EXAMINING THE PERSONALITY-PERFORMANCE LINK USING DIRECTLY OBSERVED BEHAVIOR

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ABSTRACT OF THE THESIS

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Personality psychology seeks to characterize, understand, and predict behavior. However, studies that utilize direct behavioral observation are few in number. The current study analyzes data from the Hawaii Personality and Health Cohort and links self-rated Big Five personality with directly observed behavior in a videotaped cognitive test conducted years later. The study also looks at the link between personality and performance, and how that relationship is mediated by behaviors. Correlations were conducted to assess the relationship between the Big Five Inventory and behaviors enumerated in the Riverside Behavioral Q-Sort. A significant number of correlations were found for Extraversion, Conscientiousness, and Openness. Regression analyses were conducted to determine associations among the Big Five traits, behaviors, and performance on the three sections of the Woodcock-Johnson III Tests of Cognitive Abilities: Brief Intellectual Ability. Meaningful relationships were found between Conscientiousness and all three sections of the BIA, and between Openness and two sections of the BIA. Bootstrapping was then employed to examine the mediating relationship of behavior for the personality-performance link. Some behaviors that showed mediation were “Speaks fluently; expresses ideas well,” “Shows interest in intellectual and cognitive matters,” and “Exhibits a high degree of intelligence.” This study begins to address the need to identify the mechanisms by which personality affects real-world outcomes.

Table of Contents

Title Page…… i

Abstract……...ii

List of Tables…….iv

Introduction……1

The Current Study…… 11

Methods…… 13

Results……... 18

Discussion…… 23

Appendices…… 31

Appendix 1: Big Five Inventory……... 31

Appendix 2: Riverside Behavioral Q-Sort……...34

References…… 44

List of Tables

Table 1: Correlates of Self-Rated Extraversion and Directly Observed Behavior……...37

Table 2: Correlates of Self-Rated Conscientiousness and Directly Observed Behavior……38

Table 3: Correlates of Self-Rated Openness and Directly Observed Behavior……39

Table 4: Gender Differences in Correlates of Self-Rated Agreeableness and Directly Observed Behavior……...40

Table 5: BFI Correlates of the BIA…….. 41

Table 6: RBQ behaviors as mediators of the Conscientiousness-performance link…....42

Table 7: RBQ behaviors as mediators of the Openness-performance link……...43

Introduction

Examining the Personality-Performance Link Using Directly Observed Behavior

The purpose of psychology is to characterize, understand, and predict behavior. To achieve these goals, we must first understand the underlying factors that influence behavior. There are two constituents of behavior: the situation and a person's general pattern of behavior, also known as personality (Funder, 1991). This study builds upon prior research addressing stability of one's personality as part of what makes a person unique, and how one's personality impacts one's behavior (Caspi & Roberts, 2001; Digman, 1990). This study also adds to the existing literature showing a link between personality and real-world outcomes (Barrick & Mount, 1993), and addresses a gap in the literature examining the mechanisms by which personality influences this link (Hampson, 2008; Hampson, Goldberg, Vogt, & Dubanowski, 2007).

The History of Personality Research and the Person-Situation Debate

Personality theorists have had some success in discovering the underlying structure of personality, and have generally come to the consensus that personality can be described in terms of personality traits (Goldberg, 1993). A personality trait is more than just generalized habits or patterns of behavior. Traits are global because "each refers not just to one or a few specific behaviors, but to patterns of behavior presumed to transcend time and specific situations" (Funder, 1991, p. 31). A trait is not simply a hypothetical construct that exists within the mind of the observer (Allport, 1931). Much, if not all, of personality research depends on the idea that traits are real and can be measured (Funder, 1991).

Critics of personality psychology, primarily from the field of social psychology, have gone so far as to argue that personality simply does not exist (Mischel, 1968; Mischel, 2009; Shweder, 1975). Today there are few, if any, researchers who claim that personality does not exist; however, modern critics of personality psychology claim that one's personality cannot be consistent across time and contexts (Anderson & Chen, 2009; Mischel, 2009; Mischel & Shoda, 1995). However, the idea that personality is largely stable regardless of context is central to personality theory (Funder, 2001). Even when a situational stimulus is able to elicit a change in behavior, it does not change the fact that some individuals are better able to resist situational pressures. For example, a child who is left alone in a room with a treat is more likely to eat that treat the closer it is to him or her. However, there are children who will wait longer than others regardless of the situational conditions (Funder & Harris, 1986; Sethi, Mischel, Aber, Shoda, & Rodriguez, 2000).

The most prominent critic of personality psychology is Walter Mischel. In his writings, Mischel seized upon two perceived weaknesses of personality research. The first is that traits simply do not exist because personality is not stable across time and contexts (Mischel, 1968; Mischel, 2009). Mischel (1973) seems to suggest that what we perceive as "personality" is simply the accumulation of heuristics people use to deal with certain situations. In a way, he implies that behavior is purely conditioned and highly malleable. This may simply be the result of a faulty conceptualization of personality. For example, Mischel (1968) points out that in a study of moral behavior, cheating on a test in one context did not predict cheating on a second test in another context (Hartshorne & May, 1928). The problem in this study lies not with the concept of personality, but in its

methodology: the study was looking at the consistency of a specific behavior and generalizing it to another specific behavior, rather than inferring the traits that underlie such behaviors. Evidence that a person at one point in time acted in a way not consistent with his traits is not evidence that those traits do not exist (Allport, 1931).

The second perceived weakness identified by Mischel (1968) is that of the magnitude of the relationships between personality and behavior. The correlation coefficient of .30 (later revised to .40), dubbed the "personality coefficient," is argued to be too small to make any meaningful predictions about behavior (Funder & Ozer, 1983). Correlation coefficients are dependent upon the area of study, and many concepts in social psychology have similar effect sizes (Funder & Ozer, 1983). For example, Milgram (1975) found that the proximity of an authority figure correlated .36 with obedience, and that the proximity of the "victim" correlated .42 with obedience. In fact, a recent meta-analysis found that the average correlation coefficient reported in social psychology is r = .21 (Richard, Bond, & Stokes-Zoota, 2003). The assertion that a correlation of .40 is meaningless is unfounded, and makes the assumption that the correlation coefficient of .40 is a ceiling that will not be broken with better research methods and better conceptualizations of personality (Funder & Ozer, 1983).

Conceptualizing Personality: The Big Five and its Measures

One such conceptualization of personality is the Five Factor Model (FFM) of personality, also known as the Big Five. The Big Five has been found to be the most replicable of the existing trait structures (Goldberg, 1993). The FFM is a hierarchy, with broad, general traits subsuming facets and specific behaviors (DeYoung, Quilty, &

Peterson, 2007). The Big Five traits of the Five Factor Model are measurable in peer ratings, self-report questionnaires, and expert ratings (McCrae & Costa, 2008), as well as across cultures (McCrae & Allik, 2002). The Big Five traits have been found in children as well as adults (Hampson, Goldberg, Vogt, & Dubanoski, 2006; Markey & Markey, 2002), are stable across time (McCrae & Costa, 1996), and are largely heritable (Caspi, Roberts, & Shiner, 2005). The FFM provides a framework that allows researchers to describe personality as a fundamental part of human nature (McCrae & Costa, 1996; Digman 1990), and make predictions about an individual's behavior (McCrae & Costa, 2008).

The five traits that make up the Big Five are Extraversion, Neuroticism, Conscientiousness, Agreeableness, and Openness (McCrae & Costa, 2008). Those high in Extraversion are talkative and assertive, and are not passive and reserved (Goldberg, 1993). Those high in Neuroticism are anxious and nervous. Those high in Conscientiousness are organized and thorough, and are not careless and unreliable. Those high in Agreeableness are kind and trustworthy, and are not aggressive or selfish. Those high in Openness are curious and creative, and are not afraid of change (Goldberg, 1993).

Although there are many ways of collecting personality data, the preferred method is self-report, as it is the most cost- and time-effective method of data collection. There is a lack of actual behavior being studied in the field of personality psychology, even though the layperson would probably understand psychology as the study of behavior. The term "behavior" is poorly operationalized, with no clear consensus on what constitutes behavioral data (Furr, 2009). A recent meta-analysis was conducted to investigate how often behavior was used as part of a study of personality or social

psychology. A study was considered to include behavior if its dependent or independent variable was a measurable behavior, or if behavior was the means by which the independent variable was manipulated (Baumeister, Vohs, & Funder, 2007). The authors found that in the *Journal of Personality and Social Psychology*, roughly 10 percent of studies published in 2006 included any form of behavior, compared with roughly 80 percent of studies published in 1976. According to Baumeister, Vohs, and Funder (2007), there are four potential reasons for this dramatic change after 1976. First, journals were restructured and there was no section devoted to studies including direct behavioral observation. Second, journals started to require multiple studies for a publication, and that is nearly impossible with the time and money that is required to conduct a study that uses behavioral observation. Third, trends in research such as the "cognitive revolution," which focused on inner processes rather than external outcomes, drove researchers away from behavioral observation. Finally, IRBs became more risk-adverse, and questionnaires are less likely to cause ethical issues than behavioral observation.

Self-report measures certainly have their place, and the data gathered through their use are valuable. Sometimes a self-report measure is the only method of gathering certain types of data, such as when one wants to study people's thoughts and beliefs. Other times, a self-report measure is the only ethical way of collecting data, such as when one wants to study people's sexual habits. However, when researchers excessively restrict their studies to data gathered through self-report, personality psychology is limited in the questions it can address (Baumeister et al., 2007). Personality research can benefit from behavioral observation in that the data obtained may be more reliable, as participants may consciously or unconsciously provide inaccurate data (Gosling, John,

Craik, & Robins, 1998). Whenever possible, the behaviors under study should be observed, rather than being written down by the participant after the fact. Prospective studies are generally preferred to retrospective studies, though they are sometimes implausible (Furr, 2009). People's memories are inherently flawed and potentially biased (Graziano, 2003).

Personality Stability

If the purpose of personality psychology is to characterize, understand, and predict behavior, then the second step in studying personality is establishing whether personality traits are stable, as accurate predictions about behavior across time and contexts would be difficult or impossible. Clinicians, employers, and friends operate on the notion that our personalities are unique, and are at least moderately stable (Kenrick & Funder, 1988). Common sense is not always a reliable guide, so this requires further examination. After all, it is fruitless to try to predict behavior from knowing one's personality if one's personality is always in flux.

There are four different types of stability: rank-ordered stability, absolute stability, structural stability, and ipsative stability (Caspi & Roberts, 2001). Rank-order stability refers to how much of a certain trait or traits a person has relative to his or her peers. Absolute stability refers to the average levels of traits measured in the same population over time, or among two or more populations at a single time point. Structural stability refers to the relationship of the personality traits to each other; for example, a person who is higher in Extraversion than Agreeableness will generally not become higher in Agreeableness than Extraversion. Ipsative stability refers to the degree with

which an individual changes in his or her traits. Ipsative stability can almost be conceptualized as a sixth trait, in a way, because it is a measure of how volatile a person's traits are (Caspi & Roberts, 2001).

Of the four types of stability, rank-order stability is the most frequently studied. There are six rules that govern rank-ordered stability (Caspi, Roberts, & Shiner, 2005). The first rule is that test-retest correlations are relatively high regardless of age or life stage. Though personality changes occur throughout the lifespan, the changes are not dramatic and are spread over the course of years. Second, rank-order stability increases with age, dramatically increasing after age 30 and plateauing between ages 50-70. There is a moderate amount of change during childhood and the young adult years, but is considerably slowed after age 30. Those 50 or older show little to no change in personality. Third, rank-order stability decreases as the time between data points becomes larger. Because personality change happens slowly over time, the more time that passes, the more personality changes should be evident. Fourth, rank-order stability is the same for all Big Five traits. Structural stability, or the rank-ordering of personality traits within a person, should not change. Fifth, rank-order stability is not dependent upon the method of measurement. Similar results, in terms of stability, should be found with self-report, peer-report, clinical judgment, and observer judgment methods (Nave, Sherman, & Funder, 2008). Sixth, rank-order stability is unaffected by one's gender (Ferguson, 2010).

These rules are by no means universally accepted. Hampson and Goldberg (2006) found in their analysis of the Hawaii Personality and Health cohort that Big Five traits do vary in their patterns of stability. For example, Neuroticism, Openness, and Conscientiousness were more stable over a four-year span than a three-year span.

Hampson and Goldberg (2006) also found that Extraversion and Conscientiousness were the most stable traits, followed by Openness which was moderately stable, followed by Neuroticism and Agreeableness, which were not at all stable during the length of the study. Hampson and Goldberg (2006) also suggest that the fifth rule might be violated by further study. They hypothesize that if the same method of measurement is used at all data points, we may be able to see the stability of Neuroticism and Agreeableness increase.

Stability has been shown to be evident from a very young age. Childhood temperaments measured at age 3 seem to be reflected in the personalities of those same children 18 years later (Caspi, 2000). Those children who were judged to be undercontrolled were far more likely to be depressed and abuse alcohol at age 21, and those children who were judged to be inhibited never experienced a manic episode. Stability has even been shown in young people who are going through college (Robins et al., 2001). The young adult years may be seen as formational in popular culture, and though students experience normative change over their four years at college, their rank-order stability remains remarkably high. The distribution of personality profiles does not change (Robins et al., 2001).

Though the current study does not directly address personality stability, it is dependent upon the assumption that personality is relatively stable. Because the cognitive test being observed was administered two to ten years after the Big Five traits were assessed, it would be difficult to find meaningful relationships between personality and behavior without personality being reasonably stable. However, there is good reason to think this is not the case. For example, prior research has shown that personality

measured in childhood and young adulthood has implications for school and job success. Digman (1989) found that student Conscientiousness measured by elementary school teachers correlated .70 with student GPAs measured in High School. Career success is predicted by childhood personality, both in terms of pay and satisfaction (Judge, Higgins, Thoresen, & Barrick, 1999). In the same study, it was found that personality measured in adulthood was slightly better at predicting job success.

Stability would not be important if there were not behavioral or health outcomes of some consequence. Conscientiousness has been found to predict longevity (Hill, Turiano, Hurd, Mroczek, & Roberts, 2011; Hampson & Goldberg, 2006). Statistically, individuals who are low in Conscientiousness are 1.2 times more likely to die from all causes, which is equivalent to having high cholesterol or high blood pressure (Friedman et al., 1993). High Conscientiousness also predicts cognitive functioning later in life, and is inversely related to dementia (Hill et al. 2011). Those higher in Agreeableness, Extraversion, and Conscientiousness are better liked, and therefore have higher quality social-support structures, which are related to longevity (Wortman & Wood, 2011).

A Cognitive Abilities Test as a Strong (and Stressful) Situation

The participants under study were video recorded taking a verbally-administered cognitive test, which could be considered a “strong” situation because it does not allow for a broad range of behavioral expression. A strong situation is one in which behavior is largely constrained, which may limit the salience of traits associated with those behaviors (Mischel, 1977; Price & Bouffard, 1974; Tett & Guterman, 2000). During the cognitive abilities test given to participants, interviewers follow a set script and participants are

expected to give an answer. For example, there is very little opportunity to express behaviors related to aggression or sensation-seeking. Participants also reported their anxiety in taking the test, which is consistent with people experiencing physiological and psychological stress in potentially socially-evaluative situations (Chen & Drummond, 2008; Dickerson & Kemeny, 2004). This anxiety is also consistent with Self-Determination Theory, which suggests that people should feel more like themselves in situations where they have a wide range of behavioral expression (Sherman, Nave, & Funder, 2010; Ryan & Deci, 2000). Self-Determination Theory states that situations that allow for autonomy, demonstration of competence, and feelings of relatedness are the most comfortable and allow people to feel more like their true selves. An orally-administered cognitive test would most likely limit all three aspects, preventing people from acting as their true selves. Autonomy is limited because the participant must answer the questions to the best of his or her ability, and there is not much room for deviation from the testing protocol. Demonstration of competence might be salient for some participants, but those participants who are uncomfortable with tests, interpersonal evaluation, or public speaking would most likely feel anxiety during the test. Finally, feelings of relatedness are most likely to be severely limited, due to the fact that the interviewers were given strict instructions to minimize small talk and to allow participants to work at their own pace.

Personality Mechanisms

The relationship between personality traits and real-world outcomes is well established (Ozer & Benet-Martínez 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007); however, the mechanisms by which personality traits exert their influence on real-

world outcomes is not well understood (Hampson, 2012). Learning how personality traits are related to these real-world outcomes can lead to a better understanding of the processes underlying these relationships, and help us identify the nature of these relationships. Identifying potential mediators of these relationships can help us, for example, in targeting physical and mental health improvements. Those who are low in Conscientiousness are 1.2 times more likely to die from all causes, which is equivalent to having high cholesterol or high blood pressure (Friedman et al., 1993). Though Conscientiousness is related to longevity, behaviors associated with Conscientiousness may also be responsible for this association. Individuals who are high in Conscientiousness are more likely to eat healthy and exercise, and less likely to have unprotected sex, take illicit drugs, and smoke (Bogg & Roberts, 2004).

The Current Study

The current study analyzes a personality questionnaire filled out by participants and a videotaped, orally administered cognitive test given between two to ten years later. The current study is unique in three ways. First, the study is multi-method and includes direct behavioral observation. Direct behavioral observation is often neglected in the field of psychology (Baumeister et al., 2007; Nave, Sherman, & Funder, 2008; Furr, 2009). Though many studies employ self-report measures, or consist of eye movements, button presses, and tally marks, the current study involves direct behavioral observation and self-rated personality measured years prior. Second, the current study is one of the first to look at diverse behaviors during a cognitive test. Most studies that include behavioral observation use a semi-structured or unstructured interview setting. A heavily controlled situation, such as a cognitive test, would most likely be considered a “strong” situation,

one which would limit congruence between a person's behavior and his personality (Sherman, Nave, & Funder, 2010). Third, the sample to be used in the study is heterogeneous in socioeconomic status, profession, and intelligence, and is made up of a non-college, understudied population.

Aims and Hypotheses

This study seeks to add to the growing body of literature which suggests that personality is stable across time and contexts, and that knowing one's personality can allow us to predict later behaviors. Based on the Five Factor Model (Goldberg, 1993; McCrae & Costa, 1996), it is expected that personality measured by the Big Five Inventory will have meaningful relationships with behavior measured by the Riverside Behavioral Q-sort (RBQ; Funder, Furr, & Colvin, 2000). The relationship between Big Five traits and performance on the cognitive test also were examined. Considering previous research, it is predicted that the trait of Conscientiousness will have a meaningful relationship with performance on the cognitive test.

Hypothesis 1 is that each Big Five trait should be associated with distinct behaviors of the RBQ. Hypothesis 1a is that adults who scored high on Extraversion will seem to exhibit social skills, initiate humor, and not be reserved or unexpressive. Hypothesis 1b is that adults who scored high on Agreeableness will seem to be interested in what others have to say, make or approach physical contact with others, and not keep others at a distance. Hypothesis 1c is that adults who scored high on Conscientiousness will seem to speak fluently and express ideas well, and show interest in intellectual and cognitive matters. Hypothesis 1d is that adults who scored high on Neuroticism will seem

to show physical signs of tension or anxiety, express self-pity or feelings of victimization, and not behave in a cheerful manner. Hypothesis 1e is that adults who scored high on Openness will seem to enjoy the situation, not behave in a fearful or timid manner, and not give up when faced with obstacles.

Hypothesis 2 is that the Big Five trait of Conscientiousness will positively correlate with performance on the cognitive test. According to existing research, the Big Five trait of Conscientiousness should have the strongest association with extrinsic performance (Barrick & Mount, 1993). Previous research has not found a link between Conscientiousness and IQ, but has found a link between Conscientiousness and achievement (Digman, 1989). Conscientiousness correlates strongly (r = .70) with high school GPA, even when IQ is controlled for. Conscientiousness measured in childhood predicts both extrinsic and intrinsic job success, and accounts for some of the variance in job selection (Judge, Higgins, Thoresen, & Barrick, 1999). Finally, Conscientiousness rated by peers significantly predicts both college freshman and senior GPA (Wagerman & Funder, 2007). To test whether certain behaviors are responsible for the relationship between Conscientiousness and performance, we will also look to see if there is a mediating relationship between specific behaviors and performance on the cognitive test.

Hypothesis 3 is exploratory in nature, and will examine how behaviors mediate the relationship between personality and performance. Because a trait is a pattern of behavior (Funder, 1991), it logically follows that if a personality trait is significantly related to performance, then certain behaviors associated with that trait will also be significantly related to performance. This hypothesis seeks to fill a gap in the literature examining the mechanisms by which personality traits exert their influence on real-world

outcomes (Hampson, 2008; Hampson, Goldberg, Vogt, & Dubanowski, 2007). This hypothesis was tested by using multiple regression to obtain direct effects, and bootstrapping to obtain the indirect effect of each behavior on performance and confidence intervals.

Methods

Participants

The study's participants come from the Hawaii Personality and Health cohort. The 2,572 participants were gathered from Hawaiian elementary schools by John Digman between the years of 1959 and 1967 (Goldberg, 2001). Digman (1963) had originally sought these children with the intent of performing a factor analysis with personality data collected to discover a taxonomy of traits. Digman had no intention of pursuing a longitudinal study involving these children, so tracking the former students down was a challenge. Hampson et al. (2001) searched for the cohort using several methods, the most successful of which were contacting High School reunion committees, searching public records, and using an online service called switchboard.com, a precursor to social network websites. Seventy-five percent of the original cohort was located, and 60 percent of the total sample participated in at least one later wave of data collection (Hampson et al., 2001).

Due to missing data either on the personality questionnaire or the cognitive test, 195 participants (102 female) will be used for the personality-behavior portion of the study, and 157 of those participants will be used for the personality-performance and behavioral mediation portions of the study. The ethnic makeup of the sample is: 31%

Japanese American, 20% European ancestry, 18% southeast Asian, 16% native Hawaiian, 9% Chinese, and 6% other or no response.

Procedure

Participants were mailed the Big Five Inventory (BFI) in 1998, along with other questionnaires and measures, with a welcome letter, instructions, and a prepaid return envelope to mail the packet back to the researchers. About 60 percent of the sample filled out the BFI and returned it (Hampson et al., 2001). The results were recorded and scored by Hampson and Goldberg as part of the Hawaii Personality and Health cohort project.

Participants were verbally administered the Woodcock-Johnson III Tests of Cognitive Abilities: BIA (Brief Intellectual Ability; Woodcock, Mather, McGrew, & Schrank, 2001). The video-recorded cognitive tests were each viewed by undergraduate research assistants, out of a pool of nine undergraduates. The research assistants were familiarized with the RBQ items, as well as the Q-sorter program, but were not given any specific instructions about how to code, and coding was not trained to a standard. The research assistants watched the cognitive tests from start to finish, with specific instructions to skip introductions at the beginning of the test given between the interviewer and the participant, and to stop the video immediately when the test ends. This is to avoid any conversation that may take place before or after the cognitive test, making sure that the behaviors observed by the coders only occur during the test's administration.

After watching a video, coders rated the participant's behavior using the Riverside Behavioral Q-sort Version 3.11 (RBQ; Funder, Furr, & Colvin, 2000). The 68 items of

the RBQ are each distinct behaviors, and the RBQ program forces the coders to arrange the behaviors in a quasi-normal distribution from 1 to 9. Inter-rater reliabilities were run as a quality control, and when the inter-rater reliability was low (intraclass correlation < .35), the coder who had the least agreement with the other three coders was be asked to repeat the entire process over for the video. The average inter-rater reliability, as calculated by intraclass correlation, was .50 (SD = .12). An aggregate score was then compiled for each RBQ item for each participant, and this score was used in running correlations with the personality questionnaire.

Measures

The Big Five Inventory (BFI; John, Donahue, & Kentle, 1991) is a 44-item self-report measure of personality (Appendix 1). The BFI was developed due to the need for a short personality inventory which accurately accounted for all Big Five traits (John, Naumann, & Soto, 2008). The response rates achieved are likely to be as high as possible because of the succinct nature of the BFI, which minimizes participant fatigue and resistance. The BFI asks participants to rate themselves on 44 statements which start with "I am someone who…" on a five-point Likert scale (1 = Disagree Strongly; 5 = Agree Strongly). Some sample items include "Can be somewhat careless," "Can be moody," and "Is sophisticated in art, music, and literature" (John et al., 1991). Scores are then reverse-coded for the appropriate items (as described in John, Donahue, & Kentle, 1991), and the items that are associated with Extraversion ($\alpha = .84$), Agreeableness ($\alpha = .81$), Conscientiousness ($\alpha = .77$), Neuroticism ($\alpha = .82$), and Openness ($\alpha = .81$) are added to obtain a composite score for each Big Five trait.

The Woodcock-Johnson III Tests of Cognitive Abilities: BIA (Brief Intellectual Ability; Woodcock, Mather, McGrew, & Schrank, 2001) is an abbreviated version of the Woodcock-Johnson III Tests of Cognitive Abilities (). The purpose of the full test is to assess individuals for potential learning problems. The Brief Intellectual Ability test contains three sections. The first is "verbal comprehension" ($\alpha = .92$), which includes picture identification, synonyms, antonyms, and analogies. A sample question from this section is "Refrigerator is to zoo as food is to…" The second section is "concept formation" ($\alpha = .96$), which entails questions that ask participants to identify the difference between two shapes; this section measures critical thinking skills. The third and final section is "visual matching" ($\alpha = .92$), which asks participants to find and circle matching numbers in a string of numbers. This is the only timed portion of the test, and is used to measure mental quickness.

The Riverside Behavioral Q-sort (RBQ; Funder et al., 2000) consists of 68 items and allows coders to rate a wide range of behaviors in one-on-one interactions (Appendix 2). Some sample items are "interviews others," "laughs frequently," "exhibits an awkward interpersonal style," and "tries to undermine, sabotage or obstruct." RBQ items are rated by each coder one at a time using a Q-sort computer program. The coder "drags" each behavior to the appropriate column. A score of 1 represents a behavior that is least characteristic of the participant just observed, and a score of 9 represents a behavior that is most characteristic of the participant just observed (Nave et al., 2010). The Q-sort program forces a coder's choices into a quasi-normal distribution. The average reliability, as measured by intra-class correlations, was .50 (SD = .12).

Results

Hypothesis 1: Personality and Behavior

There were 340 correlations run, one for each of the Big Five traits and each RBQ behavior (5 x 68). Among those 340 correlations, 59 were found to be significant at the $p < .05$ level. A randomization procedure was performed to ensure that we are not capitalizing on chance (Sherman & Funder, 2009). According to the randomization procedure, we would expect approximately 17 significant correlations by chance. The actual *p*-value for obtaining 59 significant correlations is less than .001. Of the five Big Five traits, Extraversion, Conscientiousness, and Openness were found to have more significant correlates than would be expected by chance. The most salient traits during the cognitive abilities test were Extraversion and Openness, with 21 and 19 significant behavioral correlates, respectively. Conscientiousness followed these two traits with 10 significant correlates. The correlation tables for Agreeableness (2 significant correlates; $p = .7054$) and Neuroticism (6 significant correlates; $p = .1824$) were not included because there were less significant correlates than would be expected by chance.

Table 1 displays the significant RBQ correlates of Extraversion (22 significant correlates; $p = .0012$). Those who rated themselves as high in Extraversion on the BFI were seen as having high enthusiasm and energy level, to be talkative, and as exhibiting social skills. Those high in Extraversion were not seen as detached from the situation, behaving in a fearful or timid manner, or reserved or unexpressive. These behaviors are consistent with our hypothesis, and match what one would think is representative of extraverted people.

Table 2 displays the significant RBQ correlates of Conscientiousness (10 significant correlates; $p = .0504$). Those who rated themselves as high in Conscientiousness on the BFI were seen as speaking fluently and expressing ideas well, expressing warmth, appearing relaxed and comfortable, and showing interest in intellectual and cognitive matters. Those high in Conscientiousness were not seen as exhibiting an awkward interpersonal style, engaging in physical activity, or talking at others. Some behaviors that significantly correlated with Conscientiousness are consistent with our hypothesis (e.g., speaking fluently and expressing ideas well), but others were not (e.g., expresses warmth). Participants high in Conscientiousness may be perceived as not awkward because they are more comfortable in the situation, rather than someone who may perform more poorly on the cognitive test. Though some of these behaviors are typically associated with Neuroticism, an inverse relationship between Conscientiousness and Neuroticism was not found.

Table 3 displays the significant RBQ correlates of Openness (19 significant correlates; $p = .0039$). Those who rated themselves as high in Openness on the BFI were seen as showing interest in intellectual and cognitive matters, exhibiting a high degree of intelligence, and enjoying the situation. Those high in Openness were not seen as giving up when faced with obstacles, saying negative things about him/herself, or having others seek advice from the participant. These behaviors are consistent with our hypothesis, and match what one would think is representative of open people.

Vector correlations were calculated among the traits, genders, and interviewers to examine how much these factors co-varied. Vector correlations are correlations of correlations, and examine how much one set of correlations (e.g., personality and

performance) correlates with another set of correlations (e.g., female personality and performance). All of the Big Five vector correlations fell below .65, indicating a reasonable level of independence for each trait. Gender vector correlations were very strong for Openness ($r = .71$, $p < .01$) and Extraversion ($r = .62$, $p < .01$), and moderate for Neuroticism ($r = .31$, $p < .05$) and Conscientiousness ($r = .25$, $p < .05$). Agreeableness displayed a strong negative vector correlation ($r = -.49$, $p < .01$). RBQ correlates of the Big Five traits were then further analyzed by gender to identify significant differences using Fischer's *r* to *z* transformation. Differences were calculated using *z*-tests, comparing females against males (positive *z* = females higher than males). No significant differences were found between the genders for Extraversion or Openness, consistent with previous research on this cohort (Hampson, 2006; Nave et al., 2010). Very few differences were found for Conscientiousness and Neuroticism. Females who rated themselves as high in Conscientiousness were seen as not saying anything interesting, though males were seen as saying something interesting ($z = -3.47$, $p = .0005$). Females high in Conscientiousness also did not have a significant correlation coefficient for the item "expresses criticism", though males were perceived as not expressing criticism ($z = 2.06$, $p = .0394$). Females who rated themselves as high in Neuroticism were not seen as likable, though this item was not significant for males ($z = -2.44$, $p = .0147$).

Given that the situation could potentially be seen as stressful, it is surprising that so few behavioral correlates of Neuroticism were found. Six significant correlations were observed, though randomization procedures tell us that about 3.5 significant correlations would be found by chance alone ($p = .1824$). An interesting pattern of behavior was also seen for Agreeableness. Table 4 shows the gender differences in behavioral correlates of

Agreeableness. Though only two correlations were significant for the trait ($p = .7045$), there were many correlations that were significant for either females or males. Males high in Agreeableness were perceived as insecure, humble, not competitive, and in pain. Females were almost the polar opposite, and were perceived as friendly, confident, ambitious, and less feminine.

Interviewer vector correlations were also calculated to ensure that the interviewer was not a confounding variable. Interviewer vector correlations were strong for Extraversion ($r = .42$, $p < .01$) and Openness ($r = .38$, $p < .05$), moderate for Conscientiousness ($r = .30$, $p < .05$) and Neuroticism ($r = .27$, $p < .05$), and non-significant for Agreeableness ($p = .294$). There were few significant differences between the two groups' correlation coefficients, though there was at least one for each Big Five trait. Differences were calculated using *z*-tests, comparing Interviewer 2 against Interviewer 5 (positive z = Interviewer 2 higher than Interviewer 5). Those participants who rated themselves as high in Extraversion, for example, were seen as having high enthusiasm and energy level with Interviewer 2, but not with Interviewer 5 ($z = 2.78$, $p < .01$). Those participants who rated themselves as high in Agreeableness were seen as laughing frequently with Interviewer 2, but not with Interviewer 5 ($z = 3.09$, $p < .01$). Those participants who rated themselves as high in Conscientiousness were seen as concentrating on and working hard at the task with Interviewer 5, but not with Interviewer 2. Those participants who rated themselves as high in Neuroticism were seen as speaking sarcastically with Interviewer 5, but not with Interviewer 2. Those participants who rated themselves as high in Openness were seen as trying to control the situation with Interviewer 2, but not with Interviewer 5.

Hypothesis 2: Personality and Performance

Performance on the Woodcock-Johnson was measured by adding up the total correct answers in the three sections of the cognitive abilities test (Verbal Comprehension, Concept Formation, and Visual Matching; Table 5). Conscientiousness was significantly correlated with performance in Verbal Comprehension, Concept Formation, and Visual Matching. Openness was significantly correlated with Verbal Comprehension and Concept Formation. Openness was not significantly related to Visual Matching. No other Big Five traits were significantly correlated with performance on any of the sections of the Woodcock-Johnson.

Hypothesis 3: Behaviors Mediating Personality-Performance Link

In order to examine mediating relationships among BFI personality, RBQ behaviors, and performance on each of the three sections of the cognitive test (BIA), mediated regression analyses were run individually for each behavior. Bootstrapping was then used to get the indirect effects and 95% confidence intervals, using an SPSS macro described in Preacher and Hayes (2004). Each behavior related to Conscientiousness and Openness was assessed for correlations with each section of the BIA individually.

Conscientiousness and the BIA (Table 6). There were significant mediating relationships for Conscientiousness on each of the three sections of the BIA, and several behaviors that consistently mediated the relationship between Conscientiousness and the BIA. “Speaks fluently; expresses ideas well” fully mediated the relationship between Conscientiousness and Verbal Comprehension, and Conscientiousness and Concept formation, and partially mediated the relationship between Conscientiousness and Visual

Matching. “Speaks fluently; expresses ideas well” also had the highest indirect effect on all three sections of the BIA. The behaviors that showed mediation on two sections of the BIA are appearing to be relaxed and comfortable, not exhibiting an awkward interpersonal style, expressing warmth, and showing interest in intellectual and cognitive matters. “Shows interest in intellectual and cognitive matters” fully mediated the relationship between Conscientiousness and Verbal Comprehension, and Conscientiousness and Concept Formation. The other listed behaviors exhibited partial mediation for two sections of the BIA. One behavior, exhibiting a high degree of intelligence, also fully mediated the relationship between Conscientiousness and Verbal Comprehension.

Openness and the BIA (Table 7). There were significant mediating relationships for Openness on two of the sections of the BIA (Verbal Comprehension and Concept Formation). Several behaviors that consistently mediated the relationship between Openness and the BIA were: exhibiting a high degree of intelligence, showing interest in intellectual and cognitive matters, not giving up when faced with obstacles, and speaking fluently and expressing ideas well. These behaviors partially mediated the relationship between Openness and Verbal Comprehension, and partially mediated the relationship between Openness and Concept Formation. Exhibiting an awkward interpersonal style partially mediated the relationship between Openness and Verbal Comprehension, and Openness and Concept Formation. Seeming to enjoy the situation and showing a wide range of interests partially mediated the relationship between Openness and Verbal Comprehension, but had no association with Concept Formation.

Discussion

Hypothesis 1: Personality and Behavior

Hypothesis 1 was that each Big Five trait should be associated with distinct behaviors of the RBQ. Hypothesis 1 was supported for Extraversion, Conscientiousness, and Openness, but not for Neuroticism or Agreeableness. Those high in Extraversion followed the predicted set of behaviors. Participants who had high self-rated Extraversion were perceived as having a great deal of energy, being talkative and social, engaged in the situation, and as not being awkward. They also showed signs of social dominance; although those high in Extraversion showed a clear pattern of social engagement, they were perceived not as agreeable, sympathetic, reserved, or fearful, but as loud, expressive in voice and gestures, and physically animated. They also were perceived as not being able to focus on the task at hand.

Participants who had high self-rated Conscientiousness followed some predicted behaviors, such as speaking fluently, showing interest in intellectual matters, and exhibiting a high degree of intelligence, but also displayed behaviors that were not predicted. Those high in Conscientiousness appeared to be relaxed and comfortable, to not exhibit an awkward interpersonal style, and to not show physical signs of tension or anxiety. These behaviors might be related to these participants' comfort with being evaluated, as those high in Conscientiousness have higher self-esteem and self-efficacy (Judge et al., 2003). This trend is also suggested by Self-Determination Theory, as it would allow a participant who is high in self-efficacy to display competence (Sherman, Nave, & Funder, 2010; Ryan & Deci, 2000). Some observed behaviors, however, were

not consistent with Conscientiousness. Those high in Conscientiousness were also seen as expressing warmth, not talking at others, and not speaking sarcastically. These behaviors are typically associated with Agreeableness (Ames & Bianchi, 2008), but were not statistically significantly related to Agreeableness in the current study.

Openness also followed the predicted set of behaviors. Those who rated themselves as high in Openness were perceived as displaying a wide range of interests, playful, curious, and not negative or insecure. Openness was the only personality trait that was significantly related to not giving up when faced with obstacles, even though we expected that item to be associated with Conscientiousness. Those high in Openness were also seen as exhibiting a high degree of intelligence, speaking fluently, and showing interest in intellectual and cognitive matters, which is consistent with some conceptualizations of Openness as Intellect (e.g., Goldberg, 1990).

Agreeableness did not follow a predicted pattern of behaviors, and displayed a negative vector correlation between the genders. Other studies using the Hawaii Personality and Health Cohort have not found similar results, and there are two potential explanations for this. First, both interviewers were female, and it may be that men and women act differently around women. For example, women become more talkative in situations where women are in the majority (Myaskovsky, Unikel, & Dew, 2005). Second, men may act differently in evaluative situations than women. For example, previous research shows that in evaluative situations consisting of groups with mixed genders, men become more task oriented (Myaskovsky, Unikel, & Dew, 2005). However, the men in our sample did not behave in this way. Men who were high in Agreeableness were perceived as insecure, downplaying accomplishments, and not competitive. Third,

the use of a strong situation may change behavioral expression, and past studies using this cohort have not looked at such situations. Further studies should examine this behavioral pattern for Agreeableness, perhaps in the next wave of data collection for the Hawaii study. Interviewer differences were also found, and they may exist because of the personalities of the interviewers, or how people acted differently with each interviewer.

Hypothesis 2: Personality and Performance

Hypothesis 2 was that Conscientiousness would be significantly related to performance on the cognitive test. Exploratory analyses were also conducted to examine the influence of other Big Five traits on performance. In accord with our prediction, Conscientiousness was significantly related to all three sections of the cognitive test: Verbal Comprehension, Concept Formation and Visual Matching. This is consistent with previous literature that finds that, even when controlling for intelligence, Conscientiousness predicts performance in diverse contexts (Digman, 1989), and is consistent with the wealth of literature that exists on the Conscientiousness-performance link (Barrick & Mount, 1993; Judge, Higgins, Thoresen, & Barrick, 1999; Wagerman & Funder, 2007). Exploratory analyses revealed that Openness was related to both the Verbal Comprehension and Concept Formation portions of the cognitive test. Openness has not been found to be predictive of performance, but has been shown to have the highest correlation with IQ of all of the Big Five traits (Holland, Dollinger, Holland, & MacDonald, 1995). This may be due to the fact that Openness also has the highest correlation with years of education than any other Big Five trait.

Hypothesis 3: Behaviors Mediating Personality-Performance Link

Several behaviors were shown to mediate the relationship between the personality traits and performance on the cognitive test. The Visual Matching section of the cognitive test had the fewest relevant mediating behaviors and was only moderately associated with Conscientiousness, which can be explained by the nature of the section: it measures mental quickness, rather than mental acuity, as it is the only timed portion of the test. Simply because a person does not produce an answer quickly does not mean that he or she cannot produce any answer. The other two portions of the cognitive test - Verbal Comprehension and Concept Formation - showed very similar patterns of mediating behaviors. There were three behaviors that mediated the relationships between Conscientiousness and Openness, and the two relevant sections of the tests: not exhibiting an awkward interpersonal style, showing interest in intellectual and cognitive matters, and speaking fluently and expressing ideas well. Not exhibiting an awkward interpersonal style may be related to performance because those who are more confident in evaluative situations may feel less self-conscious. There were several more behaviors that accounted for at least two of the four relationships, including exhibiting a high degree of intelligence, appearing to be relaxed and comfortable, and not giving up when faced with obstacles. Finding these consistent mediating behaviors suggests that the associations are not random, and that the findings are robust and generalizable to multiple forms of intelligence. Behaviors elicited by the person-situation interaction are not simply an "if-then" proposition (e.g., Andersen & Thorpe, 2009). A future study could examine the difference in behaviors between the two situations used in this study - the semi-structured interview and the cognitive test - and further evaluate whether the relationship

between behavior and performance is contextually-dependent, or if these behaviors show a similar pattern across contexts.

This study had three aims: to examine the relationship between personality and behaviors using direct observation, show the relationship between personality traits and performance on a cognitive test, and examine any mediating behaviors in the personality-performance link. The results of this study add to the existing literature showing a link between personality and real-world outcomes (Barrick & Mount, 1993), and addresses a gap in the literature examining the mechanisms by which personality influences this link (Hampson, 2008; Hampson, Goldberg, Vogt, & Dubanowski, 2007). The current study is unique in that it uses an understudied, ethnically diverse sample and measures directly observed behavior in a strong, autonomy-limiting situation. Even though this strong situation greatly restricted behavior, there were enough behavioral cues available to the coders for them to make accurate judgments about participants' personalities. The study was also strengthened by the use of direct behavioral observation, and its congruence with self-reported personality.

There are several limitations of the current study. First, though our sample consists of an understudied population, it is largely Asian-American and Native Hawaiian, and may not be representative of the U.S. population. This could limit the generalizability of our results. Second, two interviewers administered the cognitive test rather than one, and this became a confounding variable. Interviewer 2 was noted as dry by the coders, and strictly followed the protocol. As a result, the cognitive tests she administered were almost twice as long as the tests administered by Interviewer 5. Interviewer 2 allowed the participants as much time as they needed on each question, and

only moved on to the next question when participants gave a response or asked to move on. Interviewer 5 frequently gave feedback on the test, encouraging frustrated participants to continue with the test and frequently reminding them that they could move on to the next question and come back to the current item if they were stuck. Interviewer 5 was also warm with the participants and made more small talk, whereas Interviewer 2 simply read the instructions and test questions. Third, the cognitive tests were administered at the end of a full-day visit to the Kaiser Permanente hospital, during which lengthy questionnaires were administered, personal details were collected, blood was drawn, and an interview was conducted. Some participants also had to travel from the continental U.S. or the other Hawaiian islands, and were most likely tired and ready to leave the hospital. Finally, personality was measured between two and ten years before the cognitive test was administered, and the situation constrained behavioral expression. Moderate personality change over time and constrained behavior may have limited the associations observed between personality and behavior, and personality and performance.

This study does not replicate past research findings of links between broad traits and cognitive performance, but rather looks for the behaviors responsible for these relationships. A good portion of the behaviors assessed were associated with Openness and Conscientiousness and mediated the relationship with performance. These data suggest that if we can teach others to practice these behaviors, they may be able to increase their performance during tests, work, or school. Some behaviors would not be practical, or possible, to change, but others we may be able to target and improve. For instance, it could not be expected for someone to increase in exhibiting a high degree of

intelligence, but we could encourage people to show interest in intellectual and cognitive matters and to not give up when faced with obstacles. Educational institutions could benefit from this information in informing both assessments of academic difficulties and interventions. The data from this study suggest that educational institutions should focus more on getting students engaged with and excited about course material, rather than focusing on test scores alone. The fact that a good number of these mediating behaviors exist for both traits, and for the two primary sections of the BIA, is further evidence for specific behaviors' roles in determining real-world outcomes.

Appendices

Appendix 1: Big Five Inventory (BFI; John, Donahue, & Kentle, 1991)

How I am in general

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which **you agree or disagree with that statement.**

1 Disagree Strongly	**2** Disagree a little	**3** Neither agree nor disagree	**4** Agree a little	**5** Agree strongly

I am someone who…

1. _____ Is talkative
2. _____ Tends to find fault with others
3. _____ Does a thorough job
4. _____ Is depressed, blue
5. _____ Is original, comes up with new ideas
6. _____ Is reserved
7. _____ Is helpful and unselfish with others
8. _____ Can be somewhat careless
9. _____ Is relaxed, handles stress well.
10. _____ Is curious about many different things
11. _____ Is full of energy
12. _____ Starts quarrels with others
13. _____ Is a reliable worker
14. _____ Can be tense
15. _____ Is ingenious, a deep thinker

16. _____ Generates a lot of enthusiasm
17. _____ Has a forgiving nature
18. _____ Tends to be disorganized
19. _____ Worries a lot
20. _____ Has an active imagination
21. _____ Tends to be quiet
22. _____ Is generally trusting
23. _____ Tends to be lazy
24. _____ Is emotionally stable, not easily upset
25. _____ Is inventive
26. _____ Has an assertive personality
27. _____ Can be cold and aloof
28. _____ Perseveres until the task is finished
29. _____ Can be moody
30. _____ Values artistic, aesthetic experiences
31. _____ Is sometimes shy, inhibited
32. _____ Is considerate and kind to almost everyone
33. _____ Does things efficiently
34. _____ Remains calm in tense situations
35. _____ Prefers work that is routine
36. _____ Is outgoing, sociable
37. _____ Is sometimes rude to others
38. _____ Makes plans and follows through with them
39. _____ Gets nervous easily
40. _____ Likes to reflect, play with ideas
41. _____ Has few artistic interests

42. _____ Likes to cooperate with others

43. _____ Is easily distracted

44. _____ Is sophisticated in art, music, or literature

Appendix 2: Riverside Behavioral Q-Sort (RBQ) Items (Funder, Furr, & Colvin, 2000)

1. Interviews others (if present). (e.g., asks a series of questions)
2. Volunteers a large amount of information about self.
3. Seems interested in what someone had to say.
4. Tries to control the situation. (Disregard whether attempts at control succeed or not.)
5. Dominates the situation. (Disregard intention, e.g., if P dominates the situation by default because other(s) present does very little, this item should receive high placement.)
6. Appears to be relaxed and comfortable.
7. Exhibits social skills. (e.g., makes other(s) comfortable, keeps conversation moving, entertains or charms other(s))
8. Is reserved and unexpressive. (e.g., expresses little affect; acts in a stiff, formal manner)
9. Laughs frequently. (Disregard whether laughter appears to be nervous or genuine.)
10. Smiles frequently.
11. Is physically animated; moves around.
12. Seems to like other(s) present. (e.g., would probably like to be friends with them)
13. Exhibits an awkward interpersonal style. (e.g., seems to have difficulty knowing what to say, mumbles, fails to respond to conversational advances)
14. Compares self to other(s). (whether others are present or not)
15. Shows high enthusiasm and a high energy level.
16. Shows a wide range of interests. (e.g., talks about many topics)
17. Talks at rather than with other(s). (e.g., conducts a monologue, ignores what other(s) says)
18. Expresses agreement frequently. (High placement = agreement is expressed unusually often, e.g., in response to each and every statement partner(s) makes. Low placement = unusual lack of expression of agreement.)
19. Expresses criticism. (of anybody or anything) (Low placement = expresses praise.)
20. Is talkative. (as observed in this situation)
21. Expresses insecurity. (e.g., seems touchy or overly sensitive)
22. Show physical signs of tension or anxiety. (e.g., fidgets nervously, voice wavers) (Middle placement = lack of signs of anxiety. Low placement = lack of signs under circumstances where you would expect them.)
23. Exhibits a high degree of intelligence (Give this item high placement only if P actually says or does something of high intelligence. Low placement = exhibition of low intelligence. Medium placement = no information one way or another.)
24. Expresses sympathy. (to anyone, i.e., including conversational references) (Low placement = unusual lack of sympathy.)
25. Initiates humor.
26. Seeks reassurance. (e.g., asks for agreement, fishes for praise)
27. Exhibits condescending behavior. (e.g., acts as if self is superior to other(s) [present, or otherwise]) (Low placement = acting inferior.)
28. Seems likable. (to other(s) present)
29. Seeks advice.
30. Appears to regard self as physically attractive.
31. Acts irritated.

32. Expresses warmth. (to anyone, e.g., including affectionate references to close friends, etc.)
33. Tries to undermine, sabotage or obstruct.
34. Expresses hostility. (no matter toward whom or what)
35. Is unusual or unconventional in appearance.
36. Behaves in a fearful or timid manner.
37. Is expressive in face, voice or gestures.
38. Expresses interest in fantasy or daydreams. (Low placement only if such interest is explicitly disavowed.)
39. Expresses guilt. (about anything)
40. Keeps other(s) at a distance; avoids development of any sort of interpersonal relationship. (Low placement = behavior to get close to other(s).)
41. Shows interest in intellectual or cognitive matters. (discusses an intellectual idea in detail or with enthusiasm)
42. Seems to enjoy the situation.
43. Says or does something interesting.
44. Says negative things about self. (e.g., is self-critical; expresses feelings of inadequacy)
45. Displays ambition. (e.g., passionate discussion of career plans, course grades, opportunities to make money)
46. Blames others. (for anything)
47. Expresses self-pity or feelings of victimization.
48. Expresses sexual interest. (e.g., acts attracted to someone present; expresses interest in dating or sexual matters in general)
49. Behaves in a cheerful manner.
50. Gives up when faced with obstacles. (Low placement implies unusual persistence.)
51. Behaves in a stereotypically masculine style or manner.
52. Offers advice.
53. Speaks fluently and expresses ideas well.
54. Emphasizes accomplishments of self, family or acquaintances. (Low placement = emphasizes failures of these individuals.)
55. Behaves in a competitive manner. (Low placement = cooperation.)
56. Speaks in a loud voice.
57. Speaks sarcastically. (e.g., says things (s)he does not mean; makes facetious comments that are not necessarily funny)
58. Makes or approaches physical contact with other(s). (of any sort, including sitting unusually close without touching) (Low placement = unusual avoidance of physical contact, such as large interpersonal distance.)
59. Engages in constant eye contact with someone. (Low placement = unusual lack of eye contact.)
60. Seems detached from the situation.
61. Speaks quickly. (Low placement = speaks slowly.)
62. Acts playful.
63. Other(s) seeks advice from P.
64. Concentrates on or works hard at a task.

65. Engages in physical activity. (e.g., works up a sweat) (Low placement = almost completely sedentary.)
66. Acts in a self-indulgent manner. (e.g., spending, eating, or drinking) (Low placement implies self-denial.)
67. Exhibits physical discomfort or pain. (High placement = excess of what seems proportionate. Low placement implies lack of these signs where expected.)
68. Behaves in a stereotypically feminine style or manner.

Table 1: Correlates of Self-Rated Extraversion and Directly Observed Behavior

## Behavior	*r*
Positive	
15 - High enthusiasm and energy level	0.29**
20 - Is talkative	0.28**
07 - Exhibits social skills	0.23**
56 - Speaks in a loud voice	0.22**
37 - Expressive in voice, face, or gesture	0.21**
11 - Physically animated; Moves a lot	0.19**
02 - Volunteers Information about Self	0.18*
25 - Initiates humor	0.17*
16 - Displays wide range of interests	0.17*
42 - Seems to enjoy situation	0.14*
Negative	
60 - Seems detached from situation	-0.30**
36 - Behaves in fearful or timid manner	-0.28**
08 - Reserved and unexpressive	-0.27**
67 - Exhibits physical discomfort/pain	-0.23**
18 - Expresses agreement frequently	-0.21**
13 - Exhibits awkward interpersonal style	-0.21**
40 - Keeps other(s) at a distance	-0.20**
24 - Expresses sympathy	-0.18*
46 - Blames others	-0.18*
22 - Physical signs of tension/anxiety	-0.17*
66 - Acts in a self-indulgent manner	-0.16*
64 - Concentrates; Work hard at task	-0.15*

Note: RBQ item content is abbreviated. Probability of finding 22 significant correlates by chance in 10,000 randomization trials: $p = .0012$. Vector correlation by gender: $r = .62$. Vector correlation by interviewer: r = .42.
* $p < .05$; ** $p < .01$

Table 2: Correlates of Self-Rated Conscientiousness and Directly Observed Behavior

## Behavior	*r*
Positive	
53 - Speaks fluently; Expresses ideas well	0.18*
32 - Expresses warmth	0.18*
06 - Appears relaxed and comfortable	0.16*
41 - Interest in intellectual/cognitive matters	0.16*
23 - Exhibits high degree of intelligence	0.16*
Negative	
13 - Exhibits awkward interpersonal style	-0.16*
65 - Engages in physical activity	-0.16*
17 - Talks at other(s)	-0.15*
57 - Speaks sarcastically	-0.15*
22 - Physical signs of tension/anxiety	-0.14*

Note: RBQ item content is abbreviated. Probability of finding 10 significant correlates by chance in 10,000 randomization trials: $p = .0504$. Vector correlation by gender: $r = .25$. Vector correlation by interviewer: $r = .30$.
* $p < .05$; ** $p < .01$

Table 3: Correlates of Self-Rated Openness and Directly Observed Behavior

## Behavior	*r*
Positive	
41 - Interest in intellectual/cognitive matters	0.25**
23 - Exhibits high degree of intelligence	0.22**
42 - Seems to enjoy situation	0.22**
16 - Displays wide range of interests	0.18*
25 - Initiates humor	0.18*
15 - High enthusiasm and energy level	0.17*
53 - Speaks fluently; Expresses ideas well	0.17*
01 - Interviews Other(s)	0.17*
62 - Acts playful	0.15*
20 - Is talkative	0.14*
Negative	
50 - Gives up when faced w/obstacles	-0.26**
44 - Says negative things about self	-0.25**
63 - Other(s) seek advice from P	-0.24**
39 - Expresses guilt	-0.22**
36 - Behaves in fearful or timid manner	-0.21**
13 - Exhibits awkward interpersonal style	-0.20**
18 - Expresses agreement frequently	-0.19**
21 - Expresses insecurity	-0.19**
60 - Seems detached from situation	-0.17*

Note: RBQ item content is abbreviated. Probability of finding 19 significant correlates by chance in 10,000 randomization trials: $p = .0039$. Vector correlation by gender: $r = .71$. Vector correlation by interviewer: $r = .38$.
* $p < .05$; ** $p < .01$

Table 4: Gender Differences in Correlates of Self-Rated Agreeableness and Directly Observed Behavior

##	Behavior	*r*	Females	Males	*z*	*p*
17	- Talks at other(s)	-0.10	-0.27**	0.06	-2.36*	0.0183
21	- Expresses insecurity	0.10	-0.02	0.25**	-1.89	0.0588
36	- Behaves in a fearful manner	-0.08	-0.22*	0.08	-2.04*	0.0414
45	- Displays ambition	0.03	0.23*	-0.16	2.74**	0.0061
46	- Blames others	-0.08	-0.20*	0.06	-1.80	0.0719
54	- Emphasizes accomplishments	-0.06	0.12	-0.23*	2.43*	0.0151
55	- Behaves in competitive manner	-0.10	0.05	-0.25*	2.06*	0.0394
58	- Approaches physical contact	0.11	0.22*	-0.06	1.92	0.0549
63	- Other(s) seek advice from P	-0.17*	-0.25*	-0.09	-1.13	0.2585
67	- Exhibits physical discomfort	0.07	-0.07	0.24*	-2.16*	0.0308
68	- Behaves in a feminine style	0.14	-0.21*	0.09	-2.10*	0.0357

Note: RBQ item content is abbreviated. Total N = 195; Female N = 102; Male N = 93
* $p < .05$; ** $p < .01$

Table 5: BFI Correlates of the BIA

BFI Trait	Verbal Comprehension	Concept Formation	Visual Matching
Conscientiousness	.21**	.22**	.25**
Openness	.33**	.21***	.03

Note: $N = 157$
* $p < .05$; ** $p < .01$

Table 6: RBQ behaviors as mediators of the Conscientiousness-performance link

Test	*b* path[a]	*c* path[b]	*c'* path[c]	Indirect Effects	
## Behavior	b	b	b	Estimate	95% CI
Verbal Comprehension (r = .21, p < .01)					
6 - Appears to be relaxed	1.20***	3.08**	2.40*	0.69*	.11, 1.47
13 - Awkward interpersonal style	-1.24**	3.08**	2.49*	0.59*	.10, 1.29
23 - High degree of intelligence	5.07***	3.08**	1.60	1.48*	.05, 3.02
41 - Interest in intellectual matters	4.32***	3.08**	1.91	1.16**	.26, 2.32
53 - Speaks fluently	3.53***	3.08**	1.68	1.41**	.45, 2.51
Concept Formation (r = .22, p < .01)					
6 - Appears to be relaxed	2.40***	3.90**	3.08*	0.83*	.15, 1.70
13 - Awkward interpersonal style	-1.32**	3.90**	3.27*	0.63*	.09, 1.37
32 - Expresses warmth	3.03*	3.90**	3.23*	0.65*	.02, 1.49
41 - Interest in intellectual matters	5.03***	3.90**	2.54	1.36**	.32, 2.63
53 - Speaks fluently	3.51***	3.90**	2.51	1.40**	.46, 2.54
Visual Matching (r = .25, p < .01)					
32 - Expresses warmth	1.77*	2.72**	2.26**	0.39*	.02, 1.49
53 - Speaks fluently	1.31**	2.72**	2.20*	0.52**	.12, 1.07

Note: RBQ item content is abbreviated. *b*'s represent unstandardized betas. Confidence intervals are bias-corrected.

[a]*b* path: Direct effect of RBQ behavior on performance, controlling for Conscientiousness

[b]*c* path: Direct effect of Conscientiousness on performance

[c]*c'* path: Direct effect of Conscientiousness on performance, controlling for RBQ behavior

* p < .05; ** p < .01; *** p < .001

Table 7: RBQ behaviors as mediators of the Openness-performance link

Test	*b* path[a]	*c* path[b]	*c'* path[c]	Indirect Effects	
## Behavior	b	b	b	Estimate	95% CI
Verbal Comprehension (r = .33, p < .01)					
13 - Awkward interpersonal style	-1.02*	4.56***	3.94***	0.62**	.13, 1.31
16 - Shows wide range of interests	2.67*	4.56***	4.05***	0.50*	.03, 1.20
23 - High degree of intelligence	4.86***	4.56***	2.51**	2.05**	.79, 3.48
41 - Interest in intellectual matters	3.77***	4.56***	3.08**	1.47**	.64, 2.50
42 - Seems to enjoy the situation	1.72*	4.56***	3.86***	0.69**	.15, 1.41
50 - Gives up facing obstacles	-2.91***	4.56***	2.46*	1.10**	1.04, 3.32
53 - Speaks fluently	3.36***	4.56***	3.49***	1.08**	.30, 1.99
Concept Formation (r = .21, p < .001)					
13 - Awkward interpersonal style	-1.28*	3.44**	2.67*	0.79**	.15, 1.75
23 - High degree of intelligence	5.74***	3.44**	1.03	2.42**	.98, 4.00
41 - Interest in intellectual matters	5.04***	3.44**	1.47	1.96**	.95, 3.15
50 - Gives up facing obstacles	-3.24***	3.44**	1.10	2.32**	1.11, 3.74
53 - Speaks fluently	3.55***	3.44**	2.32	1.14**	.30, 2.17

Note: RBQ item content is abbreviated. *b*'s represent unstandardized betas. Confidence intervals are bias-corrected.

[a]*b* path: Direct effect of RBQ behavior on performance, controlling for Openness

[b]*c* path: Direct effect of Openness on performance

[c]*c'* path: Direct effect of Openness on performance, controlling for RBQ behavior

* p < .05; ** p < .01; *** p < .001

References

Allport, G. W. (1931). What is a trait of personality? *Journal of Abnormal and Social Psychology, 25,* 368-372. doi:10.1037/h0075406

Ames, D. R., & Bianchi, E. C. (2008). The agreeableness asymmetry in first impressions: Perceivers' impulse to (mis) judge agreeableness and how it is moderated by power. *Personality and Social Psychology Bulletin*, *34*(12), 1719-1736. doi: 10.1177/0146167208323932

Andersen, S. M., & Thorpe, J. S. (2009). An if-then theory of personality: Significant others and the relational self. *Journal of Research in Personality, 43*, 163–170. doi: 10.1016/j.jrp.2008.12.040

Barrick, M. R., & Mount, M. K. (1993). Autonomy as a moderator of the relationships between the Big Five personality dimensions and job performance. *Journal of Applied Psychology; Journal of Applied Psychology, 78*(1), 111-118. doi:10.1037/0021-9010.78.1.111

Baumeister, R. F., Vohs, K. D., & Funder, D. C. (2007). Psychology as the science of self-reports and finger movements: Whatever happened to actual behavior? *Perspectives on Psychological Science, 2,* 396-403. doi:10.1111/j.1745-6916.2007.00051.x

Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: a meta-analysis of the leading behavioral contributors to mortality. *Psychological bulletin, 130*(6), 887. doi: 10.1037/0033-2909.130.6.887

Caspi, A., (2000). The child is the father of the man: Personality continuities from childhood to adulthood. *Journal of Personality and Social Psychology, 78,* 158-172. doi:10.1037/0022-3514.78.1.158

Caspi, A., & Roberts, B. W. (2001). Personality development across the life course: The argument for change and continuity. *Psychological Inquiry, 12*, 49-66. doi:10.1207/S15327965PLI1202_01

Caspi, A., Roberts, B. W., & Shiner, R. (2005). Personality development. *Annual Review of Psychology, 56,* 453-484. doi:10.1037/0022-3514.93.5.880

Chen, V., & Drummond, P. D. (2008). Fear of negative evaluation augments negative affect and somatic symptoms in social-evaluative situations. *Cognition and Emotion*, *22*(1), 21-43. doi: 10.1080/02699930701273815

DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology, 93*, 880-896. doi:10.1037/0022-3514.93.5.880

Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: a theoretical integration and synthesis of laboratory research. *Psychological Bulletin, 130*(3), 355-391. doi: 10.1037/0033-2909.130.3.355

Digman, J. M. (1963). Principal dimensions of child personality as inferred from teachers' judgments. *Child Development, 34*, 43–60. doi:10.1111/j.1467-8624.1963.tb06008.x

Digman, J. M. (1989). Five robust trait dimensions: Development, stability, and utility. *Journal of Personality, 57*, 195-214. doi:10.1111/j.1467-6494.1989.tb00480.x

Digman JM. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology, 41*,417-440. doi: 10.1146/annurev.ps.41.020190.002221

Ferguson, C. J. (2010). A meta-analysis of normal and disordered personality across the life span. *Journal of Personality and Social Psychology, 98*, 659-667. doi:10.1037/a0018770

Friedman, H. S., Tucker, J. S., Tomlinson-Keasey, C., Schwartz, J. E., Wingard, D. L., & Criqui, M. H. (1993). Does childhood personality predict longevity? *Journal of Personality and Social Psychology, 65*(1), 176-185. doi:10.1037/0022-3514.65.1.176

Funder, D. C. (1991). Global traits: A neo-Allportian approach to personality. *Psychological Science, 2*, 31-39. doi:10.1111/j.1467-9280.1991.tb00093.x

Funder, D. C. (2001). Personality. *Annual Review of Psychology, 52*, 197–221. doi:10.1146/annurev.psych.52.1.197

Funder, D. C., Furr, R. M., & Colvin, C. R. (2000). The Riverside Behavioral Q-sort: A tool for the description of social behavior. *Journal of Personality, 68*, 451-489. doi:10.1111/1467-6494.00103

Funder, D. C., & Harris, M. J. (1986). Experimental effects and person effects in delay of gratification. *American Psychologist, 41*(4), 476. doi:10.1037/0003-066X.41.4.476

Funder, D. C., & Ozer, D. J. (1983). Behavior as a function of the situation. *Journal of Personality and Social Psychology, 44*, 107-112. doi:10.1037/0022-3514.44.1.107

Furr. R. M. (2009). Personality psychology as a truly behavioural science. *European Journal of Personality, 23*, 369–401. doi:10.1002/per.724

Goldberg, L. R. (1990). An alternative "description of personality": The Big-Five factor structure. *Journal of personality and Social Psychology, 59*(6), 1216-1229.

Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist, 48,* 26–34. doi:10.1037/0003-066X.48.1.26

Goldberg, L. R. (2001). Analyses of Digman's child-personality traits: Derivation of Big Five factor scores from each of six samples. *Journal of Research in Personality, 69,* 709-743. doi:10.1111/1467-6494.695161

Gosling, S., John, O. P., Craik, K. H., & Robins, R. W. (1998). Do people know how they behave? Self-reported act frequencies compared with on-line codings by observers. *Journal of Personality and Social Psychology, 74*(5), 1337-1349. doi:10.1037/0022-3514.74.5.1337

Graziano, W. G. (2003). Personality Development: An Introduction Toward Process Approaches to Long-Term Stability and Change in Persons. *Journal of Personality, 71*(6), 893-904. doi:10.1111/1467-6494.7106001

Hampson, S. E. (2012). Personality processes: Mechanisms by which personality traits "get outside the skin". *Annual review of psychology, 63,* 315. doi: 10.1146/annurev-psych-120710-100419

Hampson, S. E., Dubanoski, J. P., Hamada, W., Marsella, A. J., Matsukawa, J., Suarez, E., & Goldberg, L. R. (2001). Where are they now? Locating former elementary school students after nearly 40 years for a longitudinal study of personality and health. *Journal of Research in Personality, 35,* 375-387. doi:10.1006/jrpe.2001.2317

Hampson, S. E., & Goldberg, L. R. (2006). A first large cohort study of personality trait stability over the 40 years between elementary school and midlife. *Journal of Personality and Social Psychology, 91,* 763-779. doi:10.1037/0022-3514.91.4.763

Hampson, S. E., Goldberg, L. R., Vogt, T. M., & Dubanoski, J. P. (2006). Forty years on: Teachers' assessments of children's personality traits predict self-reported health behaviors and outcomes at midlife. *Health Psychology, 25*(1), 57-64. doi:10.1037/0278-6133.25.1.57

Hartshorne, H., & May, M. A. (1928). *Studies in the Nature of Character: Studies in Deceit*. Macmillan.

Hill, P. L., Turiano, N. A., Hurd, M. D., Mroczek, D. K., & Roberts, B. W. (2011). Conscientiousness and longevity: An examination of possible mediators. *Health Psychology, 30*(5), 536-541. doi:10.1037/a0023859

Holland, D. C., Dollinger, S. J., Holland, C. J., & MacDonald, D. A. (1995). The relationship between psychometric intelligence and the five-factor model of

personality in a rehabilitation sample. *Journal of clinical psychology, 51*(1), 79-88. doi: 10.1002/1097-4679(199501)51:1

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). The Big Five Inventory--Versions 4a and 54. *Berkeley, CA: University of California, Berkeley, Institute of Personality and Social Research*.

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114-158). New York, NY: Guilford Press.

Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2003). The core self-evaluations scale: Development of a measure. *Personnel Psychology, 56*(2), 303-331. doi: 10.1111/j.1744-6570.2003.tb00152.x

Judge, T. A., Higgins, C. A., Thoresen, C. J., & Barrick, M. R. (1999). The big five personality traits, general mental ability, and career success across the life span. *Personnel psychology, 52*(3), 621-652. doi:10.1111/j.1744-6570.1999.tb00174.x

Kenrick, D. T. & Funder, D. C. (1988). Profiting from controversy: Lessons from the person-situation debate. *American Psychologist, 43*, 23-34. doi:10.1037/0003-066X.43.1.23

McCrae, R. R., & Allik, J. (2002). The five-factor model of personality across cultures. New York: Kluwer Academic/Plenum.

McCrae, R. R., & Costa, P. T., Jr. (1996). Toward a new generation of personality theories: Theoretical contexts for the five-factor model. In J.S. Wiggins (Ed.), *The five factor model of personality: Theoretical perspectives* (pp. 51-87). New York: Guilford Press.

McCrae, R. R., & Costa, P. T., Jr. (2008). The five-factor theory of personality. In O.P. John, R.W. Robins, & L.A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 159-181). New York: Guilford Press.

Milgram, S. (1975). *Obedience to authority*. New York: Harper/Colophon.

Mischel, W. (1968). Consistency and specificity in behavior. In W. Mischel (author) *Personality and Assessment* (pp. 13-39). New York: Wiley.

Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. *Psychological Review, 80*(4), 252-283. doi:10.1037/h0035002

Mischel, W. (1977). The interaction of person and situation. In D. Magnusson & N. S. Endler (Eds.), *Personality at the cross-rods: Current issues in interactional psychology* (pp. 333–352). Hillsdale, NJ: Lawrence Erlbaum.

Mischel, W. (2009). From personality and assessment (1968) to personality science, 2009. *Journal of Research in Personality, 43,* 282-290. doi:10.1016/j.jrp.2008.12.037

Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review, 102*, 246–268.

Myaskovsky, L., Unikel, E., & Dew, M. A. (2005). Effects of gender diversity on performance and interpersonal behavior in small work groups. *Sex Roles, 52*(9-10), 645-657. doi: 10.1007/s11199-005-3732-8

Nave C. S., Sherman R. A., & Funder D. C. (2008). Beyond self-report in the study of hedonic and eudaimonic well-being: Correlations with acquaintance reports, clinician judgments and directly observed social behavior. *Journal of Research in Personality, 42,* 643–659. doi:10.1016/j.jrp.2007.09.001

Nave, C. S., Sherman, R. A., Funder, D. C., Hampson, S. E., & Goldberg, L. R. (2010). On the contextual independence of personality: Teacher's assessments predict directly observed behavior after four decades. *Social Psychological and Personality Science,* 1, 327-334. doi:10.1177/1948550610370717

Ozer, D. J., & Benet-Martinez, V. (2006). Personality and the prediction of consequential outcomes. *Annu. Rev. Psychol., 57,* 401-421. doi: 10.1146/annurev.psych.57.102904.190127

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers, 36*(4), 717-731. doi: 10.3758/BF03206553

Price, R. H., & Bouffard, B. L. (1974). Behavioral appropriateness and situational constraint. *Journal of Personality and Social Psychology, 30,* 579–586. doi: 10.1037/h0037037

Roberts, B. W., Kuncel, N. R., Shiner, R., Caspi, A., & Goldberg, L. R. (2007). The power of personality: The comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes. *Perspectives on Psychological Science, 2*(4), 313-345. doi: 10.1111/j.1745-6916.2007.00047.x

Robins, R. W., Fraley, R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A Longitudinal Study of Personality Change in Young Adulthood. *Journal of Personality, 69*(4), 617-640. doi: 10.1111/1467-6494.694157

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68–78. doi: 0009-3920/2004/7503-0008

Sethi, A., Mischel, W., Aber, J. L., Shoda, Y., & Rodriguez, M. L. (2000). The role of strategic attention deployment in development of self-regulation: Predicting preschoolers delay of gratification from mother-toddler interactions. *Developmental Psychology*, 36, 767–777. doi: 10.1037//0012-1649.36.6.767

Sherman, R. A., & Funder, D. C. (2009). Evaluating correlations in studies of personality and behavior: Beyond the number of significant findings to be expected by chance. *Journal of Research in Personality, 43*, 1053-1063. doi: 10.1016/j.jrp.2009.05.010

Sherman, R. A., Nave, C. S., & Funder, D. C. (2010). Situational similarity and personality predict behavioral consistency. *Journal of personality and social psychology, 99*(2), 330-343. doi:10.1037/a0019796

Shweder, R. A. 1975. How relevant is an individual difference theory of personality? *Journal of Personality, 43*, 455-84. doi: 10.1111/j.1467-6494.1975.tb00716.x

Tett, R. P., & Guterman, H. A. (2000). Situation trait relevance, trait expression, and cross-situational consistency: Testing a principle of trait activation. *Journal of Research in Personality*, *34*(4), 397-423. Doi: 10.1006/jrpe.2000.2292

Wagerman, S. A., & Funder, D. C. (2007). Acquaintance reports of personality and academic achievement: A case for conscientiousness. *Journal of Research in Personality, 41*, 221-229. doi:10.1016/j.jrp.2006.03.001

Woodcock, R. W., McGrew, K. S., Mather, N., & Schrank, F. A. (2001). Woodcock–Johnson III (WJ-III). *Itasca, IL: Riverside*.

Wortman, J., & Wood, D. (2011). The personality traits of liked people. *Journal of Research in Personality, 45*(6), 519-528. doi:10.1016/j.jrp.2011.06.006