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Explanation in personality psychology: ''Verbal magic'' and the five-factor model

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Scientific psychology involves both identifying and classifying phenomena of interest (description) and revealing the causes and mechanisms that contribute towards these phenomena arising (explanation). Within personality psychology, some propose that aspects of behavior and cognition can be explained with reference to personality traits. However, certain conceptual and logical issues cast doubt upon the adequacy of traits as coherent explanatory constructs. This paper discusses ''explanation'' in psychology and the problems of circularity and reification. An analysis of relations and intrinsic properties is then developed to address the logical requirements necessary for circumventing these problems. An examination of McCrae and Costa's defense of traits as explanatory constructs, in terms of ''tendencies'' and ''dispositions'' highlights logical issues that prevent traits, so defined, from explaining trait-like behaviors and cognitions. The logical requirements for a coherent trait-explanatory account are outlined and possible explanatory directions in trait-approaches are discussed. The ongoing tendency towards fallacious reasoning in psychology and suggestions for preventing this are further examined.

Keywords: Circular Reasoning; Dispositions; Explanation; Five-Factor Model; Relations; Trait Psychology

1. Introduction

Insofar as scientists are attempting to understand the workings of natural systems (Michell, 2000), the project of science can be understood as entailing the discovery of the causal factors and mechanisms that explain why one effect occurs instead of another. This is often taken to first involve describing what occurs, which typically involves classification and characterization of phenomena, and then accounting for the factors that contribute to the occurrence of those phenomena (e.g., causal antecedents and mechanisms—Bechtel, 2005; Cervone, 1999; Johnson, 1939;

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Machamer, Darden, & Craver, 2000; Maze, 1983; O'Neil, 1969; Valentine, 1992). Personality psychology, too, generally involves both description and explanation (Cattell, 1957; Eysenck, 1991; Mischel & Shoda, 1994), although the relation between personality and behavior has been controversial. The mid-twentieth century witnessed skepticism towards personality factors generally, and personality components were seen as either fictitious entities or simply as descriptions of behavior, themselves in need of explanation (Mischell, 1968; Skinner, 1953). More recently, however, the relevance of personality factors as explanatory constructs has gained much wider acceptance (from past critics included—see Mischel, 2004), and the once denigrated concept of "trait" has become a central component in much of personality research. As Pervin (1994) notes, "the personality field is witnessing a resurgence of interest in traits" (p. 103), and while few researchers would claim that traits constitute the entirety of personality, nevertheless, various trait accounts claim that traits are the "central and defining characteristic" of personality (Buss, 1989, p. 1387).

Although it is difficult to provide a one-size-fits-all approach that encompasses all trait approaches (Goldberg, 1994), trait accounts generally assume "temperament-like variables" (McCrae & Costa, 1995; Pervin, 1994), placing emphasis on the noncontextual factors that shape the "person" and their activities. Such traits are typically conceptualized as "consistent patterns of thoughts, feelings, or actions that distinguish people from one another" (Johnson, 1997, p. 74), and trait-identification has been guided by the lexical approach to personality, using trait-term adjectives in language, as well as factor-analytic studies, to develop hierarchical models that identify higher-level broad factors from clusters of lower-level traits and specific acts (Eysenck, 1991, 1997; Goldberg, 1990; Loehlin, McCrae, Costa, & John, 1998; McCrae & Costa, 1997). Trait approaches propose that the important facets of personality can be reduced to roughly between three and 16 traits (see Cattell, 1957; Eysenck, 1991, 1997; John & Srivastava, 1999).

The dominant trait-psychology field proposes that there are five major personality factors (Goldberg, 1990; John & Srivastava, 1999), and possibly the most influential of these is the Five-Factor Model (FFM). The FFM includes the traits neuroticism, extraversion, openness to experience, agreeableness and conscientiousness (McCrae & Costa, 1995, 1997, 1999). Proponents claim that these five factors are universal (McCrae & Costa, 1997, 1999; McCrae et al., 2000) and the influence of this account is seen in the increasing interest in the FFM dimensional approach to personality disorders as a replacement for the current DSM-IV (American Psychiatric Association, 2000) categorical perspective (see Bagby, Costa, Widiger, Ryder, & Marshall, 2005; Lynham & Widiger, 2001; McCrae, Löckenhoff, & Costa, 2005; O'Connor, 2005; Samuel & Widiger, 2006; Saulsman & Page, 2004; Widiger, 2005; for an opposing viewpoint, see Shedler & Westen, 2004).

There is an enormous literature discussing the trait perspective, and contemporary critical discussions tend to focus upon the precise number of traits, the relation between hierarchical levels, trait stability, and methodological considerations such as factor analysis and the best means of assessment (e.g., adjectives versus phrases)

(Block, 1995, 2001; Briggs, 1992; Caspi, Roberts, & Shiner, 2005; Epstein, 1996; Eysenck, 1991, 1997; Guilford, 1975; Johnson, 1997; Pervin, 1994). However, given that psychological science aims not only to describe personality characteristics, but also to provide explanations of those same features, the question arises as to whether trait accounts can coherently explain why people do the things that they do. Here there is a divergence of views: some authors note that traits serve primarily as descriptions (John & Robbins, 1994; Mervielde, 1994; Saucier, Hampson, & Goldberg, 2000; Wiggins, 1997), while others argue that traits can be used to coherently explain personality characteristics (Buss, 1989; McCrae & Costa, 1995). There are, however, longstanding criticisms of traits as explanatory constructs, particularly with respect to circularity (Bandura, 1999; Cervone, 1999, 2005; Skinner, 1953) and dispositional constructs (Harré, 1998). Associated with this, too, are questions concerning whether between-subject differences can be appropriately applied at the level of the individual (Bandura, 1999; Borsboom, Mellenbergh, & van Heerden, 2003; Cervone, 1999, 2005). The aim of this paper is to assess whether traits, and specifically those proposed in the FFM, can serve as coherent explanatory constructs. To achieve this, this paper discusses both logical problems associated with traits and solutions to these problems with respect to appreciating the distinction between relations and terms standing within relations. The paper first discusses the problems of circular reasoning and reification and the relation of these to faculty psychology. An analysis of relations and intrinsic properties is then developed to address the logical requirements necessary for circumventing these problems. McCrae and Costa's (1995) defense of traits as explanatory constructs in terms of "tendencies" and "dispositions" is then critically evaluated, before discussing whether traits can ever provide logically coherent explanations.

2. Explanation and Circular Reasoning

There are longstanding conceptual criticisms of the explanatory status of psychological constructs such as "abilities" and "capacities," terms all of which can still be found to various degrees within contemporary psychological literature. It is not uncommon, for example, to read about the effects of "abilities" upon performance, or to hear of someone's skill or behavior explained in terms of his or her "capacity" (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998; Conway & Engle, 1996; DeWall, Baumeister, Gailliot, & Stillman, 2007; Gardner, 2006; Handy, 2000; Henden, 2008; Just, Carpenter, & Keller, 1996). While perhaps seemingly innocuous, the use of terms such as "ability" and "capacity" as explanatory constructs easily invokes the problem of circular explanation. Circular explanation occurs when the construct used to explain some effect (the *explanans*) is equivalent to the effect that it is said to explain (the *explanandum*), such that the explanation for some occurrence is the occurrence itself. That is, circular explanation involves using a description of an event as an explanation of that same event. For example, if I claim that "my factory makes more goods than yours because it is more productive" (Howe, 1990, p. 491),

then this is circular, given that being ''more productive'' simply redescribes ''making more goods'' (see also Epstein, 1994).

In psychological theorizing, circularity can easily occur given the ambiguities of language and the proliferation of psychological constructs. We might, for instance, develop a term initially describing performance and then forget the term's descriptive use and later mistakenly use it to explain what was initially described. Maze (1954) refers to this as ''verbal magic'': ''giving a name to a certain kind of event and then using the name as if it accounted for the *occurrence* of that kind of event'' (p. 226, original italics; cf. McMullen, 1982). The problem of circularity can easily occur with terms such as ''ability'' and ''capacity,'' since if ''ability'' means simply what one *is able to do*, or if ''capacity'' means simply what one *is capable of*, then this is basically a description of someone's performance (or likelihood of performing in a given way at any given time). Consequently, Bandura (1999) notes, ''behavior becomes the cause of behavior'' (p. 203), and a follow-on problem of this is that it may lead one to believe falsely that the causes of performance have been discovered when they have not. As Skinner (1953) writes, ''the practice of explaining one statement in terms of the other is dangerous because it suggests that we have found the cause and therefore need search no further'' (p. 31). Accordingly, to use such descriptions as explanatory constructs is to provide only a pseudo-explanation that provides only the illusion of a understanding of the causal factors involved, when in fact we are no clearer as to what the factors are that contribute to that performance (cf. Cervone, 1999; Epstein, 1994).

Avoiding circular explanation involves appreciating Hume's (1739/1911) position that causes must precede effects, and that causes and effects must be logically distinct from one another. ''Logically distinct'' or ''independent'' is taken here to mean that any causal construct must be describable with respect to its own intrinsic properties—properties that exist independently of any relations entered into—which includes the relation to any effect (Boag, 2007; Mackay, 1996; Maze, 1983). To say otherwise would entail that the effect is already in existence and brings itself about, which reduces cause and effect relations to nonsense. That is, in postulating that some explanatory construct (C) causes an effect (E), C must be distinct from E. If C is either a redescription of E, or if C contains E (such that CE causes E), then C and E are not independent—and any such causal claim is tantamount to saying that E already exists to bring itself into existence (cf. Mackay, 1996; Passmore, 1935). Consequently, a satisfactory explanatory causal construct must be comprehensible in its own right, which is simply to say that it ''has characters of its own which can be examined quite apart from their effects on other things'' (Passmore, 1935, p. 280; cf. Boag, 2007, p. 377; Maze, 1983, pp. 24–25). Similarly, Cervone (1999) writes, ''causal mechanisms should lack the feature one is trying to explain'' (p. 313), so if there were characterizations of constructs such as ''capacity'' or ''ability'' *distinct from performance* then we would have greater grounds for considering such factors as potential explanatory constructs. However, Handy's (2000) recent comment that ''perhaps the even greater benefit to be gained by considering capacity theory is that it forces us to ask the difficult question: what *is* capacity?'' (p. 1068, original italics)

reveals that this issue is only just now beginning to receive attention. Until this question is answered with respect to a construct's properties rather than performance, there is no reason to believe that constructs such as "capacity" or "ability" are anything other than descriptive terms.

2.1. Relations and Reification

A similar, serious error emerges with respect to reification. Reification occurs when relations between things are mistakenly taken to be either entities themselves or intrinsic properties or qualities of things (Bell, Staines, & Michell, 2000; Boag, 2007; Maze, 1983; Passmore, 1935). To use a fairly obvious example, to say that person *A* is "different" from person *B* is to note a relation between *A* and *B* and, accordingly, "difference" cannot be reduced solely to a property of either *A* or *B* (i.e., to be "different" is always to be "different" to something else). To then mistakenly treat "difference" as a property or intrinsic feature of either person *A* or *B* would be to reify the relation (i.e., to mistake the relation for an intrinsic property of a person).

The issue of reification is closely related to the issue of circularity because circular explanations tend to reify the to-be-explained performance (an activity) into a property causing that same performance. For example, observing that someone is able to do well on mathematical tests might tempt the researcher to propose that the individual possesses a property of high "mathematical ability" that causes that performance (cf. Howe, 1990). Accordingly, "abilities" and "capacities" are easily reified into properties or qualities possessed by an individual, rather than being understood as activities or relations entered into. Reification, however, can be much less obvious, such as with mistaking "strength" as a property of a muscle (Passmore, 1935), rather than recognizing that strength is an act that a muscle can produce.

2.2. The Fallacy of Faculties

Circular reasoning and reification are longstanding problems within psychology specifically and science generally, and particularly apparent in Faculty psychology, the ad hoc approach that explains various capabilities of individuals with respect to postulating mental "faculties." Traceable to Aristotelian philosophy, and prominent in medieval Scholasticism (O'Neil, 1982), the faculty approach to explanation involves explaining an event's occurrence by postulating a "faculty," "power" or "force" responsible for it. Such faculties are identified from the event to be explained and conceptually bound to that which they were attempting to account for. For instance, the Scholastics postulated a "pulsific faculty" to explain the heart's beating (Clarke, 1989, p. 166), and a faculty approach is also prominent in the writings of the Scottish philosopher Thomas Reid who argued that moral reasoning and behavior could be explained with respect to a "moral faculty":

> If man had not the faculty given him by God of perceiving certain things in conduct to be right, and others to be wrong, and of perceiving his obligation to do what is right, and not to what is wrong, he would not be a moral and accountable being. (Reid, 1785/1970, p. 683)

Faculty psychology lives on in various guises, such as with postulating ''intelligence'' (see O'Neil, 1969; Passmore, 1935), and has taken a contemporary turn in the postulation of ''functional modules'' (Fodor, 1983). The main problem that any faculty explanation must be evaluated against is whether the explanandum, that which is to be explained, is used to give rise to reification, such that the performance to be explained is misconstrued as a faculty causing that same performance. This fallacious reasoning was well recognized by the early critics of Scholasticism: the faculty account allows us to believe falsely that we know the causes of an event, when all we know in fact is the event itself:

> The objectionable use of faculty language is clear. It conceals our ignorance of the real causes of natural phenomena when it appears to name something which is distinct from the phenomenon being explained and at the same time implies that we know something about this distinct entity. (Clarke, 1989, p. 169)

The problem with faculty psychology can be further understood in terms of mistaking relations for properties:

> The fundamental objection to the theory of faculties is that it pretends to give information about the mind, to determine what has relations and not merely what relations it has, without really advancing matters in the least. To discover that what knows is ''consciousness,'' or that what reasons is ''reason'' or what judges is ''conscience,'' is of no avail while consciousness can only be defined as what knows, reason as what reasons and conscience as what judges. In all of these our relation has simply been turned into a quality, so that instead of determining what has the relation, we have merely come to the conclusion that there is something which has the relation. (Passmore, 1935, p. 280)

Furthermore, if we adopt the approach of observing a behavior or activity (*X*), and then postulating an *X* faculty to explain *X*'s occurrence, then we create further problems. Since the evidence for the *X* faculty is *X* itself, then such an ''explanation'' is on par with, for example, drive accounts that ''explain'' *X* behaviors with a drive to do *X*, and then use *X* as evidence of that drive:

> Drives specified by aim can be postulated without check, because the ''evidence'' for them is always available: the observed behavior they were postulated to explain. Any commonly occurring behavior can be ''explained'' by saying there must be an instinct or drive behind it, but it is only a pseudo-explanation. (Maze, 1993, pp. 462–463)

That is, based solely on the observation of the event to be explained, one could feasibly ascribe a faculty to explain *any* event and the evidence for the faculty is always present, and we are none the wiser to the actual causes of the event. Fodor (1983) recognizes here that some independent evidence of any given ''faculty''—such as independent brain processes and mechanisms—is required to provide a minimum degree of basis for any proposed faculty or functional module. More specifically, however, any causal construct must be explicable in terms of intrinsic properties *rather than what it is said to cause*. If a causal construct can only be described in terms

of what it does and not what it is, then we have the problem again, summarized by McMullen (1982), of "an instance of word-magic, an instance of the fallacy of reification, inventing entities in an *ad hoc* fashion to do explanatory jobs. Such entities have no qualitative nature of their own; their sole existence lies in observed relations of certain kinds . . . " (p. 224).

2.3. Relations and Terms Standing Within Relations

As Passmore (1935) notes, the problem of circular reasoning and reification results from paying insufficient attention to the distinction between *relations* and *terms standing within relations*. Relations (e.g., spatial, logical, etc.) involve at least two or more distinct terms that must have their own intrinsic properties to constitute what stands in the relation:

> Anything that can stand. . .. in any relation at all, must have at least some intrinsic properties. If that were not the case . . . then we could not understand what it was that was said to have those relationships. A relation can only hold between two or more terms, and a part of what is involved in seeing those terms as related is being able to see them as distinct, that is, as each having its own intrinsic properties, so that we can say what the terms *are* that are related. This means that each term of the relation must be able in principle to be described without the need to include any reference to its relation to the other. (Maze, 1983, p. 24, original italics; cf. Maze, 1954, p. 231; Michell, 1988, p. 234)

Relations are themselves, of course, real features of *situations* (existing in the same spatiotemporal universe as the things standing within relations), but they are not to be taken as things or properties themselves since they entail how the various things and properties stand with respect to one another. Furthermore, relations are not reducible to the terms of the relation. The relation of the cup sitting on the table, for instance, cannot be reduced to either the table or the cup (see Anderson, 1927/1962). On the other hand, if a quality or property exists then it should have properties that can be identified independently of any relation entered into, which would mean describing the property independently of any particular performance or activity (Maze, 1983).

Accordingly, to avoid both circularity and reification requires a careful conceptual explication of any proposed causal construct to determine whether the term refers to a property or quality of something, or to an entity of some description (that consists of its own intrinsic properties), or whether the term refers to specific relations between properties or entities. "Activities," "performance" and "behavior" fall within the latter sense; these are what things *do* rather than what they *are*, and while one activity may be used to explain another, these activities must be independent events that things enter into (see also Cervone's 2005 distinction between "having" and "doing" for a similar discussion—pp. 428–429). Furthermore, to treat activities as properties inherent in objects or persons is to simply commit reification by confusing relations with properties.

3. McCrae and Costa's Defense of the Explanatory Status of the Five-Factor Model (FFM)

Some authors explicitly note that the FFM is primarily a descriptive account (e.g., Briggs, 1992; Eysenck, 1997; Saucier et al., 2000). However, others attempt to defend the FFM's explanatory status, and of these the most noteworthy is McCrae and Costa's (1995) attempt to directly address the issue of trait "explanations" of personality. McCrae and Costa are not claiming that traits provide complete explanations of behavior, since other factors (e.g., environmental variables) also need consideration (p. 235), but they do claim that traits are explanatory constructs nonetheless. Their defense is a particularly valuable contribution since it explicitly sets out to articulate the logic of trait explanations generally. Furthermore, these authors accept both that causes must precede effects and the distinction between description and explanation (p. 233), and so assume the basic logic expounded here earlier. To this discussion McCrae and Costa make the distinction between proximal and distal causes, but since the concern here is whether traits can avoid circular reasoning and reification, the distal–proximal distinction does not abrogate the need for causes and effect being distinct.

McCrae and Costa (1995) further recognize that if traits are simply summaries of behavior then using such summaries to explain behavior is circular. However, these authors claim that traits are not simply summary statements, and argue that there are two distinct meanings of traits, "one corresponding to patterns of behavior and experience, the other to the underlying causes of behavior" (p. 236). This distinction is discussed in terms of "surface" and "source" traits, "phenotypic" and "genotypic" traits, or "inner" and "outer" traits (e.g., Cattell, 1957, 1972; Johnson, 1997; McCrae & Costa, 1995), and McCrae and Costa (1995) write: "Let us state clearly that we use the term *trait* in the second sense, and although traits are typically inferred from patterns of behavior, we can see no necessary proportionality between the two" (p. 236).

3.1. Traits, Dispositions, and the Dimensions of Personality

McCrae and Costa (1995) define traits as "dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings, and action" and which "transcend situational constraints" (p. 235). The term "dimension" itself, of course, is not a characteristic or property of things but instead simply refers to (quantitative) variations found within properties. Additionally, many aspects of a person may also remain relatively consistent over the course of one's lifetime, such as a person's desires and beliefs. However, the question as to whether traits consist of consistent patterns of desire–belief combinations is answered in the negative:

> Motives, wishes and attitudes are not personality traits, nor are patterns of motives, wishes and attitudes. Instead, the crucial word in our definition of traits is *tendencies*, because this term denotes the dispositional core of the trait construct. (McCrae & Costa, 1995, p. 236, original italics)

The pivotal question, then, is the meaning of the term "tendency." Here McCrae and Costa claim to follow Alston (1975), defining traits as *dispositions* to respond to certain stimuli in particular ways: "Personality traits are not descriptive summaries of behavior, but rather dispositions that are inferred from and can predict and account for patterns of thoughts, feelings, and actions" (McCrae & Costa, 1995, p. 248; cf. Allport, 1961, p. 21). However, McCrae and Costa's account diverges from Alston's in two important respects. First, Alston (1961) explicitly discusses traits in terms of personality description (p. 20). McCrae and Costa (1995), on the other hand, claim that such tendencies or dispositions are the "underlying causes of behavior" (p. 236), writing that "the causal argument is in principle clear: traits as underlying tendencies cause and thus explain (in general and in part) the consistent patterns of thoughts, feelings, and actions that one sees" (p. 236; cf. Allport, 1961, p. 29).

Secondly, Alston (1975) says that traits and dispositions "cannot represent *fundamental* features of persons" (p. 41, original italics), which can be taken to mean that traits should not be understood as properties or intrinsic characteristics of persons. McCrae and Costa (1995), however, refer to these dispositional traits as *properties* of individuals, noting that this is the crucial factor for whether traits provide coherent explanations or not:

> . . . like most psychologists, we . . . use the term *trait* to refer to a property of an individual that accounts for his or her placement along this trait dimension. It is, of course, only in this latter sense that traits can be said to provide explanations for behavior. (p. 235, original italics)

Presumably a property here could best be understood as an intrinsic feature of the person (i.e., a feature or characteristic that exists independently of any relation entered into), and so to evaluate McCrae and Costa's claim here requires knowing something about tendencies as *properties*.

3.1.1. Can tendencies and dispositions be properties of persons?

At first glance it is not difficult to see problems with the claim that tendencies and dispositions are properties of individuals, a problem that has been recognized by others (e.g., Harré, 1998). A "tendency," it would seem, is generally a tendency to *do something*, such that John may tend to gossip (i.e., *S* tends to do *x*), and it is difficult to conceptualize what form a tendency would take if not in such a "doing" sense. Similarly, Hampshire (1953) notes that a disposition "is a statement which summarizes what tends to happen or is liable on the whole to happen" (p. 5l; cf. Cervone, 2005) (i.e., *S* is disposed to do *y*). As such, both tendencies and dispositions are relational constructs (i.e., *S* tends to do *x*; *S* is disposed to do *y*) and neither provide any indication of what the properties of the subject are that give rise to the "tending" or "disposing" relations in question (see also Cervone, 2004, 2005). Consequently, the concern here with using tendencies or dispositions (or reactions) as causal constructs is that these relations are neither then intrinsic features nor properties of the person (since they are relations that the person's as yet unidentified properties enter into) and neither are they conceptually distinct from that they wish

to explain. For a trait to be causally relevant to explaining behavior, including cognition, the trait must be describable by reference to its own intrinsic properties, and not just simply in relation to what it is said to explain (cf. Cervone, 2004; Mackay, 1996, p. 10; Maze, 1983, pp. 24–25). That is, if we try to explain behavior *x* by reference to a ''tendency to do *x*,'' then we cannot help but provide a circular explanation of *x*, since the ''tendency'' is not independent of the effect *x*. This issue is not mitigated by reference to traits in terms of ''reactions'' (cf. Carr & Kingsbury, 1938, p. 497) since a ''reaction'' is not a substantive quality of persons either, but rather what the person does under certain circumstances. Accordingly, Denissen and Penke's (2008) recent attempt to flesh out ''the FFM dimensions as stable individual differences in people's reactions to circumscribed situational cues'' (p. 1286) similarly can be understood only in terms of what people do, which implies that traits are activities and not properties of an individual. Consequently, traits, as either ''tendencies,'' ''dispositions,'' or ''reactions,'' are relations and not properties, and are thus incapable of standing as independent causal constructs.

3.1.2. But what of dispositional properties?

The issue here concerning intrinsic properties is not abrogated by appeal to the possibility of ''dispositional properties'' such as the commonly cited example of ''fragility.'' While the issue of ''dispositions'' is complex (e.g., single vs. multiple; passive vs. active dispositions—see Mackie, 1977), a dispositional statement is a relational one, meaning nothing more than an ''if... then...'' contingency (Maze, 1983, p. 31; cf. Alston, 1975; Cervone, 2005; Mackie, 1977; Mischel & Shoda, 1998). For instance, fragility simply means that if object *X* comes into contact with situation *Y* (e.g., with sufficient force or sudden temperature change) then *X will break* (Mackie, 1977; Maze, 1983). Hence fragility is not an intrinsic property but rather a description of a relation between an object and some other situation.

This is not to say that there are not intrinsic features that individuals possess that dispose them to act or react in various ways. The claim is only that tendencies and dispositions, as relations, cannot be reduced to a property or properties of individuals. As Mackie (1977) notes, ''ascriptions of dispositions and dispositional properties still implicitly refer to something about the individual which is causally relevant, along with the appropriate stimulus and/or conditions, to the bringing about of whatever manifests the disposition'' (p. 363). That is, any disposition must be based on some nonrelational property or intrinsic state of the object (the ''dispositional ground''—Mackie, 1977). The ''ground'' itself, though, is not the disposition, but rather a term standing within the disposing relation.

Furthermore, we could know that an object ''has'' a certain disposition, without knowing anything about the actual characteristics that are causally relevant to that disposition. In the case of ''fragility,'' for instance, we could know that something is fragile without having any idea of the specific properties that contribute to it being so (Mackie, 1977; Maze, 1954). As Mackie (1977) notes: ''To say that glass is fragile is to say that there is something about it which would help causally to bring about its breaking, but not to say what that something is'' (p. 364). Furthermore, if we can

explain something's occurrence without reference to its "disposition" (but with reference to intrinsic characteristics) then dispositional properties are redundant for any explanation of the event. For instance, if "breaking" can be explained by reference to the effect of (say) extreme temperature variation upon an object's molecular structure, then nothing is added by using the term "fragility" (apart from, perhaps, allowing prediction of what will happen to the object under certain circumstances). Consequently, as Mackie (1977) notes with respect to the redundancy of "dispositional properties," "there is no need to postulate anything other than intrinsic categorical properties (for example, molecular structures and movements) which as they interact lead on causally to various results" (p. 366).

Alternatively, on the basis of the earlier arguments, for a disposition to be a property of something then we would need to be able to discuss the supposed property independently of any effect that it is said to produce. Hence, the onus on any proponent of dispositional properties is to enunciate what these properties *are*, without reference to what they *do*. Since the disposition of "fragility" can only be discussed in terms of the effect of breaking, it cannot be a property or intrinsic feature of things, whereas the molecular structure of the glass can be described independently of whether it breaks or not, and so has some claim to being an intrinsic feature of an object.

3.2. The Ontological Status of the Five-Factor Traits

McCrae and Costa (1995) note, too, that "there is something intrinsic to the person that accounts at least in part for consistency in behavior and experience" (p. 238). However, this "something" is never given clear exposition, and others have noted the "conceptual fuzziness" in traits accounts in this respect (Wiggins, 1997, p. 111). McCrae and Costa at times appear to suggest a biological approach to understanding traits, referring to them as "neuropsychic structures" (McCrae & Costa, 1999, p. 140), and writing: "Our conception of personality traits makes them in some respects closely akin to *temperaments* . . . : both are constructed as biologically based tendencies that help shape the course of development . . . " (McCrae & Costa, 1995, p. 238, original italics; cf. McCrae, 2004; McCrae et al., 2000). The tendency, however, is only *based* on biological processes but not coextensive with any particular set of physiological structures. Further, McCrae and Costa refer to the biological bases of traits as "the peripheral components of the personality system" (McCrae & Costa, 1999, p. 142). They instead posit a psychological direction: "ours is a psychological theory of personality. We do not equate basic dispositions with biological constructs, nor have we offered a psychobiological theory of personality . . . " (McCrae & Costa, 1995, p. 239); and McCrae (2004) writes that "traits are . . . real psychological structures" (p. 4).

McCrae and Costa (1995) provide two reasons for taking a psychological direction, one empirical and the other logical. Empirically, they argue that the conceptual unity of a trait may be subserved by a variety of biological mechanisms (p. 239), such that any consistent pattern of behavior may be subserved by a variety of (neuro-)physiological

processes and structures. Accordingly, to propose a single biological process would be equivalent to looking for phrenological bumps, when instead multiple interacting biological factors are implicated here. Furthermore, there is no necessity that the same trait be subserved by the same biological set of mechanisms in any two people since any trait may be found to have two distinct sets of biological processes: ''Personality traits are hypothetical psychological constructs, and might in principle be found in Martians with an entirely different sort of nervous system'' (McCrae & Costa, 1995, p. 239). That is, traits are independent of any particular nervous system property and not reducible to biological constructs.

On the other hand, McCrae and Costa's logical argument for a psychological approach is that traits cannot be reduced to biological constructs because they are *psychological* structures, and since psychological constructs cannot be reduced to brain states, then neither can traits:

> Logically, basic tendencies in personality are at a different level of discourse from biological mechanisms (just as they are at a different level from culturally shaped adaptations). Openness to Experience, for example, might be defined as the tendency to seek out novelty and complexity, and no imaging technique or anatomical dissection would ever find that tendency among the neurons and neurotransmitters of the human brain. (McCrae & Costa, 1995, p. 239)

This logical point is a valid one, but one which also subverts their claim that such traits are also properties of persons. Cognition can be viewed as a relation between a knower and a situation known (Anderson, 1927/1962; Michell, 1988), and since relations cannot be reduced to either term of the relationship, then knowing itself cannot be reduced to either those brain processes or the known situation. McCrae and Costa are thus correct to note that traits, if psychological, cannot be reduced to brain processes. However, by then proposing that traits are psychological, traits *are* relations and not independent properties of the person standing in those same relations. Taken as such, there is no argument for traits as either properties of individuals or as causes of trait-behaviors and cognitions.

3.2.1. Is the dispositional core of the FFM traits hollow?

The problem for McCrae and Costa's defense of traits is compounded by the indeterminate nature of the trait concept itself. McCrae and Costa (1999) make a ''distinction between basic tendencies (abstract psychological potentials) and characteristic adaptations (their concrete manifestations)'' (p. 143). These ''abstract psychological potentials'' are distinct from the ordinary, garden-variety psychological processes such as desires and beliefs which they term ''characteristic adaptations'':

> [Characteristic adaptations] include knowledge, skills, attitudes, goals, roles, relationships, schemas, scripts, habits, even the self-concept. Characteristic adaptations comprise the bulk of the phenomena that psychologists are concerned with, but they do not include personality traits, which FFT [Five-Factor Theory] depicts as deeper structures, basic tendencies that are grounded in biology. (McCrae, 2004, p. 5; McCrae & Costa, 1999, p. 143)

It is unclear what these "deeper" psychological structures are, but since the FFM traits are neither biological constructs nor psychological processes in any ordinary sense of the word (desires, beliefs, etc.), such traits must stand *between* bodily processes and behavioral and cognitive outputs, and this is how the FFM traits are explicitly represented (see McCrae & Costa, 1995, p. 237; cf. McCrae, 2004, pp. 5–6; McCrae & Costa, 1999, p. 142, for visual representation of this relationship).

Clarity is not added by McCrae and Costa's (1995) reference to traits as "*hypothetical constructs* that are manifested in . . . *trait indicators* (the patterned motives, attitudes, and behaviors)" (p. 236, original italics). Here McCrae and Costa (1999) claim that the FFM traits can never be known independently of behavior and cognition: "Traits . . . are directly accessible neither to public observation nor to private introspection. Instead, they are deeper psychological entities that can only be *inferred* from behavior and experience" (p. 143, original italics). And again: "Unlike physical characteristics, personality traits are abstractions that cannot be directly measured and must instead be inferred from complex patterns of overt and covert behavior" (McCrae & Costa, 1997, p. 510).

The problem that begins to emerge is that the FFM traits are treated as structures that are said to cause behavior and cognition, but which are never known independently of either biological or ordinary psychological and behavioral processes that such traits are said to explain. There is thus no independent evidence of such traits, *or even the possibility of evidence*, apart from observed consistencies in behavior. At the same time, McCrae and Costa are postulating these traits as intervening variables causing those same consistencies. Consequently, the FFM traits may as well be afforded the same status as the "soul" or any other causal construct immune to empirical criticism. What is lacking in McCrae and Costa's defense of traits as explanatory constructs is that some account is needed of what traits are, independent of the behaviors they are said to be responsible for. As it stands, such traits are simply relations which have been reified and used circularly as explanations (cf. Bandura, 1999; Cervone, 1999).

3.3. Can the FFM Traits Be Explanatory if They Supply "Surplus Meaning"?

Apart from the lack of properties ascribable to the FFM traits, at other times McCrae and Costa acknowledge that traits are simply observable patterns of behaviors and cognition, but claim nevertheless that such patterns can be explanatory if they supply "surplus meaning."

> . . . even if a trait were measured with perfect accuracy, one might ask, is it not merely circular to assert that, say, a pattern of aggressive behavior is caused by a trait of aggressiveness? In isolation, perhaps it would be. A causal explanation becomes useful only when it provides surplus meaning and allows inferences which go beyond the observed data. (McCrae & Costa, 1995, p. 243)

Here McCrae and Costa discuss surplus meaning in terms of prediction. They write that "[an] individual who understands the construct should be able to make fresh predictions about new correlates of the trait and recognize the idiosyncratic

expression of the trait . . . in each individual'' (McCrae & Costa, 1995, p. 245). For example, understanding that someone is highly extraverted should allow predicting similarly clustering behaviors and McCrae and Costa (1995) write that ''trait explanation carries with it the implication that long-term predictions can be made'' (p. 243). This paper has no dispute with the claim that knowledge of previous patterns of behavior, etc., can be used to explain future patterns, and this is an obvious practical benefit provided by trait approaches. However, given that McCrae and Costa are claiming that a hypothetical trait-property is intervening between biology and behavioral and cognitive acts, the surplus evidence that is required for explanation is not prediction *per se*, but rather meaning which is *surplus of its activities and relations* (Maze, 1954, p. 227). While patterns of behaviors *A*, *B*, and *C* may allow one to predict *D*, this does not tell us anything of the factors that contribute to this (cf. Cervone, 1999, 2005), and what is instead needed is evidence for traits that exists independently of performance. McCrae and Costa, however, provide no account of the actual properties of the FFM traits, and as long as such traits involve the behavior to be explained then using it to explain that same behavior is circular.

3.4. Summary

To summarize, there are multiple problems with McCrae and Costa's (1995, 1997) defense of the FFM traits as explanatory constructs. As others have noted, a ''tendency'' is a description of what someone is likely to do and is not in-and-of-itself an explanation (cf. Bandura, 1999; Cervone, 1999; Epstein, 1994). More specifically, if traits are defined relationally (i.e., defined in relation to other things), and without independent existence from those relations, then they cannot then be coherently invoked as antecedent entities or properties causing that same behavior. While McCrae and Costa claim that traits cause certain behaviors, there is no evidence provided for the trait apart from the behavior itself. Consequently, it is difficult to see that traits are not simply reified entities or properties inferred from observing consistencies in responding (cf. Maze, 1993; McMullen, 1982; Skinner, 1953). None of the above detracts from the claim that humans are born with characteristics and properties that contribute to behavioral regularities, etc., and while (perhaps) ''one cannot exclude that advances in genetics and the biological sciences will eventually provide a link between the descriptive taxonomic level and causal factors at a deeper level of analysis'' (Mervielde, 1994, p. 155), there is presently no reason to believe that ''traits,'' as postulated by McCrae and Costa, are necessary for explaining the causal relation between genetics and behavior. Traits as tendencies or dispositions are logically precluded from being such properties because they are relationally defined.

4. Can Trait Accounts Ever Provide Satisfactory Explanations?

Given that McCrae and Costa's defense of traits as explanatory constructs is flawed, the question arises as to whether traits can ever provide satisfactory explanations of

human activity. As the preceding analysis indicates, a causal construct must be independently construed from the behavior it is said to explain, so if the independent properties of traits can be identified and some plausible mechanism provided then there is no logical objection to traits serving as explanatory constructs. While the FFM traits are conceptually bound by the behavior that is meant to be explained, there must, of course, be certain properties of the individual contributing to any observed behavioral consistencies. Here biological constructs may be helpful, and if to have a trait means to have certain nervous system properties (as one example), then these *biological properties* could potentially explain trait-*behaviors*. There are numerous approaches here to understanding the biological bases of personality (e.g., Jackson, Levine & Furnham, 2003; Pickering & Gray, 1999) with possibly the most well-known example of this explanatory tack being provided by Hans Eysenck's (1967, 1997) three-factor model. Eysenck attempts to provide a working mechanism linking genetics as distal antecedents, to biological intermediaries (e.g., limbic system arousal) interacting with the environment to explain trait-behaviors (see Eysenck, 1997). However, in Eysenck's theory traits still appear to be behavioral constellations, whereas the causes of such constellations lie in independent biological processes. For instance, Eysenck (1997) writes that ''extraversion is the product of low cortical arousability, due to sluggish functioning of the ascending reticular activating system'' (p. 1227). Consequently, the trait itself is not causing the behavioral constellation, but rather the biological factors described. Nevertheless, various properties are causally implicated and appear to provide plausible explanations of personality dimensions.

Whether other trait approaches avoid the logical problems of circularity and reification depends upon whether any proposed ''trait-property'' can be identified independently of trait-behaviors. While examining the coherency of every other trait account is beyond the scope of the present paper, it is clear that other trait approaches do appear to invoke the same conceptual problems involved when proposing that traits are tendencies that cause behavior. For instance, Allport (1961) writes: ''Personality *is* something and *does* something . . . . All the systems that comprise personality are to be regarded as *determining tendencies*. They exert a directive influence upon all adjustive and expressive acts by which the personality comes to be known'' (p. 29, original italics). As the preceding analysis demonstrates, the onus upon any trait theorist wishing to assert that tendencies are properties that explain behavior is to demonstrate how such tendencies are independent of the behavior that they purportedly explain. On the other hand, it should also be recognized that contributing to scientific description is itself a necessary part of the scientific task and that not all proponents of the FFM see the need to ascribe explanatory status to traits (e.g., John & Robbins, 1994; Mervielde, 1994; Saucier et al., 2000).

5. A Tendency Towards Fallacious Reasoning?

As this paper indicates, it is all too easy to fall into the trap of ''identifying'' a construct from patterns of behavior and then believing that one can explain those

behaviors in terms of that construct (cf. Howe, 1990; Maze, 1954; McMullen, 1982; Passmore, 1935). In fact, the issue of circularity and trait explanations is well recognized (Bandura, 1999; Cervone, 1999; Skinner, 1953). However, the issues discussed here are not isolated to trait-psychology and the history of psychological theorizing demonstrates that certain problems, such as circular reasoning, reification and postulating faculties, repeatedly occur. Maze (1954), in fact, writes over half a century ago:

> There is a kind of fallacy to which psychology seems especially prone (although it is not by any means peculiar to it) and which has been pointed out many times under different names—e.g., ''faculty-naming,'' ''hypostatization,'' ''the postulation of imaginary forces,'' ''verbal magic.'' (p. 226)

However, despite this tendency towards fallacious reasoning being relatively well recognized, it continues nevertheless. While there are undoubtedly many things contributing to this situation (e.g., motivational factors, historical antecedents), a step towards a solution to this is much greater theoretical and conceptual scrutiny of any proposed construct. Given that all research fields and methods in psychology subsume theory, the role of critically evaluating theoretical premises using the tools of logical and conceptual analysis is a vital component of maintaining psychology as a rigorous scientific discipline (Bell, Staines, & Michell, 2000; Machado & Silva, 2007). Conceptual research is particularly important here for helping to appreciate the distinction between properties, entities and relations. All theoretical accounts should explicitly acknowledge this distinction such that any proposed property should be posited in nonrelational terms, and any relation should have the terms of the relation identified (cf. Passmore, 1935). Furthermore, any causal account should be able to identify causal antecedents that are explicable independent of the effects that they are said to cause. While not a panacea to the problem of fallacious reasoning, this should go some way to avoiding circularity and reification. Furthermore, the distinction between relations and terms standing within relations is already implicit within contemporary discussions of trait theory. For instance, the argument that between-subject differences cannot be appropriately applied to individuals (Borsboom et al., 2003; Cervone, 1999, 2005) can be summarized as saying that between-person relations cannot be reduced to the terms (i.e., the individuals) standing within those relations. Nevertheless, such relations indicate that there must still be individual differences entering into such relations which the trait researcher may naturally wish to investigate. Accordingly, approaching the issue in terms of relations and properties clarifies both the problems associated with traits (e.g., circularity and reification) as well as indicating possible directions for research.

Importantly, however, unless the tendency to confuse relations with properties is addressed then psychology's claim to being a rigorous scientific discipline remains compromised. Furthermore, as noted earlier, there are real-world problems that follow-on from failing to appreciate such basic logical and conceptual issues in science, such as falsely believing that the causes of an event have been discovered or pursuing subsequent invalid avenues of empirical theory testing (Howe, 1990;

Passmore, 1935; Wiggins, 1997). However, while the formal recognition of the importance of conceptual research within science has been gaining greater currency of late (Machado & Silva, 2007), mainstream psychology still has a long way to go before such conceptual issues are satisfactorily addressed. Until then, psychology may continue to chase its tail and be seduced by the ease and allure of ''verbal magic.''

6. Conclusion

It is clear that the defense of the FFM traits as explanations is logically flawed. McCrae and Costa conceptualize traits in terms of tendencies and dispositions, which can only be understood in relation to the behavior to be explained. If traits are relationally defined and conceptually bound to that which is in need of explaining, then attempting to use traits as explanatory constructs is incoherent. However, as with any causal construct, if traits theorists can postulate properties that stand independently of the behaviors and cognition that they are said to be responsible for, then such properties could be considered potential explanatory candidates. Certain trait approaches go some way towards providing plausible biological mechanisms that could explain trait-like consistencies and preferences. These meet the logical requirements necessary for avoiding circular reasoning and reification since the causal properties are independent of that which they are attempting to explain. While problems associated with traits are becoming increasingly recognized, the present analysis underscores the critical need for appreciating the distinction between relations and terms standing within relations, and the general need for conceptual research in scientific psychology in order to maintain the rigorous intellectual basis of the discipline.

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