You're Only Jung Once: Building Generalized Motivational Systems Theories Using Contemporary Research on Language

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In their target article for this issue of *Psychological Inquiry*, Becker and Neuberg have provided a thoughtful reflection on the intersection of motivational subsystems as well as their elaborate interplay. The authors primarily hone in on the idea that decades of research in the fields of cognitive, evolutionary and developmental psychology (and, we would add, personality and social psychology) have shed light on motivational patterns that seem to transcend time and context. They note that each subdiscipline's contributions remain largely isolated — a sentiment that has been shared by others (Baumeister, 2016). In their quest for a more generalized framework for understanding how the subcomponents of motivational systems coalesce into higher-order outputs, Becker and Neuberg (this issue) have mapped several contemporary findings from empirical psychology to Jung's notion of archetypes (e.g., Jung, 1959).

One of the primary merits of the authors' reflection is in its attention to the need for a generalized model of how psychological subsystems collaborate to generate higher-order, abstract processes and behaviors. This reflection not only invites researchers and scientists to think more deeply about the field's progress on a "big picture" level, but nudges us to keep in mind serious considerations of an ambiguity-free, unifying framework. Despite some problematic aspects arising from this attempt, which we touch upon later, the authors' exercise is thought-provoking and gives rise to many interesting ideas, particularly in terms of operationalization and measurement.

Getting Motivational Processes Under One Theoretical Roof

That evolutionary forces have sculpted our motivational systems towards certain types of information processing is not controversial. That these subsystems likely interact in ways that are predisposed to multiple types of abstract convergence is also not controversial. Nevertheless, objective, empirical research on these interactions and their resulting output is sparse. Given the absolutely central nature of psychological subprocesses to understanding the whole human organism, it is imperative that we start integrating disparate areas of research into more unified, "360-degree" understandings of humanity.

Of course, building an integrated knowledge-base of motivational systems — let alone a strong, generalizable theoretical framework — is easier said than done. The heart of most psychological research can be found in the concepts of motivation and cognition (Baumeister, 2016); synthesizing "most" of an entire discipline into a single theory is a rare achievement. Whereas Becker and Neuberg (this issue) have begun with a pre-formulated theory and present recent findings as illustrations of its applicability, we suggest that an inductive approach may be more fruitful. In weaving together motivation-related research into a single tapestry, one of the best places to start is by looking at studies that are part of a common operational thread. By holding certain aspects of empirical research constant, such as the motivational system output modality, it becomes much easier to identify commonalities that can speak to more general, generative phenomena.

A Place to Start: Research with Language

There are several domains that are ripe for scientists to begin comparing notes and piecing together a uniform, coherent perspective on how generalized motivational systems emerge, function, and are shaped by their inputs. Becker and Neuberg repeatedly raise language

learning and acquisition as an important exemplar that is simultaneously reflective of a person's internal and external worlds, which is instructive and insightful. Psychological research with language is perhaps one of the most ready-to-serve areas of study that can shed light on how multiple psychological subsystems operate companionably (Boyd, 2018; Boyd & Pennebaker, 2017; Ferreira & Tanenhaus, 2007; Martinčić-Ipšić, Margan, & Meštrović, 2016).[1] There are already hundreds (if not thousands) of recent studies of language that can speak to motivational processes operating in tandem; inductively aggregating them into a generalizable theory of motivational systems is feasible.

Scholars have long understood language to be informative of underlying motivational systems, dating back to well before Freud. Given the social nature of language, it comes as no surprise that language has historically been used to study motivational processes that are primarily activated in social contexts (Lasswell, Lerner, & de Sola Pool, 1952; McClelland, Atkinson, Clark, & Lowell, 1953). Nevertheless, the field of implicit motives research has fallen out of vogue and is long overdue for serious re-examination through a more modern, unified understanding of psychological subprocesses that extend beyond the social domain.

Recent efforts in language analysis have made preliminary headway that is suggestive of the complex interplay of different motivational systems, many of which extend into and beyond the adaptive response domains discussed by Becker and Neuberg. Much of this research falls within something of a "Goldilocks Zone" — language metrics are not directly capturing what individual neurons are doing, but they are objective, relatively proximal to motivational subsystems, and are driven by the actual operations of motivational systems *in situ* (to be contrasted with methodologies such as explicit self-reports or hypothetical computational

[1] Notably, language represents the only "image" (as defined by Jung, 1959) that not only embodies an archetype, but also attempts to describe and explain itself.

models). Some of this work sprouts from traditional roots (Schultheiss, 2013), whereas others are often discussed in terms that are not explicitly motivation-related in nature yet obviously require coordinated, complex interactions between supporting motivational subsystems. Namely, language research in the past 15 years is very often framed as a window into various motivated attentional processes, social or otherwise. Put another way, a person's words are diagnostic of where several attentional-motivational systems are concurrently concentrated (Chung & Pennebaker, 2007; Pennebaker, 2011).

Research looking at language and shared attentional processes is not new (Tomasello & Farrar, 1986), however, recent work that examines the coordination of attention (e.g., through shared patterns of language; Babcock, Ta, & Ickes, 2013; Borelli et al., 2016; Ireland et al., 2010) strongly implies that several motivational and attentional subsystems operate in tandem to create novel (and abstract) outputs. Importantly, where the outputs of interlinked motivational systems can be observed through language analyses, we can retrace the systems that drove them in the first place. For example, we are aware of recent efforts from several labs for detecting the construct of agency from language (e.g., Pietraszkiewicz et al., in press) — agency being a construct that involves a constellation of motivational systems and is often best described from an evolutionary perspective (Bandura, 2006; Buss, 1991; Fiske, Cuddy, & Glick, 2007; Wiggins, 1991).

In line with points raised by Becker and Neuberg (this issue), research has shown that a person's words provide meaningful insights into systems that are involved in motivation formation. Indeed, early empirical work in this area often adopted a view compatible with (or at least overlapping with) Jungian-flavored views of cognitive-motivational process development (Fisher & Cleveland, 1958; Martindale, 1975; West & Martindale, 1988). An updated,

contemporary understanding of the psychology of language makes more significant contributions to our understanding of how a person's drives are negotiated with the external world, shaped heavily by "inputs" in the form of experiences in the environment.

Research that explores language use as a coalition between multiple developmental processes (e.g., personality and identity development, biological and social maturation, experience, traits) may be particularly enlightening when it comes to understanding the tensions between inborn motives and one's environment. In particular, we note recent work by Lanning and colleagues (e.g., Lanning, Pauletti, King, & McAdams, 2018) that serves as a positive example of using language analysis to probe the developmental intersection of self and environment. Similarly, Becker and Neuberg (this issue) call attention to how a person's motivational systems are imprinted by culture at a fundamental level; the bending of higher-order expressions of motivational systems towards certain predispositions as a function of culture has been explored through the lens of language as well (Qiu et al., 2017; Ramírez-Esparza, Chung, Sierra-Otero, & Pennebaker, 2012; Taylor, Larner, Conchie, & Menacere, 2017; Wilson, Mihalcea, Boyd, & Pennebaker, 2016a, 2016b).

From a more biological perspective, several well-studied biological components of motivational systems are also visible in language. Language use tracks with established neurochemical variations, both short- and long-term. Variations resulting from the circadian rhythm (Dzogang, Lightman, & Cristianini, 2017; Ethayarajh & Rudzicz, 2017), testosterone (Mascaro et al., 2018), and psychopharmacological agents (Baggott, Kirkpatrick, Bedi, & de Wit, 2015) can be better triangulated from language, as can the output of motivational systems related to various biopsychosocial behavioral phenomena (Ireland, Schwartz, Chen, Ungar, & Albarracín, 2015; Robinson, Bair, Persich, & Moen, 2016). Again, such topics have been

discussed at length from an evolutionary psychological perspective as well as systems-theoretical perspectives, and findings can be readily collapsed or integrated across disciplines.

To summarize our view, we feel that there are several areas of research that lend themselves to ready integration into higher-order theoretical frameworks on motivational processes — the domain of language research is a strong case study of one such area. As a final illustrative example, consider the realm of sexual motivation — a topic that has been researched extensively via language. Important motivated outputs such as sexual and romantic behaviors have well-established motivational underpinnings (e.g., Hill & Preston, 1996) — motives that can be captured by language (Griffin & Fingerman, 2017; Groom & Pennebaker, 2005) — and predictable, well-understood disruptions resulting from past experience can be accurately gleaned from language variations (Kilimnik, Boyd, Stanton, & Meston, 2018; Rellini, 2008; Stanton, Meston, & Boyd, 2017). With an increasingly head-to-tail view of sexual motivational processes that are measurable from language, it becomes easier to see regularities that necessarily span several motivational subsystems. The sheer amount of research performed in this space that relies on language-based methodologies affords us a “big picture” perspective on how the different pieces of sexuality — attentional systems, schemas, behaviors, and biological responses — can fit neatly together under a more generalized theoretical framework.

Marr, Connectionism, Adaptationism

We also commend Becker and Neuberg for attempting to pull together adaptationist and connectionist approaches to the mind under one Marrian framework for cognitive science. Evolutionary cognitive scientists have long recognized the value of drawing from evolutionary theory to provide descriptions of the mind at Marr’s computational level of analysis (Cosmides

& Tooby, 1995b). Insights as to the adaptive problems organisms face, such as from fundamental motivations, yield powerful predictions about the nature of resulting information processing devices that the mind evolves, which are useful for describing the mind at a representational/algorithmic level.

Nevertheless, we agree that the dominant mode of explanation for these information processing systems has been in symbolic, propositional terms. Yet in light of (1) the fact that these information processing systems must be implemented in neural networks and (2) the recent resurgence of machine learning architectures inspired by cognitive neuroscience, we agree that it could be worthwhile to reconsider the utility of this approach. A single theoretical framework that allowed researchers to generate connectionist models of the mind in light of understanding of the adaptive problems the mind was designed to solve could prove extraordinarily fruitful.

You Can't Put an Old Head on Jung's Shoulders

While Becker and Neuberg's desire for a generalized motivational framework resonates, the attempt to create one by reanimating Jungian archetypes is problematic on multiple levels. It is easy to pin recent discoveries from several disciplines onto some instantiation of Jung's archetypes. Virtually all formulations of archetypes (including Jung's) lack well-articulated boundaries and are supposedly ubiquitous, turning them them into something of an inkblot test; it is tempting to see something more in archetypes than what they actually offer. If we are to dig up the concept of archetypes, it is important to keep in mind *why* we have buried them in the first place.

Archetype Theory is Fundamentally Broken

Becker and Neuberg seem to feel that archetypes are simply misunderstood, having been unfairly rejected by cognitive science as "new age mysticism." However, there is substantially more to the story than what they present. The target article is certainly not the first to call attention to the fact that Jung's archetypes have analogues in modern cognitive sciences and related disciplines, and others have argued for a return to them as an explanatory mechanism in human motivation and behavior (Cambray & Carter, 2004; Knox, 2001; Stevens, 1982). Nevertheless, the shortcomings and pitfalls of Jung's archetypes have been repeatedly and validly criticised for the past half-century, and mainstream psychology lacks interest in archetypes for very good reasons. Even archetype advocates are keenly aware of the fact that Jung's Archetype theory is difficult to reconcile, even with itself — it is riddled with inconsistencies, contradictions, and fundamental misunderstandings of mathematical, biological, and philosophical principles (Hayman, 2002; Knox, 2003).

If we are to accept the appealing parts of archetype theory, be it Jung's formulations or subsequent iterations, we are obligated to acknowledge and address the rather heavy baggage that comes in tow. Advocates for retaining archetypes regularly call for addendums, modifications, and major redefinitions (Knox, 2003; Neher, 1996), and there is an abundant lack of agreement on what the concept of archetypes even means (Mills, 2018). Even if we were able to successfully massage archetypes into some kind of standard, widely-accepted formulation, confusion and subsequent fracturing would be inevitable as archetypes were understood by Jung and modern scholars alike to be virtually inexhaustible. We must ask whether archetypes, as a unifying concept for theoretical progress, is a useful framework that allows knowledge to pool

naturally or, instead, if substantial gymnastics are required to make it work.

Archetype Theory is Outdated and Unnecessary

Given the number and size of hurdles that must be cleared in order to make archetypes tenable, we must ask ourselves a simple question: what are the benefits? Well before the origins of psychology, scholars have understood that theories are *filii illi temporis*, a product of the epoch in which they arise. That ideas are yoked to a time and place are no less true for psychoanalytic concepts. In the nearly 60 years since Carl Jung's death, virtually all branches of psychology have lurched forward by leaps and bounds. We have fashioned new, more refined, and far more accurate understandings of psychological subsystems. We have adopted more accessible, less archaic terminology that has helped to fuel scientific insights that were barely imaginable a couple of decades ago. And, perhaps most importantly, we have majorly innovated in our theoretical reasoning about the multitude of forces that shape, drive, and respond to the human organism.

We admit that the degree to which Becker and Neuberg's framework truly hangs on Jung's notion of archetypes is not particularly clear to us. In their target article, the authors have laid out a conceptual approach to cognitive science in which researchers can describe the functions of mental systems, the algorithms they execute, and the physical implementations of those algorithms. This framework has several merits of its own and has potential to be generative for researchers interested in the nature of the mind across domains. What do researchers applying this framework gain from hanging it on Jung? Can we not simply develop this interesting framework and acknowledge the resemblance to Jung's archetypes as the type of happenstance that occurs when multiple people are working toward similar goals?

The concept of archetypes is perhaps best used for the purpose of reflection — a complement to the ongoing developments and discoveries from our own and other disciplines. It is not necessary to invoke a theoretical framework that is widely understood to be deeply flawed, even by its proponents, when attempting to organize new discoveries. Not every study of interacting motivational systems needs to be weighed down by archetypes, just as not every study of death cognitions (e.g., Goranson, Ritter, Waytz, Norton, & Gray, 2017) needs to be yoked to Freud's conceptualization of the death drive (Freud, 1955). Similarly, epigenetics appears to offer a mechanism for the inheritance of experience, yet no evolutionary biologists are proposing a serious return to Lamarck. Nor is it useful for scientists to perpetually retool the James-Lange theory of emotion to fit modern constructionist views of emotion (e.g., Gross & Barrett, 2011); we are able to describe the observed phenomena without the need to torture compliance from obsolete theories. Ultimately, such an approach would serve to muddy our understanding of the phenomena under study. Instead, we simply note the historical coincidence upon reflection, then move on and use modern tools and frameworks to study the systems of interest as we currently understand them to exist.

Additional Theoretical Considerations

In terms of their theoretical framework, we also worry that in their justified enthusiasm for connectionist models, Becker and Neuberg (this issue) are too hasty to throw out the baby with the symbolic bathwater. We cede the value of connectionist models for implementing powerfully interactive and context-sensitive systems given relatively efficient specifications. We also agree that such models will likely be highly useful to cognitive scientists at some level of analysis. We are less confident, however, that these models compete with symbolic/propositional models of mind for explanatory space.

Assuming that the mind does have connectionist-like systems, these systems likely exist — and specifically, exist in the forms that they do rather than other forms — because they were tributary to solving some recurrent adaptive problem throughout our species' evolutionary history. Regardless of their particular implementation, the existential bottom line for these mental systems would have been that they captured some useful information from the environment and processed it such a way that yielded behaviors that ultimately resulted in increased reproduction of their underlying genetic bases relative to alternative mental systems. Put another way, these systems are likely to have, at some point, executed an adaptive algorithm. The details of the algorithm — but not necessarily its specific implementation — can be discovered through task analysis of the associated adaptive problem (Cosmides & Tooby, 1995a).

Thus, while mechanisms of the mind may not be *implemented* in symbolic/propositional modes, they are likely still *expressible* in such terms and, moreover, these are the terms most discoverable to cognitive scientists. While we agree that it is possible that symbolic models of mind will ultimately prove insufficient compared to connectionist models, we also question whether a better Marrian framework would treat connectionist models as explanations at Marr's implementational level, fully consistent with symbolic/propositional models providing explanations at the algorithmic level, with both following from adaptive problems providing explanations at the computational level.

Conclusions

We appreciate and share an enthusiasm for increasingly general theories of motivation that can account for multiple levels and types of interaction. As we continue to accrue knowledge

on the complexities of psychological subsystems and their interactions, achieving theoretical unification will increasingly fall within our grasp. Rather than expend our energies on the renovation of outdated formulations, a more fruitful approach may be to look for commonalities in modern research where output modalities are held constant. The body of research on the psychology of language in particular (but not exclusively) is a special case that affords us a unique perspective on a many motivational subsystems interacting at once.

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