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Personality and density distributions of behavior, emotions, and situations

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ABSTRACT

Whole Trait Theory defines personality as a density distribution of one's momentary behavior, complete with all of its parameters (e.g., mean, SD, skew, kurtosis). Two questions regarding these parameters remain largely unexamined: (1) are individual differences in these parameters stable? And (2) do scores on standard personality tests correspond to these parameters? The current study (N = 209) employed an experience sampling design ($N_{obs} \approx 8300$) to examine the stability of density distribution parameters and the relationship between standard personality test scores and density distribution parameters of 10 behaviors/emotions and 8 situation characteristics. Results showed that, (a) individual differences in density distribution parameters are moderately stable and (b) at the bivariate level, personality was associated with numerous distribution parameters for a number of behaviors/emotions, and situations. However, when the appropriate statistical controls were taken into account, these associations diminished. While individual differences in density distribution parameters we moderately stable, standard personality measures rarely correspond to any other parameters of density distributions once the mean of the density distribution is known. Emotionality and eXtraversion appear as exceptions to this general pattern. These results imply that both theory and measurement in personality should be cognizant of within-person variability in behavior.

1. Introduction

Human behavior is both stable and variable across situations. This apparent paradox is resolved by recognizing that behavioral differences between people are quite stable across contexts (i.e., rank-order stability: Funder & Colvin, 1991), while behavioral differences within people are quite common (i.e., situation specificity; Van Heck, Perugini, Caprara, & Fröger, 1994; Dreier, 2011; Fleeson, 2001, 2007). Despite this recognition, personality theories have long-struggled to parsimoniously and simultaneously explain both between- and within-person differences in behavior. For example, trait theories of personality (e.g., Allport, 1937; DeYoung, Quilty, & Peterson, 2007; John, Naumann, & Soto, 2008; Lee & Ashton, 2008; McCrae & Costa, 2008; Zuroff, 1986) have largely emphasized and focused on between-person differences in behavior. For their part, cognitive theories of personality (e.g., Bandura, 1999; Cervone, 2004; Kelly, 1963; Mischel, 1973; Mischel & Shoda, 1995, 2008; Read et al., 2010; Rotter, 1966) have largely emphasized and focused on within-person differences in behavior. The recently developed Whole Trait Theory integrates both trait and cognitive perspectives on personality in an effort to explain both between- and within-person differences in behavior.

Whole Trait Theory (WTT: Fleeson, 2012; Fleeson & Jayawickreme, 2015) argues that personality itself is the density distribution of an individual's behavior across situations (see also Fleeson, 2001, 2007). In probability theory, density distributions describe the likelihood that a particular observation will have a particular value. Under conditions of normality, the mean is the first moment, the expected value, and value most likely to be observed from a density distribution. The other parameters of the distribution, variability, skewness, and kurtosis are the second, third, and fourth moments respectively. WTT defines personality as a person's entire distribution of behaviors, or personality states. "...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" (Fleeson & Jayawickreme, 2015, p. 89). That is, according to WTT, personality corresponds not only to the center of one's distribution of behavioral enactments, but also to one's minimum, maximum, variability, skewness, and kurtosis.

Such a position poses two problems for personality theory and measurement. The first problem concerns the stability of individual differences in density distribution parameters. Most personality

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psychologists would not consider something to be part of personality unless (a) there are individual differences and (b) those individual differences are relatively stable. Though it is well established that individuals reliably differ in their average levels of behavior (i.e., density distribution means), far less is known about the stability of individual differences in other distribution parameters (e.g., are individual differences in standard deviations reliable?). The best studies examining this question appear in Fleeson's (2001) seminal article on density distributions. In an experience sampling study, Fleeson found evidence for stability in means (0.91, averaged across all behaviors measured), standard deviations (0.59), skew (0.47), and kurtosis (0.26) in sample of 46 individuals who provide 50 reports on average across 13 days. Similar values were found in a second study of 29 individuals averaging 71 reports across 20–22 days for means (0.97), standard deviations (0.79), skew (0.44), and kurtosis (0.22).

While these values suggest that there are individual differences in density distribution parameters are stable, the analysis used by Fleeson (2001) cannot say this definitively because it did not take into account the fact that the mean (or first moment) of a density distribution is often confounded (correlated) with other parameters of the distribution (e.g., standard deviation, skew). That is, people who have very high (or low) means will likely also have low standard deviations because they will repeatedly hit the ceiling (or floor) on most rating scales. Further, the relationship between the first moment of a distribution (i.e., the mean) and later moments (e.g., the SD) is not expected to be linear, but curvilinear (Baird, Le, & Lucas, 2006). Therefore, to evaluate the stability of density distribution parameters beyond the mean, one needs to statistically control for the mean and the mean-squared. To our knowledge, this is the first study to estimate the stability of density distribution parameters while using the proper controls.

The second problem posed by Whole Trait Theory pertains to the measurement of personality. Numerous studies have shown that traditional trait personality measures do predict average behavior across both time and situations (Ching et al., 2014; Church et al., 2013; Fleeson, 2001, 2007; Fleeson & Gallagher, 2009; Fleeson & Law, 2015; Funder & Colvin, 1991; Judge, Simon, Hurst, & Kelley, 2014; Sherman, Rauthmann, Brown, Serfass, & Jones, 2015). Thus, personality measures do in fact correspond to the first moment of density distributions of behavior—the mean. Do scores personality measures correspond to any other parameters of density distributions of behavior? The best data available to address this question are reported in a study by Fleeson and Gallagher (2009). Their study combined data sets from 15 experience sampling studies conducted over 8 years and containing nearly 500 subjects and more than 20,000 individual reports. Their analyses indicate that personality scores on the Big Five do in fact correspond to numerous parameters of density distributions of behaviors (e.g., mean, median, mode, maximum, minimum, variability, skew, and kurtosis; see their Table 4). However, as noted previously, such bivariate associations can be misleading because the parameters of a density distribution are often confounded with the distribution's mean. Appropriately then, Fleeson and Gallagher (2009) controlled for the mean—as well as the squared-mean for some parameters—and found that the associations between personality measures and those additional parameters of the density distribution largely disappeared. The lone exception here was the maximum, for which only the mean was controlled, which still showed strong associations after controlling for the mean.

The present study seeks to answer two questions: (1) how stable are parameters of density distributions of behavior, emotion, and situation characteristics? And (2) are trait personality test scores related to the various parameters of density distributions. As such, this study represents a conceptual replication of Fleeson (2001) and Fleeson and Gallagher (2009) in a new sample from a different undergraduate population. The 15 samples gathered by Fleeson and Gallagher were drawn from a private university (Wake Forest University) and ranged in size from N = 12 to N = 63. In contrast, our sample is drawn from a public university (Florida Atlantic University) and contains data from N = 209 participants. In addition, this study extends the investigation by Fleeson and Gallagher by (a) including a sixth dimension of personality of Honesty/Humility and (b) examining—for the first time to our knowledge—how personality may be related to density distributions of situation experiences.

1.1. What about situations?

It does not take much to recognize that behavior is at least partially a function of the situation. Although there were some serious efforts to define, taxonomize, and measure situations in the 1970s and 1980s (e.g., Argyle, Furnham, & Graham, 1981; Frederiksen, 1972; Magnusson, 1971, 1981; Pervin, 1978; van Heck, 1984, 1989), a recent surge of research on situations has brought the topic back to the forefront (e.g., Fleeson, 2007; Fournier, Moskowitz, & Zuroff, 2008, 2009; Funder, 2009; Funder, Guillaume, Kumagai, Kawamoto, & Sato, 2012; Rauthmann, 2012, 2015; Rauthmann & Sherman, 2016a, 2016b; Rauthmann, Sherman, & Funder, 2015a, 2015b; Rauthmann et al., 2014; Reis, 2008; Saucier, Bel-Bahar, & Fernandez, 2007; Schmitt et al., 2013; Serfass & Sherman, 2013; Sherman, Nave, & Funder, 2010, 2013; Sherman et al., 2015; Wagerman & Funder, 2009; Yang, Read, & Miller, 2006, 2009). One result from this recent surge is the introduction of the DIAMONDS characteristics of situations (Rauthmann et al., 2014) and its accompanying measurement tools (Rauthmann & Sherman, 2016a, 2016b). The DIAMONDS are Duty (*Does something need to be done?*), Intellect (*Is deep thinking required or desired?*), Adversity (*Are there external threats?*), Mating (*Is the situation sexually and/or romantically charged?*), pOsitivity (*Is the situation enjoyable?*), Negativity (*Does the situation elicit unpleasant feelings?*), Deception (*Is someone being untruthful or dishonest?*), and Sociality (*Are social interaction and relationship formation possible, required, or desired?*). The DIAMONDS represent the broadest eight dimensions found in the Riverside Situational Q-sort (RSQ: Wagerman & Funder, 2009), which is the most comprehensive measure of situation characteristics currently available (Rauthmann et al., 2014).

Beyond examining the relationships between personality and parameters of density distributions of behavior and emotion, the current study also examines potential relationships between personality and density distributions of the DIAMONDS situation characteristics. Prior theorizing and empirical work suggest that personality ought to be related to the kinds of situations people experience on average (Allport, 1961; Bandura, 1978; Buss, 1987; Emmons, Diener, & Larsen, 1986; Ickes, Snyder, & Garcia, 1997). However, the empirical work in this domain is rather limited. In terms of the DIAMONDS, the only study to examine links between personality and density distributions of situation experience thus far—using the same data analyzed in this study—showed that personality does predict average self-reported situation experiences, though only rather weakly (Sherman et al., 2015). No examination of the association between personality and other distribution parameters has yet been undertaken.

2. Method

2.1. Participants

Two hundred-eighteen undergraduate participants with smart phones were solicited from Florida Atlantic University's subject