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## Whole Trait Theory

William Fleeson and Eranda Jayawickreme

Wake Forest University

### Abstract

Personality researchers should modify models of traits to include mechanisms of differential reaction to situations. Whole Trait Theory does so via five main points. First, the descriptive side of traits should be conceptualized as density distributions of states. Second, it is important to provide an explanatory account of the Big 5 traits. Third, adding an explanatory account to the Big 5 creates two parts to traits, an explanatory part and a descriptive part, and these two parts should be recognized as separate entities that are joined into whole traits. Fourth, Whole Trait Theory proposes that the explanatory side of traits consists of social-cognitive mechanisms. Fifth, social-cognitive mechanisms that produce Big-5 states should be identified.

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“To the situationist I concede that our theory of traits cannot be so simpleminded as it once was. We are now challenged to untangle the complex web of tendencies that constitute a person, however contradictory they may seem to be when activated differentially in various situations.” (Allport, 1968, p.47)

*We do not wish to quarrel over the use of a term [‘trait’] and are quite ready to recognize the existence of some common factors which tend to make individuals differ from one another on any one test or on any group of tests. Our contention, however, is that this common factor is not an inner entity operating independently of the situations in which the individuals are placed but is a function of the situation in the sense that the individual behaves similarly in different situations in proportion as these situations are alike, have been experienced as common occasions for honest or dishonest behavior, and are comprehended as opportunities for deception or honesty.” (Hartshorne & May, 1928, p.385).*

These two quotes are fascinating for a number of reasons. Allport’s quote was in 1968 - a momentous date both because it is near the end of Allport’s career and also because of Mischel’s (1968) *Personality and Assessment*, which argued against the validity of traits. Allport’s use of the word “concede” is significant and the concession is remarkably to the situationist. Near the end of his career, Allport acknowledges that the situationist has

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Correspondence should be addressed to William Fleeson, Department of Psychology, Wake Forest University, Winston-Salem, North Carolina, 27109. FleesonW@wfu.edu.

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persuasively argued that we need to change the notion of a trait. Specifically, traits have to include mechanisms explicating reacting to different situations with different behaviors.

The Hartshorne and May (1928) quote is at the end of their book, on p. 385. It represents their summary conclusion after full consideration of the evidence from their seminal study of cross-situational consistency in the moral behavior of children. Conversely to Allport, however, Hartshorne and May are “quite ready to recognize” traits. They have been convinced that there are general traits that make individuals respond differently from each other. However, they believe their evidence made a strong case that models of traits must include in them mechanisms concerning differential behavioral reactions to different situations.

Despite the common perception that the authors are on opposing sides of the great trait debate, these two quotes say nearly the same thing. They are not at odds with each other; in contrast, they appear to have come to the same conclusion after considerable reflection. This similar conclusion is a description of how researchers in personality psychology should go forward. Namely, personality researchers need to modify models of traits such that they include mechanisms of differential perception and reaction to situations. Now, 90 years after Hartshorne and May’s quote, and 50 years after Allport’s quote, we believe the field is ready to go forward in their suggested direction. We believe, moreover, that Whole Trait Theory outlines such a roadmap for the field to follow. This is because future models of traits should have social-cognitive mechanisms as the main constituent of the explanatory component of traits, and should have distributions of manifestations according to the Big 5 as the descriptive part of traits. Whole Trait Theory is presented as a theory that encapsulates this position.

### **Which Approach to Personality is Best: Social-Cognitive or Trait?**

Two approaches to personality psychology have defined the two sides of the great trait debate. These approaches generally have operated independently of each other while maintaining a degree of prominence in the modern period of the field (Fleeson, 2012). They have been considered competitors largely because they take two different stands on the degree of cross-situational consistency in behavior. The social-cognitive approach takes cross-situational consistency to be relatively low, and thus infers that social-cognitive mechanisms of situation interpretation are the best way to understand personality. The trait approach takes cross-situational consistency to be relatively high, and thus infers that traits are the best way to understand personality.

Both approaches have made important advances in understanding personality (Fleeson, 2012), verifying their importance to the field. The social cognitive approach starts with the observation that trait manifestations appear to be inconsistent (Cervone, 2005; Hartshorne & May, 1928; Mischel, 1968). For example, the same individuals will sometimes act conscientiously and other times carelessly (Mischel & Peake, 1982). If behavior is so inconsistent, describing individuals with broad trait terms such as conscientious seems pointless and inaccurate. Rather, individual differences will be in social-cognitive variables. For example, individuals will differ in the encodings of situations, in their expectancies,

competencies, self-regulatory plans, and goals (Allport, 1937; Mischel & Shoda, 1995; Mischel, 1973). These social-cognitive variables are responsible for behavior, and because the social-cognitive variables are highly sensitive to situations, behavior will be highly sensitive to situations.

The trait approach, as instantiated in the Big 5/HEXACO model (Ashton & Lee, 2009; Costa & McCrae, 2006; DeYoung, Weisberg, Quilty, & Peterson, 2013; Goldberg, 1992; Johnson, 1997, Perugini & Gallucci, 1997; see also Wright et al., 2013), has made remarkable progress in identifying the content of broad traits and in providing evidence for their existence. There is strong evidence that the universe of traits can be organized into a hierarchical structure, with the five traits of extraversion, agreeableness, conscientiousness, emotional stability, and intellect (the “Big Five”) at a middle hierarchical level (John, Naumann, & Soto, 2008). Thus, a good description of a person’s personality can be achieved by indicating the person’s level on these five traits. Because of the hierarchical nature of the Big 5, such descriptions are relatively rich. For example, describing a person as conscientious means that he or she is careful, thorough, diligent, responsible, organized, and not careless, lazy, sloppy, nor reckless. Evidence for the Big 5 includes strong cross-questionnaire (Costa & McCrae, 2006) and cross-cultural replicability (Saucier, 2009). Traits matter to important outcomes (Duckworth, Weir, Tsukayama, & Kwok, 2012; Ozer & Benet-Martínez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Turiano, Chapman, Gruenewald, & Mroczek, 2013), and observers agree about Big 5 levels of targets (Vazire, 2010).

As much as the two approaches have accomplished, they also have areas in which they have achieved very little. Although traits are great describers of individual differences, there is a need for an explanatory account of traits. There has long been a call to explain where traits come from, how they operate, and how they produce differences in behavior. This is because traits, and especially the Big 5 traits, are mostly atheoretical and non-explanatory (Cramer et al., 2012; Hampson, 2012). In short, trait theory has described the *what*, but few theories have attempted to explain the *why* or *how* (with a few, mostly biological, exceptions, e.g., Depue & Collins, 1999; DeYoung, 2010; DeYoung et al., 2010; H. J. Eysenck, 1997; Gray, 1981; see also DeYoung, 2014 and Read et al., 2010). Furthermore, although traits do a reasonable job of describing behavior and identity, even on that front they fall somewhat short (Kandler, Zimmerman, & McAdams, 2014; McAdams & Pals, 2006).

Specifically, they do not provide a full account of how individual differences in traits are manifest in behaviors. Many studies have shown specific behavioral correlates of traits, but there is not a conceptual account of how a trait label translates into accounts of daily behavior. For example, it is not known what describing someone as extraverted means for how extraverted he or she is in daily life and how much he or she deviates from extraversion.

The social-cognitive approach has the corresponding opposite weakness. Although such approaches suggest an explanation for personality variables, they have not yet explicitly identified the individual differences the theories should be used to explain. Whatever ways people turn out to differ, social-cognitive approaches argue that the causes of those

differences will be social cognitive mechanisms such as encodings, expectancies, and self-regulatory plans. For social-cognitive approaches to achieve their potential, they need a descriptive account of personality to explain (Baumert & Schmitt, 2009).

## Whole Trait Theory

Whole Trait Theory is designed to address this circumstance by taking advantage of the strengths of the trait approach and of the social-cognitive approach. It is also designed to ameliorate the weaknesses of the two approaches. It does so by recognizing that the weakness of each approach is the corresponding strength of the other. Moreover, Whole Trait Theory recognizes that the two perspectives not only can be brought together, but appear to be logically implicative of each other. Fortunately, Whole Trait Theory is joined in this endeavor by theories engaged in at least partially overlapping activities (Baumert & Schmitt, 2012; Bleidorn, 2009; Cramer et al., 2012; Denissen, van Aken, Penke, & Wood, 2013; DeYoung, this volume; Little & Joseph, 2007; Perunovic, Heller, Ross, & Komar, 2011; Read et al., 2010; Snow, 2009)

Whole Trait Theory makes five primary points, as shown in Table 1. Whole Trait Theory starts with the assertion that *the descriptive side of traits is best thought of as density distributions of states* (Baird, Le, & Lucas, 2006; Fleeson, 2001, 2012; Fleeson & Wilt, 2010; Judge, Simon, Hurst, & Kelley, 2013; Timothy Church et al., 2013). The description afforded by the Big 5 factor analyses was incomplete, because it did not indicate what people with a given trait level looked like in regard to that trait's manifestation in daily life. Density distributions are distributions of the frequency of manifesting the particular trait at each level of the trait. The density distributions approach completes the Big 5 description by arguing that individuals have distributions of personality states; the distributions are wide because people change the personalities they are manifesting from moment to moment; but the distributions differ between individuals in their location, size, and shape. This description of individuals focuses the description on how people act rather than on the trait label.

The second assertion is that *it is important to provide an explanatory account of the Big 5*. Whole trait theory takes the Big 5 and the corresponding descriptive account as its starting point. The evidence in favor of the Big 5 is just too good. However, science requires that the Big 5 move beyond merely describing individual differences, and begin to explain the mechanisms underlying the Big 5 (Hampson, 2012). Furthermore, the existence of stable differences in descriptiveness implies logically that there must be some explanation responsible for those individual differences. This assertion is of course not unique to whole trait theory, and most theorists interested in the Big 5 would have the basic goal of providing explanations for the Big 5.

Third, Whole Trait Theory argues that *adding an explanatory account to the Big 5 creates two parts to traits, an explanatory part and a descriptive part, and these two parts are distinct entities that nevertheless can be joined into whole traits because one of the parts is the causal consequence of the other part*. Once an explanation is arrived at, researchers should realize that the explanation has added a second part to traits rather than replaced the

descriptive part (which we term Trait<sub>DES</sub>) with an explanatory part (which we term Trait<sub>EXP</sub>). Detailing the mechanisms constitutive of traits does not complete the job of explicating trait terms – it does only part of the job, specifically, it does the explanatory part of the job. The descriptive part of traits still remains as an important descriptive account of the trait. That is, trait levels refer to more than the mechanisms explaining the label, but also do the distributions of states on which people differ. Providing an explanation has added a second part of traits. Further, the second part of traits stands in a particular relation to the descriptive side of traits. The explanatory side of traits causes the descriptive side of traits. They are separate parts of the same trait.

Nonetheless, they belong together, because they stand in a very direct and mutually logically necessary relationship to each other. The explanatory part implies a descriptive part as its direct output, and the descriptive part implies an explanatory part that produced it. A full account of traits must include both parts, separate and individually important, but working together. Researchers interested in studying traits should focus on traits as wholes – that is, understand both the descriptive and the explanatory parts of traits.

Fourth, Whole Trait Theory proposes that *the explanatory part of traits consists of social-cognitive mechanisms*. Because the descriptive side is caused by the explanatory side, it is possible to use the nature of the descriptive side to infer the nature of the explanatory side. The descriptive side consists of highly variable distributions of states with stable means. Social-cognitive mechanisms explain variability, and can also account for the stability of means (Mischel, 2004), so they fit with the Big 5 relevant evidence for the descriptive side of traits. When we refer to social-cognitive mechanisms, we are referring to information processing mechanisms that are connected to affect and motivation and that have to do with interpreting changing situations and events. Social-cognitive mechanism concern a whole swath of variables of deep and abiding interest to personality psychologists (e.g., goals, beliefs, values, scripts, life stories, etc.). If Trait<sub>DES</sub> and Trait<sub>EXP</sub> imply each other, and if Trait<sub>DES</sub> represents the Big Five and Trait<sub>EXP</sub> represents social cognitive mechanisms, then social-cognitive mechanisms imply the Big 5 and the Big 5 imply social cognitive mechanisms. Far from being antagonistic, and more than being compatible, social-cognitive and trait approaches appear to imply each other. Other trait theories have included social-cognitive elements as part of their models (e.g., DeYoung, this volume; Funder, 2009; Gray, 1981), but whole trait theory places social-cognitive mechanisms front and center.

The fifth and final central assertion of Whole Trait Theory is that research in personality psychology would now fruitfully focus on identifying the social-cognitive mechanisms constituting the explanatory side of traits. There is a great deal of work to be done and a great deal of creative theorizing to be done to uncover these mechanisms, and finally provide a full account of traits. For example, researchers might discover the properties of relationships predictive of personality states in those relationships (Clifton, 2013). Others have begun to explore situational, work, cultural, motivational, and interpersonal processes involved in causing Big 5 personality states (Côté, Moskowitz, & Zuroff, 2012; Fleeson, 2007; Heller, Komar, & Lee, 2007; Huang & Ryan, 2011; Judge et al., 2013; McCabe & Fleeson, 2012; Read et al., 2010; Church et al., 2013).

Whole Trait Theory can be tested, and we propose two important initial tests. The first test is whether the manifestations of the Big 5 have characteristics of something producible by social-cognitive mechanisms but also compatible with consistency. The second test is whether social-cognitive mechanisms produce Big 5 manifestations. Supporting findings would support Whole Trait Theory as an account of traits. In the next section, we review the results of these tests.

### Trait<sub>DES</sub> (what one actually does)

The first test of Whole Trait Theory is whether the manifestations of the Big 5 have characteristics of something producible by social-cognitive mechanisms. This requires discovering what is described in a person when a trait level label is applied to him or her. When a person is described as moderately agreeable, for example, what does that mean about how agreeably he or she acts?

### Trait<sub>DES</sub> as Density Distributions of States

To test this idea requires discovering the form of the descriptive part of traits. Whole trait theory claims that the descriptive part of traits takes the form of density distributions of personality states (Fleeson, 2001). Figure 1 presents a figural representation of Whole Trait Theory; the descriptive part of traits is shown in the bottom part of the figure. That is, what is described in a person by a trait level is their distribution of corresponding state levels over time.

**Personality states**—When trying to discover how often a person acts in a way expressive of a trait, we have tried to stay as close as possible to the trait in its content. We wanted the correspondence between how a person is acting at the moment and the trait term to be as clear as possible. Thus, we used the state concept of assessing personality (Cattell, Cattell, & Rhymer, 1947; Fleeson, 2001; Heller, Komer, & Lee, 2007; Steyer, Ferring, & Schmitt, 1992). The state concept has been used to characterize emotions and anxiety for some time (e.g., Gerstorf, Siedlecki, Tucker-Drob, & Salthouse, 2009; Watson, 1988). However, despite familiarity of the state concept in the affect domain, the concept of state had to this point almost never been applied to a non-emotion domain, such as the trait/personality domain. A personality state is defined as having the same affective, behavioral, and cognitive content as a corresponding trait (Pytlik Zillig, Hemenover, & Dienstbier, 2002), but as applying for a shorter duration. For example, an extraverted state has the same content as extraversion (talkativeness, energy, boldness, assertiveness, etc.), but applies as an accurate description for only a few minutes to a few hours as opposed to the months or years that a trait description applies.

Just as trait extraversion can be assessed by self-reports of how talkative, bold, and assertive an individual is in general, e.g. from 1 to 7, state extraversion can be assessed by self-reports of how talkative, bold, and assertive an individual is at the moment, from 1 to 7. This definition transfers the content of the trait as a whole to the state. Thus, states are directly commensurate with traits, and provide direct information about the degree to which a person is enacting trait content in the moment.



**Density distributions of states**—Naturally, if a person changes the degree to which he or she is enacting a given trait content to any extent at all, a distribution of state levels will form over time for that person, as shown in Figure 1. Each person's distribution records the frequency the individual enacts each level of the state. The density distributions approach to trait descriptions (Fleeson, 2001, 2012; Fleeson & Gallagher, 2009) proposes that individual differences in trait descriptions will be in the *parameters* of such distributions. That is, each person's states overtime will form a unique distribution.

The parameters of a distribution are the distribution's location on the dimension, its size in terms of how wide it is, and its shape in terms of how much it corresponds to a normal distribution. Although most distributions to date have been roughly normal, this is not a requirement of the approach. The proposal is that individuals will have different parameters of their distributions, and that individual differences in these parameters will be highly consistent. Research has confirmed this proposal. Individual differences in locations of parameters were highly stable from week to week, with correlations around .8 (Fleeson, 2001; Baird, Le, & Lucas, 2006), which are some of the highest correlations observed in psychological research. In Figure 1, the two distributions might represent two different people on a given trait. Size and shape parameters were also consistent from week to week, although not as highly consistent (size stability .5 to .7; shape stability .2 to .5).

Additional evidence that distributions are the descriptive side of traits is that distribution parameters correlate with self-reported questionnaire scores on the corresponding traits (Fleeson & Gallagher, 2009). These correlations for distribution location are around the .50 level, meaning that when people complete self-descriptive Big 5 questionnaires, they are largely referring to the location of their distribution. Big 5 questionnaire scores also correlated with the maximum enacted states in the distribution, even after controlling for location, meaning that individuals are also referring to their maximums. Finally, factor analyses of these states have revealed structures similar to the Big 5 (Borkenau & Ostendorf, 1998). If averages are calculated for each individual and then factored, or if individuals are chained together and their momentary states are factor analyzed, the Big 5 are typically produced.

Thus, these distributions capture individual differences in trait manifestation in everyday behavior. They capture the extent to which individuals enact the content of the Big 5 traits in their everyday life, and they capture individual differences in the descriptiveness of traits for individuals. If researchers want to explain why different people enact different traits in their behavior, that is, if researchers want to explain traits as descriptions of individuals, then explaining these distributions is one compelling route for doing so.

### **Compatibility with the Social-Cognitive Approach**

For Whole Trait Theory to be able to integrate the Big 5 with the social-cognitive approach, the descriptive side of traits has to have a form that could be reasonably producible by social-cognitive mechanisms. This may seem difficult to achieve, because the social-cognitive perspective brings dynamic processes to Trait<sub>DES</sub>. (Note that other theories also bring dynamic elements to Trait<sub>DES</sub>, so that Trait<sub>DES</sub> might be consistent with those theories as well, but whole trait theory is limited primarily to social-cognitive approaches).

The social-cognitive approach emphasizes situational variation in behavior, inconsistency based on subtle interpretations, and rapid motivationally-induced shifts in behavior. In contrast, the trait approach emphasizes stability. In a trait approach, an individual is expected to think, feel and behave in similar ways most of the time.

Although the trait approach would allow for some variability in behavior, it does not appear to allow the high degree of variable responding required in the social-cognitive approach (Allport, 1937; Fleeson & Nofle, 2009; Mischel, 1973). It would appear that the descriptive side of traits does not have the space for dynamic processes.

However, the density distribution model may provide an account of the descriptive side of traits that does make room for dynamic processes. Following the work of Allport, Buss, Cantor, Larson, Moskowitz, Nesselrode and others, the density distribution approach (Fleeson, 2001) proposed that people will vary from moment to moment quite a bit in the states they enact. Research supported this proposal. The amount that one typical individual varied in his or her states across two weeks was (i) almost as much the total amount that behavior varied in the entire sample, meaning that knowing who a person is does not much reduce the range of states one can expect of the person; (ii) about the same as the amount of within-person variation in affect, something that is commonly known to vary so much that it is hard to conceive of it as a trait; and (iii) more than the amount of variability between individuals, meaning that individuals differ from themselves more than they differ from others (Fleeson, 2001; Nofle & Fleeson, 2010).

The width of the density distributions (in other words, the high variability), creates the descriptive space into which the dynamics of the explanatory account might be placed. Each distribution in Figure 1 covers a wide range of states. Because the typical person's traits, as manifest, are shifting rapidly from occasion to occasion, this shifting may be the result of a dynamic process. Moreover, because this shifting of states is part and parcel of the distribution, and because the distribution makes up the individual differences in the descriptive side of traits, this shifting represents the potential output of the explanatory side of traits within the descriptive side of traits.

For example, almost all people shift from being extraverted to introverted and all points in between during the course of just a few days, and this is the fact that allows for the dynamics of the explanatory account to apply to extraversion. These shifts in how extraverted or introverted a person is from moment to moment could very well be the result of social-cognitive mechanisms such as encodings, expectancies, and self-regulatory plans. And since the distribution of extraversion states is possibly the person's trait, then the person's trait has room for dynamic explanations.

This high degree of variability may create a new problem. Specifically, it may be so high that it threatens the stability required for trait concepts. Allport, for example, was troubled enough by variability to conclude that traits could only exist as multiple, idiosyncratic and contradictory in nature: "If a child is a hellion at home, an angel outside, he obviously has two contradictory tendencies in his nature" (Allport, 1968, p. 46). However, the concept of a distribution eliminates the need to posit multiple contradictory traits. Rather, consistency of



traits occurs in the parameters of distributions. Although individuals are highly variable within the distribution, they are highly consistent in the forms of their distributions. And this consistency is extremely high. Thus, distributions allow both dynamic processes required by social-cognitive approaches and the stability required by the trait approach.

Traits<sub>DES</sub>: The crux of the matter: Trait<sub>DES</sub> meets the criteria needed for the possibility that social-cognitive mechanisms explain trait descriptions. First, there is strong evidence that the descriptive side of traits, Trait<sub>DES</sub>, can be conceived as density distributions of states (Fleeson, 2001; Baird et al., 2006). States transfer the content of traits to the momentary level, and individual differences in distribution parameters are highly stable. Additionally, individual differences in distribution parameters correlate with individual differences in questionnaire assessments of traits (Fleeson & Gallagher, 2009), and personality states structure into the Big 5. Thus, a trait, taken as a description of an individual, may be Trait<sub>DES</sub>. The form of Trait<sub>DES</sub> is the crux of the matter, because the form must be something producible by social-cognitive mechanisms. The large variability in distributions means that Trait<sub>DES</sub> has the necessary form.

### Trait<sub>EXP</sub> (what one is capable of)

Whole Trait Theory does not invent a new explanation for traits. It imports an existing one, namely, the social-cognitive one. This is an advantage to Whole Trait Theory, in that it does not create a new explanatory mechanism, it joins two existing parts into wholes. Rather than be a competitor to the trait approach, social-cognitive mechanisms should betaken to be part of the same account of personality as is the trait approach. This joining of two parts needs a model of the descriptive side of traits that allows social cognitive explanations. This joining also needs an explanatory account of traits that is capable of producing the descriptive side of traits. This joining is possible precisely because social-cognitive approaches supply the explanatory account that trait approaches are missing, whereas trait approaches supply the descriptive sides of traits that social-cognitive approaches are missing.

Whole Trait Theory's account of Trait<sub>EXP</sub> builds on the prior work of All port (1937) and Mischel and Shoda (1995, the CAPS model) and consists of links between nodes. On this account, manifestations of traits are adaptive tools for accomplishing goals, and variability is useful, responsive and controllable. Individual differences in the explanatory side are in the links between nodes. The second critical test of Whole Trait Theory is whether Big 5 personality states are responsive to inputs and intermediates.

### Explaining Traits = Explaining Distributions of States

The goal of the explanatory part of traits is to explain the descriptive part of traits. That is, the explanation of traits is intended to explain why people end up enacting different personality traits and to explain why they enact the traits they do when they do. The first of these questions addresses etiology – explaining differences between people in which traits they have. The second of these questions addresses mechanism – explaining how traits lead to any given behavior in a given moment.

To the extent that Trait<sub>DES</sub> can be taken as the descriptive part of traits, it follows that explaining traits requires explaining Trait<sub>DES</sub>. Because Trait<sub>DES</sub> consists of density distributions of states, explaining Trait<sub>DES</sub> means explaining distributions of states. The etiological question refers to explaining differences between people in the parameters of their distributions. The mechanism question refers to predicting personality states — that is, predicting the states people actually enact at any given moment.

### Social-Cognitive Processes as Constituents of Trait<sub>EXP</sub>

Whole trait theory proposes that social-cognitive processes can explain density distributions of states. Social-cognitive mechanisms can explain both the considerable within-person variation in personality states within a distribution, and the between-person variation in parameters of distributions.

We propose that several processes, including social-cognitive ones described by (but not identical to) CAPS (Mischel & Shoda, 1995), are the determinants of states (Fleeson & Jolley, 2006). These processes include interpretative processes, motivational processes, stability-inducing processes, temporal processes, and random error processes. We designate these processes, which make up the explanatory part of traits, as Trait<sub>EXP</sub>. We discuss these processes in turn.

The Interpretative Process represents the cognitive aspects of the mind—the manner in which information is processed and which results in implications for behavior. The Motivational Process is the representation of desired and feared end-states that create the directional impetus in the individual. The Stability-Inducing Process account for factors that guide the individual towards his or her typical trait manifestation, such as genetic, homeostatic, or habit forces. The Temporal Process is necessary to account for influences of past events on the present, such as inertia or cycles. The Random Error Process is needed to account for unpredictable trait manifestations. For example, extraversion state levels are the function of *interpreting* the current situation as favorable towards extraversion, *pursuing* a goal that produces extraverted behavior, a homeostatic *tendency* towards extraverted behaviors, an ongoing *trend* that leads to extraverted behavior, and/or purely *random processes*.

As shown in the top part of Figure 1, these processes have structural elements and dynamic elements. The structural elements include inputs, intermediates, outputs, and links. The dynamic elements are flows. The first structural elements – inputs -- are environmental or internal events. Intermediates are other environmental or internal events influenced by those inputs. The outputs are always increases or decreases in at least one of the Big-5 states. For example, the output of an interpretative process might be to increase an individual's state openness and to decrease his or her state extraversion. Finally, links are connections between inputs, intermediates, and/or outputs; they are structural elements that allow other structural elements to influence each other. For example, there may be a link between the goal of wanting to have fun and the output of state extraversion.

Flows are the dynamic processes that run across these structural elements. When a given structural element is activated, a link will spread that activation to other structural elements,

and so on, creating a dynamic process. Prior to a flow, a particular process is relatively dormant. Only when a flow spreads to and through a structural element via links does a structural element become active in producing states. Thus, these processes explain the occurrence of any given state as the result of flow across one or more of the social-cognitive processes. Different states happen at different times because of different inputs to the processes at different times, because of different intermediates in the processes, and because of different links between the inputs, intermediates, and outputs.

Individuals differ in these processes because they differ in the links between the inputs, intermediates, and outputs. As a result, the same input to different individuals may lead to different outputs (i.e., to different states), depending on the individuals' strengths of the links between those inputs and those outputs. For example, individuals with strong links between goals of connecting with others and extraverted behavior are likely to manifest high levels of extraversion in their behavior (McCabe & Fleeson, 2013.). The outputs of these processes are changes in current levels of states. Because states include affective, behavioral, and cognitive elements, states may influence each other; the cognitive change in a state may then lead to a behavioral change in the same state. It is important to keep in mind that states have these dual roles as outputs and intermediates. Individuals may also differ in the chronic activation of the nodes or the ease of linking to various nodes.

For example, in an interpretative process, psychologically active elements of situations trigger cognitive-affective units that ultimately lead to behavior (Shoda & LeeTiernan, 2002; Fleeson, 2007). Whole Trait Theory sees trait-manifestations as reasonable responses to situations. Variability is caused by the situation, and people interpret situations and act accordingly. For example, an individual in a relatively structured situation may expect it to be easy to concentrate and so may increase his or her level of conscientiousness (Fleeson, 2007). The inputted environmental or internal events flow via encoding of the events into interpretations, which flow via activation to other beliefs. These beliefs flow to implications for behavior, and the output of that flow is behavioral changes in manifestation of states. This step is the final step only in the schematic of the process. All outputs (interpretations, beliefs, and behaviors) count as internal or environmental events that feedback into the process, continuously adjusting the interpretative process (Mischel, 1973), and impacts of the outputs on the situation also change the environmental events, creating new situations (Snyder, 2006; Snyder & Stukas, 1999). Thus, the interpretative process is a continuous process, which includes changes in states on an on-going basis – those changes in states influence other beliefs, which continue to influence other beliefs, other emotions, and other behaviors.

Several studies have now tested these ideas and revealed consistent support. Big 5 personality states are predictable from features of the situation (Bleidorn, 2009; Church et al., 2008; Clifton & Kuper, 2011; Côté et al., 2012; Fleeson, 2007; Fournier, Moskowitz, & Zuroff, 2009; Huang & Ryan, 2011; Judge et al., 2013). Big 5 personality states are also predictable from the goals an individual is pursuing at the moment (Bleidorn, 2009; Heller et al., 2007; McCabe & Fleeson, 2012; Perunovic et al., 2011). In fact, McCabe & Fleeson (2012) found that 50–75% of the variance in personality states is predictable from the goals

people are working on at the moment. Thus, it has been shown empirically that indeed enactment of Big 5 states is predictable from social-cognitive processes.

Trait<sub>EXP</sub> also addresses the etiological question. Because individuals differ in the links in the processes, they will differ in the outputs of the processes and ultimately will differ in the distribution of states they manifest in their behavior. A stable mean and shape of the distribution of personality states are produced because the processes are stable; overtime, the same processes will tend to produce similar output. There is initial evidence in support of this etiological explanation. McCabe & Fleeson (2012) showed that most of the between-subjects variation in extraversion could be explained by between-subjects variation in the goals people pursued. In other words, the entire distribution of states –its whole range, its location, and its width – is produced by Trait<sub>EXP</sub>.

In sum, Whole Trait Theory meets the second key test. Even states of the Big 5 are dependent on situations and on motivational processes. This has been shown empirically in multiple studies. Thus, if the descriptive side of Big 5 traits is Trait<sub>DES</sub>, then the explanatory side of traits consists at least in part of social-cognitive mechanisms.

### **Alternative Accounts of the Explanatory Side of Traits**

We are open to alternative accounts of the explanatory side as well as to variants of the above. This is because we believe the explanatory side of traits is only in the beginning states, and empirical results will change the field's understanding of the explanatory side as the field develops. We believe that the best candidates will be social-cognitive at heart, but the specific social-cognitive mechanisms may vary from those laid out above.

In fact, there are at least two alternative accounts of the explanatory side of traits that we find very compelling. Read and colleagues (2010) have proposed instantiating the explanatory side of traits in a connectionist model. The purpose of their model is to identify the mechanisms underlying the structure of the Big 5, the origin of the Big 5, and the dynamics of the Big 5, similarly to Whole trait theory. In the connectionist model, the input of situations leads to the output of behavior through multiple hidden layers. These hidden layers can consist of goals, expectancies, and other social-cognitive units. This model is very concrete and specific, and has demonstrated promising results.

Another compelling account is that offered by DeYoung in this special issue. Although CB5T differs from Whole trait theory in several respects, it is similar in proposing cognitive-motivational (as well as biological) explanations for traits. In CB5T, traits are caused by relatively stable parameters of cybernetic mechanisms. Cybernetic systems operate via goal standards, feedback, comparisons, and adjustments. However, CB5T puts “characteristic adaptations”, which we refer to as goals, beliefs, etc., as separate and simultaneous contributors to behavior, whereas we put such variables inside the traits explanatory machinery.

## Accretion into the Big 5

One distinctive feature that distinguishes Whole Trait Theory from existing social-cognitive approaches such as CAPS (Mischel, 2004; Mischel & Shoda, 1995) is its grounding in the Big 5. The Big 5 provides CAPS with traits to explain, and it grafts some of the most important work in personality to a CAPS approach. This is a difficult move to make because of the long history of antagonism between social-cognitive and trait approaches (Funder, 2009; Kenrick & Funder, 1988; Lucas & Donnellan, 2009). But there is also a fundamental sticking point. This sticking point concerns the breadth of the traits that result from social-cognitive mechanisms.

In CAPS, the resulting traits will be rather narrow (Mischel, 2004), so narrow in fact that they are referred to as “dispositions” rather than as “traits”. That is, the resulting dispositions will be specified quite narrowly by the eliciting situations and the resulting behaviors. In contrast, Big 5 traits are quite broad. Broad means that each Big 5 trait covers a wide range of behaviors and is elicited in a wide range of situations. For example, if a person is friendly, then they are also polite and warm and generous, and that they will do so with many others and under many circumstances. In contrast, narrow dispositions would not cross from the domain of friendliness to politeness, warmth, or generosity. Narrow dispositions would also not cross situations, such that a person might be friendly in public but may or may not be friendly in private.

In the Big 5, such broad traits are the result of empirical and psychological connections between the behavioral domains and the behaviors in one situation and the behaviors in another. In the Big 5, for example, warm people are empirically more likely to be generous, friendly, and polite. There are psychological reasons that these characteristics cohere in people, and there are psychological reasons that people act the same way in different situations.

Whole Trait Theory proposes that the explanatory social-cognitive mechanisms can cause the manifestation of the Big 5 traits through the *accretion* of specific explanatory mechanisms into the broad traits that make up the Big 5. That is, the explanatory part of traits indeed does consist of countless narrow traits relating specific features of situations to specific behavior reactions. However, these narrow traits accrete over time into broader traits. Accretion means that the narrow traits become linked together and influence each other psychologically.

Several thinkers (G. W. Allport, 1937; Cramer et al., 2012; Snow, 2009) have argued that accretion may occur through generalization, learning abstract principles, the links and outputs influencing each other, and logical, biological and cultural processes. Generalization (Allport, 1937) occurs as individuals recognize similarities in situations, similarities in behaviors, and similarities in effects of behaviors. Recognizing similarities leads to aligning behaviors up to be consistent with each other across such similarities. For example, individuals may recognize that boldness with friends has similar effects to boldness with family members, and so act similarly boldly in both situations.

Learning abstract principles about situations and behavior may result in applying the principles broadly. For example, individuals may learn that boldness and assertiveness both involve pushing others to get ones way, and so use either interchangeably. Finally, situations, behaviors, and the links between them may cause each other (Cramer et al., 2012). For example, being bold may cause individuals to become more assertive. Thus, traits are always developing.

Why do these accretion principles have the capacity to account for the Big 5, its heritability, and its relative cultural universality? We are grateful to DeYoung (this volume) for his careful consideration of Whole trait theory and for his explication of differences from our theory. Accretion principles can account for these features of the Big 5 because accretion principles do not follow the logic of “anything goes”. Rather, biology, culture, logic, and physical realities put constraints on the accretions that can happen. It’s pretty hard to like parties if one doesn’t like being around other people (Cramer et al., 2012). These constraints result in the common structure forming across a wide variety of individuals and cultures. The heritability of many aspects of the TraitEXP mechanisms results in the heritability of the broad traits, because accretion forms these mechanisms into the broad traits.

In fact, accretion principles have an advantage over other accounts, in that accretion principles can account for both cultural universality of the Big 5 structure and cultural specificity. Cultural universality results when logical, biological, and physical constraints result in similar accretion principles. Cultural specificity results when different cultures relate different behaviors to each other around those constraints. Given that the current empirical picture is one of primary cultural universality of structure combined with pervasive cultural differences in the specifics of structure, this feature of accretion counts as an advantage for it

It is this emphasis on accretion that sharply divides Whole trait theory from CAPS (Mischel & Shoda, 1995). Accretion is what produces the Big 5, and is what allows social-cognitive mechanisms to be the explanation for the Big 5.

## Theoretical Considerations

### Circularity

When traits are considered to be both explanatory and descriptive, there is a danger of circularity. The danger arises if the same construct is used to explain itself, as when the descriptive referent of traits and the explanatory reference are the same thing. Whole Trait Theory solves this problem by having two distinct parts to traits, and by constituting the two parts to traits out of different elements, so there is no circularity of one part explaining itself. It is important that Whole Trait Theory does not drop the descriptive part once the explanatory part is included, because it allows the descriptive and the explanatory part to be two different things. The descriptive part is more than just the trait label, but also is the distribution of states. The explanatory part is something different, namely social-cognitive links among motivations, expectancies, and other similar concepts. This avoids circularity, because one thing does not explain itself, but rather one thing explains a different thing. The



explanatory part causes the descriptive part. With different concepts, assessments, and validity evidence for the two parts of traits, the circularity charge is addressed.

### Comparison to Modern Theories of Traits

Whole Trait Theory is not incompatible with modern theories of traits (e.g. DeYoung, 2014). In fact, it should be clear at this point that one of Whole Trait Theory's strengths is that it builds on the impressive advances of trait theory. It recognizes that traits must be a central part of any broad model of personality.

However, it differs from other theories of traits in a few important ways. First, it incorporates social-cognitive approaches into the model of traits, as the explanatory part. Because of the person-situation debate, trait and social-cognitive theories have been largely at odds with each other (Fleeson, 2012; Funder, 2009; Hampson, 2012; Lucas & Donnellan, 2009). Whole trait theory is distinctive in its linking of traits with social-cognitive mechanisms (DeYoung, 2014). As Baumert & Schmitt (2012, p. 87) note, "(l)inking traits with this understanding of personality involves the general idea that chronic parameters of the cognitive-affective-motivational system shape information processing in specific situations and, thus, cause the patterns of emotion and behavior captured by trait terms."

Second, it combines motivational and cognitive domains into the trait domain of personality, rather than keep the domains separate. Most modern theories of traits keep motivational, cognitive, and narrative domains as separate from but related to the trait domain. For example, Costa and McCrae (2006) have motives and cognitions as an outcome of traits, McAdams and Olson (2010) and Roberts and Wood (2006) hold motivational and trait domains as separate domains of personality functioning, and Winter and colleagues (1998) suggested motives provide the direction of behavior whereas traits provide the style of behavior. Whole trait theory puts the domains together: motives and cognition are the constituent components of part of traits (the explanatory part). In this way, Whole trait theory is in collaboration with other theories that create an intimate connection between traits and motivational domains (e.g., DeYoung, this volume; Gray, 1981; Read et al., 2010; Revelle & Condon, this volume)

Third, Whole Trait Theory proposes a mechanism explaining how traits result in behavior and how they originate, while most modern theories of personality leave traits as yet unexplained (Hampson, 2012). Another influential approach to traits, which proposes a person-centered framework that integrates the Big Five (McAdams & Pals, 2005), defines goals, values and plans as *characteristic adaptations* that are independent from traits, Whole Trait Theory sees such characteristic adaptations as comprising part of the explanatory side of traits.

Fourth, Whole Trait Theory separates the explanatory and the descriptive part of traits out as two different parts of traits. The two parts of traits have distinct concepts and existence, but are intimately joined. Each part necessitates the other part, and they work together extremely closely, because they stand in a cause-effect relationship to each other. The descriptive part is more than the label, but is explicated as distributions of behaviors. The explanatory part is the set of mechanisms that produce those distributions.

### Traits Include Nearly Everything but Are Themselves No Single Thing

In Whole Trait Theory, the explanatory side of traits is considered to be a rich collection of a wide diversity of psychological variables. It includes variables such as goals, expectancies, competencies, and plans (Mischel, 1973), but goes beyond them to include narratives, scripts, defenses, and other variables (Demorest, Popovska, & Dabova, 2012; McAdams & Olson, 2010). These variables are all included because, among their many effects, they are all likely to influence the personality states a person manifests. For example, the script of “The unknown-fear” may lead to reduced extraversion behaviors (Demorest et al., 2012). These types of variables are important, and any comprehensive theory of personality will need to include them.

On this account, Big 5 traits undergo an elevation, to include nearly all personality variables. They include nearly all personality variables because the explanatory part of traits includes the set of social-cognitive mechanisms that produce distributions of personality states. Any variables that cohere with other explanatory variables and are responsible for distributions of states would be included in the explanatory part of traits. In other words, the Big 5 traits (the descriptive side of traits) are each the product of an ensemble of social-cognitive processes.

However, it follows from this “elevation” that Big 5 traits are simultaneously diminished into non-existence. Some personality psychologists have argued that traits are exclusively biological in origin and are insulated from direct effects from the environment (Five-Factor Theory; McCrae & Costa, 1999). In other words, traits are seen as “set in plaster” (Costa & McCrae, 1994; Srivastava, John, Gosling, & Potter, 2003) with the environment and learning having little influence on these traits. In contrast with such theoretical perspectives, in Whole Trait Theory there is no single variable that is “the trait”. There is no essence to a person that is the person’s trait, and that is who the person “really is”. Rather, the explanatory part of a trait is a set or an ensemble of social-cognitive processes. These many explanatory mechanisms in a given set are connected to each other, via the processes of accretion, so that they do indeed belong together as a set, and the set itself can be rightly labeled by the trait term. However, there is no separate Big 5 “trait” that exists in isolation from that set.

### The Referent of a Trait Level in a Single Individual

Given that there are two parts to traits in Whole Trait Theory, it becomes ambiguous what it means to describe an individual with a level of a trait. For example, what does it mean to describe someone as moderately extraverted? In whole trait theory, each person will have two trait levels, not just one. One trait level will refer to the descriptive part, and one trait level will refer to the explanatory part.

When referring to the descriptive part of the trait, a person’s trait level refers to his or her distribution of personality states. A distribution is not a single number, and Whole Trait Theory argues that individuals’ actual behavior should be described by entire distributions rather than by single numbers. However, if one were simply interested in an individual’s average behavioral level, it is possible to summarize the distribution by its location. For

example, saying someone is moderately extraverted means his or her distribution of enacted extraversion states is located at the moderately high end of extraversion.

When referring to the explanatory part of the trait, a person's trait level refers to the person's set of explanatory variables. People differ in the kinds of distributions their explanatory variables would produce under the same conditions and situations. The person's level of the explanatory part of the trait refers to the distribution of states their explanatory part would produce under typical conditions and situations. For example, saying someone is moderately extraverted means that the explanatory mechanisms the person has would produce moderately extraverted behavior under typical circumstances.

Both references are legitimate references of a trait description of an individual. For example, a monk may be very introverted in his or her actual behavior over the course of years, but may be very extraverted in underlying social-cognitive mechanisms. A consequence of whole trait theory's introduction of two parts to traits is there must be two references of the trait term, one for each part of traits. In most cases, because most people are in standard or typical situations, the explanatory trait level will be the same as the descriptive level. However, in unusual circumstances, the two levels may not match.

## Conclusion

It has long been recognized that the mechanisms constituting traits such as the Big 5 need to be discovered, and we are gratified to see this endeavor beginning to occupy so many good researchers' minds, as evidenced by this special issue. We are gratified because we have pushed hard for the field to use the language of explanatory and descriptive parts of traits, to recognize that both parts need to be studied as distinct entities, and to add an explanatory part to the existing descriptive part. Further, we are gratified because we have long seen the potential for social-cognitive mechanisms to be the explanatory account (Fleeson & Jolley, 2006; Fleeson, 2001, 2004, 2007; McCabe & Fleeson, 2012). We believe the field has the opportunity to make great advances as a mature science by describing these mechanisms, and we hope this special issue pushes us in those directions.

We started the paper with two quotes. These two quotes were wonderful because they were by two of the strongest representatives of opposing views on traits, yet concluded the same thing about traits. This conclusion was that traits are real descriptions of how people act, yet they need to be constituted by mechanisms capable of discriminating between situations. Whole Trait Theory is the first theory to take up this charge with regard to the Big 5, because the field needed to address other issues first. Whole trait theory is in the same spirit of the two quotes, because it argues that two historically opposed approaches to personality – the trait and the social-cognitive – actually belong together to finally make traits into wholes.

Whole Trait Theory is centered on five main points. First, the descriptive side of traits is best thought of as density distributions of states. When traits are used to describe what people do, traits are describing individuals' entire distributions of how the individuals act. Trait labels are more than just labels. Second, it is important to provide an explanatory

account of the Big 5. The job of the explanatory account is to explain the distributions – that is, to explain why people differ from each other in their distributions (origin of traits) and to explain the within-person variability in states within the distributions (mechanisms constituting traits). Third, adding an explanatory account to the Big 5 creates two parts to traits, an explanatory part and a descriptive part, and these two parts are separate but also are joined into whole traits. The two parts of traits are joined together because one causes the other, and because both are considered legitimate references of the trait term. Fourth, whole trait theory proposes that the explanatory side of traits consists of social-cognitive mechanisms. This is because social-cognitive mechanisms are clearly important in personality, and because density distributions of states make it clear that personality is responsive to situations.

Two strong and omnibus tests were described to evaluate Whole Trait Theory. First, the actual manifestation of traits in everyday life took a form amenable to social-cognitive explanations (Baird et al., 2006; Fleeson, 2001; Fleeson & Gallagher, 2009; Timothy Church et al., 2013). Thus, the descriptive account of traits that is empirically supported is consistent with social-cognitive mechanisms, in that states are highly variable across moments. Thus, if we want to explain traits, in so far as traits are descriptions of how people act, then we need something capable of explaining density distributions of states. Second, social-cognitive mechanisms were shown to predict the actual manifestation of traits, arguing that they are indeed at least part of the explanation of traits (Church et al., 2008; Clifton & Kuper, 2011; Fleeson, 2007; Heller et al., 2007; Judge et al., 2013; McCabe & Fleeson, 2012; McNiel, Lowman, & Fleeson, 2010; Read et al., 2010; Yang et al., 2011). Personality in the moment responds to situations, intentions, and goals. What needs to be done next is a major effort to discover the social-cognitive mechanisms that produce Big-5 states. There is much to be discovered here, and the work should be easily productive.

In sum, Whole Trait Theory creates a model of what is described in behavior and of how that description comes to be, merges trait and social-cognitive perspectives, merges the descriptive with the explanatory side of traits, incorporates both the person and the situation into the definition of traits, builds on and integrates a wide range of literature, creates a communicative framework for future research on traits, generates new research directions, and provides a theory of the field's most basic units. In other words, it is time to untangle Allport's "web of complex tendencies" and to discover Hartshorne and May's "inner entity".

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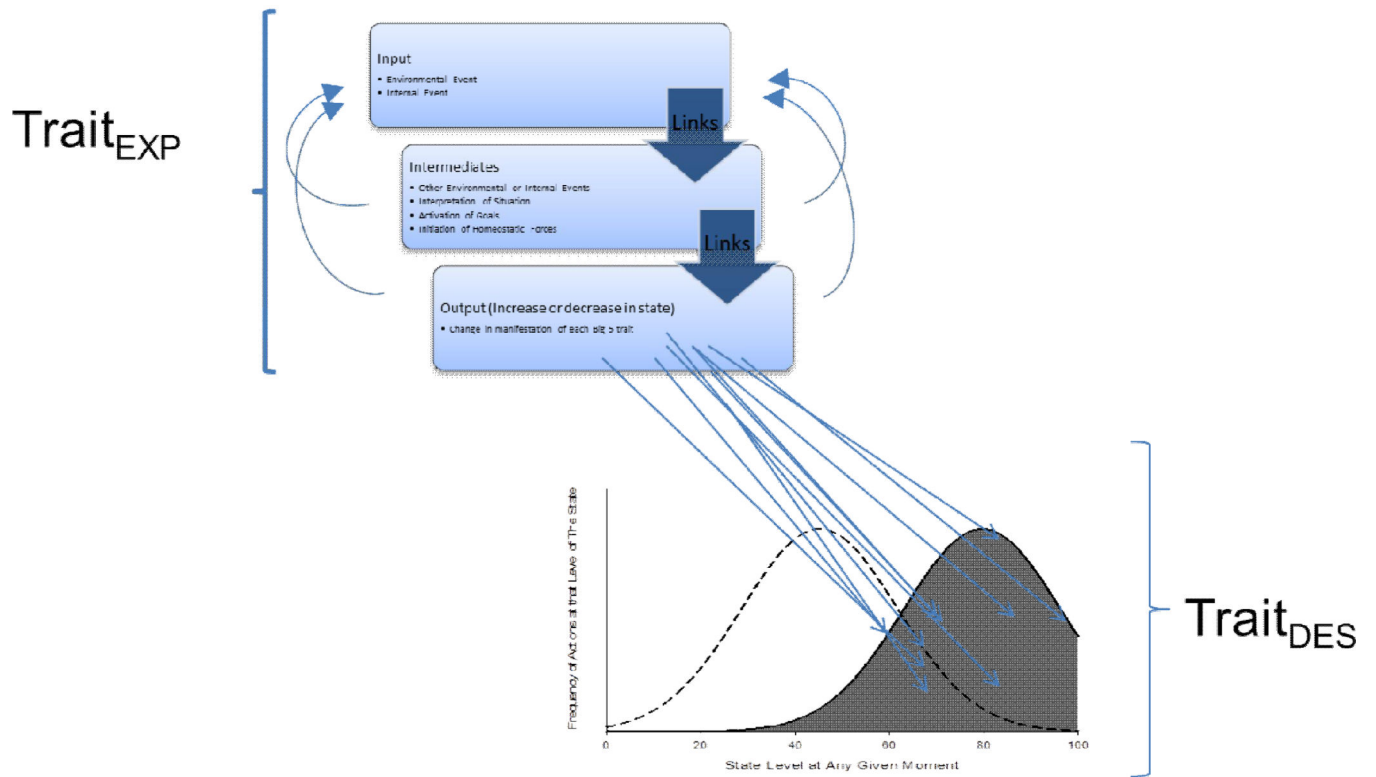
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### Highlights

- Proposes Whole Trait Theory as an integrative model of traits
- Combines descriptive, mechanism explanatory, and etiological parts of traits into a single model
- Combines Big 5 trait with social-cognitive explanatory accounts of personality
- Based on 15 years of empirical support
- Suggests a rich ground of future, coordinated work on personality psychology

# Whole Trait Theory



**Figure 1.** Whole trait theory.  $Trait_{DES}$  = the descriptive part of traits.  $Trait_{EXP}$  = the explanatory part of traits.

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**Table 1**

## Five Main Assertions of Whole Trait Theory.

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1	The descriptive side of traits is best thought of as density distributions of states.
2	It is important to provide an explanatory account of the Big 5.
3	Adding an explanatory account to the Big 5 creates two parts to traits, an explanatory part and a descriptive part, and these two parts are distinct entities that nevertheless can be joined into whole traits because one of the parts is the causal consequence of the other part.
4	The explanatory part of traits consists of social-cognitive mechanisms.
5	What needs to be done next is to identify social-cognitive mechanisms that produce Big-5 states.

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