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Analysis of the Primary and Global Factors of the 16PF to Predict the Scale of Accurate Personality Prediction (SAPP)

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Analysis of the Primary and Global Factors of the 16PF to Predict the Scale of
Accurate Personality Prediction (SAPP)

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We the undersigned committee hereby approve the attached thesis, "Analysis of the Primary and Global Factors of the 16PF to Predict the Scale of Accurate Personality Prediction (SAPP)" by Lauren Marie DiLullo, M.S..

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Abstract

Title: Analysis of the Primary and Global Factors of the 16PF to Predict
the Scale of Accurate Personality Prediction (SAPP)

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In attempt to measure one's self-knowledge, Miller (2000) developed the
Scale of Accurate Personality Prediction (SAPP), which is a measure
derived from obtained and self-predicted scores across the 21 scales of the
Sixteen Personality Factor Questionnaire (16PF). The aim of this
investigation was to assess which of the 16PF primary and global factors
are the best predictors of SAPP scores. Identification of these predictor
variables would then allow for the derivation of one's SAPP score directly
from the those determined factors. Archival data consisting of 645
participants were analyzed through a series of regression analyses across
four random samples of the data base, in the attempt to increase the
reliability of the results. Analysis indicated that in three of the four
samples, Tough Mindedness (TM-) and Tension(Q4+) emerged as the best
predictors of the SAPP scores. In addition, Emotional Control Stability
(C+), Dominance (E-), Apprehension (O+) and Suspiciousness (L) acted
as predictive factors in two of the four random samples. These results
were then compared to some previous similar efforts.

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Acknowledgements

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The Self

Various definitions are available for the self. The Merriam-Webster, Oxford, and Cambridge dictionaries all agree the self is the factor that makes an individual unique and distinguishable from others (Merriam-Webster's Collegiate Dictionary, 2017; English Oxford Dictionary, 2017; Cambridge Dictionary, 2017). However, each of the dictionaries provides its own twist within the definitions. For example, Merriam-Webster (2017) indicates that the self is whom the person genuinely is, thereby indicating that the self is the particular part of the personality expressed in a given situation, whereas the Cambridge dictionary (2017) offers that the self is the non-physical components of a person that makes him or her unique.

Whereas dictionaries have given broad, general definitions of the self, researchers have by necessity elaborated on the concepts within the term. For example, Leary and Tangney (2003) describe the self as a mental construct that allows individuals to consciously think about themselves, and is centralized by their unique experiences. They chose this definition as it accounts for the psychological processes of self-reflection, for people making decisions for themselves, and for the ability of individuals to conceptualize themselves. Osyerman, Elmore and Smith (2003) agree with Leary and Tangney (2003) that the self-description derives from the situations individuals experience, while also including that the self also shapes behavior across situations. They also define the

self as being a mental construct represented in memory (Oysterman, Elmore & Smith, 2003). Finally, the self has also been defined as a product of one's consciousness (Hart & Matsuba, 2012).

     With regard to the development of the self, it is believed that communities, parenting approaches, education, and daily interactions contribute to its creation (Osyerman, Elmore & Smith, 2003). Other researchers believe the self is created, and defined, by personal memories, representations and generalizations, such as the person's capabilities, relationships, self-appearance, and psychological characteristics (Hart & Matsuba, 2012).

     As there are different definitions of this term, there are also different types of the self. The self as the total person is one form of the self, and tends to be used synonymously with the word person. Because this conceptualization does not capture the psychological component of the self, it tends to create some level of confusion (Leary & Tangney,2003). A second type of self is the self as personality (Leary & Tangney,2003). In this version, the self consists of a set of abilities that predict potential behaviors and of individual differences such as preferences, temperament, values, and goals. Although using the self synonymously with personality in everyday conversation is suitable, it still creates some confusion. For example, are those who research personality actually studying the self, and are those researching the self actually examining personality? This type of self indicates the importance of

perhaps having a clearer definition in order to reduce overlap and confusion.

The third form of self is the self as the experiencing subject. When referring to the self as the experiencing subject, also referred to as the self as "I", one typically is referring to the psychological systems necessary for being aware of, and knowing, the self (Leary & Tangney, 2003). The self as "I" is an indivisible aspect of the individual and is often referred to as one's consciousness and/or one's awareness.

The fourth form of the self refers to the self as the object, or the self as "Me", and it typically reflects the descriptions and analyses of all the constituent parts of the self.

Finally, the fifth form of the self reflects the self as the executive agent of an individual. This form of the self is responsible for regulating one's behaviors, making decisions, and planning. This is the component of the self-referred to when discussing topics such as self-regulation and self-control (Leary & Tangney, 2003).

This present study focuses on the self as "Me". As previously stated, the self as Me refers to the almost endless number of feelings, thoughts, beliefs, values, perceptions and other attributes one has for him or herself, across the past, present or future. This form of the self can be viewed as a component of one's memory, indicating that the "Me" aspect of self continues to exist outside of social situations or, it can be viewed as

something that evolves from moment to moment within a situation (Osyerman, Elmore & Smith, 2003). This form of the self is also reflected in phrases such as self-concept, self-belief, self-image and the myriad other number of hyphenated "selfs" that psychologists have investigated across time (Leary & Tangney, 2003). The specific component of the self as "Me" that is the focus in this paper is one's self-knowledge.

Self-Knowledge

Self-knowledge utilizes the self to reason and make decisions, and is a principal tool for the processes of perception, self-regulation, and motivation (Oyserman, Elmore & Smith, 2003). Self-knowledge can be immersed in an individualistic sense of self, in which focus is drawn to the unique components of the self and what makes the individual different from others. In other words, it is one of the "me" components of the self (Osyerman, Elmore & Smith, 2003). It can also be immersed in the collectivistic perspective in which the focus is targeted toward how the self is similar to others and connected to others by one's varied interpersonal relationships (Osyerman, Elmore & Smith, 2003). People can also know themselves through a distal or immersed perspective. For example, humans can view themselves as the actor that is shaped by other humans and various situations (immersed perspective), or they can step outside themselves and consider how others are perceiving them (distal perspective). Taking the distal approach, the focus is directed to the individual's broader values and goals, while reducing the investment one

emotionally has in the self. This distal approach is most likely to be associated with the collectivistic approach and consider how others perceive the individual. Because of this, those who take the collectivistic perspective of self are able to predict the outcome of social interactions, evaluate themselves from multiple perspectives and regulate themselves in ways that will get their needs met by others (Osyerman, Elmore, & Smith, 2003). It has been shown that a person's understanding of self consists of what other people think of him or herself. However, it is important to note the individual tends to view him or herself more positively than someone else would (Osyerman, Elmore, & Smith, 2003). When individuals are describing their self-concept, they are likely to describe components that relate to the situation at hand and describe their relations to others (Osyerman, Elmore & Smith, 2003).

Self-knowledge is based partially on the stability of one's beliefs of one's self individually, and in formal social situations (Oyserman, Elmore & Smith, 2003). Nonetheless, there is also a flexibility to the self. Humans make decisions in situations based on what one feels is congruent with the self, and these beliefs have the potential to fluctuate based on the circumstances (Oyserman, Elmore & Smith, 2003). Additionally, the self has been referred to as a motivational resource because even though the self feels stable, it is formed and arranged by constructs such as the time in a person's life and their location (Osyerman, Elmore & Smith, 2003; Hart &Matsuba, 2012). What sets self-knowledge apart from other self-

constructs such as self-concept, self-esteem and self-schemas is its emphasis on the accuracy of self-views (Vazire & Wilson, 2012). Being able to accurately understand one's thoughts, feelings, motives, behaviors and mental processes has consequences that affect achievement, interpersonal relationships and overall happiness. Self-knowledge also relates to making decisions and self-regulation. If one does not have self-knowledge, difficulties may arise in making good decisions and accepting the consequences of those decisions, as well as exercising one's values and exerting control within one's life (Vazire & Wilson, 2012).

People have been found to safeguard their self-worth by upholding self-enhancing illusions about the self (Schriber & Robins, 2012). Seeing oneself through rose-colored glasses may not happen in all circumstances, and in some cases, people may view themselves through negative lenses, which distorts their self-knowledge, leaving them only able to see the negative components of the self. These biases in self-knowledge are created by cognitive-informational accounts and motivational-affective accounts. Cognitive-informational accounts focus on the details readily accessible by the self, such as previous beliefs, prior expectations and how information about the self is encoded and retrieved. Motivational-affective accounts aim to sustain or enhance the individual's self-esteem and are fueled by the need for approval and to reduce negative emotions, such as shame and embarrassment, and increase the positive emotions such as pride (Schriber & Robins, 2012). People often have higher motivation to

seek personal information that aligns with their already established self-concept, and because they are often unaware of their deeply rooted core traits, they put themselves in situations that accent their positive traits, even if they are unaware of them, because it creates a positive reaction within (Chin, Mrazek, & Schooler, 2012). Although people also put themselves in situations that demonstrate their positive traits, which is often known as self-enhancement, it is important to note that this does not always result in a completely distorted sense of knowing the self, but rather it can merely skew the focus of the self-knowledge (Schriber & Robins, 2012). However, people can also focus on the negative components of themselves as well, and therefore place themselves in situations that confirm the negatively skewed self-knowledge (Schriber & Robins, 2012).

Development of Self-Knowledge

According to the ancient Greeks, self-knowledge allows an individual to make decisions based on the person's true interests and values instead of being influenced by temptations (Hart & Matsuba, 2012). In order to determine if a person has self-knowledge, three conditions must be met. Their perception must be based on truth, it must be justified, and the individual must believe in the proposition (Hart & Matsuba, 2012). Neopsychoanalytic theorists believe self-knowledge is obtained via powerful needs and emotions that govern psychological functioning (Hart & Matsuba, 2012), whereas cognitive developmental theorists believe self-

knowledge develops through imitation, particularly social imitation, which

is based in structural commonalities in the representation of the

individual's self and other people (Hart & Matsuba, 2012). According to

Baldwin, self-knowledge starts in the projective phase in which infants are

learning to distinguish between objects and people. Because their interest

is mainly being attracted to other people, social imitation begins to

emerge. When children realize their movement is initiated by their own

will and do not result from someone else making the same movement,

they have entered into the subjective stage. During this time, they begin to

realize that even though the motions are derived from different powers of

will, they realize they may be sharing similar experiences (Hart &

Matsuba, 2012). This phase then leads to the ejective stage in which the

child develops empathy (Hart & Matsuba, 2012). Another driving

mechanism of self-knowledge is social attunement, in which the individual

infers other people's perceptions of the self (Hart &Matsuba, 2012). It is

in the final stage of development that the individual learns to act

consistently regardless of context (Hart & Matsuba, 2012).

Limitations in self-knowledge

There are various limits associated with the concept of self-

knowledge, particularly as it relates to the self as "me". Since humans, for

example, are typically in a state of "being" or experiencing the world

around them (e.g., the self as "I"), they may not explicitly be aware of all

that is happening around them, or the impact it may be having on their

behavior (e.g., self as "me") (Chin, Mrazek, & Schooler, 2012). In most

cases, people are open to exploring their personality traits, particularly

when it easily aligns with the mental image they already hold of

themselves. Even when there are instances of uncertainty, research has

found people can be interested in exploring their abilities. However, when

it comes to the core traits that people are unaware of, they will place

themselves in situations that show those less known qualities in a positive

light. This is referred to as the self-signaling theory, which simply states

that when people are unsure of any given personality trait, they will be

motivated to access that trait in an environment that will show its positive

components (Chin, Mrazek & Schooler, 2012).

The importance of accurate self-knowledge

Philosophers have discussed the importance of self-knowledge and

have referred to accurate self-knowledge as a process that affects all

humans, and that life may not be worth living without understanding the

self (Vogt & Colvin, 2005). Some have referred to accurate self-

knowledge as the agreement between reality and self-judgments (Tenney,

Vazire, & Mehl, 2013), whereas Vogt and Colvin (2005) elaborate further

by referring to accurate self-knowledge as having little disparity between

one's self-views, the presentation of their behavior, and they being aware

of the underlying structural components of their personality. There are

various benefits to having accurate self-knowledge. For example, those

with accurate self-knowledge have been found to make decisions that

make them more pleasant to be around (Tenney, Vazire, & Mehl, 2013).

Individuals with better self-knowledge were also found to have better

interpersonal relationships. More specifically, those with higher levels of

self-knowledge had stronger relationships, had better relationship quality,

and reported liking each other more (Tenney, Vazire, & Mehl, 2013).

These findings remained even after controlling for personality,

intelligence, and attractiveness, and also after ruling out the variable of

how predictable a person might be (Tenney, Vazire & Mehl, 2013). Those

with accurate self-knowledge also tended to be viewed more positively for

being honest about their abilities, particularly when applying for a job

(Tenney, Vazire, & Mehl, 2013).

       If accurate self-knowledge has been shown to have positive effects,

what is the outcome for those who are over confident in their abilities?

Schriber and Robins (2012) found that those who tend to self-enhance are

often unaware of their limits, which leads them to engage in impulsive risk

taking, poor planning, and poor academic performance. Indirectly, self-

enhancement has been linked to negative physical and emotional health

consequences, as those with inflated self-knowledge tend to use defensive

and/or repressive coping strategies (Schriber & Robins, 2012).

Interpersonally, those who have an inflated sense of self tend to be judged

more critically, and are more likely to be rejected by peers because of their

narcissistic-like tendencies (Schriber & Robins, 2012). However, it is

important to note that self-enhancement also has the potential to be

adaptive rather than maladaptive, which is why it is important to understand the underlying factors such as the outcome (e.g. intrapsychic or interpersonal) being assessed, the setting the self-enhancement is occurring in, how the term self-enhancement is being defined and assessed, and the outcome time frame (e.g. short-term or long-term consequences) (Schriber & Robins, 2012). For example, when people self-enhance, they tend to be seen as more competent than those who have been considered to have accurate self-knowledge (Tenney, Vazire, & Mehl, 2013). However, this can also backfire because those who self-enhance may damage their reputation when others learn of the individual's true abilities and competencies (Tenney, Vazire, & Mehl, 2013). It is also important to note that the research conclusions about the benefits of self-enhancement tend to be derived from methodologies with mutiple limitations (Tenney, Vazire, & Mehl, 2013). For example, findings found from self-report studies were not replicated when ratings came from peers or observers (Tenney, Vazire, & Mehl, 2013).

Personality Prediction

One form of self-knowledge is personality self-knowledge (PSK), in which people often describe themselves across those personality traits they view as most important (Back & Vazire, 2012). Personality self-knowledge is defined as the agreement between a person's real personality and the self-perception of the person's personality (Back & Vazire,2012). It is also generally defined as the self-perception of how one behaves,

feels and thinks, as well as being aware of how one's patterns are perceived by others (Back & Vazire, 2012). Perhaps the major hurdle in arriving at one's PSK is determining how to measure one's "real personality". Some reasonable measures of the real personality include considering the people's reputations, information obtained from informants, actual behaviors measured by behavioral observation, and the implied personality self-concept, which is measured by indirect personality tests (Back & Vazire, 2012). However, there is limited empirical evidence supporting the consistent accuracy of self-views (Back & Vazire, 2012). Although it may seem that self-reports might be the best option to describe one's emotions and responses in a situation, people are also susceptible to bias, as well as exaggeration and distortion, in their perception of their personalities (Back & Vazire, 2012).

Back & Vazire (2012) have proposed a dual-processing model of PSK, which includes two major components. The first component is the explicit-implicit consistency, which examines the convergence between the explicit self-views of personality, or the part of self that is directly measured or observed, and the implicit self-perception of personality, or the indirect personality assessment. The amount of consistency between these two is referred to as the amount of access to one's inner self, or the amount of awareness a person has into his or her true self (Back & Vazire, 2012). Behavioral prediction is the second component, and it considers how well people's perception of their personality aligns with their actual

behavior. If one's self-report personality measure accurately predicts a person's behavior, PSK is said to be high (Back & Vazire, 2012). Back & Vazire (2012) also acknowledge a third variant of PSK, whereby it is also assessed by self-other agreement, which examines how well a person's self-view matches with other people's perceptions of the person's personality.

Measures of Accurate Personality Prediction

Measuring the accuracy of one's self-knowledge is often times difficult, as there must be a criterion for measuring people's beliefs, which is difficult to unanimously develop across researchers (Vazire & Wilson, 2012). Accuracy of a person's self-knowledge is based on three criteria: pragmatic criteria, social consensus, and objective criteria. Pragmatic accuracy refers to whether or not an appraisal is predictive of behavior, and/or if it functionally tied to a person's needs (Schriber & Robins, 2012). Social consensus is defined as how well the individual's self-knowledge compares with other people's perceptions of the individual (Schriber & Robins, 2012). This criterion is particularly helpful in assessing global personality traits, but it also is limited by the fact it is created by gaining the opinion of different informants that have different relationships with the person, which could reduce the validity of the social census. Traits that are harder to observe may also be less accurately described by informants. For the objective criteria of accuracy, the individual's self-description is compared to fact-based data such as test

scores or the results from laboratory experiments. However, not all traits can be directly observed and it may be difficult to tap into certain traits in the laboratory (Schriber & Robins, 2012). However, improvements have been made in this area of assessment. Now, implicit measures are used to tap into the mental process that occur unconsciously while behavioral observations allow for naturalistic, objective behaviors to be recorded (Vazire & Wilson, 2012).

Even once the accuracy criteria are chosen, there is still the difficulty of determining how to measure the difference between the self-evaluation and the chosen criteria (Schriber & Robins, 2012). One way of doing so is to calculate a simple difference score, which refers to subtracting the chosen criterion measure from the self-evaluation scores. In this case, both factors must be measured in the same way in order to subtract them. Residualized difference scores is another option in which a multiple regression uses the criterion measure to predict the self-evaluation while retaining the residuals. Therefore, this score reflects the direction and extent of the person's bias. If the person is participating in self-enhancement, the residuals will be positive. If the residuals are negative, the person is participating in self-diminishment (Schriber & Robins, 2012).

Regardless of the method chosen, it is recommended that researchers empirically support why they chose their respective criterion. The criterion should be measured validly and reliably, while also

following the measurement guidelines that are utilized in the scale development. Researchers should also precisely explain how they are calculating the discrepancy between the criterion and self-evaluations, the assumptions associated with that choice and potential confounds. Because of the limitations with each criterion, using multiple criteria may give a more accurate picture of the rater's bias (Schriber & Robins, 2012).

Vogt and Colvin (2005) developed a valuable, systematic approach to measuring the accuracy of one's self-knowledge. Data collectors first obtained self-descriptions by utilizing the California Adult Q-sort and the NEO Personality Inventory. Psychological factors were also assessed on measures of life satisfaction, happiness, self-esteem, and resiliency. For each participant, two friends and two parents or guardians completed reporter forms of the same assessments. An observational component was also utilized to determine the accuracy of participants' self-knowledge. To do so, participants' behavior was also coded in four, five-minute sessions. During two of these sessions, participants were paired with same-sex partners, and for the other two, opposite-sex partners. Behaviors during sessions were coded with the Behavioral Q-Sort. Following the sessions, partners rated each other on a list of 20 adjectives that reflected the big give personality factors (Vogt & Colvin, 2005)

Vogt and Colvin (2005) operationalized their definition of accurate self-knowledge by indicating that self-knowledge is considered accurate if it agrees with ratings from others, and predicts behavior. Analyses

indicated the agreement between parent ratings and self-descriptions were higher than agreement between coded behavior and self-descriptions (Vogt & Colvin, 2005). Participants with more accurate self-knowledge were found to endorse being more satisfied with life, happier, having higher self-esteem, experiencing more positive than negative affect, and being more resilient (Vogt & Colvin, 2005). Also, those with accurate self-knowledge were highly rated by friends as being psychological well (Vogt & Colvin, 2005).

The sophisticated procedure used by Vogt & Colvin appears quite sound and informative. The one question raised by it is its clinical utility. That is, how translatable is it to the clinical arena? Because this methodology consists of various data sources, it requires considerable time and effort from all parties involved. Even though having the ability to compare perspectives between the self and others, both through self-report and observed/coded interaction has its benefits, this system is less feasible within a clinical setting. Additionally, the methodology in its present state does not yield a usable, singular metric. If available, such a score could then be compared across settings and populations, and utilized for pre and post testing. What follows next is the description of such a recently developed measure of self-knowledge.

The Scale of Accurate Personality Prediction (SAPP)

Miller (2000) aimed to develop a measure of the accuracy of a person's self-prediction of personality. To do so, 196 participants

completed the 16PF Fifth Edition and then were instructed to predict their scores utilizing the 16PF scoring form (see Appendix A). First a little background of the 16PF is in order. The 16PF was the first personality measure that was constructed on the foundation of systematic scientific research. The creator, Raymond B. Cattell, began his work by utilizing the fundamental lexical hypothesis, which was formulated by Sir Francis Galton and stated that personality characteristics of human beings will eventually become incorporated into their respective languages, and that the most important of these characteristics will be eventually reflected by a single word. Cattell then utilized the more than 4500 dictionary-based words that had been previously identified as descriptive of personality traits in the English language (Allport & Odbert, 1936), and submitted the behavioral ratings and questionnaire data to a series of non-orthogonal (or oblique) factor-analytic analyses. Cattell then reduced the adjectives to a list of 15 factors he felt underlies a person's personality. He and his research team later added a 16th factor, one they believed would yield a measure of a respondent's overall reasoning and cognitive ability (Factor B). These 16 factors became known as the 16PF Primary Factors. Since its development, the 16PF has been used in clinical, counseling, educational, and industrial/organizational settings. It has given its users the ability to predict a person's performance with regard to academic achievement, leadership, creativity, interpersonal skills, psychological adjustment, and interpersonal skills.

Currently, the 16PF is in its fifth edition. It was most recently updated to improve the individual items, to re-standardize the normative sample, and to improve the intercorrelations within the measure. Item selection was based on the following eight criteria: items had to load and correlate more on their designated scale than any others, items had to be unambiguous, short, and simple, items referencing old data were to be removed and avoided, items had to avoid any suggestion of bias, items had to easily be translatable into other languages, items were not to be intrusive or offensive, items should not target socially undesirable or desirable content, and items were to be avoided if they had extreme frequency endorsements (Conn & Reike, 1994).

The 16 primary factors of the 16PF are Warmth, Reasoning, Emotional Stability, Dominance, Liveliness, Rule-Consciousness, Social Boldness, Sensitivity, Vigilance, Abstractedness, Privateness, Apprehension, Openness to Change, Self-Reliance, Perfectionism, and Tension. Warmth is measured on the continuum of being reserved, impersonal and distant versus being warm, attentive to others, and outgoing. Reasoning determines how concrete or abstract a person rates, while Emotional Stability assesses how emotionally reactive or stable a person is. The Dominance scale is a measure of cooperativeness, dominance, and assertiveness. Liveliness refers to the degree of seriousness and spontaneity within a person's personality. The spectrum of Rule-Consciousness indicates a person's degree of nonconformance

versus how dutiful they are, and the continuum of Social Boldness assesses how shy, timid, socially bold, or thick-skinned they are. The Sensitivity scale addresses the range of how sensitivity or unsentimental one is, while Vigilance reflects the degree of trustworthiness versus suspiciousness. Abstractiveness measures the dimension of practicality and imaginativeness, and Privateness assesses the degree of being forthright or private. Apprehension refers to the dimension of being self-assure versus self-doubting, and Openness to Change refers to the range of being traditional versus experimental. The degree to which a person is group-oriented or self-reliant is measured by Self-Reliance, and the degree to which a person tolerates disorder or needs organization and perfection is measured by the primary factor of Perfectionism. The final primary factor, Tension, assesses the degree of being relaxed and patient, compared to being tense and impatient (Conn & Reike, 1994).

Because of the oblique nature of the factor analyses used to identify the primary factors, these factors could themselves be submitted to a series of similar factor analyses to further look at the more fundamental and underlying factor structure of the 16PF. These analyses led to the identification of the 16PF-Fifth Edition's five second-order, or Global Factors. The first global factor, Extraversion, is created through the loadings on the Liveliness (F+), Warmth (A+), Social Boldness (H+), Self-Reliance (Q2-), Privateness (N-) primary scales. This factor determines where a person falls between being introverted and social

inhibited, and being extraverted and socially participating. The Anxiety global factor is created by loadings on Emotional Stability (C-), Apprehension (O+), Vigilance (L+), and Tension (Q4+), and reflects the degree of anxiety and emotional discomfort experienced by the respondent. Tough-Mindedness, the third global scale, consists of loadings on Warmth (A-), Abstractedness (M-), Sensitivity (I-), and Openness to Change (Q1-), and assesses where on the continuum a person falls between being receptive, open-minded and intuitive, and being tough-minded, resolute, and unempathetic. Independence is the fourth identified global factor, and is created by loadings on the Dominance (E+), Vigilance (L+), Social Boldness (H+), and Openness to Change (Q1+) factors. This Independence factor rates people on a continuum ranging from being accommodating, agreeable, and selfless, to being independent, persuasive and willful. The final global factor, Self-Control, consists of high loadings on Liveliness (F-), Abstractedness (M-), Rule-Consciousness (G+), and Perfectionism (Q3+). Self-control assesses if a person is more unrestrained and impulse guided, or more controlled and regulated (Conn & Reike, 1994) (see Appendix A for a copy of the 16PF Individual Record Form).

After completing the 16PF, Miller (2000) had her participants rate themselves from 1-10 on the 21 primary and global factors, using the profile form in Appendix A. The 16PF profiles and the self-rated scoring

forms were then used to determine the participants' level of self-prediction accuracy, according to the follow equation:

$$SAPP= [OSA-PSA] +[OSB-PSB] +[OSC-PSC] +[OSE-PSE] +[OSF-PSF] +[OSG-PSG] + [OSH-PSH] + [OSI-PSI] +[OSL-PSL] +[OSM-PSM] +[OSN-PSN] +[OSO-PSO] + [OSQ1-PSQ1] +[OSQ2-PSQ2] +[OSQ3-PSQ3] +[OSQ4-PSQ4] +[OSEX-PSEX] + [OSAX-PSAX] +[OSTM-PSTM] +[OSIN-PSIN] +[OSSC-PSSC],$$ where OSA stands for the obtained score on scale A, PSA stands for the predicted score on scale A, and so on for all 21 factors.

According to this formula, low scores would indicate better self-predictions, while high scores would indicate poorer self-predictions. On the SAPP, the lowest receivable score is a 0, which indicates optimal accuracy, and the highest score obtainable is 189, which indicates the poorest possible prediction accuracy (Miller, 2000).

Furthermore, Miller (2000) also tried to establish which of the factors could best predict the SAPP scores. Through a number of multiple regression analyses, Miller (2000) found that the global factors of Tough-Mindedness (-), Independence (-), and Anxiety (-), and the primary factors of Reasoning (B+) and Tension (Q4-) best predicted the SAPP scores. These results indicated that those with high SAPP scores (and thereby presumably knew themselves less well) could be described as reserved,

introverted, private, unsentimental, more concrete in reasoning, and empathic, whereas those with lower SAPP scores (those who are better predictors of their 16PF scores) could be described as trusting of others, sensitive, open to change, intuitive, outgoing, more abstract in their thinking, and more empathic.

SAPP Reliability

To determine the SAPP's test-retest reliability, Silva (2011) tested participants twice, with a two-week gap in between, and hypothesized that a person's SAPP score would be relatively consistent over time. With a sample of 62 participants, Silva (2011) found a significant correlation between the SAPP scores obtained from the two testing sessions space two weeks apart (r = .397). This correlation was lower than what be generally acceptable. Hirsch (2012) replicated Silva's 2011 study but with a higher number of participants. A Pearson correlation revealed a moderate correlation between the two sets of SAPP scores (r =.566), which provided stronger support for the SAPP's test-retest reliability. It should also be noted that this generally lower than usual reliability score is, by definition, limited by the test-retest reliabilities of the 21 primary and global factors (which range from .69 to .87) for the two-week time period).

Sverdlova (2012) also examined the test-retest reliability of the SAPP, using instead a delay of four weeks between the testing sessions. Upon completion of a Pearson correlation, a significant correlation also emerged scores across the two testing periods (r = .466).

Elghossain (2012) added to the examined test-retest reliability of the SAPP, utilizing a six-week break between the two sessions. With 47 participants, Elghossain found a statistically strong and significant (r = .772) correlation.

SAPP Validation Efforts

In order to test the construct validity of the SAPP, Hood (2001) replicated Miller's (2000) study using 48 graduate and undergraduate student volunteers. All participants completed the 16PF and then predicted their scores on the 16PF scoring form, as in Miller's (2000) study. Participants were then given the Self-Consciousness Scale-Revised (Scheier & Carver, 1985) and Tennessee Self-Concept Scale-2 (Fitts, Warren & WPS, 1996). in order to measure the SAPP's convergent and divergent validity. It was hypothesized that the SAPP may well be similar to the concept of self–consciousness (thereby producing a significant negative correlation between the two measures, and thus reflect some convergent validity), while at the same time not being related to one's self concept (divergent validity). A significant correlation between the SAPP and the Self-Consciousness Scale Revised was not found, although the expected nonsignificant correlation between the SAPP and the Tennessee Self-Concept Scale-2 did emerge (Hood, 2001).

Glywasky (2003) replicated Hood's 2001 study in hopes of building construct validity for the SAPP using a different measure that might also be reflective of self-knowledge; namely the Private Self-Consciousness

scale (provide a reference here). In this study, 219 participants completed the same packets utilized in Hood's study. Similarly, to Hood's results, no significant correlation between the Private Self-Consciousness Scale and the SAPP emerged (Glywasky, 2003).

Anderson (2002) also researched the measure's validity. She hypothesized that high scorers on the Self-Monitoring Scale (reference) would have lower SAPP scores, indicating that those with high self-monitoring characteristics will be more accurate in their personality prediction. Her results, however, did not support this hypothesis, as no significant correlation between these two measures was found.

An additional attempt was made to see if the SAPP's convergent validity would emerge by correlating with another instrument that purports to measure some degree of self-knowledge. Pass (2012) tested the SAPP's convergent validity by correlating it with the Integrative Self-Knowledge Scale (Ghorbanifar, et al., 2008). Here, a predicted correlation emerged, but it did not reach statistical significance.

The Construct validity of the SAPP continued with a study by Winter (2002), who compared SAPP scores between graduate engineering students and psychology students. It was predicted that psychology graduate students would be better predictors of their personality characteristics. Twenty-two graduate psychology students and 10 graduate engineering students participated. Although the sample size was small, it enabled Winter to determine that average SAPP scores for each group

were similar to average scores Miller (2000) obtained. Nonetheless, a significant difference between the mean SAPP scores of the two groups did not emerge. Interestingly, Winter did find significant mean differences was not found between the psychology and engineering groups except for the Warmth and Tough-Mindedness factors, with psychologists obtaining higher Warmth scores and engineers obtaining higher scores Tough-Mindedness scores (Winter, 2002).

In order to further investigate Winter's 2002 findings and provide further support for the SAPP's validity, Grossenbacher (2006), collected data from psychologists and engineers who already earned their degrees and began working in their fields. Thirty-six psychologists and 17 engineers completed the SAPP and 16PF-Fifth Edition. Results indicated a significant difference between the psychologists' and engineers' mean SAPP scores, with the psychologists scoring significantly lower on their mean SAPP score, which indicated that the psychologists were better at predicting their own personality characteristics than the engineers, providing some validating evidence for the SAPP (Grossenbacher, 2006). With regard to specific scales on the 16-PF, significant differences between the groups were found on the factors of Reasoning (B), Warmth (A), and Tension (Q4), with psychologists being better than engineers in predicting these variables (Grossenbacher, 2006).

Further efforts to support the SAPP's construct validity came from Layton (2005). In this study, Layton argued that the better one is able to

predict his/her personality traits (lower SAPP scores) the closer that person's self-predictions would agree with the personality prediction of that person made by close friends. Consequently, in this study, SAPP scores were obtained from a group of participants, and then two friends of each of the participants predicted their friend's scores utilizing the same 16PF scoring form (see Appendix A). A concordance measure (CM) was then calculated for each subject, which was essentially a measure of the degree of agreement of one's self-prediction and those of the two friends. The derived CM scores were then correlated with the derived SAPP scores, and a significant negative correlation (i.e., greater concordance aligning with lower SAPP scores, or more accurate self-predictions) would offer some support for the construct validity of the SAPP. Although the obtained correlation was in the predicted direction, it did not reach significance level. Similar results, a negative correlation between the SAPP and the CM scores, were also found by Hickey (2005) who completed the same study but using family members instead of friends. Both authors recognized that their respective studies were limited by the rather small sample sizes in each study. Consequently, Wolfe (2006) replicated Layton's 2005 study with a larger sample size, as did Blackmailer (2006) with Hickey 2005 study. Results from both of these two latter studies were able to reach levels of statistical significance, suggesting that the SAPP may well be measuring some degree of self-knowledge.

Generalizability of the SAPP

To determine the generalizability of the SAPP, Rodriguez (2011) recruited participants who identify as Hispanic (N = 50) to complete a demographic form, the 16 PF Fifth Edition, and then predict their SAPP scores on the 16PF profile form. SAPP scores for each participant were calculated and when the group SAPP mean was compared to that from the Miller study, no significant difference was found. Mean scores on the 21 factors from the sample were also compared to the normative scores of the Hispanic/Latino standardization sample and analysis indicated a discrepancy across only four factors: (G) Rule-Consciousness, (F) Liveliness, (O) Apprehension, and (M) Abstractedness. Rodriguez (2011) concluded that, despite his small sample size, the SAPP may well generalize to the Hispanic/Latino community.

Zeng (2014) completed a similar study as Rodriguez (2011), with the intent to determine the generalizability of the SAPP to those of Asian descent (N=36). Participants had to be individuals who self-identified as Asian. Zeng randomly pulled three subsamples (each N=36) from a database of over 600 non-Asian respondents, and compared her sample SAPP mean to those from the three sample means, respectively. Results from an independent-samples t-test found an insignificant difference on the obtained SAPP means between the Asian sample and the first random sample. Independent-samples t-tests across the primary and global factors were also completed significant differences were found for factor H

(Social Boldness) and IN (Independence). The Asian sample mean SAPP

score was then compared to from the second random sample group. This

time, a significant difference was found between the Asian sample and the

second random sample. Significant primary and global factors differences

emerged across. C (Emotional Stability), E (Dominance), H (Social

Boldness), Q1 (Openness to Change), and IN (Independence). Finally,

same results protocol was applied to the third random sample and a

significant SAPP difference was not found between the third random

sample and the Asian sample. Sten score analysis indicated a significant

difference for Q1 (Openness to Change), and A2 (Self-Reliance). Because

two of the three groups did not have a significant difference, Zeng (2014)

concluded that the SAPP was likely generalizable to the Asian

community. This study was also limited by its small sample size (Zeng,

2014).

Additional Psychometric SAAP Studies

      McElligott (2014) replicated Miller's (2000) study, with the now

larger data base of over 600 respondents, and with the intent of extracting

descriptive statistics from the normative database, as well as reversing all

the SAPP scores so that high SAPP scores would reflect better self-

knowledge. To achieve this, McElligott simply subtracted each SAPP

score 189, which is the highest SAPP score that could be obtained. With

this change, a SAPP score of 0 now would indicate the lowest score of

one's personality prediction, and a SAPP score of 189 would indicate

perfect personality prediction. A Pearson correlation found a -1.00

correlation between the new and old SAPP scores, indicating that this

change in SAPP scores reflects only a linear transformation.

McElligott also wished to create STEN scores across the SAPP

distribution. She did so through two different methods. The first method,

which was used on the most recent edition of the 16PF, extracted STEN

scores from SAPP percentile frequency counts. Therefore, STEN scores of

1 and 10 reference the bottom and top 2.3% of SAPP scores, respectively,

STEN scores of 2 and 9 reference the next 4.3%, respectively, STEN

scores of 3 and 8 reference the next 9.2%, respectively, STEN scores 4

and 7 reference the next 15%, respectively, and the STEN scores 5 and 6

reference the final 19.2%, respectively.

For the second method of developing STEN scores for the SAPP

distribution, McElligott utilized the following equation:

$$\frac{(\textit{SAPP score-mean})2+5.5}{\text{SD}}$$

To test the viability of either method, McElligott correlated the two STEN

scores obtained, and the resultant r=.98 suggests that either approach is

equally acceptable (McElligott, 2014).

Most recently, Mazur (2015) wanted to replicate the part of the of

the Miller (2000) study that determined which of the 16PF primary factors

could best predict a person's individual SAPP score by utilizing a

significantly larger data base. By doing so, one's SAPP score could then

potentially be obtained without the individual having to complete the self-prediction phase of testing. Since Miller (2000) found that the global factor of Tough Mindedness, which is composed of the primary factors of A-, I-, M-, and Q1-, was the most accurate in predicting a SAPP score, it was anticipated that these primary factors would be the best primary factors to predict the SAPP score (Mazur, 2015). In her study, Mazur utilized the same data base (N=609) used by Elliott (2014), divided the sample randomly in half, and then conducted the regression analyses of the separate halves to further test the reliability of her findings.

Overall, the results of the split half analyses were more similar than different, so as a result, similar analyses were next performed on the entire data. Significant predictors of SAPP scores (now having been adjusted so that high SAPP scores would reflect better self-prediction) were higher Emotional Stability (A+), higher Sensitivity (I+), lower Suspiciousness(L-), and lower Tension (Q4-) (Mazur, 2015).

Statement of Purpose

The aim of the present study was to further Mazur's (2015) analyses to include not only the 16 Primary Factors as the independent variables, but also the five Global Factors as well. Similar regression analyses were utilized to determine which primary and global scales of the 16PF most accurately predict a person's SAPP scores, first across the two split halves of the sample, and then, as the results hopefully indicate, with the entire sample. It was hoped that with this information, responses to the 16PF can be used to most reliably determine SAPP scores without individuals having to complete the second step of rating themselves on the 16PF profile. In other words, this study hoped to identify which of the 21 scales of the 16PF would combine to best measure a person's degree of self-knowledge.

Method

Participants

Participants were individuals from past SAPP studies whose data have been combined into one database. These individuals include college students, other professionals, and people from numerous communities. The resultant data base of 600 individuals were compiled over the past 15 years and were collected in a generally non-randomized manner.

Procedure

All participants were given a 16PF to complete as well as a 16PF scoring sheet (see Appendix A for a copy of this form). For the scoring sheet, participants were asked to score themselves on the 5 global factors and 16 personality factors of the 16PF. Upon completion, the self-ratings were compared to the 16PF scores on global and personality factors and utilizing the adjusted formula described in the background section, SAPP scores were calculated for each participant.

Analysis

As done in the previous SAPP studies that have utilized this data base, descriptive demographic data were analyzed, as well as the ranges, means, and standard deviations for all 21 16PF primary and global factors, and the newly adjusted SAPP scores. To determine the best 16PF predictors of the SAPP scores, the methodology utilized by Mazur (2015) was replicated in the present study. Specifically, four consecutively and randomly extracted samples (N = ??, for each quarter-sample) were

utilized (Samples 1 – 4, respectively), and for each quarter-sample,

descriptive demographic statistics were first calculated, and then ranges,

means, and standard deviations for all 21 16 PF variables and the SAPP

scores were determined. To arrive at the best 16PF predictor variables of

the SAPP, a series of two different regression analyses (e.g. forward

stepwise, and backward stepwise) were conducted (where statistically

feasible) across the four quarter-samples.

Hypotheses

Given Miller's findings, it was reasonable to hypothesize that those

individuals with higher SAPP scores (i.e., those that are better able to

predict their own 16PF results), would be found to score stronger on

global factors TM- (Open-minded & Intuitive), on IN- (Accommodating),

and Anxiety- (Unperturbed), and stronger on the primary factors of B+

(Abstract Thinking), and the primary factor of Q4- (Patient & Relaxed)

Results

Demographic Results

   Specific demographics results can be found for each of the four random samples in Tables 1-4. Across the four samples, participants ranged in age from 16 to 81 years old. The mean age of participants was ranged from 28.44 to 28.94 years-old and there was a standard deviation ranging from 12.21 to 12.76. Within the four samples, 52.8% - 59.2% were females and the percentage of participants who were male ranged from 40.8% to 47.2%. Across the samples, the percentage of participants who identified as Caucasian ranged from 67.3% to 73.0%, and the percentage of participants who identified as Hispanic ranged from 12-13.5%. The percentage of participants who identified as Asian ranged from 8.2-10.1%, 1.7-2.9% of participants identified as African American, 0-.3% of participants identified as Indian, and 3.0-6.3% identified as Other. In regard to employment, 51.6% to 55.3% of participants across the samples were students, 17.1% to 19.4% identified as having a job that classified as White Collar, .9% to 1.5% of participants identified as Blue-collar employees, 2.9% to 4.1% reported being Retired, 2.7 to 5.0% identified as Unemployed/Homemaker, and 0% to 7.7% identified as Other. The majority of participants were from the Southeast (56.9%-61.9%) followed by the Northeast (8.5-11.0%), the Midwest (2.3-3.8%), the Southwest (1.7-3.2%), and Canada (0-.3%). In regard to education, 0-0.3% of participants completed less than a high school education, 3.3-5.7% completed 12 years of education, 30.9-37.1% of participants

completed some college, 20.7-26.4 completed college, and 36.4-42.3%

participated in graduate training.

Random Sample Multiple Regression Analyses

As a method of assessing reliability, a forward stepwise and

backward stepwise regression analysis was conducted on each of the four

random samples and the results from these eight analyses can be found in

Tables 5-20.

More variability was found in the backward stepwise regressions

with regard to which variables best predicted a participant's SAPP score.

Within the first random sample, which is referenced in Tables 5 and 6,

Dominance (E-), Emotional Stability (C+), Independence (IN-) and Tough

Mindedness (TM-) were the best predictors of SAPP scores. Dominance

(E-), Emotional Stability (C+), and Tough Mindedness (TM-) were also

best predictors in the second random sample, with the addition of Tension

(Q4+) and Suspiciousness (L-). These results are reflected in Tables 9 and

10. Within the third random sample, depicted in Tables 13 and 14,

Dominance (E-), Sensitivity (I+), Abstraction (C-), Privateness (N-),

Apprehension (O+), Openness to Change (Q1-) and Tension (Q4+) were

the best predictors, while Apprehension (O+), Tension (Q4+), Tough

Mindedness (TM-) and Anxiety (AX-) were the best predictors within the

fourth random sample which is reflected in Tables 17 and 18. The main

commonalities among the random samples, using the backward stepwise

method emerged, were Dominance (E-), and Tough Mindedness (TM-), which occurred in three of the four random samples.

Fewer factors were predictors of SAPP scores in the forward stepwise regressions across the four random samples. Within the first (Tables 7 and 8) and fourth random sample (Tables 19 and 20), Sensitivity (I+) and Suspiciousness (L-) were the best predictors of a participants SAPP score. Suspiciousness (L-), Tension (Q4+) and Tough Mindedness (TM-) were significant predictors of SAPP scores in the second random sample (Tables 11 and 12), and Suspiciousness (L-), Tension (Q4+), and Sensitivity (I+) were the best predictors in the third random sample (Tables 15 and 16). Suspiciousness (L-) was evident in all four of the stepwise random samples and Sensitivity (I+) was evident in three of the four.

Finally, Tables 21 and 22 offer a summary of the eight regression results across the four quarter-samples and the two stepwise regression methods. As previously stated, there was higher numbers of, and more variability within, the extracted numbers of factors that best predicted participants' SAPP scores in the backward stepwise regressions results, as compared to the forward stepwise analyses.

Discussion

The principal goal of this study was to hopefully identify which 16PF Primary and Global factors would best predict one's obtained SAPP score. If these factors could be identified, then it would then be possible to arrive at one's SAPP score directly from the 16PF scores in a manner consistent with the other 16PF specialty scales already in existence. Because there were considerable differences across the two methods of extraction (i.e., backward or forward stepwise regressions), it is reasonable to focus on the results obtained from the backwards analyses, as there is some agreement that forward regression analyses tend to underestimate the number and accuracy of the extracted factors, due largely to the effects of those scales which tend to serve as suppressor variables (see for example, Field, 2005).

Looking at Table 21, if a somewhat liberal inclusion criterion of any predicted factor emerging in at least two of the four sample analyses is utilized, it can be seen that the Toughmindedness factor (TM-) and the Tension (Q4+) emerged in three of the four samples, while Emotional Stability (C+), Dominance (E-) and Apprehension (O+) and Suspiciousness (L-) were found to predictive variables in two samples. These results would then suggest that being open-minded and intuitive (E), having overall good coping skills, having a certain amount of drivenness and higher energy levels (Q4+), being emotional stable and adaptive (C+), demonstrating a more cooperative and deferential manner

(E-), having a degree of self-doubting (O+), and being trusting and accepting (L-) would likely yield a higher degree of accuracy in predicting one's own personality., and thereby perhaps possessing a higher amount of self-knowledge.

When these results are then compared to those of Miller's (2000) study, it can be seen that two of the identified predictors (TM-, & Q4+) found in the present study also emerged in Miller's work.

Limitations of this study center on the lack of a more diverse sample, as participants were mostly Caucasian, single, from the Southeast portion of the country, and identified as students. Future research should attempt to diversify the current sample to gain further support for the generalizability of the identified predictors of the SAPP score. In additional, it would reasonable to examine the present data base to look at a series of random half-samples, and then a final look at regression analyses of the entire sample.

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Table 1

Summary of Demographic Statistics Random Sample 1

Demographic Variable	Frequency	Percent
GENDER		
Female	168	52.8
Male	150	47.2
RACE		
Caucasian	214	67.3
Hispanic	43	13.5
Other	20	6.3
Asian	32	10.1
African American	8	2.5
Indian American	1	.3
MARITAL STATUS		
Single	176	55.3
Married	57	17.9
Divorced	13	4.1
Separated	3	.9
Widowed	2	.6
OCCUPATION		
Student	176	55.3
White Collar	58	18.2
Retired	13	4.1
Unemployed/Homemaker	16	5.0
Blue Collar	3	.9
GEOGRAPHY		
Southeast	197	61.9
Southwest	8	2.5
Northeast	32	10.1
Midwest	12	3.8
Canada	1	.3
EDUCATION		
Less than 12 Years	0	0
High School Completed	18	5.7
Some College	101	31.8
College Degree	66	20.8
Graduate/Professional Training	133	41.9

Table 2

Summary of Demographic Statistics Random Sample 2

Demographic Variable	Frequency	Percent
GENDER		
Female	202	59.2
Male	139	40.8
RACE		
Caucasian	149	73.0
Hispanic	41	12.0
Other	13	3.8
Asian	28	8.2
African American	10	2.9
Indian American	0	0
MARITAL STATUS		
Single	178	52.2
Married	50	14.7
Divorced	10	2.9
Separated	4	1.2
Widowed	1	.3
OCCUPATION		
Student	176	51.6
White Collar	62	18.2
Other	23	6.7
Retired	10	2.9
Unemployed/Homemaker	16	4.7
Blue Collar	3	.9
GEOGRAPHY		
Southeast	194	56.9
Southwest	11	3.2
Northeast	29	8.5
Midwest	8	2.3
Canada	0	0
EDUCATION		
Less than 12 Years	1	.3
High School Completed	14	4.1
Some College	112	32.9
College Degree	90	26.4
Graduate/Professional Training	124	36.4

Table 3
Summary of Demographic Statistics Random
Sample 3

Demographic Variable	Frequency	Percent
GENDER		
Female	169	56.5
Male	130	43.5
RACE		
Caucasian	217	72.6
Hispanic	40	13.4
Other	9	3.0
Asian	27	9.0
African American	5	1.7
Indian American	1	.3
MARITAL STATUS		
Single	165	55.2
Married	40	13.4
Divorced	10	3.3
Separated	4	1.3
Widowed	3	1.0
OCCUPATION		
Student	160	53.5
White Collar	51	17.1
Other	23	7.7
Retired	10	3.3
Unemployed/Homemaker	8	2.7
Blue Collar	4	1.3
GEOGRAPHY		
Southeast	174	58.2
Southwest	5	1.7
Northeast	33	11.0
Midwest	9	3.0
Canada	1	.3
EDUCATION		
Less than 12 Years	0	0
High School Completed	10	3.3
Some College	111	37.1
College Degree	62	20.7
Graduate/Professional Training	116	38.7

Table 4

Summary of Demographic Statistics Random Sample 4

Demographic Variable	Frequency	Percent
GENDER		
Female	189	58.3
Male	135	41.7
RACE		
Caucasian	226	69.8
Hispanic	41	12.7
Other	17	5.2
Asian	32	9.9
African American	7	2.2
Indian American	1	.3
MARITAL STATUS		
Single	167	51.5
Married	53	16.4
Divorced	13	4.0
Separated	3	.9
Widowed	1	.3
OCCUPATION		
Student	169	52.2
White Collar	63	19.4
Other	25	7.7
Retired	10	3.1
Unemployed/Homemaker	12	3.7
Blue Collar	5	1.5
GEOGRAPHY		
Southeast	189	58.3
Southwest	8	2.5
Northeast	30	9.3
Midwest	10	3.1
Canada	0	0
EDUCATION		
Less than 12 Years	1	.3
High School Completed	18	5.6
Some College	118	30.9
College Degree	68	21.0
Graduate/Professional Training	137	42.3

Table 5
Backward Stepwise Regression Model
Summary Sample 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Dominance, Emotional Stability, Independence, & Tough Mindedness	.250	.063	.050	12.99

Table 6
Backward Stepwise Regression
Coefficients Sample 1

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	160.65	4.48		35.85	.000
Emotional Stability	1.03	.480	.122	2.16	.032
Dominance	1.89	1.00	.228	1.89	.059
Tough Mindedness	-1.81	.501	-.240	-3.62	.000
Independence	-3.59	1.10	-.417	-3.25	.001

Table 7
Forward Stepwise Regression Model
Summary Sample 1

Model	R	R Square	Adj. R Square	Std. Error of the Estimate
Sensitivity & Suspiciousness	.224	.050	.044	13.03

Table 8
Forward Stepwise Regression Coefficients
Sample 1

| Model | Unstandardized | Coefficients | Standardized Coefficients | | |
	B	Std. Error	Beta	t	Sig.
(Constant)	146.13	3.73		39.16	.000
Sensitivity	1.10	.41	.15	2.70	.007
Suspiciousness	-.96	.39	-.14	-3.45	.015

Table 9
Backward Stepwise Regression Model
Summary Sample 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Dominance, Tension, Suspiciousness, Emotional Stability, Tough Mindedness	.32	.10	.09	12.42

Table 10
Backward Stepwise Regression
Coefficients Sample 2

Model	Unstandardized		Coefficients	Standardized Coefficients		
	B	Std. Error		Beta	t	Sig.
(Constant)	152.68	4.92			31.02	.000
Emotional Stability	1.04	.48		.13	2.17	.031
Dominance	-.96	.45		-.12	-2.15	.032
Suspiciousness	-1.54	.39		-.23	-3.97	.000
Tension	1.59	.51		.18	3.13	.002
Tough Mindedness	-1.06	.40		-.14	-2.64	.009

Table 11
Forward Stepwise Regression Model
Summary Sample 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Suspiciousness, Tension & Tough Mindedness	.29	.08	.07	12.53

Table 12
Forward Stepwise Regression Coefficients
Sample 2

Model	Unstandardized	Coefficients	Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	156.00	3.45		45.25	.000
Suspiciousness	-1.79	.38	-.26	-4.73	.000
Tension	1.08	.48	-.11	-2.-2	.025
Tough Mindedness	-.79	.39	-.11	-2.02	.04

Table 13
Backward Stepwise Regression
Model Summary Sample 3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
*	.407	.165	.136	12.20	-.003	1.08	1	275	.000

* Dominance, Sensitivity, Abstractness, Privateness, Apprehension, Openness to Change, Tension

Table 14
Backward Stepwise Regression
Coefficients Sample 3

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	291.67	48.75		5.98	.000
Dominance	-1.14	.51	-.14	-2.26	.025
Sensitivity	-4.58	1.89	-.64	-2.43	.016
Abstractness	-2.27	1.05	-.26	-2.17	.031
Privateness	-1.11	.57	-.17	-1.95	.053
Apprehension	1.64	.78	.19	2.09	.037
Openness to Change	-5.46	1.76	-.77	-3.11	.002
Tension	3.39	.71	.39	4.79	.000

Table 15
Forward Stepwise
Regression Model Summary
Sample 3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
*	.33	.11	.10	12.44	.02	7.36	1	293	.007

* Suspiciousness, Sensitivity, Tension

Table 16
Forward Stepwise Regression Coefficients
Sample 3

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	142.88	3.87		36.93	.000
Suspiciousness	-1.64	.39	-.24	-4.18	.000
Sensitivity	1.21	.40	.17	3.01	.003
Tension	1.36	.50	.16	2.71	.007

Table 17
Backward Stepwise Regression
Model Summary Sample 4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
*	.32	.10	.09	12.19	-.003	1.17	1	315	.28

* Self-Reliance, Tension, Apprehension, Tough
Mindedness, Anxiety

Table 18
Backward Stepwise Regression Coefficients
Sample 4

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	142.98	4.20		34.04	.000
Apprehension	3.18	.70	.39	4.52	.000
Tension	3.09	.69	.37	4.48	.000
Anxiety	-4.47	.84	-.60	-5.34	.000
Tough Mindedness	-.93	.41	-.12	-2.28	.023

Table 19
Forward Stepwise Regression Model Summary
Sample 4

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
*	.25	.06	12.43	12.43	.02	6.85	1	318	.009

* Suspiciousness, Sensitivity

Table 20
Forward Stepwise Regression Coefficients
Sample 4

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	150.01	3.29		45.57	.000
Suspiciousness	-1.34	.38	-.20	-3.57	.000
Sensitivity	.99	.38	.14	2.62	.009

Table 21
Summary of Backward Stepwise Multiple Regression Analyses
of Best Predictive Factors

Sample 1	Sample 2	Sample 3	Sample 4
Independence (-)			
Tough Mindedness (-)	Tough Mindedness (-)		Tough Mindedness (-)
Emotional Stability (+)	Emotional Stability (+)		
Dominance (+)	Dominance (-)	Dominance (-)	
	Tension (+)	Tension (+)	Tension (+)
	Suspiciousness (-)		
		Sensitivity (-)	
		Abstractness (-)	
		Privateness (-)	
		Apprehension (+)	Apprehension (+)
		Openness to Change (-)	
			Anxiety (-)

Table 22
Summary of Forward Stepwise Multiple Regression Analyses of
Best Predictive Factors

Sample 1	Sample 2	Sample 3	Sample 4
Sensitivity (+)		Sensitivity (+)	Sensitivity (+)
Suspiciousness (-)	Suspiciousness (-)	Suspiciousness (-)	Suspiciousness (-)
	Tension (+)	Tension (+)	
	Tough Mindedness (-)		

Appendix

16PF® Fifth Edition Individual Record Form
Profile Sheet

Name

Date

IPAT

Instructions: Write the sten score for each factor in the second column. Starting with Factor A, place a mark over the spot representing the appropriate sten score. Repeat for each factor. Connect the marks with straight lines.

PRIMARY FACTORS

Factor	Sten	Left Meaning	Standard Ten Score (STEN) 1-10	Right Meaning
A: Warmth		Reserved, Impersonal, Distant		Warm, Outgoing, Attentive to Others
B: Reasoning		Concrete		Abstract
C: Emotional Stability		Reactive, Emotionally Changeable		Emotionally Stable, Adaptive, Mature
E: Dominance		Deferential, Cooperative, Avoids Conflict		Dominant, Forceful, Assertive
F: Liveliness		Serious, Restrained, Careful		Lively, Animated, Spontaneous
G: Rule-Consciousness		Expedient, Nonconforming		Rule-Conscious, Dutiful
H: Social Boldness		Shy, Threat-Sensitive, Timid		Socially Bold, Venturesome, Thick-Skinned
I: Sensitivity		Utilitarian, Objective, Unsentimental		Sensitive, Aesthetic, Sentimental
L: Vigilance		Trusting, Unsuspecting, Accepting		Vigilant, Suspicious, Skeptical, Wary
M: Abstractedness		Grounded, Practical, Solution-Oriented		Abstracted, Imaginative, Idea-Oriented
N: Privateness		Forthright, Genuine, Artless		Private, Discreet, Non-Disclosing
O: Apprehension		Self-Assured, Unworried, Complacent		Apprehensive, Self-Doubting, Worried
Q1: Openness to Change		Traditional, Attached to Familiar		Open to Change, Experimenting
Q2: Self-Reliance		Group-Oriented, Affiliative		Self-Reliant, Solitary, Individualistic
Q3: Perfectionism		Tolerates Disorder, Unexacting, Flexible		Perfectionistic, Organized, Self-Disciplined
Q4: Tension		Relaxed, Placid, Patient		Tense, High Energy, Impatient, Driven

GLOBAL FACTORS

	Left Meaning	Average 1-10	Right Meaning
EX: Extraversion	Introverted, Socially Inhibited		Extraverted, Socially Participating
AX: Anxiety	Low Anxiety, Unperturbed		High Anxiety, Perturbable
TM: Tough-Mindedness	Receptive, Open-Minded, Intuitive		Tough-Minded, Resolute, Unempathic
IN: Independence	Accommodating, Agreeable, Selfless		Independent, Persuasive, Willful
SC: Self-Control	Unrestrained, Follows Urges		Self-Controlled, Inhibits Urges