and twenty-six older <sup>16</sup>(N=66; 60+ years,  $M=69.79$ ,  $SD=8.12$ ) and younger (N= 62; 18-25 years,  $M=18.60$ ,  $SD=1.18$ ) adults were recruited via Lancaster University and local clubs and organisations across the North of England. Participants received course credit or took part on a voluntary basis. Age group (18-25 vs 60+ years), condition (Ego depletion vs Control), hunger, fatigue and time of day (AM vs PM) were the independent variables. Brand choice and placement recall were the dependent variables.

**Materials.** The TV soap *Coronation Street* was chosen as it is popular with both age groups (YouGov, 2011). All participants saw a short clip (6min 10sec) consisting of three recently aired ads and three typical scenes from *Coronation Street*. The second scene featured a family sitting in their lounge, a

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<sup>16</sup> Sample size was determined before data analysis using Soper (2006) calculations;  $\pi = .8$ ,  $\alpha = .05$ ,  $df = 5$ ,  $\beta = .15$ , minimum required N=91.

teenager emerges from the kitchen holding an orange Kit-kit (candy bar) and says, "Orange Kit-Kat? They're your favourite." The Kit-Kat can be seen on screen for four seconds.

After viewing the clip all participants were offered one of two biscuit options, either an orange *Kit-Kat* or an orange *Club*. *Jacobs Club* has similar perceptual features e.g. size, shape and packaging (silver foil in an orange paper sleeve) to *Kit-Kat*, hence the brand would be the only prominent distinguishing feature.

The COLT was chosen as the most appropriate depletion task for the current research. A 493 word passage from a textbook (*Multilevel Modelling: Methodological Advances, Issues and Applications*) was chosen for the task. Participants in the control condition were instructed to cross out every 'e' in the text. The number of errors and correctly crossed out 'e's' was calculated for each participant. The number of 'e's' crossed out provided the participant's number of correct answers. Letters other than 'e' which were crossed out provided the total number of errors. Those in the Ego Depletion condition were asked to cross out every 'e', except if the letter was adjacent to or one letter away from another vowel. The number of 'e's' which were crossed out in adherence to the instruction provided the number of correct answers for participants in the Ego Depletion condition. Participants were considered to have made an error if an 'e' was crossed out which was adjacent to or one letter away from another vowel.

**Procedure.** To avoid compromising the implicit element of the study a foil purpose of the study was presented. The foil explained that the study aimed to investigate how the number of adverts watched before a television show influence content recall. Participants were informed that they would be asked to complete a task, watch a clip of *Coronation Street* and answer some questions. All participants were presented with the textbook passage (*Multilevel Modelling: Methodological Advances, Issues and Applications*) and randomly assigned to either the Control or Ego Depletion condition. Those in the control condition were instructed to cross out every 'e' in the text. This task does

not require the use of self-control resource. Participants in the Ego Depletion condition were asked to cross out every 'e', except if the letter was adjacent to or one letter away from another vowel. As this requires inhibition of the simple rule, self-control resource should be depleted. There was no time restriction of the task.

Once a participant had completed the COLT, they watched the Coronation Street clip, which was shown on a laptop. Having viewed the clip the participant was asked if they would like to select (and eat) one of the two biscuits. The snack was offered as gesture of thanks for taking part in the study. To assess explicit recall of the placement, participants were asked to describe the clip. A series of prompts (adapted from Auty & Lewis, 2004) was used as required.

- What was happening in the second scene?
- Was anything else happening?
- Did you notice any food or drinks?
- What were the snacks shown?
- What was the biscuit shown?
- What was the colour of the packet?
- What brand was the biscuit?

Hunger and fatigue control scales (10: Extremely hungry/tired – 1: Not hungry at all) were completed.

## Results

**Time of Day Effects.** To investigate the proposed time of day effects on brand recall we conducted a series of frequency analyses (see Table 1) and logistic regression (see Table 2) for each age group. Time of day and depletion do not significantly mediate placement recall for either younger ( $\chi^2$  (3,



n=62) =.28, p=.96, Nagelkerke R<sup>2</sup>=.01.) or older adults ( $\chi^2$  (3, n=66) =1.97, p=.58, Nagelkerke R<sup>2</sup>=04.). H1 is not supported.

Table 1. *Brand Recall and Brand Choice by Age group Time of Day, and Condition.*

Age Group	Time of Day	Condition	Brand Recall N(%)		Brand Choice N(%)	
			Yes	No	Kit-Kat	Club
18-25	AM	Control	4 (50)	4 (50)	6(75)	2(25)
		Ego Depletion	6 (60)	4 (40)	5(50)	5(50)
	PM	Control	13 (59)	9 (41)	5(56)	4(45)
		Ego Depletion	12 (55)	10 (46)	4(57)	3(43)
	Total	Control	18 (56)	14 (43)	11(64)	6 (35)
		Ego Depletion	17 (57)	13 (43)	9(53)	8(47)
60+	AM	Control	2 (22)	7 (78)	13(59)	9(41)
		Ego Depletion	3 (43)	4 (57)	19(86)	3(14)
	PM	Control	12 (48)	13 (52)	16(64)	9(36)
		Ego Depletion	11 (44)	14 (56)	15(60)	10(40)
	Total	Control	14 (41)	20(59)	29(62)	18(38)
		Ego Depletion	14 (44)	18 (56)	34(72)	13(28)

Table 2. *Interaction and Main Effect of Time of Day and Condition on Placement Recall*

Variable	Model 1				Model 2			
	<u>18-25</u>				<u>60+</u>			
	B	SE	Wald	OR	B	SE	Wald	OR
ToD	.37	.83	.20	1.44	1.17	.90	1.71	3.23
Condition	.19	.61	.09	1.20	.16	.57	.08	1.18
ToD x Condition	-.59	1.14	.27	.55	-1.13	1.25	.82	.32
Constant	-.37	.43	.72	.69	.08	.40	.04	1.08
Nagelkerke R <sup>2</sup>	.01				.04			
$\chi^2$	.28, df=3, p=.96				1.97, df=3, p=.58			

\*p<.05.

We next assessed whether there is a main effect or interaction between of time of day and condition on product choice (see Table 3). Time of day and depletion do not interact to mediate brand choice in either younger ( $\chi^2$  (3, n=62) =6.26, p=.10, Nagelkerke  $R^2$ =.14.) or older adults ( $\chi^2$  (3, n=66) =.26, p=.97, Nagelkerke  $R^2$ =.01.). H2 is not supported.

Table 3. *Interaction and Main Effect of Time of Day and Condition on Product Choice*

Variable	Model 3 <u>18-25</u>				Model 4 <u>60+</u>			
	B	SE	Wald	OR	B	SE	Wald	OR
ToD	-.73	.93	.63	.48	.35	.79	.20	1.42
Condition	-1.48	.76	3.81	.23	.17	.58	.09	1.19
ToD x Condition	2.58	1.28	4.05	13.15*	-.23	1.17	.04	.79
Constant	-.37	.43	.72	.69	-.58	.42	1.91	.56
Nagelkerke $R^2$			.14				.01	
$\chi^2$			6.26, df=3, p=.10				.26, df=3, p=.97	

\*p<.05.

It was necessary to conduct a separate analysis to investigate the relationship between time of day, condition and placement recall on brand choice for each age group (see Table 4) as inclusion of the interaction in previous models (see Table 3) resulted in high standard error. Neither model was significant. Hence time of day, depletion and recall do not interact to mediate brand choice for either younger ( $\chi^2$  (1, n=62) =.68, p=.41, Nagelkerke  $R^2$ =.02.) or older adults ( $\chi^2$  (1, n=66) =.05, p=.82, Nagelkerke  $R^2$ =001.). H3 is not supported.

Table 4. *Interaction between Time of Day, Condition and Placement Recall on Product Choice (H3).*

Variable	Model 5 <u>18-25</u>				Model 6 <u>60+</u>			
	B	SE	Wald	OR	B	SE	Wald	OR
ToD x Condition x Recall	-.86	1.13	.58	.42	-.27	1.25	.05	.76
Constant	-.75	.29	6.82	.47	-.42	.26	2.64	.66
Nagelkerke $R^2$			.02				.001	
$\chi^2$			.68, df=1, p=.41				.05, df=1, p=.82	

\*p<.05.

We conducted a series of logistic regression to investigate whether depletion and tiredness mediate brand recall of either younger or older adults (see Table 5). The analyses indicated that time of

day, depletion and tiredness do not interact to mediate brand recall for either younger ( $\chi^2$  (3, n=62) =.24, p=.97, Nagelkerke R<sup>2</sup>=.01) or older adults ( $\chi^2$  (3, n=66) =.35, p=.95, Nagelkerke R<sup>2</sup>=.01).

Table 5. Interaction and Main Effect of Age Group, Condition and Tiredness on Product Recall (H4)

Variable	Model 7 18-25				Model 8 60+			
	B	SE	Wald	OR	B	SE	Wald	OR
Condition	-.79	1.67	.22	.46	-.58	1.84	1.00	.56
Tired	-.09	.22	.15	.92	.04	.14	.07	1.04
Condition x Tired	.12	.29	.17	1.13	.06	.24	.06	1.06
Constant	.36	1.34	.07	1.43	.11	1.00	.11	1.11
Nagelkerke R <sup>2</sup>	.01				.01			
$\chi^2$	.24, df=3, p=.97				.35, df=3, p=.95			

\*p<.05.

We conducted a series of logistic regression to investigate whether depletion and tiredness mediate product choice of either younger or older adults (see Table 6). The analyses indicated that time of day, depletion and tiredness do not interact to mediate brand recall for either younger ( $\chi^2$  (3, n=62) =1.24, p=.75, Nagelkerke R<sup>2</sup>=.03) or older adults ( $\chi^2$  (3, n=66) =1.02, p=.80, Nagelkerke R<sup>2</sup>=.02). H4 is not supported.

Table 6. Interaction and Main Effect of Age Group, Condition and Tiredness on Product Choice (H4)

Variable	Model 9 18-25				Model 10 60+			
	B	SE	Wald	OR	B	SE	Wald	OR
Condition	-.38	1.81	.05	.68	-1.43	1.89	.57	.24
Tired	-.03	.23	.01	.97	-.13	.15	.77	.88
Condition x Tired	-.05	.32	.02	.96	.22	.25	.76	1.24
Constant	-.43	1.39	1.00	.65	.37	1.02	.13	1.44
Nagelkerke R <sup>2</sup>	.03				.02			
$\chi^2$	1.21, df=3, p=.75				1.02, df=3, p=.80			

\*p<.05.

In order to investigate whether there was a main effect of time of day on hunger we conducted a t-test for each age group. There was no effect of time of day on hunger for either younger [(t(56)=-.89, p=.38), (AM: M=5.35, SD=1.80; PM: M=5.95, SD=5.95)] or older adults [(t(64)=-.66, p=.25), (AM: M=7.75, SD=1.98; PM: M=7.73, SD=2.35)]. A logistic regression was conducted for each age group to

investigate the main effects and interaction between time of day, condition, and hunger on brand choice (H5). However, the model would not converge so a separate model was run for each time of day (AM and PM). The model was not significant for at either time of day for younger (AM,  $\chi^2$  (3, n=17) = 4.42, p=.22, Nagelkerke R<sup>2</sup>=.32; PM  $\chi^2$  (3, n=41) =6.79, p=.08, Nagelkerke R<sup>2</sup>=.22) or older adults (AM,  $\chi^2$  (3, n=16) =1.98, p=.58, Nagelkerke R<sup>2</sup>=.16; PM,  $\chi^2$  (3, n=40) =.13, p=.99, Nagelkerke R<sup>2</sup>=.004). Hence, H5 is not supported (see Table 7).

Table 7. *Interaction and Main Effect of Time of Day, Age Group, Condition and Hunger on Product Choice (H5)*

Variable	Model 11 AM 18-25				Model 12 PM 18-25				Model 13 AM 60+				Model 14 PM 60+				
	B	SE	Wald	OR	B	SE	Wald	OR	B	SE	Wald	OR	B	SE	Wald	OR	
Condition	-	4.25	1.33	.01	-	2.58	1.28	.05	.85	5.38	.03	2.35	-	1.98	.01	.80	
	4.89				2.92								.22				
Hunger	-.17	.47	.12	.85	.18	.19	.90	1.19	-.36	.33	1.16	.70	-	.18	.01	.98	
													.02				
Condition x Hunger	1.07	.77	1.95	2.92	.25	.36	.51	1.29	-.11	.68	.02	.90	.05	.26	.04	1.05	
Constant	-.23	2.55	.01	.79	-	1.33	1.39	.21	2.50	2.60	.92	12.13	-	1.27	.13	.63	
					1.56								.46				
Nagelkerke R <sup>2</sup>		.32				.22				.16				.004			
$\chi^2$		4.42, df=3, p=.22				6.79, df=3, p=.08				1.98, df=3, p=.58				.13, df=3, p=.99			

\*p<.05.

## Exploratory Analyses

**COLT Performance Follow-up Analysis.** We next conducted a series of analyses to investigate whether COLT performance was associated with tiredness and hunger control scales and brand recall and choice. It was not possible to include the Control groups in the analyses as a large number of zero counts in the error variable meant that the model would not converge. Hence, only data from Ego Depletion group was included in the subsequent analyses.

COLT performance is associated with tiredness is commonly used as a control scale for depletion effects. A correlation analysis indicated that fatigue of younger adults was not associated with COLT performance. Neither the number of correct answers given ( $r(27) = -.06, p = .77$ ) nor number of errors made ( $r(27) = -.10, p = .62$ ) were associated with the self-report measure of tiredness. The number of errors made by older adults did not correlate with tiredness ( $r(30) = -.10, p = .61$ ). However a significant moderate correlation was observed between the number of correct answers and tiredness ( $r(30) = .39, p = .03$ ). Hence, older adults who gave fewer correct answers on the COLT reported a greater level of tiredness than those who gave more correct answers.

As hunger was observed to mediate choice (see H4 analysis in paper) we next assessed if this control scale was associated with COLT performance. As reported in the results section of the paper, young adults who gave fewer correct responses reported greater hunger than those who gave more correct answers ( $r(27) = .41, p = .03$ ). The number of errors made on the COLT was not associated with hunger of young adults ( $r(27) = -.05, p = .79$ ). Neither the number of correct answers given ( $r(30) = -.01, p = .15$ ) nor errors made ( $r(30) = .30, p = .10$ ) on the COLT were associated with the level of hunger reported by older adults.

We next explored the number of correct answers or errors made on the COLT indicate depletion effects. A series of logistic regression to assess the main effects and interaction between errors and

correct answer given on the COLT upon brand recall and brand choice. COLT performance did not significantly mediate brand recall for either younger ( $\chi^2 (3, n=29) = 1.85, p=.61, \text{Nagelkerke } R^2=.08$ ) or older adults ( $\chi^2 (3, n=32) = 5.31, p=.15, \text{Nagelkerke } R^2=.21$ ), or brand choice for either younger ( $\chi^2 (2, n=29) = .12, p=.99, \text{Nagelkerke } R^2=.01$ ) or older adults ( $\chi^2 (3, n=32) = .22, p=.97, \text{Nagelkerke } R^2=.01$ ), (see Table 8).

Table 8. *Effect of COLT Performance on Placement Recall and Choice*

Variable	Model 15 (Recall) 18-25				Model 16 (Recall) 60+			
	B	SE	Wald	OR	B	SE	Wald	OR
Correct	.02	.02	.96	1.01	.01	.01	.84	1.01
Error	.24	.22	1.20	1.27	-.05	.05	1.17	.95
Correct x Error	-.002	.002	1.05	1.00	<.001	<.001	1.00	1.00
Constant	-2.04	1.70	1.44	.13	-.27	.98	.07	.77
Nagelkerke R <sup>2</sup>	.08				.21			
$\chi^2$	1.85, df=3, p=.61				5.31, df=3, p=.15			

Table 8 continued.

Variable	Model 17 (Choice) 18-25				Model 18 (Choice) 60+			
	B	SE	Wald	OR	B	SE	Wald	OR
Correct	.01	.02	.09	1.01	-.004	.01	.15	1.00
Error	.04	.17	.06	1.04	-.01	.03	.15	.99
Correct x Error	<.001	.002	.04	1.00	<.001	<.001	.15	1.00
Constant	-1.72	1.81	.90	.18	-.02	.92	<.001	.98
Nagelkerke R <sup>2</sup>	.01				.01			
$\chi^2$	.12, df=3, p=.99				.22, df=3, p=.97			

\*p<.05

The final model investigated the interaction whether COLT performance mediated the observed interaction between recall and condition on product choice of younger adults (H4). The model (see Table 9) was not significant for either younger ( $\chi^2 (3, n=29) = 4.21, p=.24, \text{Nagelkerke } R^2=.20$ ) or older adults ( $\chi^2 (3, n=32) = 6.10, p=.11, \text{Nagelkerke } R^2=.23$ ).

Table 9. *Interaction between COLT performance and Recall on Product Choice*

Variable	Model 1 18-25				Model 2 60+			
	B	SE	Wald	OR	B	SE	Wald	OR
Correct x Recall	-.02	.01	2.02	.99	.01	.01	.73	1.01
Errors x Recall	-.20	.41	.25	.82	.44	.42	1.12	1.56
Errors x Correct X Recall	.001	.003	.20	1.00	-.01	.01	1.21	.99
Constant	-.32	.57	.31	.73	-.49	.47	1.10	.61
Nagelkerke R <sup>2</sup>			.20				.23	
$\chi^2$			4.21, df=3, p=.24				6.10, df=3, p=.11	

## Discussion

Three issues emerge from the results: first, ego depletion and product placement vulnerability do not appear to increase throughout the day; secondly, the number of errors made on the COLT do not mediate tiredness or hunger. However, a lower number of correct answers is associated with increase hunger in young adults and increased tiredness in older adults. Thirdly, performance on the COLT appears to be dissociated from ego depletion effects.

Contrary to the proposal that product placement vulnerability increases throughout the day (Gillespie et al., 2012) we observed that neither placement recall nor choice were mediated by time of day. Placement vulnerability did not increase in the afternoon for those in the Control or Ego Depletion condition. This finding conflicts with a key concept of the strength model of ego depletion; that self-control resource depletes throughout the day leaving consumers more susceptible to influence and impulse (Baumeister, 2002; Baumeister et al., 2004, Vohns et al., 2008). Those in the Ego depletion condition did not exhibit increased susceptibility in the afternoon. Should self-control resources have been lowered throughout the day, as predicted by the strength model, we would expect to see a greater vulnerability in those who completed the Ego Depletion COLT in the afternoon compared to those who completed the task in the morning. In addition, those in the control group did not show a greater vulnerability in the afternoon compared to the morning session. If ego depletion occurred throughout the day (Baumeister, 2002; Gillespie et al., 2012) we would expect to see natural depletion effects in the

Control group, exhibited as a greater placement vulnerability in the afternoon. Hence, we propose that self-control resource is not depleted through the day, and that self-control is not more susceptible to depletion later in the day.

Contrary to previous research (Lowden et al., 2001, Mckiernan et al., 2008), hunger appeared relatively stable through the day. Consequently, the increase in placement vulnerability due to greater hunger in the afternoon was not observed. Younger adults reported a significantly greater baseline hunger than older adults. However, this did not relate to placement vulnerability. Previous research (Boland et al., 2013) reported that self-control resources are depleted through the day. We propose that the increased consumption of the M&Ms in the afternoon was due to the snack being was not due to reduced self-control resource. As the consumption of unhealthy snack foods are more commonly associated with, and consumed in the afternoon (Cross, Babicz, Cushman, 1994), we suggest that M&Ms are more 'time of day appropriate' for the afternoon. As consumption did not differ between the indulgent and non-food prime in either the morning or afternoon, we suggest that the indulgent advert failed to prime the behaviour of the participants. Had the indulgent advert successfully primed behaviour we would expect to observe a greater consumption for the indulgent group than the control group in the morning session, when resources are available to be depleted. Hence, we question the authors' conclusion that consumption of the indulgent and non-food groups were equal due to participants having achieved maximal depletion.

The data show that placement recall was not directly mediated by depletion. However, placement recall increased choice of the featured product in depleted younger adults (see paper 3), indicating that the recall and choice measures were sufficiently sensitive to depletion mediation. Previous research (Gillespie et al., 2012) indicated that depletion can reduce the recall of subtle placements. Yet, blatant placements were resistant to depletion effects. A null effect of depletion on placement recall was also observed in the current study. Gillespie et al. (2012) observed that brand attitude for a blatant



placement did not differ between the control and ego depletion groups. This finding was interpreted in relation to the Persuasion Knowledge Model (Friestad & Wright, 1994), concluding that depletion impaired persuasive defences for the subtle but not the blatant placements. However, as discussed in Chapter 1, blatant placements are more likely to activate persuasive defences than subtle placements (Cowley & Barron, 2008). We suggest that ego depletion would impair persuasive defences of blatant or explicitly processed placement rather than subtle or implicitly processed placements, as observed in the current study.

Baumeister et al. (1998) suggested that fatigue can indicate the depletion self-control resource. Tiredness scales are commonly used in ego depletion research to verify the effect of the depletion task (see Hagger & Chatzisarantis, 2016). Based on this premise we expected tiredness to act as a proxy, indicating depletion effects on placement vulnerability. However, we observed that tiredness does not directly predict recall or choice. In line with the conclusions of Hagger and Chatzisarantis (2016), we propose that people cannot perceive how much self-control resource has been used. We suggest that the fatigue scale cannot be used reliably to gauge depletion of self-control resource. The validity of the scale is questioned. We suggest that the perceived fatigue may be related to general cognitive effort rather than to ego depletion specifically. This could be investigated by comparing the perceived fatigue levels following a general cognitive and ego depletion task.

We proposed that the number of errors on the ego depletion COLT would indicate depletion as the participant was unable to inhibit behavior. However, performance on the COLT does not directly impact on placement recall or product choice. Older adults make significantly more errors on the ego depletion COLT than younger adults. However, the number of correct answers does not differ. We suggest that older adults have a reduced ability to inhibit their behavior preceding completion of the ego depletion COLT due to an impaired ability to maintain context specific rules (Braver et al., 2001). In contrast, COLT performance did not relate to placement vulnerability of younger adults who are able to maintain

context specific demands. As COLT performance does not correlate with subsequent self-control resource we suggest that further research. A review of relationship between performance on a range of ego depletion tasks and subsequent depletion effects could offer insight into the mechanism by which depletion occurs.

We observed that fewer correct answers on the ego depletion COLT were associated with increased hunger in younger adults. However, the number of errors made was not related to hunger. The relationship between hunger and the correct number of answers given on the COLT was not observed in older adults. Yet, older adults who provided fewer answers on the ego depletion COLT reported higher levels of fatigue, but the number of errors was not related to fatigue. There was no relationship between fatigue and COLT performance observed in younger adults. The data indicate that the perceivable effects of depletion may be dependent on consumer age group. Though COLT performance does not directly mediate vulnerability to ego depletion effects, we suggest performance metrics should be considered in future research to gain further insight into the mechanism by which the COLT induces depletion.

There are several limitations to the study which provide an opportunity for future research. First, the time of day at which participants took part in the study was not controlled. As morningness or eveningness can influence cognitive performance (Fahrenberg, Brugner, Foerster & Kappler, 1999) it is possible that participants chose their preferred time of day, providing an optimal performance. In addition, the inclusion of an evening session could further the understanding of whether self-control is depleted through the day. Second, a blatant product placement was used in the current as we predicted that older adults would have a lower level of placement recall. As subtle placements have lower levels of recall we wanted to avoid a placement which may not have been recalled by many, or any, older adults as this would not have exhibited the age differences in placement vulnerability which we observed in the current study. Future research could directly compare the impact of subtle and blatant

placements, as this would offer further insight into age differences however the placement clip would need to be chosen with caution. There are few studies which investigate the effect of ego depletion on older adults. As this is the initial study investigating the effect of ego depletion upon the placement vulnerability of older adults'. Future research is required to replicate the null effects, supporting the premise that older adults are not susceptible to ego depletion.

## **Conclusion**

Chapter Two explored whether product placement effects can be replicated, if assumption that implicit measures of placement influence are equivalent and whether the order in which tasks are presented impacts observed placement efficacy. It was observed that placement effects can be replicated. However, the observed efficacy of a placement may be influenced by the measures chosen and the order in which the tasks are presented. It is suggested that the diverse range of measures and procedures used within placement research may have contributed to the lack of regularity in existing research.

Chapter Three investigated age related differences in product placement influence. The first study explored how multi-tasking and motivation during placement exposure influence placement effects. As predicated, older adults were less likely to recall the placement than younger adults. Contrary to prediction, older adults were only influenced by placements when the product was recalled. The second study replicated these findings. In addition, eye-tracking data revealed age differences in the relationship between placement fixation time on brand recall and choice. Brand recall and choice of younger adults does not appear to be influenced by attention to the placement. Conversely, both placement recall and choice is influenced by attention in older adults. Additional age differences in

attention were observed during the Product Choice Task, providing an initial insight into the effects of ageing on the decision making process.

The observations in Chapter Two indicate age-related changes in cognitive processes. Based on these findings we suggest that older and younger adults have different cognitive mechanisms which process placement exposure.

The current chapter explores whether placement vulnerability can be influenced by ego depletion, and if older adults are susceptible to ego depletion. The impact of additional variables including, time of day, hunger, fatigue and COLT performance, were explored in relation to depletion effects. Paper Three revealed three key findings. First, ego depletion does not appear to increase through the day. Second, though increased hunger and fatigue are considered to be indicators of depletion, the number of errors made on the COLT depletion task do not influence these variables. Yet, fewer correct answers are associated with greater hunger in young adults and increased fatigue in older adults. Thirdly, performance on the COLT appears to be dissociated from ego depletion effects.

We tentatively suggest that older adults are not susceptible to ego depletion. The findings indicate that younger adults are susceptible to depletion effects. We observed that depleted younger adults demonstrate a greater vulnerability to placement exposure when the product is recalled or if the product relates to current need-states. The absence of implicit influence in depleted younger adults appears to mimic the cognitive processing patterns of older adults. In addition, it has been argued that age related decline in cognitive processing and need-states may inadvertently provide protection from the variables which mediate the placement vulnerability of younger adults.

This thesis has revealed age related differences in the underlying mechanisms which process brand placements. Older adults are less able to recall a placement, yet appear to only be influenced by exposure when the product is explicitly processed. Conversely, younger adults appear to be susceptible

to both implicit and explicit placement influence. Age-related differences were observed in the role of attention during placement exposure and choice tasks. In addition, age differences are present in both the performance on ego depletion tasks and subsequent product choice task. Based on these observations it is argued that different mechanisms underlie product placement effects of younger and older adults.

## **Chapter Five**

### **General Discussion**

To the author's knowledge, this thesis is the first series of studies to investigate placement vulnerability of older adults and explore the validity of methods used to gauge product placement effects. The current research has observed several novel and unexpected outcomes. In this chapter I will address the key findings. First, I will discuss the contributions of this thesis to methodological issues and associated theoretical models in product placement research. The next section will discuss the observations of this thesis to age-related differences in product placement influence and associated theoretical implications.

#### **Methodological Observations and Implications**

Television is the most common medium for product placement (PQ Media, 2012) and snack foods, particularly chocolate bars, are frequently bought on impulse (Neilson, 2016). In order to explore the influence which this form of advertising has on consumer brand choice I selected a scene from a soap-opera which features a chocolate biscuit brand placement. Though several studies have identified variables which can mediate the success of a featured brand (Boerman, Van Reijmersdal & Neijens, 2014; Noguti & Russell, 2014; Russell, 2002), some placements still have unanticipated effects (e.g. Yang & Roskos-Ewoldsen, 2007). Consequently, it was necessary to explore the recall and influence of the chosen placement clip. Following the recent debate surrounding the replicability of research (see Eearp & Trafimow, 2015; Pashler & Wagenmakers, 2012), it was essential to confirm the placement effects could be reproduced before investigating further hypotheses. The influence on brand choice was assessed in two studies before proceeding with the chosen stimuli. A significant increase in choice of the featured product was observed in both studies (see Chapter Two). This replication indicated that

viewing the placement had a reliable effect on product choice and the Coronation Street clip was chosen to be used as the stimuli to investigate further hypotheses.

In addition to the issues surrounding the predictability and reproducibility of placement influence, it was necessary to validate the method used to gauge the effects of placement influence on brand preference (see Chapter Two). Text based measures of placement influence, such as purchase intention scales, are most commonly used within product placement research (Russell, 2002), with only a small number of studies using stimulus based choice tasks (e.g. Auty & Lewis, 2004; Yang & Roskos-Ewoldensen, 2007). Numerous studies have demonstrated that priming effects are strongest within the same modality (Barnhardt et al, 2016; Butler & Berry, 2001; Chung & Szymanski, 1997). Yet, it is assumed within placement research that implicit measures presented in different modalities are equivalent. The second study of Chapter Two compared two methods of measuring product placement effects, a stimulus based brand choice task and a text based shopping list task. The data from this thesis indicate that that methods used to measure placement effects are not equivalent. This observation contributes a fundamental methodological finding for product placement research.

The secondary aim of Study Two was to investigate the effects which experimental design can have on observed placement influence. Studies often employ multiple measures of placement influence (e.g. Coates, Butler & Berry, 2006) yet the impact of this on consumer preference is unknown. Two unexpected findings were observed. Paradoxically, the first phase of measures indicated that the Shopping List Task revealed a greater effect of the featured product than the Stimuli Choice Task. The second phase of measures revealed an apparent absence of placement effects in the Stimuli Choice Task (List-Choice group). Yet, priming effects remained in the Shopping List task (Choice-List group). This observation suggests that the use of multiple measures may inadvertently acted as a confounding variable in existing research. The finding, that placement measures may interact, offers a novel insight

for product placement research. This observation presents a significant methodological consideration for future research.

The observations of Study Two offer several points of consideration for the theoretical assumptions and underlying mechanisms of mere exposure effects. The methodological insights and theoretical contributions will be discussed in relation to existing research and theory in the sections below.

### **Implications for Theoretical Accounts of Product Placement Influence**

The absence of priming effects in the second phase Choice Task (List-Choice group) contradicts the proposal that priming effects are stable and long lasting (Shapiro & Krishnan, 2001; Zajonc, 2001). This may be the case if the prime is distinct and similar stimuli are unlikely to be seen, such as the abstract shapes in many priming studies (e.g. Lee, 1994). However, this is not the case with more ecologically valid stimuli. Brand placements are typically shown on USA TV every 3 seconds (La Ferle & Edwards, 2006). It is probable that any exposure to a brand will be followed by a competing brand. Consequently, viewing a subsequent placement could override the mere exposure effects of the initial placement. Contrary to the general consensus that priming effects are long lasting and stable (Shapiro & Krishnan, 2001; Zajonc, 2001), I propose that under certain circumstances effects may be short lived and transient.

As discussed in the Introduction to this thesis, numerous studies have observed mere exposure effects, yet the underlying mechanisms are still debated (Fang, Singh & Ahluwalia, 2007; Lee, 1994, 2001, 2004; Monahan, Murphy & Zajonc, 2000). Two contrasting explanations have been put forward. One account suggests that the observed effects are due to an increase in perceptual fluency and misattributed familiarity (Bornstien & D'Agostino 1994; Lee, 2001; Whittlesea, 1993; Whittlesea & Price, 2001). The alternative theory suggests that an increase in processing fluency produces a general



increase in positive affect, this results in a more favorable judgements of stimuli (Fang et al, 2007). Despite the increasing prevalence of the Affect explanation in the literature on the nature of mere exposure effects (e.g. Fang et al, 2007; Monahan et al, 2000) it is argued that the PF/M model offers a more comprehensive account of these effects. The findings of the current research will be discussed in relation of the Affect Model and Perceptual Fluency/ Misattribution Theory (PF/M). In addition to the debate of the underlying mechanisms of mere exposure effects, the insights which the Intersensory Interaction Account (IIA) may contribute to understanding priming effects will also be debated.

The Affect Model of mere exposure suggests that viewing primed materials causes a general increase in affect. This results in more positive judgements of all stimuli, including novel items, images which are both visually similar and ones which are dissimilar to the original prime. Monahan et al (2000) concluded that the increase in stimuli evaluation, even when there was no perceptual similarity between the prime and test stimuli, supported the Affect hypothesis rather than Perceptual Fluency account of mere exposure effects. However, the measures they employed may account for the observed effect. Participants were asked to evaluate the stimuli on a scale, allowing a simultaneous increase in evaluation of all stimuli (Monahan et al, 2000). Conversely, the current research employed a forced choice task. Due to the nature of the task it was not possible to increase choice of both biscuit brands. The data of this thesis indicated that viewing the product placement increased choice of the featured product over the alternative, demonstrating mere exposure effects for the primed product only. This observation cannot be accounted for by the Affect Model as the theory proposes that exposure to the prime would cause a general rise in positive affect for all stimuli. The Affect Model predicts that an increase in preference would be observed for both the featured product, and an alternative product. Therefore, there would have been no difference in brand choice of those who viewed the product placement. Consequently, though a general increase in judgment is proposed by the Affect Model of mere exposure, it was not observed in the current research. In addition, support for the Affect Model

cannot be observed using forced choice tasks or ranked preference measures. Based on the observations of this thesis it is argued that a general increase in affect may be limited to certain measures which allow a simultaneous increase in the evaluation of stimuli, such as Likert or numerical scales.

In contrast to the Affect Model, the PF/M explanation of mere exposure can offer a more comprehensive account of the observed findings. The PF/M proposes that exposure to a prime increases stimulus processing fluency. This results in the item being more easily processed during subsequent encounters. The increased familiarity of the prime is mistaken for a greater preference for the item (Bornstien & D'Agostino 1994; Whittlesea, 1993).

The findings of the current research will be interpreted in relation to the PF/M explanation of mere exposure. The theory predicts that viewing the product placement would increase the perceptual fluency for the featured product. Participants experience a feeling of familiarity more toward the Kit-Kat than the Club biscuit during the Choice Task. The sensation of familiarity is mistaken for personal preference, resulting in a greater choice of the featured product. Hence, the perceptual fluency/misattribution account of mere exposure effect are able to account for product placement effects. Though this explanation can account for the increase in preference for the featured product, the theory does not easily account for the increase in preference indicated by the Shopping List task. This approach proposes that perceptual fluency is specific to the priming stimuli (Lee, 1994). Yet, the second study observed an increase in preference for the featured product on the Shopping List task, which lacks the perceptual features of the placed product. This issue will be discussed below in relation to the Intersensory Interaction Account (IIA) of priming (Klatzky & Creswell 2014).

As discussed above, the PF/M account of mere exposure predicts an increase in choice of the featured product, whereas the Affect Model does not (Klatzky & Creswell 2014). It is proposed that the

Affect Model fails to account for an additional finding of the current research. As discussed in Chapters Two and Three, recall of the product placement did not mediate brand choice of younger adults. The Affect explanation of mere exposure suggests that if participants are aware of the prime the positive influence will be corrected for when evaluating stimuli (Fang et al, 2007). This rationale predicts that being aware of a product placement would negate any influence of the featured brand. Yet, it was observed that recall had no effect on the brand choice of younger adults. This finding conflicts with the predictions of the Affect Model (Fang et al, 2007; Monahan et al, 2000), as recall of the placement increased rather than decreased placement influence. Conversely, the PF/M theory (Bornstien & D'Agostino, 1994; Whittlesea, 1993) explains that awareness of the prime stimuli does not necessarily negate prime influence (Bornstien & D'Agostino, 1992; Lee, 1994). The absence of effects which awareness has on prime efficacy is particularly dominant when the measures of mere exposure gauge affect rather than being cognitively based (Lee, 2001), as with the Choice Task the current research.

In conclusion, the PF/M model of mere exposure offers a more comprehensive account of the findings observed in the current research than the Affect explanation. As perceptual fluency is the common element of both theories it is suggested that fluency is the critical underlying mechanism. The Affect Model fails to explain findings of this thesis, which are accounted for by the PF/M hypothesis. It is argued that general increase in affect observed in past research may be an artefact of perceptual fluency, rather than the underlying mechanism. Consequently, it is proposed that the PF/M hypothesis offers a more valid and parsimonious explanation for mere exposure effects than the Affect Model.

Priming effects can be observed cross-modally. This indicates that visual (or verbal) placements do not just increase the fluency of the brand in the given modality. Instead, exposure to an audio-visual placement can result in a greater preference on a text based task, which lacks the perceptual features of the branded product. As priming effects were observed both on the Shopping List task and Choice Task (on phase one choices) it appears that there is an underlying mechanism which accounts for the priming

effects, which can be mediated by different modalities. This finding conflicts with existing research which claimed that mere exposure effects were specific to the priming stimuli (Lee, 1994). However, as discussed below, the Intersensory Interaction Account (IIA) of priming (Klatzky & Creswell, 2014) may offer a theoretical account of these unexpected findings.

Unlike the PF/M model, the IIA explains that sensory stimuli do not simply activate perceptual processing but can also trigger memory-based knowledge and associations with the stimuli. The multiple sensory inputs from a prime can be combined and interact, resulting in a stronger network of activation (Klatzky & Creswell 2014). It is argued that the incongruity in priming effects between previous research and the current study may be due to the stimuli used. Novel abstract patterns as have been used as stimuli to investigate priming effects (Lee, 2002). As the stimuli employed by Lee (2002) were both limited to the visual modality and novel, interaction with other sensory input and existing knowledge would not occur. It is therefore unlikely that a strong network of activation would be formed. As a weak network is formed, the priming effects of the novel patterns would be unlikely to extend to other stimuli. Contrasting with the simple and novel stimuli employed by Lee (2002), the current research used a more complex prime. The placement was presented in two modalities, visual and audio, and featured a brand which the majority of UK consumers be familiar with. This would allow an interaction of both audio and visual sensory inputs and activation of memory based knowledge. As a stronger network of activation it is more likely that the priming effect could be observed on the Shopping List task, which lacks the sensory input of the placement.

In addition to the insight which the IIA (Klatzky & Creswell, 2014) offers for the underlying mechanism of cross modal priming, the model may explain why a deflated priming effect was observed on the Stimuli Choice Task. As discussed in the second chapter, two alternative theories explained why the Shopping List task indicated a significantly greater preference for the featured product than the Stimuli Choice Task. The first account debated that the effect was due to perceptual fluency

competition. The alternative explanation put forward that the verbal element of the placement activated conceptual knowledge of the product. It was argued in Chapter Two that the perceptual fluency competition was considered the most likely cause of the unexpected difference in measures. This proposal suggested that viewing the placement increased perceptual fluency for the featured product. As the Club and Kit-Kat biscuits share several physical features, it is argued that the perceptual fluency increased for both brands during the Choice Task. Yet, the Kit-Kat brand name may have provided a point of distinction between the products, allowing the brand to possess the greater perceptual fluency and overall preference. Though the Shopping List Task did not present physical features of the biscuits, a preference for the featured product was observed. Developing the debate presented in Chapter Two, the rationale of the IIA is applied to the data of the current research. As discussed in the next paragraph, the IIA may offers a theoretical account of inflated preference observed on the Shopping List Task.

Viewing the placement presents multiple sensory inputs which would be combined and interact to create a unique representation of the elements. The inputs trigger a network of activation and associated knowledge. Both the Kit-Kat and Club biscuits were presented for the Stimuli Choice Task which would have differentially interacted with the existing bids. The Kit-Kat biscuit would align the perceptual and memory elements of the bid. Due the visual similarity of the products, the Club would align with the majority of perceptually based bids and, potentially, some of the memory components. Hence, when weighing the mere exposure effects during the choice task, the Kit-Kat choice 'bid' would be slightly stronger than the Club 'bid' though source confusion and competing bids would exist due to the mutual product features. Conversely, the Shopping List task would tap into the associated knowledge activated by the placement but not be subject to the perceptual 'bids'. Hence, the Shopping List task bypasses the 'noise' of the Stimuli Choice Task, offering a more distinct brand option.

As discussed in the Literature Review of this thesis, the IIA offers an account of the cross-modal priming effects, the model fails to explain how behavioural bids are weighted and integrated to influence behaviour. This is a critical element in any priming theory. As this omission in the theory fails to predict the placement effects observed in the current thesis, and in previous product placement research (e.g. Auty & Lewis, 2004). It is proposed that this element of the theory needs to be described. This may enable to model cannot to predict which placements will successfully influence behaviour. Further to this, the IIA argues that recalling a prime nullifies potential influence (Klatzky & Creswell 2014). As recall did not nullify the priming effects. the IIA fails to account for this observation. Conversely, the PF/M explains that priming effects are observed when the stimulus is recalled. It is argued, therefore, that the PF/M can better account for this finding.

As discussed above, the PF/M, Affect and IIA models each have limitations in explaining the observed findings. The Affect Model fails to account for widely reported effects of product placement. The IIA offers some insight into cross-modal priming effects, yet fails to explain priming effects are produced, relying on a 'black-box' system to explain how 'bids' are weighted and integrated. The PF/M hypothesis predicts the majority of findings of existing research, the benefit of congruous prime-test stimuli and the greater choice of a primed object over alternatives. Consequently, it is argued that the PF/M offers a more comprehensive theoretical account of priming effects, yet cannot fully explain all of the data in this thesis. It is proposed that combining the network activation elements of the IIA theory into the PF/M may offer advancement in the understanding of priming effects.

Based on the data of this thesis (Paper One, Two and Three) and literature cited above I propose a new model which combines the perceptual fluency and misattribution components of the PF/M and the network activation element of the IIA theory. The Intersensory Fluency Interaction Model (IFIM) explains that sensory inputs of a stimuli would combine, creating intersensory fluency for the prime. For example, a product placement which is both verbal and pictorial would cause the audio and visual the

sensory inputs to be combined. The audio-visual prime would create a greater fluency network than if the placement was just presented verbally. Yet, the greatest fluency will be in the modality in which the prime is presented. For example, a visual placement would show the strongest priming effect on visual measures. The next element of the IFIM incorporates the network activation aspect of the IIA. It is proposed that the increased sensory fluency network would interact with existing knowledge which is associated with the feature brand. Consequently, a network of increased fluency is created for the featured product. The consumer would not need to be aware that they had viewed a placement or be aware that they hold knowledge of the product for an increase in fluency to occur. Drawing from the PF/M, it is proposed that the consumer would be able to process the product or associated information more quickly on subsequent interactions, resulting in a sensation of familiarity. The sensation of familiarity is mistaken for the consumers own preference for the product. Consequently, the consumer would be more likely pick the featured product over an alternative.

The IFIM accounts for the cross-modal priming observed in the current study (see Paper One) and previous research (Law & Braun-LaTour, 2004; Russell, 2002). The IFIM explains that the sensory inputs from the placement would interact with the associated knowledge of the product, creating a network of activation for the brand. Consequently, priming effects could be observed with measures of any modality. In addition, the network of sensory and existing knowledge described by the IFIM may account for the 'reminder effect'. The effect states that those who have previously viewed a placement clip, prior to taking part in the study, have a greater choice for the featured product than those who have only viewed the clip during the study (Auty & Lewis, 2004). It is proposed that this effect is due to the activation of prior knowledge of the featured brand being combined with the sensory input of the audio-visual product placement employed by Auty and Lewis (2004). The interaction of sensory input described by the IFIM predicts that primes which are represented in multiple modalities will create a stronger fluency network than those presented in a singular modality. This has been shown in previous

research, audio-visual placements typically have a stronger impact than those presented either as a verbal or visual (Chung & Szymanski, 1997; Purnawirawan, Wouters & De Pelsmacker, 2010; Russell, 2002). It is argued that the IFIM can account for findings of the current thesis and previous research which cannot be explained by the PF/M or IIA alone, yet it is suggested that the model is explored by future research.

The predictions of the IFIM could be explored by assessing the priming effects of singular and multi-sensory (e.g. audio, visual, audio-visual) product placements on measures of different modalities (e.g. audio, visual). In addition, the use of novel and common brands would reveal whether existing knowledge and experience of a brand combines with sensory input to create a stronger priming effect.

### **Age Differences in the Underlying Mechanisms of Product Placement Influence**

The main aim of this thesis was to conduct an initial investigation into the age related differences in product placement vulnerability. This section will discuss the contributions of this thesis to product placement research and associated theoretical models. This thesis offers the first series of studies to investigate the impact of placement exposure upon product choice of older adults. Fundamental assumptions within placement and literature were assessed. Based on previous research it was predicted that older adults would be less able to recall the placement (Ballesteros & Mayas, 2014; Fleischman et al, 2004; Geraci & Hamilton, 2009), which would result in greater susceptibility to implicit influence. Combining the findings from studies three and four (see Chapter Three), we describe four key observations; first, older adults are less likely to remember seeing a product placement on TV; second, an age-related dissociation of implicit and explicit processing of placements mediate vulnerability to placement influence; third, an age-related dissociation of placement fixation time on brand recall and choice; fourth, divided attention appears to increase explicit processing and placement susceptibility of



older adults. Based on these observations it will be argued that different mechanisms underlie product placement effects of younger and older adults.

It is necessary to return to two key issues which were identified in the Literature Review of this thesis, the debate surrounding the structure of implicit and explicit memory (e.g. Baddeley, Lewis, Eldridge & Thomson, 1984; Baddeley & Wilson, 2002; Shanks & Berry, 2012) and the nature of age related cognitive decline (Baddeley & Wilson, 2002; Berry, Shanks, Speekenbrink & Henson, 2012; Drury, Kinsella & Ong, 2000; Light, 1991). The data of this thesis indicate that older adults are less able to recall a product placement and are not susceptible to implicit influence compared to younger adults. These findings demonstrate that older adults experience a decline in both explicit and implicit memory. The observations of this thesis will be used to re-examine the debate of multiple component and the SS model of memory.

It is argued that (see Chapter Three) the age related decline of implicit and explicit memory provides support for the single system (SS) model of memory over multiple component explanations (Baddeley, Lewis, Eldridge & Thomson, 1984; Baddeley & Wilson, 2002). The proposal that the SS model offers a fuller explanation of memory is supported by the observations of the current thesis and the increasing body of research which reports age related decline in both implicit and explicit memory (La Voie & Light, 1994; Poldrack & Foerde, 2008; Shanks & Berry, 2012). Support for the SS model has primarily been observed in older adults (e.g. Ward, Berry & Shanks, 2013). Yet, the data from this thesis and numerous studies conducted with younger adults demonstrate a dissociation between implicit and explicit processing (Baddeley et al., 1984), as explained by the multiple component models of memory (Baddeley & Wilson, 2002). Based on these observations it is proposed that younger and older adults have different underlying mechanisms of memory. Specifically, younger adults possess a multiple component structure and age related cognitive decline results in a single system model of memory.

The SS model proposes that memory traces are weaker in older adults. This results in impaired explicit memory and priming effects (Berry et al., 2012; Shanks & Berry, 2012). Yet, an alternative account of cognitive ageing proposes that the observed effects are due to a decline in speed of processing (Rozas, Juncos-Rabadán & González, 2008), rather than a weakening of memory traces (Berry et al., 2012). This alternate hypothesis explains that a reduction in speed of processing underlies a decline in inhibition and working memory functions which mediate cognitive performance (Rozas et al., 2008). As reported in Chapter Three, older adults are more likely to recall a placement if it is fixated on for longer, demonstrating this age group require longer to explicitly process perceptual information. Yet, several older adults were unable to recall the placement and did not show evidence of priming, demonstrating impairment of both implicit and explicit processes. It is proposed that the absence of placement recall or priming is due to considerable slowing of cognitive systems. Consequently, the placement was not processed within the timeframe in which the brand was displayed. This finding suggests that decline in processing speed reduces the automaticity of implicit priming. In addition to the reduction in priming, the biscuit choice task also exhibits an age related decline in speed of processing. Older adults spend significantly longer deciding on which product to pick than younger adults (see Chapter Three Appendix). It is argued that these findings demonstrate an age related slowing in perceptual processing and decision making processes. Conversely, the implicit and explicit processing of younger adults was not associated with fixation time, and this group chose their preferred brand significantly faster than older adults (see Chapter Three). This indicates that time is not a dominant mediating factor for the cognitive processes of younger adults, as it is for older adults.

Taking the findings of this thesis and existing research into account it is argued that younger adults possess the processing speed and capacity to maintain a multiple component system. Yet, the decline in speed of processing in older adults results in them not being able to maintain a multiple model structure. It is proposed that age related cognitive decline is mediated by a reduction in speed of

processing in addition to, and potentially interacting with the weaker memory traces identified by the SS model.

### **Depletion Effects Mimic Cognitive Ageing**

In Chapter Four it was observed that older adults are not susceptible to depletion effects. It was argued that absence of effects and high number of errors on the COLT, indicating a reduced ability to inhibit, suggests that this age group are in a continuous state of 'depletion'. This finding conflicts with the strength model of ego depletion (Baumeister, Bratslavsky, Muraven & Tice, 1998) which proposes that an individual possesses self-control resources which can be fatigued through self-control activities. The results of this chapter suggest that older adults appear to have little self-control resource before completing depletion tasks. Consequently, the strength model of ego depletion cannot account for the behaviors of this age group.

The data of this thesis have demonstrated that ageing is associated with a decline in implicit processing and that older adults are not susceptible to depletion effects due to impaired inhibition (see Chapters Three and Four). It was argued above that the absence of implicit processing is due to a decline in the speed of processing. As cognitive processing speed has been shown to mediate inhibition (Rozas et al., 2008), it is proposed that the age related decline in speed of processing accounts for the impaired inhibition in older adults, and lack of ego depletion effects.

In addition to the contribution of this thesis to the debate on whether older adults are susceptible to depletion effects, novel findings were revealed for younger adults. As discussed in Chapter Four, depleted younger adults exhibited significantly greater vulnerability to placement influence when the brand was explicitly processed than if the featured product is implicitly processed. This shows that depleted younger adults exhibit a pattern of placement which mimics that of older adults, indicating a dissociation between implicit and explicit processing and brand influence (see

Chapter Three and Four). The dissociation of processing and absence of depletion effects observed in older adults has been attributed to the age related decline in cognitive processing speed. Subsequently, two alternative explanations of the depletion effects observed in younger adults are offered.

First, the observed effects in this group seem to be due to mental fatigue slowing cognitive processes. As observed in older adults, a decline in speed of processing reduces placement recall and implicit priming effects. Following this rationale, if the processing speed of depleted younger adults reduces to that of older adults, this age group would demonstrate reduced placement recall and impaired implicit influence. The data discussed in Chapter Four indicate that the depletion task did not significantly reduce the implicit influence or placement recall younger adults, yet increased placement vulnerability was observed when the featured product was explicitly processed. This explanation does not initially appear to account for the observed effects, as a decline in recall and implicit influence are predicted. However, if the speed of processing is not slowed to the same level as older adults, a milder impairment would be observed.

The second explanation of the observed effects suggests that the depletion task impairs inhibition systems, rather than the speed of processing in younger adults. As older adults exhibit impaired inhibition (Rozas et al., 2008), younger adults with temporarily reduced inhibition would show a similar pattern of placement influence. Based on this rationale, placement recall would remain stable, yet due to the reduction of inhibition participants would be more influenced by impulses. Consequently, choice of the featured product would be significantly greater whether the placement is implicitly or explicitly processed. The data indicate that the explicit processing of younger adults is not impaired, yet a greater placement influence is only observed when the featured brand is recalled.

Though the impaired inhibition explanation accounts for some of the observed effects, it fails to account the relative stability of implicit processed. Consequently, neither the speed of processing or

inhibition explanation of depletion effects in younger adults can fully account observed findings. Future research should investigate whether depleted younger adults exhibit a temporary decline in speed of processing or just impaired inhibition. This would indicate whether the depletion task impairs inhibition alone or the observed effects are due to mental fatigue slowing cognitive processes.

### **Marketing Implications**

In this section the findings from the current will be discussed in relation to their implications for marketing strategy and optimisation. As discussed in above, the observations of this thesis revealed factors which may lead to the effects of a product placement being compromised. In addition, the data indicate a strategy which could be used to target older adults. The current research demonstrates two ways in which the intended effects of this marketing strategy could be jeopardised. First, the consumer may be 'reprimed' by brand exposure which follows the product placement. For example, viewing a placement for Pepsi may increase consumer choice of Pepsi over an alternative option. Should a prime for Dr Pepper be subsequently viewed then this may override the preference for Pepsi, nullifying previous priming effects. As a placement typically occurs every three seconds on prime time TV in the USA (La Ferle & Edwards, 2006) and over half of placement are for soda, candy, convenience foods and fast-food restaurants (Nielsen, 2015 as cited by Elsy & Harris, 2015), it is likely that similar products will be featured in the same viewing period. Consequently, advertisers should aim to show a brand in movies or shows which do not feature competitor products. This will avoid priming competition and maximise the chance of a placement successfully influencing consumer brand choice.

Second, the product placement may have unintended effects by increasing the perceptual fluency of product features which are present in competitor brand. For example, Budweiser and Coors Light beer both have red and white labels on a brown glass bottle. A product placement of a Budweiser

beer may inadvertently increase preference for Coors Light, which is a visually similar product. Based on the observations above I propose that when marketing practitioners are selecting a product to be featured as a product placement products which share perceptual features with competing brands should be avoided. Instead, marketers should aim to for a pack design and clarity of placement which clearly distinguishes their brand from that of competitors. This strategy would allow clear brand distinction. Consequently, product placements would only act as a prime for the featured brand and would not increase preference visually similar competitors.

As discussed in Chapter Three, the data of this thesis revealed a paradoxical observation. Older adults are only influenced by placement exposure when the featured product was recalled, yet those who do not remember the placement show no evidence of implicit processing. Conversely, younger adults exhibit placement influence whether the product is implicitly or explicitly processed. Informed by existing academic research the advertising industry assumes that product placements can influence viewers over whether the placement is recalled or not (Russell, 2002; Russell & Stern, 2006). Further to this, past research demonstrates that a placement may be more successful when it is subtly shown as, in such a circumstance, persuasive defences are not activated (Campbell & Kirmani, 2000; Friestad & Wright, 1994). Based on the observation that older adults must recall a placement to be influenced it is argued that blatant and prominent placements may more successful in influencing this age group than subtle placements. It is suggested that blatant placement should be used to target older adults, whereas subtle placement may be more successful with younger adults. As almost one quarter of the population in the UK (Office for National Statistics, 2017) and US (U.S. Census Bureau, 2015) are over sixty, and older adults watch more TV than any other age group (Ofcom, 2015), it is argued that this method could offer an impactful strategy to target a growing segment of television viewers.

## **Directions for Future Research**

The data from this thesis have provided new understanding in the importance of methodological design and the use of suitable implicit measures when gauging placement influence. These findings highlight methodological issues which should be investigated in future research.

As discussed above, the selection of appropriate tasks and the use of multiple measures to gauge placement influence may inadvertently act as a confounding variable and mediate the observed placement efficacy. This thesis compared two methods of measuring placement influence, yet the validity and potential interaction effects of other commonly used measures are not fully known. It is proposed that future research should compare the placement influence observed by commonly used measures, such as brand attitude scales, preference ranking tasks and computer based choice tasks. In addition, potential interaction effects of these measures should be explored. This body of research would allow researchers to identify the most appropriate measure of placement efficacy. Consequently, it would allow researchers to identify the most appropriate measures, this would in turn provide greater insight into the underlying mechanisms of product placement. The findings of this research may explain variability observed between studies which have explored placement influence. In addition to the methodological issues highlighted by the current research, it was argued in this thesis that product placements are susceptible to 'repriming' effects (see Chapter Two). It would be of interest for academic researchers and advertisers to investigate how consecutively viewing placements of competing brands influences consumer preference. Specifically, it would be of importance to establish whether placement effects are susceptible to primacy or recency effects. For example, would viewing a placement for Pepsi then a placement for Coca-Cola result in an increased choice for the brand which was viewed first or most recently? Understanding of the stability and longevity of mere exposure effects offers insight into priming effects and would also provide clear strategies for advertisers who use this form of advertising.

Perhaps the most intriguing observation of this thesis is the absence of implicit priming in older adults. It was argued that younger and older adults have different mechanisms which underlie placement effects. As the vast majority of research which explores placement effects has been conducted with younger adults, it is not possible to apply the observations of existing placement research to older people. Consequently, we lack understanding of how product placement may affect almost one quarter of the UK population. It is suggested that future research should revisit the fundamental principles of product placement research. For example, understanding of how placement modality (audio, visual, audio-visual), congruency, and connection to the plot, interact to mediate brand recall and attitude (e.g. Russell, 2002), would provide the foundation of many further studies. Yet, we do not know how these placement features will be processed by the distinctive processing mechanism of older adults. Understanding how these factors influence the placement influence in older adults will provide a foundation on which to explore more complex effects. These findings could reveal age related differences in persuasive defenses and provide theoretical contributions to the Persuasion Knowledge Model. In addition, this body of research may uncover modality specific priming deficits which would offer development for current models of cognitive ageing.

## **Conclusions**

This thesis has contributed several novel and paradoxical observations to the field of product placement research. It has been argued that different implicit measures of product are not equivalent. Product based choice tasks offer an appropriate measure of placement effects, especially for low involvement goods which are bought on impulse. Reviewing previous research which used scales measures rather than product choice may offer insight into the impact of perceptual processing on the mechanisms of placement influence.



The evidence gathered has revealed age related differences in the underlying mechanisms which process brand placements. Younger adults are susceptible to both implicit and explicit influence. It has been observed that depletion only increases the vulnerability of this age group when the placement is recalled or if the product relates to current need-states. It has been argued that age related cognitive decline inadvertently provides protection from the variables which mediate the placement vulnerability of younger adults. Paradoxically, depleted younger adults mimic the cognitive processing patterns of older adults. Though this observation may provide an intriguing insight for advertisers, it may be prove challenging for them effectively to target young adults who are in a fatigued state. It has been argued that older adults are only susceptible to explicitly processed placements, and this age group could be targeted with prominent placements. As the use of product placement is now permitted within UK produced programming (Ofcom, 2011) and older adults watch more television than any other age group. Older adults may be inadvertently influenced by this advertising technique.

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