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The relationships between biodata and personality: How different is different?

Lindsay A. Bousman
University of Nebraska at Omaha

THE RELATIONSHIPS BETWEEN BIODATA AND PERSONALITY: HOW DIFFERENT IS DIFFERENT?

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Lindsay A. Bousman

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

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Committee

Wayne Harrison

Kenneth Deffenbacher

Lynn Haviland

Roni Reiter-Palmon

Chairperson Roni Reiter-Palmon (above)

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Lindsay A. Bousman, MA

University of Nebraska, 2002

Advisor: RONI REITER-PALMON, PH.D.

The relationships between personality measures and biodata measures were examined using a measure of the Big Five Factors of personality, and a newly created biodata measure. Each measure was used to predict academic achievement and job satisfaction. The biodata measure was created to mimic a factor structure similar to the five factors of personality, to allow a better comparison of the two measures. However, the biodata items were original (with combinations of previously used original items), and were developed for use in this study. Biodata items are typically multiple-choice, situational, and historical in nature, whereas personality items are typically based on general response tendencies. Previous studies have not made the distinctions clear between these two types of measures, nor come to any conclusions regarding prediction of academic achievement or job satisfaction. This study examined these relationships in detail. In addition, participant's perceptions of the measures were examined. Similarities and differences between the psychometric properties of the scales were examined, as well as the incremental validity of each measure when added to the other if both were used in prediction of the two criteria.

The results of this study suggest that neither measure is better than the other, and that each can provide a unique contribution.

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The Relationships Between Biodata and Personality: How Different is Different?

Overview of Topic

In industrial/organizational psychology, biographical data and personality measures have frequently been used as selection tools. However, research is limited as to the similarities and differences between these two types of individual difference measures. Research is also lacking in determining which is a better predictor of specific criteria, and the possible reasoning for this. This study had two goals. First, the study examined the psychometric similarities and differences between a personality measure and a biographical data measure developed to measure the same constructs as the personality measure. Second, the current study attempted to determine the differences in predictive validity between the two measures in predicting two criteria: job satisfaction and academic achievement. In addition, applicant perceptions of the measures and reactions to the measures were examined. The following sections will provide an overview of both biodata and personality, the measurement issues of each, and the current published relationships each measure has to the criteria of job satisfaction, academic achievement, and applicant perceptions.

History of Biodata

Biographical data, or biodata, originated in the life insurance industry in 1894 as a way for members and managers to select better insurance agents. It was first used by Colonel Thomas L. Peters of the Washington Life Insurance Company of Atlanta by asking prospective agents a standard set of questions about their life experiences and using this information to select insurance agents (Owens, 1976; Stokes, Mumford,

& Owens, 1994). Shortly afterwards, other test developers began to examine the data empirically to determine differences between high and low performers based on their responses. Since that time, biodata has evolved into what it is today, a selection tool based on objective measurement of historical life experiences, answered in a multiple-choice self-report format (Mumford & Owens, 1987; Owens, 1976). The often-cited theory behind biodata is that " the best predictor of what a man will do in the future is what he has done in the past." (Owens, 1976, p. 625). Biodata has often been used for its predictive abilities, and low adverse impact (Mumford, Reiter-Palmon, & Snell, 1994).

In order to evaluate results from biodata instruments, the item responses must be analyzed or scaled. The most often used approach to scaling biodata is the empirical keying method. The empirical keying approach is a statistically based approach that examines the correspondence of the items to maximize their ability to predict a measurable criterion. For example, items that statistically differentiate high and low performers are retained in a measure, and items that cannot are discarded. Item responses may then be weighted based on the predictive ability of each response, commonly known as a weighted application blank (WAB).

Empirically keyed biodata has been criticized as "dustbowl empiricism" because of its seemingly haphazard approach to the psychometric properties of scaling. Empirical keying has also been criticized for its lack of theoretical and job relevance, but viewed positively for its statistically sound predictive qualities

(Mitchell & Klimoski, 1982). It has also been viewed in terms of its advantages by identifying nonintuitive relationships between criterion and predictors.

Rationally scaled biodata was developed as another alternative scoring method to empirical keying. Rational scaling methods employ the idea that the items should have an intuitive and/or theoretical relationship with the criterion the researcher wishes to study. This method is more construct-related than an empirical approach, and leads back to the importance of the theoretical relationships and underlying constructs that an item measures by determining psychologically meaningful life history variables.

Several studies have directly compared the rational scaling approach with empirical keying. Stokes and Searcy (1999) examined the differences between an empirically derived biodata measure and a rational measure while also examining a global versus a specific construct orientation of each across two samples. The biodata items were written to predict objective and subjective performance criteria of salespersons in a mechanical equipment merchandise company. The rationally scaled measure was based on the performance criteria dimensions. The items were then analyzed to fit into 47 specific factors. The empirical key was analyzed by examining the correlational relationships of the items and responses to the performance criterion scores. Initial results indicated that each method showed consistency and some instability. The results were then used in the cross-validation sample which determined that the rationally developed specific scales had a somewhat higher validity than both of the global scales. The rationally developed scales also predicted

subjective performance ratings just as well as the empirical scale, and predicted objective performance ratings better than the empirical key.

Mitchell and Klimoski (1982) have also compared the two popular scaling methods using cross-validation techniques in a field study of real estate personnel. The criterion used was the passing or failing of state licensure tests. Shrinkage (or the loss of validity from an original sample to a cross-validation sample) was less for the rational key than the empirical key.

In a similar study, Reiter-Palmon and Connelly (2000) examined empirical and rational scale validities from the point of view of the item pools, either from theory-based or non-theory-based item pools. Empirical scales which used items selected from a pool of theory-based items were more valid predictors than items selected from non-theory-based item pools and scored empirically. These studies illustrate that items generated using a rational approach can be relevant and valid predictors, and predict as well or better than items that are not from a theory-based pool.

These studies have also indicated that empirical keys may provide somewhat higher initial validities, but that rational scales have resulted in less shrinkage and more interpretable results, usually with equally high validities. As a result, recent calls have been made by biodata theorists and researchers for the use of rational scales, specifically using construct oriented approaches.

Brief History of Personality and Personality Measurement

The concept of personality has been considered a part of psychological research for many years, and dates back to Aristotle (Goldberg & Rosolack, 1994;

Goldberg, 1993). Major theories of personality delve into the aspects of what "makes" individuals who they are. These identifying constructs range from our characteristics, abilities, traits, subconscious and conscious needs, desires, to values, all depending on which theory is taken into consideration. Over the years, many theories of personality have been researched including type theories and trait theories by influential psychologists in areas such as humanistic psychology, psychoanalytic psychology, and cognitive social learning psychology. Prominent personality researchers include Freud, Jung, Eysneck, Kelly, Mischel, Bandura, and Cattell (Derlega, Winstead & Jones, 1991; Digman, 1990; Goldberg, 1993; Hogan, 1991).

The Big Five Theory of personality was developed as a result of failed efforts to replicate the findings of such theories as the sixteen personality factors found in Cattell's 16 Personality Factors measure (Barrick & Mount, 1991; Digman, 1990; Goldberg, 1993; Hogan, 1991), Guilford and Guilford's factor analysis of nine factors (1939, as cited in Digman, 1996), and Tupes and Christal's original five factors (1961, as cited in Digman, 1996). The Big Five Theory of personality examined many of the ideas of previous theorists such as Cattell, Fiske, Tupes, and Christal to determine a more parsimonious theory of personality using factor analysis. Norman, in 1963 was able to label the five factors that repeatedly emerged into "Norman's Big Five" or the "Big Five" (Barrick & Mount, 1991; Digman, 1990; Goldberg, 1993). Digman (1990) gives a rich history of the theory and how it was evolving at the same time through the efforts of different researchers using different data. According to his review,

references to five factors of personality date back to 1932, and the research has since developed into a parsimonious theory of individual differences.

The Big Five Factor Theory of personality does not state that there are only five complete factors to personality, rather that there are five overarching constructs, each made up of different, smaller and more specific facets representing enduring and relatively stable patterns of thoughts, feelings, and actions (Digman, 1990, 1996). The personality traits which compose the factors are basic tendencies of a person which develop through childhood and reach a relatively stable state in adulthood. The five factors make up the broadest way to examine personality (McCrae & Costa, 1999). The current theory contends that these five factors account for most of the variance in personality. Although some disagreement has occurred over the years regarding the labels, the standard labels are: Conscientiousness, Agreeableness, Openness to Experience, Extraversion, and Neuroticism. The Big Five Theory has gained much attention from personality researchers, and has been used to repeatedly "assess" personality in varying populations and across cultures, and with different measures, yet all still yielding the similar five factors (Barrick & Mount, 1991; Digman, 1990; John & Srivastava, 1999; McCrae & Costa, 1987). Researchers have demonstrated the emergence of the five factors also with measures not designed to measure these five factors such as the Eysenck Personality Inventory (EPI), Eysenck Personality Questionnaire (EPQ), Jackson Personality Research Form (PRF), the Myers-Briggs Type Indicator (MBTI), Hogan Personality Inventory (HPI), the California Q-set, and Goldberg's unipolar and bipolar measures (Digman, 1990; Goldberg & Rosolack,

1994; Goldberg, 1992, 1993). The Five Factor Theory of personality was selected for use in this study based on current popularity and use in psychology literature in general, and in industrial/organizational psychology, specifically.

The Five Factors of Personality

Each aspect of the Big Five Factors can be conceptualized in terms of a definition as well as a counter-definition, or by its polar opposite on a continuum of descriptors. Barrick and Mount (1991) also supported the definition and descriptions of the five factors given in McCrae and Costa (1987), yet at times incorporated a somewhat broader interpretation based on the results of their meta-analysis. Research by Borgotta and Smith (1964, 1967, as cited in Goldberg, 1993) likewise has shown evidence for the five factors to be supported as comprehensive in the realm of personality. Each of the five factors is described below, based on the combined findings and descriptions from Barrick and Mount (1991), Digman (1990), Goldberg (1993), and McCrae and Costa (1987, 1999). These descriptions were used as the operational definitions of the five factors of personality selected for use in this study.

Neuroticism (versus emotional stability). Neuroticism can be examined in the context of worrying, embarrassment, having insecurities, self-consciousness, pessimistic attitudes, and negative emotionality. Negative emotionality is viewed as a tendency to experience negative affect such as anxiety, embarrassment, and depression in situations. Mistrust, self-reference, and impulse-ridden behaviors may also be involved in views of neuroticism. High levels of this factor may include disturbed thoughts and behaviors which follow emotional distress, such as depression, jealousy,

anxiety, nervousness, and anger. Low neuroticism is characterized by being controlled rather than spontaneous, being self-sufficient, being adaptable, able to handle stress and changes well, and being even-tempered, calm, and secure.

Extraversion (or surgency). Generally, Extraversion refers to sociability, friendliness, talkativeness, ambition, affection, and fun-loving characteristics. Assertiveness may also be involved in extraversion, depending on the researcher's view of the factor, but was not included in the definition for this study. Positive emotionality is also involved as an aspect of extraversion. Those high in Extraversion are usually sociable, friendly, optimistic, cheerful, and outgoing. They enjoy the presence of others, and can be ambitious, outspoken, and energetic. Alternatively, those who are low in Extraversion (introversion) may be quiet, reserved, shy, and would rather keep to themselves than be the center of attention.

Openness to Experience. In past research, Openness to Experience has been defined by characteristics such as originality, curiosity, imaginativeness, having broad interests, and being open-minded. However, openness to experience can sometimes be better viewed within a context or in such things as feelings, actions, ideas, and values. It is not clear what role intelligence plays in this factor, as intelligence has been shown to have correlations up to .30 with Openness to Experience, and Openness to Experience has also been labeled Intellect in some studies (McCrae & Costa, 1987). Cause and effect relationships have not been established, and therefore, for the purpose of this study, intelligence was not be used as a defining characteristic of this factor. However, those high in Openness are imaginative, curious, analytical, and

inquisitive. They may prefer variety, change, and independence. In turn, those low in Openness may not be receptive to changes, prefer standards and rules, may be less imaginative and creative, and have fewer but well-defined interests than those who are high in Openness.

Agreeableness (versus antagonism). The factor of Agreeableness is best viewed in relation to it's opposite, antagonism, or on a continuum. Antagonists are likely to set themselves up to be pitted against another individual, be mistrustful, skeptical, callous, unsympathetic, uncooperative, stubborn, and rude. Antagonism should not be confused with dominance in terms of being the opposite of agreeableness, however. On occasion, Agreeableness is also seen as a continuum of ill- or well-intentioned and strong or weak in carrying out the intentions. Agreeableness has been viewed as being heavily value-laden in its definitions. Additional characteristics from Costa and McCrae (1987) for those who are high in Agreeableness are: straightforward, cooperative, humble, acquiescent, soft-hearted, good-natured, helpful, flexible, courteous, and generous. Therefore, those low in Agreeableness would be cynical, skeptical, rigid, standoffish, and abrasive.

Conscientiousness (versus undirectedness). Conscientiousness has been defined as careful, thorough, hardworking, ambitious, energetic, persevering, purposeful, and adhering to plans, as opposed to lacking a direction. Therefore, those high in Conscientiousness may be self-disciplined, scrupulous, reliable, ambitious, perceptive, well organized, and self-reliant. High Conscientiousness also reflects dependability, responsibility, and organization skills. Those low in Conscientiousness

may be unorganized, inefficient, impulsive in decision-making, hasty in their actions, distracted, and may lack responsibility and self-discipline.

Overall, McCrae and Costa (1987) concluded that more in-depth analyses may be needed in the future on personality research, but currently the structure is best represented in the five-factor model of personality. Barrick and Mount's (1991) meta-analysis of the five factors and job performance also indicated that overall, the five factor model is beneficial in investigating and communicating personality research.

The use of personality measurements to conceptualize individual difference variables has generated much research and many measures. Because results of other theories have been somewhat variable and changing in the past, and the Big Five Factors show stability and parsimony, the remainder of the focus of personality in this study will refer to the Big Five Factors.

Comparing the Reliability and Validity Issues of Personality Measures and Biodata Measures

In order to compare personality measures relative to each other, and to biodata measures, researchers examine the validity and reliability of these measures. In addition, it is also important to examine social desirability.

The validity of biodata and personality measures can be examined relative to the different approaches to validity. With biodata, convergent and discriminant validity coefficients have been reported that are acceptable, such as convergent validities ranging from .41-.66 by Kilcullen, White, Mumford, and Mack (1995). Also, criterion-related validity may be higher when an empirical key is used.

However, even with a rational key, validity can remain at acceptable levels of .30 - .50 (Reilly & Chao, 1982). Construct validity has been successfully examined using factor analysis methods (James, 1973) and by examining the relationships that the constructs have to other similar measures (Kilcullen et al., 1995). Personality measures are viewed by some as relatively stable, and typical reported predictive validity coefficients have ranged from .20 - .30 in a recent meta-analysis of Big Five measures (Barrick & Mount, 1991).

Biodata and personality measures have been examined to determine reliability, internal scale consistency, and test-retest reliability. Results for biodata measures have shown that Cronbach's alpha for internal scale consistency are typically at or above the suggested threshold of acceptability by Nunnally and Bernstein (1994) of .70 (Stokes, Mumford, & Owens, 1994). Test-retest reliability of biodata have been examined, and although the nature of biodata is that of life experiences, and these do change with time, the nature of historical and verifiable items yields test-retest reliability results ranging as high as .85-.91 (Mitchell, 1994). However, depending on how the biodata measure is scored, the stability of the measure may change over time. In addition, an empirical key may lose stability in prediction over time as the performance dimensions and criterion change. Nonetheless, this does not mean that the measure is not reliable. Overall, biodata can be a reliable and valid measurement tool when constructed carefully and used properly.

Personality measures are also evaluated by the internal consistency of the items relative to one another. Personality measures are typically summated rating scales,

and measurement researchers would argue for internal reliability coefficients, or "alphas" to be at least .70 before using the measure (Nunnally & Bernstein, 1994; Spector, 1992). However this is not always the case. Nonetheless, measures of the Big Five Factors have reported internal consistency alpha levels of each factor that are above .70 (Mount, Witt, & Barrick, 2000; Shafer, 2000).

Generalizability also becomes suspect when using personality or biodata measures in selection processes due to the potential problems due to faking and social desirability (Hough & Oswald, 2000). Social desirability becomes an issue when the measure is used for selection because many applicants want to give a favorable impression. The social desirability of the responses is judged based on the social norms of the times, or what the participant thinks "should" be the best answer. Many personality researchers have used lie scales or social desirability scales as part of their measures to minimize this inaccurate responding or "fake-good responding", but this is never foolproof (Hogan, 1991). Depending on the measure and how it is used in selection decisions, the predictive validity information assessed may or may not be related to other jobs or organizations.

Personality items have also been viewed as transparent, and therefore, reliability and validity estimates may also fluctuate based on social desirability of the answers (Kilcullen, et al., 1995). Due to the transparent nature of personality items, faking an item can mean a loss in validity (Kilcullen, et al., 1995; Mitchell, 1994). But biodata may be more resistant to faking due to the advantage that the "right" answers are less transparent to the participant (Kilcullen, et al., 1995; Mitchell, 1994).

Biodata may also be less susceptible to distortion with more objective items (Lautenschlager, 1994). Respondents may also be less likely to alter a response to a biodata item when the item can be verified, or is historical and factual in nature (Mitchell, 1994).

McFarland and Ryan (2000) compared a biodata measure and a Big Five measure of personality in regards to honest and faking response conditions. Half of the participants were instructed first to respond in a way that would give them a high score and look good for a job, while half of the participants were instructed to answer honestly. Then, the conditions were reversed for the participants so that each responded to both conditions. The results were surprising to the authors in that the biodata measure was overall easier to fake, however those participants that were able to fake well on one measure (increasing their scores) were more likely to fake just as well on the other measure. Interestingly however, when the five personality factors were analyzed separately for individual differences in participants, results indicated that two personality factors in particular influenced the results in a unique way. Those who were high in Conscientiousness faked the measures to a lesser degree than those low in Conscientiousness. In addition, those who were high in Neuroticism faked the measures to a greater degree than those low in Neuroticism. Therefore, although the biodata measure was slightly easier to fake than the personality test overall, individual differences still may make a difference in the degree of faking that occurs.

Distinguishing the Differences Between Personality Measurement and Biodata

Several researchers have outlined some of the major differences between personality and biodata, as well as areas of disagreement with other researchers in the field. Asher's (1972) account of the differences outlines the dimensions of biodata, which has come to be known as Asher's Taxonomy. Asher's Taxonomy states that items are classified as either personality or biodata based on how they fall on a continuum in each of eight dimensions, outlined in Table 1. Asher's (1972) Taxonomy dimensions are: (a) Verifiable to Unverifiable, (b) Historical to Futuristic, (c) Actual Behavior to Hypothetical Behavior, (d) Memory to Conjecture, (e) Factual to Interpretive, (f) Specific to General, (g) Response to Response Tendency, and (h) External Event to Internal Event. From this taxonomy, one can examine how personality measurement is different, based on the continuum of his taxonomy. For example, using the External Event- Internal Event dimension, biodata items are more related to external events, whereas personality items tap internal thoughts and ideas. The items are considered to be personality items when they fall along the right extreme side of the continuum of the eight dimensions. Therefore, personality items would be: unverifiable, futuristic, measure hypothetical behaviors, conjecture, interpretive, general, measure response tendencies, and internal events. Biodata items are therefore on the side of verifiable, historical, actual behaviors, from memory, factual, specific, have a response, and refer to external events. There is disagreement among researchers in the field regarding whether or not an item must conform to the biodata end of the continua on all eight dimensions, or on some but not all of the dimensions to be considered a biodata item.

Table 1: Asher's Taxonomy of Biodata and Personality

Biodata	Personality
Verifiable	Unverifiable
Historical	Futuristic
Actual Behavior	Hypothetical Behavior
Memory	Conjecture
Factual	Interpretive
Specific	General
Response	Response Tendency
External Event	Internal Event

Asher (1972) gave recommendations about writing biodata measures which are still followed today such as: including all possible responses and an escape option ("does not apply to me" response), using specific and real situations in the question stems, using multiple choice as responses, and using item analysis as part of the scoring process. Asher's work (1972) hallmarks the first attempt to concretely distinguish biodata items from personality items, and it is still used in part today to classify items and measures.

Mael (1991) also tried to clarify the domain and attributes of biodata and update the classification system, by examining the difference between biodata and temperament items, which are akin to personality to some researchers. Mael's view is that biodata items are gleaned from a larger area of individual differences data by getting information about actual behaviors that reflect interests, values, skills, and aptitudes. Biodata can also encompass work situations, abilities and motivation. Mael (1991) stated that "Biodata measures attempt to capture both the personal identity and the range of social identities, while temperament measures deal primarily with the personal identity." (p. 769). Biodata items measure actual behaviors, while temperament items may not. Mael also gave attributes of biodata that make it different from personality items, and some of them (such as historical, external, verifiable) have been mentioned previously. Other attributes of biodata that make it different from personality are: biodata items are objective and first-hand; deal with discrete actions and single behaviors; and are under the control of the respondent (controllable). Situational items are equally accessible to the majority of the respondents, items are

visibly job relevant, and biodata items minimize invasion of privacy. Mael (1991) also suggested that in selection procedures, biodata items should always be historical, and there should always be a justifiable reason for including an item that may be legally challenged. The researcher should always consider sample sizes, base rates, variance, and range restriction issues in relation to each scale. Personality measures do not usually examine these issues, nor do they ensure that the items are under the control of the respondent, or are visibly job relevant. Not only do these attributes differentiate biodata from personality, they may make biodata a better predictor than personality.

Other researchers attempted to examine biodata along a continuum of "hard" items and "soft" items within Asher's Taxonomy (Shultz, 1996). "Hard" items are inherently more historical and verifiable, whereas "soft" items are more private and unverifiable.

With the many varied differentiation methods used in attempting to distinguish personality and biodata measures, it is easy to be confused about what the distinctions are between them. These issues need to be clarified for future researchers, as well as for the benefit of current consumers of these selection tools.

Studies Investigating Both Biodata and Personality

The main thrust of the current study is to investigate the similarities and differences between biodata and personality measurement. A number of recently published studies have indicated these relationships are areas of interest to be explored further. The studies described in this section have attempted to examine these two

measurement methodologies; each has its own particular strengths and weaknesses. Unfortunately, results are inconsistent across studies due to definitional issues of personality, biodata, criteria selected, and limitations of generalizability.

In a recently published article, Chait, Carraher, and Buckley (2000), attempted to examine the relationship between a biodata measure and service orientation. In this study, the biodata items were subjected to a principal components analysis, and five factors emerged that closely resembled the Big Five. The authors suggested that "a personality instrument in the biodata format, might be a useful tool to consider for selecting individuals for service-related positions" (p. 115).

Shultz (1996) examined possible models for hard biodata, soft biodata, and personality. Personality was defined with three constructs, or traits, and therefore a three-trait by three-method matrix was formed. In the beginning of the Shultz (1996) study, twelve personal traits were identified and grouped into four general constructs. Three of these traits were used as personality constructs: Dependability, Demeanor, and Ambition. In terms of the Big Five Factors, the three traits can be interpreted as follows: Dependability is similar to Conscientiousness in that concepts involved getting to work on time, and completing assignments in a timely manner. Demeanor is similar to Agreeableness in that concepts involved ability to get along with others, and Ambition is similar to Openness to Experience because it represented the person's willingness to ask for additional work, and ability to adapt to new situations. All items were classified either as hard biodata, soft biodata, or personality items by three individuals, and then analyzed using a principal components analysis to reduce the

total number of items. The results of analysis yielded 19 personality items, nine soft biodata, and nine hard biodata items. The three highest loading items were retained for each personality factor, resulting in nine items. Two items were retained for each of the three biodata trait factors (Dependability, Demeanor, and Ambition), resulting in six items for hard biodata and six items for soft biodata. Preliminary confirmatory factor analysis was performed using the 21 items (nine personality and six hard and six soft biodata items).

Four models were examined as they applied to the nine resulting scales, and then tested and cross-validated using confirmatory factor analysis. Model A included two factors: personality, which included the personality items and the soft biodata items, and a hard biodata factor. Model B included two factors: personality with only the personality items, and a biodata factor with both hard and soft biodata. Model C included two factors: personality with personality items and soft biodata items, and a biodata factor of hard and soft biodata items. Model D included three factors: personality with only personality items, hard biodata, and soft biodata.

The best, most parsimonious model according to the data was the model in which personality items and soft biodata items represented one factor and hard biodata items represented another factor (Model A). However, it should be noted that Model B which was designed so that soft biodata items loaded on a general biodata factor, was not much different than Model A in terms of the goodness of fit indices. Noting this, Model A and Model B are not that much different. The author then indicated that soft biodata may blur the distinction between personality and biodata, and these items

should be viewed with caution. At a theoretical item development level they may be distinct, but at a psychometric measurement level they may be similar to personality items.

As described, Shultz (1996) used confirmatory factor analysis techniques to find a model that best fit the differences of hard and soft biodata to personality. In this case, soft biodata items were better viewed as personality items. However, the personality measure that Shultz (1996) used was an unknown measure written by Shultz based on his own taxonomy. In addition, Shultz did not examine any uses of the measures. The measures were not compared via utility in predicting a criterion, and therefore, do not answer the questions about the differences between the two measures completely.

Shafer (2000) compared personality and biodata by using personality to predict biodata results. As part of a larger study, this research examined the relationship of the Big Five and biodata. Participants (n=210) completed The Bipolar Big Five Markers (written by the author) and a Biodata Questionnaire. The Bipolar Big Five Markers consisted of 30 items that were based on previous measures constructed by Goldberg and Saucier (Shafer, 2000). Each of the five factors consisted of six items. Each item included two contrasting traits rated on a nine-point scale. The Biodata Questionnaire was developed for the study based on biodata measures already in use. Through factor analysis, seven factors were identified for the biodata measure. The seven factors were: psychological problems vs. adjustment, cultural and artistic interests, poor financial habits, good work habits, social activities, aggression, and

academic interests and achievement. Multiple regression was used to assess the unique contribution of each of the Big Five Factors in predicting the biodata factors.

The regression analyses demonstrated that the Big Five are a good set of predictors of the biodata factors. For example, the Conscientiousness factor of personality was a significant predictor of Academic Interests and Achievement. Results also indicated that each of the Big Five Factors was significantly associated with at least one biodata factor. The personality factor of Openness was a strong predictor of the biodata factor of Cultural and Artistic Interests, while the factor of Extraversion was a strong predictor of the biodata factor of Social Activities. Accordingly, Agreeableness was a (negative) predictor of Academic Interests and Achievement, and Neuroticism was a strong predictor of the biodata factor of Psychological Problems versus Adjustment. In addition, Conscientiousness and Extraversion had the most associations with the biodata factors. Each of the Big Five factors was a significant predictor in four regression equations. Consequently, this study indicated that biodata is related to the Big Five, and can be predicted by personality. However, biodata was not used comparatively in prediction against (or with) personality to predict a separate criterion. Shafer (2000) does demonstrate the overlap and similarities between the measures, however it is still difficult to draw conclusions for the purpose of use in an organizational context.

Addressing the differences between a Big Five measure of personality and a biodata measure, Allworth and Hesketh (1999) used biodata and the Big Five personality constructs, as well as cognitive factors, to predict job performance (task,

contextual, and adaptive) in the hotel hospitality industry. The personality measure used was Goldberg's Adjective Checklist, which is a measure that consists of 100 adjectives self-rated on a five-point scale. This measure has been used in previous research to measure the Big Five, and has established similar comparisons with the Hogan Personality Inventory and the NEO-PI (Neuroticism, Extraversion, Openness-Personality Inventory) (Allworth & Hesketh, 1999). The biodata measure was developed rationally, and then analyzed using principal components analysis to determine three factors, or scales, that were related to change, and three factors that were related to context. The change-related scales were: experience of change, coping with change, and self-efficacy for change. The coping with change scale was divided into three factors: positive coping, negative coping, and support mobilization. The contextual biodata scales were: customer service experience, experience with people, and goal-setting/effort. Results showed that the five factors of personality were significantly correlated with different scales of the biodata measure.

Multiple regression of the performance measures on the predictors (biodata, personality and cognitive ability) indicated that the change-related biodata strongly predicted all four of the performance dimensions (overall, task, contextual, and adaptive). Then, the personality measure was split into two areas, change-related personality in one area (Openness to Experience and Emotional Stability), and nonchange (Conscientiousness, Extroversion, and Agreeableness). Only the non-change grouping was as strong of a predictor of performance as biodata and only for one criterion. The nonchange personality grouping was only as strong as biodata in

predicting task performance. Hierarchical multiple regressions were also performed and determined that biodata added incremental validity over and above the cognitive measure in predicting all measures of performance. However, a multiple regression was not reported to determine the contribution of biodata over and above the personality measure, an extending step that should be researched further.

Solomonson (2000) developed a rationally based biodata measure of 17 internally consistent scales (yielding three general components: citizenship, socialization, and adjustment) and as part of a larger study, examined the relationships between his measure and Goldberg's Five Factor Markers (FFM) measurement of the Big Five Factors of personality. Although the biodata measure was developed to predict job performance, the results were still interesting in that the biodata total scale, and individual scale scores were related to three of the five factors of personality measured. The total biodata measure was significantly and positively related to the Big Five composite score ($r = .64$, $p < .01$). The biodata total score was related to each of the five factors in the following ways: Agreeableness ($r = .48$, $p < .01$), Conscientiousness ($r = .44$, $p < .01$), Emotional Stability (Neuroticism) ($r = .34$, $p < .01$), Extraversion ($r = .14$, $p < .01$), and Openness to Experience ($r = .04$, ns). This study supports the notion that biodata and personality measures are related, and have been compared in predicting criteria such as job performance. However, this author did not develop the biodata measure to specifically tap the same dimensions as the personality measure (FFM).

McManus and Kelly (1999) looked at the incremental validity of a personality measure to a biodata measure in predicting task and contextual job performance in the life insurance industry. Job performance was used as the criterion in this study predicted by biodata and personality. This study used an existing biodata measure in the life insurance industry- the Initial Career Profile (ICP), and a personality measure developed by the authors to measure the Big Five Factors through attributes relevant to the position as identified using a job analysis. The attributes were assigned by the authors to one of the Big Five Factors and items were developed for each attribute. The Extraversion facets developed were sociable and assertive. The Agreeableness facets were polished, tasteful, and considerate. The Conscientiousness facets were achievement-oriented, conscientious, and perseverance. The Emotional Stability facets were self-confident, and well-adjusted. The Openness to Experience facet was analytical. Hierarchical regression was used to determine the incremental validity of the personality scales above and beyond the biodata measure on the performance criterion. Results indicated that the five factors of personality increased the variance explained from 6% using only the ICP to 23% (with the personality measure) of contextual performance. However, for task performance, personality did not add significantly to the biodata measure.

In a recent study, Mount et al. (2000) examined the incremental validity of empirically keyed biodata over and above the five factors of personality and general mental ability (GMA). The four criteria used in the study were: quantity and quality of work, problem-solving performance, interpersonal facilitation, and retention

probability. The biodata measure used 138 items selected to predict each criterion. These items were rationally divided into four sub-scales before using empirical keying to predict the criteria. The four sub-scales were: work habits, problem-solving abilities, interpersonal relations skills, and situation perseverance. The Personal Characteristics Inventory was used as the measure of the Big Five Factors. The Personal Characteristics Inventory is a measure of the Big Five developed by Barrick and Mount (1998) and is widely used for personnel selection.

Because job tenure may have influenced the results, it was entered first in the regression equations to control for its effect. General mental ability was entered second, personality third, and the biodata scale was fourth. A regression equation was computed for each of the four criteria. Biodata added significant variance over and above general mental ability and personality in predicting three of the four criteria: quantity and quality of work ($\Delta R^2 = .06$, $p < 01$), interpersonal facilitation ($\Delta R^2 = .07$, $p < 01$), and retention probability ($\Delta R^2 = .09$, $p < 01$). However, biodata only added marginally, ($\Delta R^2 = .02$, $p = .07$) to the prediction of problem solving. What these results indicate though, is that biodata does add significant variance over personality in predicting these criteria. Conversely however, Mount et al. (2000) state that when the personality and general mental ability were examined to determine their contribution above and beyond biodata, less incremental validity was accounted for in the performance criteria. But, the authors do not report these statistical results. More support was given for the differences of personality and biodata by the authors in that personality and biodata were not assessing the same constructs.

This research by Mount et al. (2000) clearly shows that biodata added significant variance above and beyond that which was accounted for by the five factor model of personality, in predicting work-related criteria. The biodata information was shown to be correlated with the FFM, but they did not overlap completely. However, the biodata inventory was not designed to measure the same constructs as the Big Five Factors. The researchers showed that using both kinds of measures can maximize validity, however, for the sake of practicality, not all businesses have this luxury. If one wants to have the better of the two predictors, this study alone does not answer that question, although it is suggestive of the importance of the use of biodata.

Mael and White (1994) overcame some of these issues by using both personality and biodata as predictors when they empirically tested the ideas brought forth by Mael in 1991. Mael and White (1994) as part of a continual study, used objective biodata that were empirically keyed directly to temperament scales using the ABLE (Assessment of Background and Life Experiences form from the United States Military Academy- West Point). This resulted in biodata items that were highly correlated with the temperament measure. These biodata items were then used to predict multiple criteria. The main goal in this research was to create biodata scales that were parallel to temperament scales and then examine whether or not they accounted for unique variance in the criteria. So, instead of determining the differences in the measures, the researchers attempted to tap the similarities in the measures and created five biodata scales similar to the five subscales from the ABLE. The ABLE subscales were: Emotional Stability, Dependability, Work Orientation,

Dominance (leadership), and Energy. Therefore, the subscales that were created from the biodata to be similar to the ABLE were known as Bio-Emotional Stability, Bio-Dependability, Bio-Work Orientation, Bio-Dominance, and Bio-Energy. Three criteria measures were available: leadership capability from Cadet Basic Training (measured six weeks before classes), demonstrated leadership capability ratings from the end of the first semester, and leadership ratings from field training following the first year.

The results indicated that the biodata scales closely approximated the corresponding temperament scales. Correlations for each ABLE subscale and its biodata subscale counterpart ranged from .37 to .53. The biodata scales were then used to predict unique variance in the leadership criteria. Overall, the ABLE and the Bio-ABLE added incremental validity to one another when entered in a regression equation separately. Each of the biodata scales were significantly related to end of the semester leadership ratings. All of the biodata scales except bio-dependability were related to the field training leadership criterion, and biodata added significantly to the ABLE measure. Cross-validation was conducted with a different sample and comparable results were found, as well as little shrinkage. Mael and White (1994) indicated that it is possible to create an objective biodata measure that is similar to a temperament measure, which adds incremental validity to the prediction of leadership.

Mael and White (1994) offered valuable insight and supported the notion that biodata measures can be constructed to tap temperament (likened to personality measures), and still be valid predictors that add incremental validity to personality in

predicting performance. However, this study used a temperament measure specific to the military as a personality measure, and not a widely-used measure of the Big Five Factors of personality.

Overall, the results from these studies have contributed to the research available investigating personality and biodata. Biodata has been found to add incremental validity above temperament or personality in predicting various measures of job performance (Mael & White, 1994; Mount et al., 2000). Personality has also added incremental validity to biodata in predicting job performance (McManus & Kelly, 1999), personality has been used to predict biodata information (Shafer, 2000), and personality factors and biodata factors have been related in previous studies as well (Mael & White, 1994; Solomonson, 2000).

Shultz (1996) and Shafer (2000) indicated that there are differences in personality and biodata. However, each study using this approach has fallen short of answering the current questions completely. The Allworth and Hesketh (1999) study falls short of examining the relationships between biodata and personality in the manner which would determine the incremental validity of each in predicting a specified criterion. In addition, while they have used a more accepted measure of the Big Five, their biodata measure was developed to maximize the relationship with the criteria, and not to mimic the Big Five. However, in the current study, a widely-recognized Big Five measure and a biodata measure written specifically to tap the Big Five constructs were compared based on incremental validity added in predicting a criterion. In addition, the current study examined what each adds to the other, as well

as the correlations between the Five Factors and the biodata scales. Similarly, Mael and White (1994) used a temperament measure specific to the military as their personality measure, and not a widely used measure of the Five Factor model. In addition, the current study did not use performance as a criterion, or a specific job sample such as in Allworth and Hesketh (1999). The current study encompasses a wider range of jobs, and different criteria than the previous studies. Mount et al. (2000) and Solomonson (2000) both attempted to use a wide range of jobs and different criteria than previous studies, however their biodata measures were performance-related as opposed to a biodata measure intended to measure the Big Five.

In conclusion, each of these studies contributed to the knowledge that we already have about biodata and personality. However, none of the previous studies specifically examined the relationship of a biodata measure written uniquely to tap the Big Five Factors and a common, accepted personality measure of the Big Five Factors. The current study examined the relationships of a biodata measure written to tap the Big Five Factors and a personality measure of the Big Five Factors, to predict job satisfaction and student achievement, as well as examined the perceptions of both measures. In this way, the differences and similarities of the measures themselves were compared without regard to variables measured. While specific item content may vary, the constructs were the same. The incremental predictive validity of a biodata measure over and above a personality measure, as well as the incremental validity of personality above and beyond biodata, were examined to determine which

is a better predictor. Each of the criteria were selected for unique purposes, and are detailed below.

The current study is also different from prior studies in that it examined two criteria not previously used in the studies examining both personality and biodata: job satisfaction, and academic achievement. In addition, this study investigated whether the two measures are different in terms of applicant perceptions of fairness, job relevance and utility.

Criteria Selection

Job satisfaction. The first criterion selected to examine was job satisfaction. Job satisfaction has been researched in the industrial/organizational psychological literature for many years. However, job satisfaction is usually tied to predictors such as salary and wages, environmental or working conditions, and organizational factors (see Bloom, 1999; Somers, 1999). Job satisfaction has also been linked to turnover and retention. Recently, it has been examined with regard to various aspects of personality.

Job satisfaction has not been used often as a criterion for biodata, although researchers have indicated that the relationship between job satisfaction and biodata should be examined (Stokes & Cooper, 1994). Due to the current lack of research in this area, only one study was found in the literature searches that examined the relationship between biodata and job satisfaction. Shaffer (1987) investigated patterns

of work and nonwork satisfaction using different measures of biodata taken at different time periods. The author purported that there may be different groups of individuals with different moderators of satisfaction, and thus, different satisfaction profiles. Three types of psychologically important variables were used in this study: background, work-related, and nonwork related variables. Background variables included things such as family history, SES, social activities, and sports participation. Work related variables were such things as career success, and intentions to leave a job. Nonwork related variables were personal aspects such as leisure activities and religious involvement. The purpose of the study was two-fold. First, the presence of subgroups was examined in participants that shared similar internal profiles, but had different profiles of work and nonwork satisfaction. Secondly, the complex relationships of background, work and nonwork related factors, and satisfaction were examined and expected to vary across the subgroups of participants.

Shaffer (1987) used the Post College Experience Inventory (PCEI), a 97-item measure about job activities, job-seeking behavior, leisure activities, religious involvement, and other adult life experiences measured six to eight years after graduation. In addition, the Biographical Questionnaire (BQ 118) was used, which consisted of 118 items in component scores relating to parental relationships, SES, sports participation, and social activities which were collected when the participants were freshmen. The goal of this research was to determine the relationships between biodata information and satisfaction later in life. To do this, a subgrouping

methodology was used to categorize the participants into different groups based on profiles of satisfaction, and identify biodata factors relating to these different groups.

From the PCEI instrument, work and nonwork variables were identified. Twenty PCEI items were identified for work and nonwork satisfaction and were subjected to a principal components analysis. This analysis showed that for men five factors (two nonwork, three work) emerged, and for women four factors (two work and two nonwork) emerged. For the men, the work related satisfaction factors were job, job relationships, and pay. The nonwork related satisfaction factors for men were relationships and leisure activities, and environment. For the women, the two work related satisfaction factors were intrinsic job elements, and extrinsic job elements. The two nonwork related satisfaction factors for women were personal and social relationships, and environment.

Then, a cluster analysis was used to group participants with similar patterns of satisfaction. From the subgrouping, five male subgroups emerged: generally satisfied individuals, nonwork compensators, work compensators, materially dissatisfied individuals, and generally dissatisfied individuals. Generally satisfied individuals scored high on most of the satisfaction factors. Nonwork compensators scored highest on nonwork satisfaction factors, and lower on work related satisfaction factors. Work compensators scored highest on the job relations and pay factor, but were also dissatisfied with other work related satisfaction factors. Materially dissatisfied individuals were dissatisfied with pay and environment factors. Generally dissatisfied

individuals scored low overall on all of the satisfaction factors, both work and nonwork related.

Using the same method, six female subgroups emerged: generally satisfied individuals, generally dissatisfied individuals, nonwork compensators, materially dissatisfied individuals, dissatisfied isolates, and work compensators. Generally satisfied individuals scored high on all four satisfaction factors, whereas generally dissatisfied individuals scored low on all four factors. Nonwork compensators scored lowest on work related satisfaction factors, but scored highest on nonwork related factors such as personal and social relationships. Materially dissatisfied individuals were the most dissatisfied with extrinsic job elements. Dissatisfied isolates were most dissatisfied with intrinsic job elements, and were also dissatisfied with personal and social relationships. Work compensators were most satisfied with both extrinsic and intrinsic job elements, but were least satisfied with personal and social relationships.

Results showed that several background data factors varied across subgroup membership for men and women. For example, the generally satisfied group had better parental relationships than the dissatisfied group. SES also varied for men and women such that the generally dissatisfied women came from a much lower SES background than the generally satisfied women. For sports participation and social activities, variation was significant across only the male subgroups. The satisfied men's group participated in more athletic activities in high school than the work compensators group and was more socially active in high school than the generally dissatisfied men's group.

Work-related variables showed differences for men and women as well. For example, the men in the satisfied subgroup were more financially successful than the men in the nonwork compensators subgroup. For the women's subgroups, the work compensators were more financially successful than any of the other subgroups.

Likewise, nonwork-related variables also showed gender differences such that the men who were generally satisfied or were nonwork compensators had higher social and civic involvement than the other subgroups. The satisfied subgroup of men also had more reading activity than the other subgroups. The women who were in the nonwork compensators subgroup spent more time on hobbies than the women in the other subgroups. The women's subgroups of nonwork compensators and the generally satisfied subgroup also indicated more social involvement than the other subgroups of women. Although these differences between subgroups show that biographical information can be used to meaningfully group individuals in terms of work and nonwork-related satisfaction, the information was not used to predict satisfaction. Finally, this study did not use any current measure of job satisfaction, but rather evaluated job satisfaction using biodata items.

On the other hand, personality has been studied in relation to job satisfaction in numerous ways. Tokar and Subich (1997) examined the relative contributions of personality dimensions to the prediction of job satisfaction (for various occupations) over and above congruence (a match between personality and vocational personality). Personality was measured using the NEO-Five Factor Inventory (NEO-FFI Form S, Costa & McCrae, 1992, as cited in Tokar & Subich, 1997) which is a 60-item self-

report measure of the five factors of personality. Job satisfaction was measured by the Hoppock Job Satisfaction Blank (Hoppock, 1935, as cited in Tokar & Subich, 1997), a four-item self-report measure of global job satisfaction. Congruence was measured with the Self-Directed Search (Holland, 1985, as cited in Tokar & Subich, 1997). Results indicated that two of the five personality factors were significantly correlated with job satisfaction. Extraversion was significantly positively related to participant's ratings of job satisfaction ($r = .16$, $p < .01$) and Neuroticism was significantly negatively related to participant's ratings of job satisfaction ($r = -.18$, $p < .01$). Personality factors accounted for a significant increment in the variance of predicting job satisfaction over and above congruence measures [$R_{inc}^2 = .05$, $F_{inc}(5,388) = 3.67$, $p = .003$]. Neuroticism ($\beta = -.14$) and Extraversion ($\beta = .11$) were unique predictors of job satisfaction and followed the directions the correlations suggested.

This negative relationship between neuroticism and job satisfaction was also supported by Judge, Bono, and Locke (2000). This study was mainly designed to test the mediating effect of job characteristics between personality and job satisfaction, and examined neuroticism as one of the core specific traits. Neuroticism was measured by twelve items from the Eysenck Personality Inventory, job satisfaction was measured by a five-item measure used by Brayfield and Rothe (1951), and a three-item global satisfaction measure (Judge, Boudreau & Bretz 1994). Again, a significant negative relationship was found here between each job satisfaction measure and Neuroticism ($r = -.27, -.28$, respectively, $p \leq .01$).

One research study in particular focused on Extraversion and Neuroticism and their influence on subjective well-being, a much broader variable than job satisfaction. Costa and McCrae (1980) examined these two factors of the Big Five before they were studied in relationship to job satisfaction, and their results lend explanatory support as to why Extraversion and Neuroticism are found to be valid predictors of job satisfaction. Positive affect is a component of Extraversion and negative affect is a component of Neuroticism. Results indicated that persons who have high levels of Extraversion have higher levels of subjective well-being, and are "happier." Those with high levels of Neuroticism have lower levels of subjective well-being and are "unhappy." Taken further, this could explain why one would expect an overall happy person to be content with many aspects of his/her life, and vice versa. Therefore, we could reasonably expect that persons with high levels of positive affect are more likely to be satisfied with their jobs, and persons with high levels of negative affect are more likely not to be satisfied with their jobs. This expectation has been supported by Duffy, Ganster, and Shaw (1998). Participants who were higher in positive affect as measured by Extraversion also rated themselves as higher in job satisfaction.

Cawsey, Reed, and Reddon (1982) examined the relationship of personality and job satisfaction using the Personality Research Form to measure personality, and the Job Descriptive Index (JDI) to measure job satisfaction. Their results indicated that Social Desirability as a factor of the PRF accounted for the largest component of job satisfaction, followed by Achievement, Autonomy, Affiliation, and Abasement. When all five predictors were used together, the multiple R was .53. Autonomy was

the only variable negatively related to the criterion. Because this scale was not mapped onto the Big Five Factors, conclusions cannot be made explicitly, although similarities can be noted between these scales and the five factors. For example, Affiliation can be likened to Extraversion, and Abasement can be likened to lower degrees of Agreeableness, (antagonism). Affiliation is defined by a desire to form a relationship with another, or to be associated with others, and Extraversion includes a component of friendliness and sociability as well. Abasement includes a component of humiliation of another, and low degrees of Agreeableness are associated with antagonistic behavior.

In a later study, Gellatly, Paunonen, Meyer, Jackson, and Goffin (1991) evaluated the variables of personality, vocational interest, and cognitive ability as predictors of first-line managerial performance and job satisfaction. Due to the irrelevance of several of these variables to the current study, personality and job satisfaction will be the focus of the results presented here. Personality was measured by the Personality Research Form-E (PRF-E), a self-report measure of twenty-two 16-item scales. Job satisfaction was measured by the Index of Organizational Reactions (IOR), a self-report measure of eight dimensions of work (42 items). The dimensions were supervision, company identification, kind of work, amount of work, coworkers, physical work conditions, financial rewards, and career future. A composite score was used to measure overall satisfaction. Results indicated that personality was related to overall job satisfaction. However, because the measure was not broken into the Big Five Factors, interpretation rests on the six factors used in this study: (a) Impulsive,

(b) Accommodating and Helpful, (c) Sociable, (d) Enjoys routine, (e) Self-Reliant, and (f) Hardworking. The Impulsive factor had the strongest correlation with job satisfaction ($r = -.28$, $p < .05$), followed by Enjoys Routine ($r = .23$, $p < .05$). When verbal and numerical aptitude were controlled for using partial correlations, only Impulsive remained significant ($r = -.29$, $p < .05$).

Therefore, to make a broad generalization to the Big Five Factors is difficult, but it appears that through their definitions, Impulsive is similar to Neuroticism, which has also been shown to have a negative relationship with job satisfaction (Judge et al., 2000). These factors could by definition be extrapolated to relate to the Big Five, such that Impulsive could be positively related to Neuroticism, and Enjoys Routine could be negatively related to Openness to Experience. Impulsive was described as someone who behaves without regard to others (feelings), to act without deliberation, and in a disorganized fashion; while Enjoys Routine was described as not liking new and different experiences and not being intellectually curious. This line of research, when the factors are viewed as similar to the Big Five Factors, is consistent with other research findings in the literature. Likewise, when entered in a hierarchical regression equation, Impulsive was a significant predictor of job satisfaction. Conclusions indicate that first-line managers who are uninhibited, disorderly and impulsive are less satisfied with their jobs.

Research conducted by Judge, Higgins, Thoresen, and Barrick (1999) was unique in that it was a longitudinal study using information collected beginning in 1928 and continuing until the participants were of retirement age. Personality was

assessed using a California Q-set of items that were factor analyzed to resemble the Big Five Factor structure. In this study, career success was split into two dimensions, intrinsic and extrinsic. Intrinsic career success was also interpreted as job satisfaction and was measured using an eight-item scale consisting of items measuring satisfaction with income, satisfaction with degree to which work involves interests, satisfaction with coworkers, satisfaction with use of skills and abilities, satisfaction with supervision, satisfaction with respect to what others give to the job, satisfaction with ability to develop ideas on the job, and satisfaction with job security. General mental ability was also measured using intelligence tests; the Stanford-Binet was used when the participants were younger and the Weschler Adult Intelligence Scale as adults. Results showed that of the five factors of personality, three were significantly correlated with job satisfaction. Openness to Experience ($r = .21$, $p < .05$) and Conscientiousness ($r = .40$, $p < .01$) were positively related to job satisfaction. As with other studies, Neuroticism was negatively related to job satisfaction ($r = -.22$, $p < .05$). Although the correlations indicated that these three factors are related to job satisfaction, when they were entered into a regression equation together to predict job satisfaction, Conscientiousness remained the only significant predictor ($\beta = .34$, $p < .01$). Results also showed that the Big Five Factors explained significant incremental variance in job satisfaction when controlling for general mental ability ($\Delta R^2 = .09$, $p < 01$). Not surprisingly, adulthood measures of personality explained more variance in job satisfaction than childhood measures of personality. Therefore, in this study one can conclude that high Conscientiousness is related to higher feelings of job

satisfaction. Also, due to the decrease in variance explained when controlling for general mental ability, these authors conclude that general mental ability should be measured and accounted for when examining the predictive validity of personality. This study is the most recent, and as of yet, the only longitudinal study of personality and job satisfaction.

In a meta-analysis presented by Judge, Heller and Mount (2001) at the annual Society for Industrial and Organizational Psychology conference, job satisfaction was moderately related to Neuroticism, Extraversion and Conscientiousness, but not Agreeableness or Openness to Experience. These authors suggest that using the five-factor model is a useful basis from which to examine dispositional aspects of job satisfaction. Their meta-analytic results are in line with the general overall research presented earlier. However, in the current study, only Conscientiousness was significantly related to job satisfaction. Judge et al. (2001) did not account for age or tenure in their meta-analyses, and this too could impact the complex relationship that job satisfaction has with other variables.

To summarize, the five factors of personality have been successfully linked to job satisfaction. For example, Extraversion was found in several studies to be positively related to job satisfaction (Judge et al., 2000; Tokar & Subich, 1997), and Neuroticism was negatively related to job satisfaction (Judge et al., 1999, 2000; Tokar & Subich, 1997). Moreover, Openness to Experience and Conscientiousness were positively related to job satisfaction (Judge et al., 1999).

Information resulting from the current study can augment the available literature relating biodata (Shaffer, 1987) and personality to job satisfaction (Judge et al., 2000), as well as providing a comparison to the published results presented using personality variables. This study adds to the very minimal research on biodata and job satisfaction (only one study was identified), and provides a direct comparison of the predictive validity and utility of both personality measures and biodata as predictors of job satisfaction. As of yet, job satisfaction has not been used as a criterion for biodata and personality in the same study to determine which is a better concurrent predictor.

Student achievement. Student achievement was selected as the second criterion variable in this study. Historically this variable has been added almost haphazardly to research as a "demographic" variable, and then analyses conducted to determine if results differ for different students of varying levels of academic achievement. Prediction of academic achievement may arise in many disciplines, in addition to psychology, as this variable and its antecedents still remain a mystery to some. Academic achievement has been conceptualized in different ways, from study to study, and country to country, making it difficult to synthesize the findings. However, biodata and personality research that has attempted this connection is described below.

Logically, biodata would appear to be a relevant predictor of academic achievement information. Academic achievement is varied between persons, and biodata is useful because it attempts to examine the historical life events that may have influenced the academic achievement results of many students. This link between

biodata and student achievement is not a highly researched area, and this study proposes another link in this line of research.

Melamed (1992) offers an interesting framework in which the attempt was made to study biographical information and student achievement. The durability of biographical information, both empirical and rational, was examined in a "longitudinal" study of their relation to academic success in the United Kingdom. Essentially, the longitudinal aspect of the design was that information from the 1960s was used to predict information in the 1990s. It was expected that the indicators of previous academic achievement would continue to be useful over time, but that other items not directly related to academic achievement would not be as stable over time. The criteria of academic success are somewhat different than in the USA. Grade point average (studied as GPA in the United States) was not predicted, but rather academic 'grade level' such as A-level, F-level in the United Kingdom. (This grading system was changed in the study numerically to mimic the USA system). Also, the 'biodata' utilized wasn't a biodata questionnaire necessarily, as defined previously, but rather 15 pieces of information gathered from admissions applications. Information considered to be biodata in this study were such things as age, gender, first names, and personal comments about participating in group activities. Usually, information such as age, gender, etc. does not fall under our definition of biodata (although participating in group activities is close), and should be viewed with caution, as other studies may likewise use the term biodata, when in fact are using mostly demographic information. Range restriction was mentioned as a problem as well. Nonetheless, results showed

that biodata was significantly and positively correlated with degree grades and graduation. The biodata that correlated with degree grade was comprised of age, the type of psychology degree, referee comments (comments from a 'judge' on whether or not they used all of the space on the form), and partaking in group activities. The biodata that correlated with graduation was comprised of gender, age, personal comments (if the applicant used all of the personal comment space), partaking in group activities, and first names (three or more versus two or one). Melamed (1992) then suggested that biodata was not a good predictor of future academic success and that the validity decayed over time. However, one must remember that the types of items they used (i.e. age, type of degree, and the amount of space left blank on the application) are not indicative of the items we consider today to be life-history biodata. This study should not be considered as representative of the results of predicting academic success with traditional biodata.

However, Wilder (1992) came closer to using traditional biodata to predict student achievement in a study that examined academic "decliners" versus "maintainers" in college. The decliners showed a 20% decrease in their academic GPA from the first semester to the second and third semesters. Maintainers showed an improvement in GPA or sustained the same level. This population was selected as a specific group in which to look at retention efforts in this study. The biodata form utilized in this research was successful in predicting the academic group in which the student would be classified. Differences between decliners and maintainers were based on differences from the results of the biodata information. For example, level of

extra-curricular involvement; college intentions, long-term goals, and commitments; and level of faculty and staff interactions (as measured by the biodata form) differentiated the two groups. Maintainers were more likely to have a high level of commitment, have more faculty and staff interactions, and be involved in fewer extra-curricular activities. Decliners had lower long-term educational goals, fewer interactions with faculty and staff, and lower levels of commitment to college.

Reiter-Palmon and Connelly (2000) succeeded in using rational and empirically keyed biodata scales developed from items that were from either a theory-based item pool or a non-theory-based item pool to show that biodata scales are useful in predicting high school and college grade point averages (GPA). In constructing the rational biodata scales, it was expected that particular constructs would be positively related to GPA, such as achievement motivation, quantitative skills/scientific interests, verbal skills, work ethic, institutional adaptation (adjustment to high school), and self-esteem. To predict college GPA, a construct of high school achievement made up of grades in specific courses, was added to the predictors. Each of these scales, except quantitative ability, was positively related to high school GPA and college GPA.

Although Reiter-Palmon and Connelly's (2000) study is the closest of these studies in resembling what is studied here, all of the studies show some support for the use of biodata in predicting academic achievement.

Many studies have examined the relationships between personality and academic achievement over the years, however, the measures used differ from study to

study, and especially country to country. Conclusions are not definitive as to the predictive validity of personality in academic achievement.

Wolfe and Johnson (1995) examined the ability for personality factors to predict academic achievement in college students as measured by Grade Point Average (GPA). Personality was measured by the Jackson personality Inventory, a sample of items from the Multidimensional Personality Questionnaire (MPQ), and a 35-item Big Five Inventory (John, Donahue, & Kentle, 1991, as cited in Wolfe & Johnson, 1995). The MPQ items used were represented by three smaller scales, selected to represent larger constructs. Well-being represented Positive Emotionality, Stress Reaction represented Negative Emotionality, and Control represented Constraint. Results indicated that the measure of the Big Five Factors yielded one factor that was significantly related to GPA. Conscientiousness was significantly positively related to academic achievement as measured by GPA ($r = .34$, $p < .01$). Extraversion, Agreeableness, Neuroticism, and Openness to Experience were not significantly related to GPA. However, Conscientiousness was not used as a single predictor. When high school GPA was entered in the first step of the analyses, it accounted for 19% of the variance in college GPA ($p < .01$). The increment in R^2 when Conscientiousness was added to this equation was .09, or 9% of the variance ($p < .01$). Therefore, one factor of the Big Five accounted for a significant increment in variance above and beyond high school GPA in predicting college GPA. Unfortunately, due to the additions of other successful predictors such as self-control, Conscientiousness was not further analyzed in this study. From the MPQ measure,

Control was a significant predictor of GPA, and it was concluded that it accounted for a similar amount of variance in GPA as the Conscientiousness factor.

Brown (1994) in a brief report, tells of her use of the Adjective Checklist (Gough & Heilbrun, as cited in Brown, 1994) as a personality measure and indicated that "personality test scores alone were the best predictors of GPA." (p. 605). This information was collected from first-semester engineering students who had already been selected based on cognitive dimensions such as SAT scores, so this information may be in part due to range restriction. Unfortunately, this study does not give any information regarding the personality measure or the significance of the result. Brown (1994) indicated that the correlation between the 37 scales from the Adjective Checklist and GPA in the first year of college was .78. However, this was without further investigation of specific relationships between different scales and the criterion.

Rothstein, Paunonen, Rush, and King (1994) examined classroom and written performance as well as GPA at the end of the first academic year of students in an MBA program. Personality was measured with Form E of Jackson's Personality Research Form (PRF) (Jackson, 1984 as cited in Rothstein et al., 1994), which has 352 items and covers 20 traits. For this study, the PRF was interpreted in terms of the Big Five Factors.

The full sample ($n = 450$) was randomly split into two equal samples for further analyses. In the full sample, Agreeableness was significantly negatively related to GPA ($r = -.19$, $p < .001$), and Openness to Experience was significantly

positively related to GPA (r = .12, p < .05). Using only a random sample of half of the students (n = 225), Conscientiousness was significantly positively related to GPA (r = .14, p < .05), and Openness to Experience was significantly positively related to GPA (r = .17, p < .01). In the second random sample of half of the students, Agreeableness was significantly negatively related to GPA (r = -.23, p < .001). Regression analyses were not available to determine the predictability of GPA from all Big Five factors.

Results from the PRF indicated that the Big Five Factors did not consistently predict classroom or written performance. But, it is not completely accurate for the authors to state that the Big Five did not predict the academic achievement criterion because the factors of the PRF were not written to represent the five factors with the same conceptual or definitional structure as the traditional Big Five. In addition, the authors later made a general statement which referred to the matter that the personality factors were "marginally useful predictors" (p. 526), but that they did not predict as well as the other predictors in the study. It does not mean that they did not predict at all, or were not related at all. Nonetheless, their interpretations of the Big Five Factors did indeed significantly correlate with GPA, as stated above.

In a cross-cultural study, De Fruyt and Mervielde (1996) used the NEO-PI-R measure (a Dutch adaptation) of the Big Five Factors of personality, and the RIASEC (a measure of vocational interests) to predict classification of academic major, and academic achievement. Academic achievement was measured by number of re-examinations, attainment of a degree, and grades after the first two academic periods. Participants in the study were university students in Belgium. Due to the differences

in relevance of grades in Belgium and in the United States, the variable of final grades and grades after the first exam period were the criteria most similar to GPA, and the ones for which results will be reported here. Conscientiousness was significantly positively correlated with final grades ($r = .28$, $p < .001$). Three of the five factors were significantly related to grades after the first exam period. Neuroticism and Openness to Experience were both significantly negatively related to grades after the first exam period ($r = -.16$, $p < .001$ for both factors). Conscientiousness was significantly positively related to grades after the first exam period ($r = .35$, $p < .001$). Facets of the Big Five Factors were correlated with measures of academic achievement, and all of the six facets of Conscientiousness correlated significantly with grades after the first period and final grades (significant correlations range from $r = .16$ to $r = .46$, all significant at $p < .01$). Due to other goals of the study, prediction of academic achievement in terms of final grades or grades at the end of the first period were not reported with regression analyses. Nonetheless, these results offer more information using a common measure of the Big Five Factors of personality, and show consistency with above-mentioned results which show that Conscientiousness is related to academic achievement.

Results consistent with the notion that Conscientiousness is correlated with academic achievement were found by Goff and Ackerman (1992) in a comprehensive study of personality and intelligence. A section of the Goff and Ackerman (1992) study focused on relationships between the Big Five Factors as measured by the NEO-PI-R scale and academic achievement as measured by numerous variables including

college GPA. A significant positive correlation appeared here between Conscientiousness and college GPA ($r = .17$, $p < .05$). However, this study also showed a significant negative correlation between Extraversion and college GPA ($r = -.16$, $p < .05$).

Victor (1994) reported a study in which he used teachers' ratings of personality of fifth and sixth-grade children (as measured by the Hawaii Scales for Judging Behavior- HSJB) to predict behavior problems (as rated on the Revised Behavior Problem Checklist) and composite student achievement scores (as indicated from results from the Iowa Test for basic Skills). The results from the HSJB were factor analyzed to represent the Big Five Factors of personality, accounting for 76% of the variance. Stepwise multiple regression was then used to determine the amount of variance accounted for by personality in behavior problems and academic achievement. However, regression was not used with personality predicting academic achievement alone. Correlations between the Big Five and academic achievement were reported and indicated that personality and academic achievement were significantly related to one another. The composite score of the Iowa Test of Basic Skills was significantly related to two of the five factors. Academic achievement and Extraversion were significantly and negatively related ($r = -.15$, $p < .01$), and academic achievement and Openness to Experience were significantly and positively related ($r = .63$, $p < .001$). The other three factors were not significantly related to academic achievement in this study. Although some researchers have found significant relationships between Conscientiousness and academic achievement, these

researchers suspect that their finding was due to the measurement used for academic achievement. They suspected that Conscientiousness was related to achievement in other studies because of how it is conceptualized as related to the will to achieve, ambition, and self-discipline, and in their study attention problems and immaturity were also incorporated into the Conscientiousness factor. Therefore, Conscientiousness was not related to academic achievement (Victor, 1994). Victor (1994) correctly anticipated that in other studies not incorporating behavior problems, Conscientiousness would be related to academic achievement, as detailed in previous research.

Finally, in a unique study by Dyer (1987), personality and biodata were used as independent variables, and academic achievement and first-year job performance were used as dependent variables. This study used the California Psychological Inventory (CPI) to assess personality, and a 145-item biographical inventory written by the author as a biodata measure. Items in the biographical inventory were indicated by the author as describing the community, school and home life of the student as well as the preferences, values, and perceptions of the student. This appears to be closer to our definition of a "biodata" measure than the Melamed (1992) measure. These measures were used to predict nursing (academic major) GPA, university GPA, and first-year job performance. Step-wise multiple regression was used to analyze the data from these health-care participants.

Results indicated that university GPA and nursing (major) GPA could be predicted by biodata and personality together and separately. The CPI alone

accounted for 7% of the variance in nursing GPA and 12% of the variance in university GPA. Nursing GPA was predicted by many scales on the CPI such as Independent Achievement, Socialization, Good Impression, Responsibility, and Psychological mindedness. University GPA was predicted by the CPI scales of Socialization, Sense of Well-being, Independent Achievement, Dominance, Social Presence, Good Impression, and Capacity for Status. Then, when the biodata information was used alone, it accounted for 30% of the variance in nursing GPA and 30% in university GPA. When all of the personality and biodata scales were used together to predict nursing GPA nine out of the 12 significant predictors were biodata scales. When all of the personality and biodata scales were used together to predict university GPA, 13 of the 15 significant predictors were biodata scales. Significant biodata scales that were predictive of nursing GPA and university GPA were focused on success in the physical sciences, biological sciences, language and arts; and feelings of achievement. From this, one can see that biodata is a significant predictor of academic achievement, even when used in conjunction with personality scales.

Therefore, with regard to the criterion of academic achievement, results from these previous studies in general indicated that Conscientiousness was positively related to academic achievement in many studies (De Fruyt & Mervielde, 1996; Goff & Ackerman, 1992; Rothstein et al., 1994; Wolfe & Johnson, 1995). However, in terms of the other five factors, the directionality of the results has been varied, but shows that the other four factors have been at least related to academic achievement in some way. For example, Goff and Ackerman (1992) found Extraversion to be

negatively related to college GPA. Whereas Rothstein, et al. (1994) found that Agreeableness was negatively related to GPA and Openness to Experience was positively related to GPA, De Fruyt and Mervielde (1996) found both Neuroticism and Openness to Experience were negatively related to academic achievement.

However, the only study to use both biodata and personality was conducted by Dyer (1987). That study was similar to the current study in that it used a biodata measure and a personality measure to predict college GPA. But, it is different from the current study in that the personality measure used was not reflective of the Big Five Factors, and the biodata measure was not rationally developed to tap the personality dimensions. Also, incremental validity was not examined when the biodata measure was added into the regression equation after the personality measure. Nonetheless, it is the only study currently available which attempts to examine both biodata and personality as predictors of academic achievement.

Each of these studies lends support to the idea that personality as measured by the Big Five Factors is related to academic achievement, or that biodata is related to academic achievement. The present study offers empirical findings concerning the abilities of personality as measured by the Big Five Factors, or biodata as modeled after the Big Five Factors, to predict academic achievement. This study adds to the information about the concurrent relationships of these two measures and academic achievement.

Participant's perceptions of the measurements. In industrial/organizational psychology, personality measures and biodata are most often used as part of a

selection decision process. Therefore, a majority of the literature regarding perceptions of these measures is in relation to applicants' perceptions of the measure as a selection tool. Perceptions of the measures have ranged along dimensions of fairness, job-relatedness, consistency of selection procedures, and invasiveness or invasion of privacy (Borman, Hanson, & Hedge, 1997). Hough and Oswald (2000) reviewed the recent and relevant personnel selection literature and indicated that personality measures are currently viewed as invasive, whereas biodata measures are viewed as less invasive and have greater face validity. This study examined the participants' reactions and perceptions to the measures. The studies that follow outline some of the current conflicting perceptions and reactions towards personality and biodata.

Rynes and Connerley (1993) examined the perceptions of students who were current and future job seekers. Their reactions to thirteen selection tools were gathered in regards to content validity, and the business-related content of the selection tools. This study examined (among others) personality inventories that were purported to reflect the Big Five measures. Three aspects of preference were examined: the extent to which participants felt that the employers could be trusted to accurately interpret the information gathered from the procedure, if the employer actually needed to have the information in order to make a good hiring decision, and how well the participant felt he or she would perform. Participants were given thirteen short selection scenarios and asked to respond as they would if they were faced with this situation in their own job searches. Participants were asked to rate on a seven-point scale their attitude toward the company in the scenario and their intentions to

pursue the company. They were also asked to rate three statements for each of the thirteen scenarios: a) whether or not they would trust the employer to accurately interpret the information, b) if the employer needed the information to make a good hiring decision, and c) how they felt they would perform if they encountered the scenario. Based on these ratings, the selection tools were then ranked by the authors. The personality inventories ranked "neutral" or in 5th place of preference, behind a simulation interview, reference check, business-related test, and written simulation exercise.

Mael, Connerly, and Morath (1996) studied biodata items that were evaluated by professionals and nonprofessionals about perceived invasiveness. Despite the researchers attempts to clarify participants' own definitions of 'invasiveness', and their consequential objections to "invasive" items, questions were still raised about job relevancy, legal issues, and items that were 'not right or too personal' (i.e. religion, traumatic events, fear of stigmatization, and intimacy). Results showed that items rated as less invasive were viewed as more verifiable, transparent, and impersonal.

In a different study, Kluger and Rothstein (1993) used an experimental procedure where 'simulated applicants' either failed (study 1), or failed or succeeded (study 2) on a biodata inventory, a cognitive ability test, a trainability test, or a work sample test. Results indicated that 'applicants' who were rejected for employment on the basis of their biographical inventory scores perceived the measure as less difficult, tended to cope more adaptively with the decision, and had better moods than 'applicants' who were rejected with the other instruments. Overall results showed that

of the four selection instruments studied, the biodata measure was perceived more positively than the others. Participants viewed it as less difficult, more fair, and led them to better coping and moods (when they 'failed').

Smither, Reilly, Millsap, Pearlman, and Stoffey (1993) examined perceptions of face validity, predictive validity and job relatedness of selection tools such as a personality inventory and biodata. Again, in this study only a one-sentence description of the selection tool, and two or three sample items were provided to the participants. Therefore, the results should be interpreted with caution. In terms of different perceptions of validity, the personality inventory was perceived by participants to have greater face validity than predictive validity. However, both personality and biodata measures were perceived as having less validity than other tools, with less than 45% of the subjects agreeing that they were valid (as compared to simulations, interviews, and cognitive tests). Both the personality and biodata measures were judged as having relatively low job relatedness. Problems can occur when attempting to generalize these results because the perceptions were based on a few sample items, not the complete measures.

In a related study, Smither, Millsap, Stoffey, Reilly, and Pearlman (1996) used an experimental manipulation with a 'college recruiting brochure' to examine three selection procedures: a biodata inventory, an abstract cognitive test, or an in-basket simulation. Again, the actual selection measures were not used, but instead descriptions of the measures and sample items were given to participants. The in-basket exercise was perceived as being more job-related than the cognitive test or

biodata. However, these results may reflect the fact that the in-basket was described as being job-related, and that the participants did not actually partake in the selection process or a simulation.

Whereas Smither et al. (1993) assessed selection measures relative to one another, Elkins and Phillips (2000) have shown that selection tests can be perceived negatively or positively depending upon the job context (international, local, or unspecified entry-level managerial positions) and the decision outcome (selected or rejected for further consideration). This study focused on the distributive and procedural fairness issues associated with a selection instrument, due to job relatedness and the subsequent hiring decision. Results from this study confirmed their hypotheses that biodata are viewed as more job relevant for an overseas international job than a local job; and that the outcomes and context (where the job is located- here or overseas) interact such that those applicants who were rejected viewed the measure less positively than accepted applicants.

Questions have also been raised by researchers regarding whether the perceptions of personality and biodata can be changed by altering the items. Indeed, Baehr, Jones, Baydoun, and Behrens (1994) examined the Experience and Background Inventory to determine if items could be developed that were seen as nondiscriminatory and noninvasive for two biodata subscales of the inventory. Alternative items were developed for the Financial Responsibility and General Responsibility scales to be less invasive and personal. The items were judged independently by eight industrial psychologists on the basis of representation of the

targeted construct, perceived face validity, and the likelihood of discrimination against protected groups. These items were correlated with the original items, and with the performance criterion to indicate that indeed biodata items can be developed that are viewed as less invasive and still retain substantial validity and reliability.

In a recent personality study, Robie, Schmit, Ryan, and Zickar (2000) attempted to alter the perceptions and psychometric characteristics of the Conscientiousness scale of the NEO-PI-R by adding a context-specific phrase to each item. 'At work' was incorporated into each item, or the items were re-written to reflect a job context, in order to determine if the reliability or validity of the scale or its facets changed compared to a noncontextualized (regular) version of the same scale. Robie et al. (2000) attempted to address the arguments that personality measures are not job related, by making the items more job related through context. Generally, the error variances were lower as predicted with a contextualized 'at work' scale, but alpha reliability levels remained generally stable. The authors speculated that the lower error variances of the contextualized scale should translate to better predictability, although this was not tested.

Each of these studies has contributed to the research on applicant perceptions, but they did not address the current research questions. Although Elkins and Phillips (2000) demonstrated that biodata could be perceived as negative or unfair, they do not support that biodata measures in general, or at "face value" are viewed as unfair. Elkins and Phillips (2000) did not illustrate how the participants would evaluate a personality measure within the same context and decision outcomes. The current

study is different because it does not use job relatedness (Robie et al., 2000; Smither et al., 1996) or selection decisions (Kluger & Rothstein, 1993) as variables against which to judge the fairness or invasiveness of the biodata measure. Participants' reactions to the biodata measure are specifically in relation to the invasiveness and fairness relative to the personality measure presented, similar to Mael et al. (1996), and Smither et al. (1993).

As one can see, questions still remain as to whether the same criteria are used when judging each item or each measure for invasiveness and job relatedness, and the outcomes of the perceptions. These studies indicate the empirical need for a complete biodata measure and personality measure to be compared on the basis of participant perceptions of specific criteria such as invasion of privacy, job-relatedness, and face validity. In this study, participant's perceptions were measured in order to better determine any differences between personality and biodata instruments as indicated by participants who actually respond to the measures. It is indeed plausible that a difference in the utility of personality and biodata measures may lie in the connotation for the participants of the name "personality test" or "biodata test." Perhaps, it is that "biodata" is perceived as historical, and then likewise cannot be "changed", or "controlled" by the employee that is influencing the results. The current study included an attempt to iron out the differences between personality and biodata by gauging participant's perceptions to an actual, although unnamed measure, thereby reducing a confound of the design.

Research Questions

As Owens (1976) stated: " With tests in general and personality questionnaires in particular the subjects of some rather scathing current criticism, biodata may well enjoy better acceptance than the former, and will almost certainly be more valid than the latter." (p. 612). This statement has brought about few studies examining both biodata and personality, none of which cover the scope that the current study has.

Biodata is an available method to examine historical, verifiable, objective life events about a person. These events, and their subsequent recall has been shown to be stable across time (Shaffer, Saunders, & Owens, 1986). Personality measures may measure subjective, internal states that may be subject to lower validity and reliability, and higher instances of faking and social desirability.

Because biodata and personality measures differ in how they are created and scored, their results certainly may differ. Given the similarity between soft biodata and personality measures (Shultz, 1996), and the call for the use of rational scales which measure constructs (therefore even more similar to personality), the question remains whether biodata are really different or better predictors than personality. By developing a biodata measure with items written in a historical, life-event context to tap the same main five factors as the personality measure, the first research question was addressed.

Research Question One: a) Are rational biodata scales developed to measure the Big Five constructs, and a personality measure of the Big Five different in

their prediction of job satisfaction and academic achievement?

b) Do the two measures differ in participants' perceptions of fairness and invasiveness?

The second research question addressed whether one measurement system provides better prediction than the other. Therefore, the degree to which biodata can add incremental validity to a personality measure in predicting the criteria of job satisfaction and academic achievement was examined. Likewise, the incremental validity of a personality measure was examined.

Research Question Two: a) Does biodata add incremental validity to personality measurement in predicting academic achievement and job satisfaction?

b) Does personality add incremental validity to biodata in predicting academic achievement and job satisfaction?

Chapter 2: Method

Participants

Participants in this study were 193 undergraduate students from the University of Nebraska-Omaha. To qualify for this study, participants were required to be currently employed.

Originally, data were collected from 193 participants, 142 females, 50 males and 1 of unknown gender. Twenty-four participants were excluded from the analyses due to various reasons (i.e. completing the same response for all questionnaire items, not being currently employed, not providing enough information, etc.) This left a sample of 169 participants, 46 males and 123 females.

Participants ranged in age from 16 to 42, with the average age of 21 (SD = 4). Participants worked an average of 23.8 hours per week (SD = 9.1), and have worked an average of 19 months (range 1 – 155 months, SD = 21 months) in their current positions.

Materials

The materials used in this study were collected via paper and pencil inventories, or through participant's written responses to demographic items.

Personality. The Personal Characteristics Inventory measure was selected to measure the Big Five Factors of personality (Barrick & Mount, 1998). The PCI measures the five factors of personality that are labeled as follows: Stability (Neuroticism), Agreeableness, Openness (Openness to Experience), Extraversion, and Conscientiousness. It consists of 120 items that measure the five constructs, and 30

additional items that measure other facets not relevant to the current research. Each of the factors and the number of items it includes are as follows: Stability (Neuroticism)- 20 items, Agreeableness- 20 items, Openness (Openness to Experience)- 20 items, Extraversion- 30 items, Conscientiousness- 30 items. Items are rated on a three-point scale of Agree, Disagree or Neither. Although other personality measures were considered, the PCI was selected because of its current use in personnel selection. The PCI also has established convergent and divergent validity with other measures of the Big Five Factors such as the NEO-PI, Hogan Personality Inventory, and Goldberg's Adjective Checklist (Mount et al., 2000).

The internal consistency of each factor as provided by Wonderlic, Inc. (Mount et al., 2000) is as follows: Stability (Neuroticism) α = .82, Agreeableness α=. 77, Openness (Openness to Experience) α= .75, Extraversion α= .82, and Conscientiousness α= .74.

Due to the copyright of the measure, and exact item could not be printed. However, an example of a general personality item is:

I feel comfortable around people:

a.) Agree

b.) Neither Agree nor Disagree

c.) Disagree

The internal consistency of each factor of the PCI with the current participants was not available from the testing company. Two participants were dropped from the

analysis from Wonderlic, Inc. due to an insufficient number of test responses completed.

Biodata. The biodata measure used in this study was a new measure and it consisted of rationally scaled items. Each of the Big Five Constructs was defined, and items were selected from an existing database of items or were written by the researcher and other graduate students to tap each of the five constructs using a situational biodata format for each items in a series of pilot tests. The items are included in Appendix A.

The first pilot study consisted of the item development project of the biodata measure. Two-hundred and sixty-six items were reviewed by a panel of eight judges, current Master's and Doctoral level industrial/organizational psychology students who have taken a course in biodata. The judges were asked to categorize each item into one of the five factors (Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness.) Once they selected a category, they were asked to determine on a scale of 1-5 how much the item resembled the definition given for that factor, with 1 indicating 'very uncharacteristic of this definition' and 5 indicating 'very characteristic of this definition'. The definitions provided for the judges appear in Table 2. Judges were allowed to categorize an item they believed was poorly written into the factor they thought the item was intended to resemble. Judges were also asked to edit the items they felt were poorly written and to provide comments if they desired. Items were initially selected for further use if five out of the eight judges categorized the item into the same factor. Of those items that were

Table 2: Definitions of the Five Constructs

Neuroticism (versus emotional stability).
Neuroticism can be examined in the context of worrying, embarrassment, having insecurities, self-consciousness, pessimistic attitudes, and negative emotionality. Negative emotionality is viewed as a tendency to experience negative affect such as anxiety, embarrassment, and depression in situations. Mistrust, self-reference, and impulse-ridden behaviors may also be involved in views of neuroticism. High levels of this factor may include disturbed thoughts and behaviors which follow emotional distress, such as depression, jealousy, anxiety, nervousness, and anger. Low neuroticism is characterized by controlled rather than spontaneous, self-sufficient, adaptable, able to handle stress and changes well, and are even-tempered, calm, and secure.
Extraversion (or surgency).
Generally, Extraversion refers to sociability, friendliness, talkativeness, ambition, affection, and fun-loving characteristics. Assertiveness may also be involved in extraversion, depending on the researcher's view of the factor, but was not included in this measure. Positive emotionality is also involved as an aspect of extraversion. Those high in Extraversion are usually sociable, friendly, optimistic, cheerful, and outgoing. They enjoy the presence of others, and can be ambitious, outspoken, and energetic. Alternatively, those who are low in Extraversion (introversion) may be quiet, reserved, shy, and would rather keep to themselves than be the center of attention.

Openness to Experience.

In past research, Openness to Experience has been defined by characteristics such as originality, curiosity, imaginativeness, having broad interests, and being open-minded. However, openness to experience can sometimes be better viewed within a context or in such things as feelings, actions, ideas, and values. It is not clear what role intelligence plays in this factor, as intelligence has been shown to have correlations up to .30 with Openness to Experience, and has also been labeled Intellect in some studies (McCrae & Costa, 1987). Cause and effect relationships have not been established, and therefore, for the purpose of this study, intelligence will not be used as a defining characteristic of this factor. However, those high in Openness are imaginative, curious, analytical, and inquisitive. They may prefer variety, change, and independence. In turn, those low in Openness may not be receptive to changes, prefer standards and rules, may be less imaginative and creative, and have fewer but well-defined interests than those who are high in Openness.

Agreeableness (versus antagonism).

The factor of Agreeableness is best viewed in relation to it's opposite, antagonism, or on a continuum. Antagonists are likely to set themselves up to be pitted against another individual, be mistrustful, skeptical, callous, unsympathetic, uncooperative, stubborn, and rude. Antagonism should not be confused with dominance in terms of being the opposite of agreeableness, however. On occasion, this is also seen as a continuum of ill- or well-intentioned and strong or weak in carrying out the intentions. Agreeableness has

been viewed as being heavily value-laden in its definitions. Additional characteristics from Costa and McCrae (1987) for those high in Agreeableness are: straightforward, cooperative, humble, acquiescent, soft-hearted, good-natured, helpful, flexible, courteous, and generous. Therefore, those low in Agreeableness would be cynical, skeptical, rigid, standoffish, and abrasive.

Conscientiousness (versus undirectedness).

Conscientiousness has been defined as careful, thorough, hardworking, ambitious, energetic, persevering, purposefulness, and adhering to plans, as opposed to being lacking direction. Therefore, those high in Conscientiousness may be self-disciplining, scrupulous, reliable, ambitious, fair, perceptive, well organized, and self-reliant. High Conscientiousness also reflects dependability, responsibility, and organization skills. Those low in Conscientiousness, however, may be unorganized, inefficient, impulsive in decision-making, hasty in their actions, distracted, and may lack responsibility and self-discipline.

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categorized similarly by five out of the eight judges, items were further selected if they were rated a three or above on the scale by at least five of the judges. Lower rated items were included only if a judge offered a suggestion to re-write the item.

Due to concerns of the research team regarding the potential differences between hard and soft biodata items, the decision was made to separate the biodata measure into a hard measure and a soft measure in the pilot testing. Three judges then categorized the 266 items as hard or soft biodata. Two of the judges were of the same judging panel as in pilot study 1, and a faculty biodata researcher served as the third judge. The judges were instructed to use Asher's (1972) taxonomy on the eight dimension he described. Judges were instructed to categorize an item as a hard item if it met the biodata criteria end of the continuum of at least five of the eight dimensions. If an item did not fit five of the eight dimensions on the biodata end of the continuum (as opposed to the personality end), judges were instructed to categorize the item as soft biodata. Items in the Neuroticism and Agreeableness categories were categorized as hard or soft based on a ratio of agreement between the judges. If two or three of the judges agreed on the classification (hard or soft), then the item was categorized as such. However, due to the number of "ties", when there were only two ratings, or disagreements between judges, items in the Conscientiousness, Extraversion, and Openness to Experience categories were categorized as hard or soft based on the decision of the primary researcher serving as an additional judge. Based on the results of the judges, the biodata measure was reduced from 266 items to 147 items. Table 3

Table 3

Item Count of Final Biodata Measure

Category	Hard	Soft	Total Number of Items
Neuroticism	2	27	29
Extraversion	16	14	30
Openness to Experience	14	21	35
Agreeableness	17	7	24
Conscientiousness	18	11	29
	67 hard items	80 soft items	147 total items

illustrates the breakdown of the number of items by factor. The items were randomized and the measure containing 147 items was used throughout the remainder of the pilot and thesis studies. It is included in Appendix A.

An example of a hard item is:

How many different kinds of music do you listen to?

a.) none

b.) 1

c.) 2

d.) 3

e.) 4 or more

An example of a soft item is:

To what extent have you tended to dwell on accidents or mishaps that happened during the day?

a.) great extent

b.) large extent

c.) moderate extent

d.) slight extent

e.) not at all

In the second pilot study, the biodata measure and the initial perceptions measure (described in detail later) were pilot-tested with 27 undergraduate psychology students to ensure that it was understood by the participants and to determine internal

consistency of the items. The 147-item biodata measure was separated into two measures, one with all of the hard items, and one with all of the soft items. Participants were asked to mark yes or no if each item was understandable and clear. They completed the 25-item perceptions scale twice, once after the hard biodata items, and once after the soft biodata items. The materials were counterbalanced so that participants would receive either the hard or the soft measure first.

To determine the internal consistency of the five factors of the biodata scales, the reliability coefficients were calculated separately for hard and soft biodata and also calculated for the measure of hard and soft combined. The results are presented in Table 4. Because the reliability estimate for soft Agreeableness items was negative, the items were examined individually for any coding errors and theoretical relevance. No coding errors were found, therefore, the negative coefficient may have been a function of the small sample size. It was decided to keep all items and determine whether additional items needed to be eliminated after the second pilot test.

Due to the small sample size, ($\underline{n} = 27$) and the inconsistent reliability results for the biodata measure, the biodata measure and a revised perceptions measure were pilot-tested with an additional 26 participants. The third pilot study followed the same procedure as the second pilot study.

To calculate the internal consistency of the biodata measure, data from the second pilot study was included because no additional items were added to the biodata measure from the second to the third pilot study. The results are included in Table 5. Because the reliability estimate for Agreeableness was again negative, the items were

Table 4

Reliability Estimates of Biodata Measure for Pilot Study 2

Factor	Together	Hard	Soft
Neuroticism	.394	.2757	.8477
Extraversion	.496	.566	.7179
Openness to Experience	.415	.7090	.7958
Agreeableness	.203	.7247	-.1760
Conscientiousness	.137	.5530	.2565

Table 5

Reliability Estimates for Biodata Measure for Pilot Study 3

Factor	Together	Hard	Soft
Neuroticism	.8516	.1541	.843
Extraversion	.8109	.568	.794
Openness to Experience	.8435	.737	.822
Agreeableness	.6714	.776	-.009
Conscientiousness	.6214	.585	.2127

examined individually for any coding errors and theoretical relevance. No coding errors were found, and all items appeared to be measuring Agreeableness, therefore, the negative coefficient may still have been a function of the small sample size. It was decided to eliminate items based on reliability analyses in the full sample.

Because the internal consistency increased when the hard and soft biodata scales were combined, and due to the small number of items for some of these scales, the decision was made to combine the hard and soft biodata items into one measure for the remainder of the research. In addition, it was hard to separate biodata into hard and soft because most or all of the questions are already situational and historical, or categorized according to Asher as more factual, and memory-based. It was difficult for participants in the second pilot study to classify and make a distinction between hard and soft biodata for the items.

When writing the items, a researcher who assisted in item development noticed that writing behavioral Neuroticism or Emotional Stability items was difficult because the construct is inherently an emotional state, not a behavioral state. In this case, it is possible that softer biodata items or personality items may be better than hard biodata items. It is also interesting to note that certain constructs that are inherently more external and behavioral-based, such as extraversion. These constructs may be better suited for biodata measures than other softer constructs, such as Neuroticism.

The final measure consisted of 147 items, 29 Neuroticism items, 30 Extraversion items, 35 Openness to Experience items, 24 Agreeableness items, and 29 Conscientiousness items. The final internal consistency reliability analysis indicated

that a select few items were not consistent with the other items in each scale. Therefore, four items were deleted from the Biodata Neuroticism scale, and one item was deleted from each of the following three biodata scales: Extraversion, Agreeableness, and Conscientiousness, to yield 147 items. After deleting items, the internal consistency reliability estimates for the biodata scales were as follows: Neuroticism $\alpha = .91$, Extraversion $\alpha = .85$, Openness to Experience $\alpha = .87$, Agreeableness $\alpha = .73$, and Conscientiousness $\alpha = .77$.

The Biodata Neuroticism scale was recoded to correspond to the PCI Emotional Stability Factor for the remaining analyses and hypothesis testing. Therefore, in the following analyses it will be referred to as Biodata Emotional Stability.

Job satisfaction. The job satisfaction measure selected was the Job Satisfaction Scale modified from Brayfield and Rothe (1951), taken from Judge et al. (2000). Although numerous other measures were considered, this measure was selected because of its use in the job satisfaction literature. It consists of five items, measuring global satisfaction and is included in Appendix B. Each item was rated on a five-point scale of agreement to disagreement. The internal consistency of the measure as reported by Judge et al. (2000) was .89. The internal consistency in this study was .80.

Academic achievement. Academic achievement was measured by several self-report items included on the demographics sheet (Appendix C). Participants were asked to provide current overall college GPA and ACT composite score. They were also be asked to provide their high school GPA, as some of the students were in their

first or second semesters of college and do not have a college GPA yet. Students were asked to provide their student identification number granting the researcher permission to use the university's student information system to access their official GPA and ACT scores. One-hundred and forty-five students provided their student identification numbers and an estimate of their ACT scores and current cumulative GPA. Many of these 145 students tended to overestimate their cumulative GPA, and underestimated their ACT scores. Because an official cumulative university GPA was not available for the students who were in their first semester, and their high school GPAs were on different scaling systems, ACT score was chosen as the academic achievement variable in the regression analyses. The average college cumulative GPA was 3.11 (SD = .66), and the average ACT score was 23 (SD = 4.3).

Perceptions. Participant's perceptions of each of the independent variables were measured using the scale Perceptions of the Measures. To construct the scale, items were taken from previous selection research (Elkins & Phillips, 2000; Gilliland, 1994; Harland, Rauzi, & Biasotto, 1995; Smither et al., 1993, 1996), and new items were developed by the researcher. The previous items selected have been used to measure invasiveness, fairness, and perceptions of bias. The Perceptions Measure was pilot-tested with the biodata measure, in the second and third pilot studies, using undergraduate students to ensure that the participants understood it and to determine internal consistency of the items.

In the second pilot study, the perceptions measure was pilot-tested with 27 undergraduate psychology students to ensure that it was understood by the participants

and to determine internal consistency of the items. In this Pilot Study, the perceptions measure contained 26 items, measuring seven dimensions. The seven dimensions were: fairness, face validity, perceived predictive validity, affect, perceived knowledge of results, perceived fakability and perceived controllability. Participants completed the perceptions scale twice, once after the hard biodata items, and once after the soft biodata items. Because the perceptions scale was completed twice, internal consistency reliability coefficients (α's) were available for the perceptions of the hard biodata and the perceptions of the soft biodata for each dimension, as illustrated in Table 6.

Due to the small sample size, ($\underline{n} = 27$) and the inconsistent reliability results for the perceptions measure and the biodata measure, nine items were added to the perceptions scale, and both the biodata measure and new perceptions measure were pilot-tested with an additional 26 participants. Items were added to the dimensions: fairness (3 items) predictive validity (3 items), fakability (1 item), face validity (1 item), and affect (1 item). The third pilot study followed the same procedure as the second pilot study, and included the additional nine perception items.

The internal consistency estimates of the perceptions dimensions from the third pilot study were calculated with the additional items on the 35-item measure. The results are included in Table 7.

To reiterate, after pilot-testing, the Perceptions Measure consisted of seven dimensions, totaling 35 items and is included in Appendix D. The seven dimensions

Table 6

Reliability Estimates of Perceptions Measure by Dimension for Pilot Study 2

Dimension	Hard	Soft
Fairness	.284	.6971
Face Validity	.7827	.8006
Predictive Validity	.4567	.7796
Affect	.5872	.4995
Perceived Knowledge of Results	.3496	.9034
Perceived Controllability	.1955	.3268
Perceived Fakability	.4454	.4821

Table 7

Reliability Estimates of Perceptions Measure by Dimension for Pilot Study 3

Dimension	Hard	Soft
Fairness	.5953	.6930
Face Validity	.8358	.8599
Predictive Validity	.5978	.7993
Affect	.6020	.4290
Perceived Knowledge of Results	.5851	.8963
Perceived Controllability	.147	.0700
Perceived Fakability	.3787	.4031

were: fairness, face validity, perceived predictive validity, affect, perceived knowledge of results, perceived controllability and perceived fakability.

The internal consistency demonstrated in the thesis study was $\alpha = .88$ for all items together in perceptions of personality measure, and $\alpha = .89$ for all items in the perceptions of biodata measure. Internal Consistency reliability levels of each of the dimensions are as follows: Perceptions of Personality- Fairness $\alpha = .79$, Face Validity $\alpha = .75$, Perceived Predictive Validity $\alpha = .87$, Affect $\alpha = .72$, Perceived Knowledge of Results $\alpha = .79$, Perceived Controllability $\alpha = .39$, and Perceived Fakability $\alpha = .59$. Perceptions of Bidoata- Fairness $\alpha = .78$, Face Validity $\alpha = .75$, Perceived Predictive Validity $\alpha = .87$, Affect $\alpha = .71$, Perceived Knowledge of Results $\alpha = .78$, Perceived Controllability $\alpha = .19$, and Perceived Fakability $\alpha = .62$.

The internal consistency reliability levels for five of the seven dimensions were close to, or higher than .70, the level recommended by Nunnally (1994). This is encouraging due to the reliance on a new measure in this study. The internal consistency reliability levels for Perceived Controllability of biodata and personality were both quite low, .19 and .39, respectively. This may have occurred for numerous reasons. It is possible that this dimension did not include enough items, or that the items that were included were not measuring Perceived Controllability, but several different constructs.

Social desirability. Social desirability was included in the study to ensure that participants were not responding in an unnecessary socially acceptable manner. Kluger and Colella (1993), Stokes and Hogan (1993) and Viswesvaran and Ones

(1999) have indicated that social desirability measurement should be included in studies of selection measures such as personality tests and biodata inventories.

The Marlowe-Crowne scale (Crowne & Marlowe, 1960) consists of 33 items answered as True or False. The items concern everyday behaviors that are desirable but rare, or undesirable but common. This scale is more concerned with impression management than self-deception, and is included in Appendix E. Internal consistency alpha coefficients have ranged from .73 to .88 in varied samples, and test-retest reliabilities of .84 and .88 have been reported (Paulhus, 1991). The internal consistency in the current study was $\alpha = .83$. The Marlowe-Crowne scale was used to determine if participants were responding in a socially desirable manner. Higher scores on this scale indicate a higher need for approval. Scores ranged from 1-29, with a slightly skewed distribution of scores indicating a higher need for social desirability.

Covariates.

General mental ability (intelligence). The Wonderlic Personnel Test (Wonderlic, 1997) was used to assess general mental ability in this study. Because some research has suggested that it is best to look at the incremental validity of personality or biodata as predictors after general mental ability has been accounted for (Mount et al., 2000), this measure was included in the study.

The Wonderlic Personnel Test is a widely used general intelligence measure, available through Wonderlic, Inc. It consists of a timed 12-minute multiple-choice test of three subscales: learning ability, understanding instructions, and problem

solving. Internal consistency has been reported from .88 to .94, and alternate forms reliabilities have ranged from .73 to .95. The test is available from the publisher. The internal consistency of the WPT with the current participants was not available from the testing company.

Length of Employment (tenure). Participants' length of employment within their current position was measured as a self-report item on the demographics questionnaire (Appendix C). Length of employment has been researched in relation to job satisfaction in the past with mixed results. Overall, researchers agree that tenure is related to job satisfaction, however the nature of the relationship has not yet been solidly determined. Katz (1978) and Kemp and Cook (1983) argued that it is a curvilinear relationship and in different stages of tenure an employee uses different aspects of the job to guide his or her perception of job satisfaction. Katz (1978) also argued that after 10 years in a position, the relationship between job satisfaction and tenure is not as strong as it is between 4-36 months in a position. Therefore, in order to control for varying levels of length of employment, tenure was measured and used as a covariate for job satisfaction.

Procedure

Research sessions were conducted in classrooms. At the beginning of each session, participants were instructed orally about the general topic of individual differences. Then they were first asked to complete the Informed Consent Form, which was subsequently handed in to the researcher separate from their packet of

materials. The entire session lasted approximately 1.5- 1.75 hours. Participants were allowed and encouraged to take breaks if needed, to reduce fatigue.

The Wonderlic Personnel Test was administered first in the study, because it is a timed 12-minute measure. Following this, participants opened their packet of materials, and were instructed to complete the questionnaires in the order in which they appeared in the packet. Within the packet of materials, either the personality measure or the biodata measure appeared first, thereby counterbalanced to reduce order effects. The demographics sheet was inserted as the filler questionnaire in between these two independent variable measures (biodata and personality). The Perceptions Measure appeared in the packet twice, once directly after the personality measure, and again after the biodata measure. The social desirability measure was next, and the job satisfaction measure was last in the packet. Job satisfaction was measured last so that the participants would not take into account their attitudes toward their jobs as they were answering the independent variable questionnaires. Some participants may have negative attitudes toward their jobs, and making these attitudes salient could interfere with the other measures. Upon completion of the packet, participants were debriefed about the topic of the study, asked if they had any questions, and thanked for their time and participation.

Chapter 3: Results

Descriptive Statistics

Descriptive statistics about the sample and the measures were calculated and are included in Table 8 for all of the variables.

Correlations among the biodata and personality scales are presented in Table 9. All of the biodata scales were positively correlated with each other. Similarly, none of the PCI scales showed negative correlations with one another. Each of the biodata scales was significantly correlated with its corresponding personality PCI factor, ranging from .53 to .73. These correlations indicate that the constructs are similar between the two measures. Moreover, each construct's highest significant correlation was with its counterpart construct from the other measurement tool, indicating discriminant validity of each construct from the other four constructs.

Each of the five PCI and Biodata constructs were correlated with the dependent variables, academic achievement and job satisfaction. The correlations are illustrated in Table 10. When using the Five Factors from the PCI, only Conscientiousness was significantly correlated with job satisfaction, $r = .23$, $p < .01$. Similarly, when using the Biodata Scales, Conscientiousness was significantly correlated with job satisfaction, $r = .196$, $p < .05$. When examining academic achievement, ACT score was used to represent academic achievement in the analyses. When using the PCI Five Factors, Openness to Experience and Conscientiousness were positively correlated with ACT score, $r = .17$, $p < .05$ for Conscientiousness, and $r = .32$, $p < .01$ for Openness to Experience. However, when using the Biodata Scales,

Table 8

Descriptive Statistics for All Variables Included in the Study

Variable	M	SD	Min	Max	N
Length of Employment (months)	19.3185	21.3444	1	155	168
Hours Worked Per Week	23.8274	9.0976	2	58	168
Age	21.3787	4.2242	16	42	169
ACT	23.0270	4.3487	8	32	148
GPA	3.11711	.65503	.670	4.0	129
Wonderlic Personnel Test	23.0592	5.4682	8	41	169
Biodata- Emotional Stability	74.3571	14.1469	33	109	168
Biodata- Extraversion	96.5060	13.1724	64	137	166
Biodata- Openness to Experience	121.9641	14.0549	89	163	167
Biodata- Agreeableness	82.2455	7.7828	60	101	167
Biodata- Conscientiousness	97.4371	10.5548	73	120	167
Personality- Neuroticism	22.5527	22.4596	.08	89.81	169
Personality- Extraversion	57.5537	28.3765	.27	99.53	169
Personality- Openness to Experience	44.6152	30.8875	.16	100	169
Personality- Agreeableness	37.0618	25.6310	.16	100	169
Personality- Conscientiousness	27.8336	20.5188	.08	77.82	169
Job Satisfaction	17.4217	4.1006	5	25	166
Social Desirability	16.8614	6.1525	1	29	166

Perceptions- Fairness (Personality)	18.4970	4.2694	6	30	167
Perceptions- Face Validity (Personality)	12.0592	3.0778	4	20	169
Perceptions- Predictive Validity (Personality)	14.1341	4.2866	6	30	164
Perceptions- Affect (Personality)	16.3905	3.3312	6	24	169
Perceptions- Perceived Knowledge of Results (Personality)	8.7278	2.3496	3	15	169
Perceptions- Perceived Controllability (Personality)	15.8443	2.8262	5	23	167
Perceptions- Perceived Fakability (Personality)	19.5689	3.6971	9	28	167
Perceptions- Fairness (Biodata)	18.2073	4.0450	6	27	164
Perceptions- Face Validity (Biodata)	11.3193	3.0212	4	19	166
Perceptions- Predictive Validity (Biodata)	14.8282	4.3328	6	28	163
Perceptions- Affect (Biodata)	16.2892	3.3395	5	25	166
Perceptions- Perceived Knowledge of Results (Biodata)	8.2500	2.2607	3	15	168
Perceptions- Perceived Controllability (Biodata)	15.7365	2.4203	9	22	167
Perceptions- Perceived Fakability (Biodata)					

	18.9940	3.6330	6	29	167

Table 9

Correlations of Biodata Scales with PCI Factors (N = 164)

	Biodata Scales					PCI Factors				
	ES	EX	OE	AG	CO	ES	EX	OE	AG	CO
Biodata ES	1.00									
Biodata EX	.357**	1.00								
Biodata OE	.483**	.547**	1.00							
Biodata AG	.049	.362**	.341**	1.00						
Biodata CO	.175*	.181*	.213**	.109	1.00					
PCI ES	.733**	.264**	.406**	.041	.256**	1.00				
PCI EX	.160*	.665**	.464**	.137	.152	.102	1.00			

	ES	EX	OE	AG	CO	ES	EX	OE	AG	CO
PCI OE	.328**	.273**	.601**	.133	.096	.290**	.305**	1.00		
PCI AG	.165*	.291**	.243**	.533**	.201**	.276**	.143	.135	1.00	
PCI CO	.207**	.003	.058	.017	.634**	.345**	.006	.110	.303**	1.00

Note. PCI- Personal Characteristics Inventory. ES- Emotional Stability, EX-Extraversion, OE- Openness to Experience, AG- Agreeableness, CO- Conscientiousness.

** $p < .01$

* $p < .05$

Table 10

Correlations of Biodata and Personality Factors with the Dependent Variables of Job Satisfaction and Academic Achievement

Scale	Job Satisfaction		ACT		College GPA	
PCI-Stability	.087	(166)	.027	(148)	.025	(129)
PCI-Extraversion	.091	(166)	.028	(148)	.012	(129)
PCI-Openness	.118	(166)	.320**	(148)	.149	(129)
PCI-Agreeableness	.130	(166)	-.060	(148)	-.071	(129)
PCI-Conscientiousness	.223**	(166)	.170*	(148)	.240**	(129)
Biodata- Stability	.113	(165)	.162*	(147)	.083	(129)
Biodata- Extraversion	.151	(163)	-.011	(145)	-.003	(128)
Biodata-Openness	.060	(164)	.125	(146)	-.034	(124)
Biodata- Agreeableness	.128	(164)	-.181*	(146)	-.191*	(128)
Biodata- Conscientiousness	.196*	(164)	.117	(146)	.415**	(127)

** $p < .01$

* $p < .05$

(n)

Emotional Stability and Agreeableness were correlated with ACT score, $r = .16$, $p < .05$, for Emotional Stability, and $r = -.18$, $p < .05$, for Agreeableness.

Social Desirability.

Scores on the Marlowe-Crowne Social Desirability Scale were correlated with Personality and Biodata, and the correlations are illustrated in Table 11. Most correlations were negative and significant, indicating that a high score on the various personality or biodata measures are related to less need for approval, suggesting that both measures are not susceptible to social desirability in the expected way.

Differences in the correlations were compared using the Hotelling-Williams test (Bobko, 1995) to test the equality of the correlations dependent upon social desirability. Significant differences were found between biodata and personality on two of the five factors, Extraversion ($t = 3.828$, $p < .05$), and Agreeableness ($t = 2.32$, $p < .05$). Therefore, the correlation between social desirability and PCI Extraversion, and the correlation between social desirability and Biodata Extraversion are significantly different. Likewise, the correlation between social desirability and PCI Agreeableness, and the correlation between social desirability and Biodata Agreeableness are significantly different.

Comparison of the correlations of PCI-Extraversion and Social Desirability ($r = .035$, ns), with Biodata Extraversion and Social Desirability ($r = -.196$, $p < .05$), involves a comparison of a nonexistent relationship with a moderately negative relationship. Comparison of the correlations of PCI –Agreeableness and Social Desirability ($r = -.453$, $p < .01$), with Biodata Agreeableness and Social Desirability

Table 11

Correlations Between Biodata Scales, Personality Factors and Social Desirability

Scale	Social Desirability
PCI-Stability	-.528**
PCI-Extraversion	.035
PCI-Openness	-.170*
PCI-Agreeableness	-.453**
PCI-Conscientiousness	-.391**
Biodata- Stability	-.448**
Biodata- Extraversion	-.196*
Biodata-Openness	-.301**
Biodata- Agreeableness	-.296**
Biodata- Conscientiousness	-.293**

** $p < .01$
* $p < .05$
n = 166

(r = -.296, p < .05), involves a comparison of a higher negative relationship with a lower negative relationship. Although these pairs of relationships are significantly different, they are difficult to interpret. Research would support expecting a positive correlation between the measurement instruments and Social Desirability, but the opposite was found here.

Due to the puzzling results, the social desirability issue was examined further, and results are provided for the interested reader. The social desirability results were further inspected by separating the data into high and low groups based on the median-score on the Marlowe-Crowne Scale, and then the means were calculated for each of the Big Five Factors on both personality and biodata for each high/low social desirability group. The table illustrating the groups are included for comparison purposes in Table 12. One-way ANOVAs were used to compare the means on between within each biodata or personality factor for the high and low social desirability groups. For example, the mean on Personality-Emotional Stability for the High Social Desirability group (M = 13.2, SD = 16.05) was compared to the mean on Personality-Emotional Stability for the Low Social Desirability group (M = 32.01, SD = 24.07). Significant differences between High and Low Social Desirability groups were found in the following factors: PCI-Emotional Stability, Biodata-Emotional Stability, Biodata-Openness to Experience, PCI- Agreeableness, PCI-Conscientiousness, and Biodata-Conscientiousness. A marginally significant difference was found in Biodata-Agreeableness. Significant differences were not found in PCI-Extraversion, Biodata-Extraversion, or PCI- Openness to Experience.

Table 12

Analyses of Variance for High and Low Social Desirability

	ANOVA			High (Above Median) on Social Desirability			Low (Equal to or Below Median) on Social Desirability		
	df	F	p	n	Mean on Big 5 Factor	SD	n	Mean on Big 5 Factor	SD
PCI – Emotional Stability	1, 164	34.71	<.001	81	13.2	16.05	85	32.01	24.07
Biodata- Emotional Stability	1, 163	17.86	<.001	81	71.27	12.45	84	80.17	14.47
PCI – Extraversion	1, 164	.94	ns	81	59.82	28.25	85	55.55	28.52
Biodata- Extraversion	1, 161	.35	ns	80	95.88	12.68	83	97.11	13.87
PCI – Openness to Experience	1, 164	1.46	ns	81	42.12	30.91	85	47.90	30.88
Biodata- Openness to Experience	1, 162	6.87	.01	81	119.23	12.78	83	124.90	14.81
PCI – Agreeableness	1, 164	23.09	<.001	81	27.91	21.07	85	45.87	26.63
Biodata- Agreeableness	1, 162	3.75	.055	81	81.05	8.35	83	83.40	7.15
PCI – Conscientiousness	1, 164	21.58	<.001	81	21.04	17.83	85	34.99	20.70
Biodata- Conscientiousness	1, 162	20.09	<.001	80	93.83	10.89	84	100.85	9.13

Notes.
Social Desirability Median = 17.00, Social Desirability Mean= 16.8, Social Desirability Standard Deviation = 6.15.

Therefore, the ANOVAs indicate that those who scored above the median on Social Desirability scored significantly lower on PCI-Emotional Stability, Biodata-Emotional Stability, Biodata- Openness to Experience, PCI-Agreeableness, Biodata-Agreeableness, PCI-Conscientiousness, and Biodata- Conscientiousness. Those who scored below the median on Social Desirability scored significantly higher on the factors listed above. Further interpretation of these results is not clear.

Research Questions and Regression Analyses

The research questions were addressed using a multiple regression technique to compare the ability of each independent variable (biodata and personality) to predict participants' ACT scores and job satisfaction ratings. When both measures were used as predictors in different steps in the hierarchical regression equations, incremental validity was examined to determine how much variance accounted for changed when the other measure was added as a predictor.

Statistical controls were used to account for two potential covariates. Job satisfaction may be related to the number of hours worked per week, and the amount of time (quantified in months) the participant has held the position. For example, it is unlikely that someone who is relatively new to a position and only works five hours a week would feel a strong sense of dissatisfaction. In addition, previous research (Mount et al., 2000) has suggested that general mental ability may be highly related to personality measurement results, and it should be examined as a covariate as well. Therefore, these potential covariates were controlled for in the regression analyses by entering them first in the equations. Both covariates were used when job satisfaction

was the criterion, whereas general mental ability was the only covariate in the analyses when academic achievement was the criterion.

Research Question 1A

Recall that the first research question addressed the development of the biodata measure, and the ability of both personality and biodata to predict job satisfaction and academic achievement.

Job satisfaction. To answer this question regarding job satisfaction, the five biodata scales were used together in a regression equation to predict job satisfaction, while controlling for general mental ability and length of employment. The biodata results were then compared to the results of using all five personality factors in one equation to predict job satisfaction, while controlling for general mental ability and length of employment (Table 13). When the five factors of personality were added in step 2, the variance accounted for increased from .8% to 7.1%, although not significantly. In comparison, when the five biodata scales were added in step 2, the variance accounted for increased from .7% to 7.3%, although not significantly.. When these regression results were compared side by side, it is interesting to note that the regression coefficients for both Biodata Conscientiousness ($\beta = .162$, $t = 1.99$, $p < .05$) and PCI Conscientiousness ($\beta = .207$, $t = 2.43$, $p < .05$) were significant, even though the equations were not significant. A regression coefficient may be significant when the regression equation is not significant as a result of Type I error. In addition, this may be the result of low power in the analysis due to the ratio of subjects to variables in the equation. However, when this does occur, Bobko (1995) recommends

Table 13

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on Five Factors of Personality (N = 165) to Hierarchical Regression Analysis of Job Satisfaction on Five Biodata Scales (N = 160).

Personality				Biodata			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	.533	0.042	.595	WPT	0.470	0.037	.639
Tenure	-1.020	-0.080	.309	Tenure	-0.910	-0.072	.364
Step 2				Step 2			
WPT	0.191	0.015	.849	WPT	0.590	0.047	.556
Tenure	-0.981	-0.077	.328	Tenure	-0.848	-0.059	.398
PCI- Emotional Stability	-0.307	-0.027	.759	Biodata- Emotional Stability	1.276	0.119	.204
PCI- Extraversion	0.510	0.042	.611	Biodata- Extraversion	1.029	0.102	.305
PCI- Openness to Experience	0.831	0.070	.407	Biodata- Openness to Experience	-1.388	-0.146	.167
PCI- Agreeableness	0.729	0.061	.467	Biodata- Agreeableness	1.302	0.115	.195
PCI- Conscientiousness	2.433	0.207	.016	Biodata- Conscientiousness	1.997	0.152	.048

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates. PCI – Personality Characteristics Inventory.
Personality R^2 = .008 for Step 1; ΔR^2= .063 (ns) for Step 2, R^2 = .071 (ns).
Biodata R^2 = .007 for Step 1; ΔR^2= .066 (ns) for Step 2, R^2 = .073 (ns).

evaluating the significant regression coefficients when they are the focus of the research question. This would indicate that Conscientiousness, regardless of the measurement tool, is useful in predicting job satisfaction after controlling for general mental ability and length of employment. In addition, both covariates are not significant, and they remain so throughout the job satisfaction analyses. They are still included as covariates as a result of the theoretical rationale.

In addition, because of the methodological nature of the study, each individual biodata scale and personality factor was used as single predictors after including the covariates. Although personality and biodata researchers would not expect all five constructs to be predictive of job satisfaction, to thoroughly assess the research question, all constructs were evaluated. These results were then compared on an individual basis.

The regression equations using Emotional Stability as measured by biodata or personality to predict job satisfaction, while controlling for general mental ability and length of employment were compared in Table 14. When PCI Emotional Stability was added to the covariates in Step 2, the variance accounted for increased from .8% to 1.6%, although not significantly. Likewise, when Biodata Emotional Stability was added to the covariates in Step 2, the variance accounted for increased from .8% to 2.2%, although not significantly. When the regression coefficients were compared side by side, Emotional Stability was not a significant predictor of job satisfaction after controlling for general mental ability and length of employment, regardless of the measurement tool.

Table 14

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on PCI Emotional Stability (N = 165) to Hierarchical Regression Analysis of Job Satisfaction on Biodata Emotional Stability (N = 164).

Personality				Biodata			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	.533	0.042	.595	WPT	0.517	0.041	.606
Tenure	-1.020	-0.080	.309	Tenure	-0.982	-0.077	.328
Step 2				Step 2			
WPT	0.482	0.038	.631	WPT	0.325	0.026	.746
Tenure	-1.053	-0.082	.294	Tenure	-1.220	-0.097	.224
PCI- Emotional Stability	1.120	0.088	.264	Biodata- Emotional Stability	1.537	0.123	.126

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates.
PCI – Personality Characteristics Inventory.
Personality R^2 = .008 for Step 1; ΔR^2= .008 (ns) for Step 2, R^2 = .016 (ns).
Biodata R^2 = .008 for Step 1; ΔR^2= .014 (ns) for Step 2, R^2 = .022 (ns).

The regression equations using Extraversion as measured by biodata or personality to predict job satisfaction, while controlling for general mental ability and length of employment were compared in Table 15. When PCI Extraversion Stability was added to the covariates in Step 2, the variance accounted for increased from .8% to 1.3%, although not significantly. Likewise, when Biodata Extraversion was added to the covariates in Step 2, the variance accounted for increased from .7% to 2.8%, a marginally significant increase ($\Delta R^2 = .020$, $p = .07$). When the regression coefficients were compared side by side, Extraversion was not a significant predictor of job satisfaction after controlling for general mental ability and length of employment, regardless of the measurement tool. However, note that the regression coefficient for Biodata Extraversion was marginally significant ($\beta = .143$, $t = 1.813$, $p = .07$), as was the R^2 change when adding Biodata Extraversion to the covariates.

The regression equations using Openness to Experience as measured by biodata or personality to predict job satisfaction, while controlling for general mental ability and length of employment were compared in Table 16. When PCI Openness to Experience was added to the covariates in Step 2, the variance accounted for increased from .7% to 2.8%, although not significantly. Likewise, when Biodata Openness to Experience was added to the covariates in Step 2, the variance accounted for increased from .8% to 1.3%, although not significantly. When the regression coefficients were compared side by side, Openness to Experience was not a significant predictor of job satisfaction after controlling for general mental ability and length of employment, regardless of the measurement tool.

Table 15

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on PCI Extraversion (N = 162) to Hierarchical Regression Analysis of Job Satisfaction on Biodata Extraversion (N = 165).

Personality				Biodata			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	0.533	0.042	.595	WPT	0.497	0.039	.620
Tenure	-1.020	-0.080	.309	Tenure	-0.963	-0.076	.337
Step 2				Step 2			
WPT	0.476	0.037	.635	WPT	0.556	0.044	.579
Tenure	-0.811	-0.065	.418	Tenure	-0.747	-0.059	.456
PCI- Extraversion	0.916	0.073	.361	Biodata- Extraversion	1.813	0.143	.072

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates.
PCI – Personality Characteristics Inventory.
Personality R^2 = .008 for Step 1; ΔR^2= .005 (ns) for Step 2, R^2 = .013 (ns).
Biodata R^2 = .007 for Step 1; ΔR^2= .020 (p = .07) for Step 2, R^2 = .028 (ns).

Table 16

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on PCI Openness to Experience (N = 165) to Hierarchical Regression Analysis of Job Satisfaction on Biodata Openness to Experience (N = 163).

Personality				Biodata			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	.533	0.042	.595	WPT	0.468	0.037	.640
Tenure	-1.020	-0.080	.309	Tenure	-0.967	-0.076	.335
Step 2				Step 2			
WPT	0.258	0.021	.797	WPT	0.400	0.032	.690
Tenure	-0.974	-0.076	.332	Tenure	-0.960	-0.076	.338
PCI- Openness to Experience	1.385	0.110	.168	Biodata- Openness to Experience	0.685	0.054	.495

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates.
PCI – Personality Characteristics Inventory.
Personality R^2 = .008 for Step 1; ΔR^2= .012 (ns) for Step 2, R^2 = .020 (ns).
Biodata R^2 = .007 for Step 1; ΔR^2= .003 (ns) for Step 2, R^2 = .010 (ns).

The regression equations using Agreeableness as measured by biodata or personality to predict job satisfaction, while controlling for general mental ability and length of employment were compared in Table 17. When PCI Agreeableness was added to the covariates in Step 2, the variance accounted for increased from .8% to 2.6%, a marginally significant increase ($\Delta R^2 = .018$, $p = .09$). Likewise, when Biodata Agreeableness was added to the covariates in Step 2, the variance accounted for increased from .8% to 2.4%, a marginally significant increase ($\Delta R^2 = .017$, $p = .09$). When the regression coefficients were compared side by side, Agreeableness was not a significant predictor of job satisfaction after controlling for general mental ability and length of employment, regardless of the measurement tool. However, note that the regression coefficients for both personality ($\beta = .134$, $t = 1.716$, $p = .09$) and biodata ($\beta = .131$, $t = 1.669$, $p = .10$) were marginally significant.

The regression equations using Conscientiousness as measured by biodata or personality to predict job satisfaction, while controlling for general mental ability and length of employment were compared in Table 18. When PCI Conscientiousness was added to the covariates in Step 2, the variance accounted for increased significantly from .8% to 5.9% ($p < .05$). When Biodata Conscientiousness was added to the covariates in Step 2, the variance accounted for increased significantly from .8% to 4.4% ($p < .05$). When the regression coefficients were compared side by side, Conscientiousness was a significant predictor of job satisfaction after controlling for general mental ability and length of employment ($\beta = .226$, $t = 2.947$, $p < .05$), when measured in a personality format, and it was a significant predictor of job satisfaction

Table 17

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on PCI Agreeableness (N = 165) to Hierarchical Regression Analysis of Job Satisfaction on Biodata Agreeableness (N = 163).

Personality				Biodata			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	.533	0.042	.595	WPT	0.550	0.043	.583
Tenure	-1.020	-0.080	.309	Tenure	-0.920	-0.072	.359
Step 2				Step 2			
WPT	0.612	0.048	.542	WPT	0.701	0.055	.484
Tenure	-1.008	-0.078	.315	Tenure	-0.909	-0.071	.365
PCI- Agreeableness	1.716	0.134	.088	Biodata- Agreeableness	1.669	0.131	.097

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates.
PCI – Personality Characteristics Inventory.
Personality R^2 = .008 for Step 1; ΔR^2= .018 (p = .09) for Step 2, R^2 = .026 (ns).
Biodata R^2 = .007 for Step 1; ΔR^2= .017 (p = .09) for Step 2, R^2 = .024 (ns).

Table 18

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on PCI Conscientiousness (N = 165) to Hierarchical Regression Analysis of Job Satisfaction on Biodata Conscientiousness (N = 163).

Personality				Biodata			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	.533	0.042	.595	WPT	0.499	0.039	.618
Tenure	-1.020	-0.080	.309	Tenure	-1.024	-0.081	.307
Step 2				Step 2			
WPT	0.338	0.026	.736	WPT	0.488	0.038	.626
Tenure	-1.183	-0.091	.239	Tenure	-0.878	-0.068	.381
PCI- Conscientiousness	2.947	0.226	.004	Biodata- Conscientiousness	2.450	0.190	.015

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates.
PCI – Personality Characteristics Inventory.
Personality R^2 = .008 for Step 1; ΔR^2= .051 ($p < .05$) for Step 2, R^2 = .059 ($p < .05$).
Biodata R^2 = .008 for Step 1; ΔR^2= .036 ($p < .05$) for Step 2, R^2 = .044 (ns).

after controlling for general mental ability and length of employment when measured in a biodata format ($\beta = .190$, $t = 2.45$, $p < .05$), although the overall equation was not significant. It is possible that measurement error contributed to the nonsignificant overall equation, and that Conscientiousness could be a significant predictor of job satisfaction regardless of the measurement tool. It is also possible that the nonsignificant overall equation was due to the significance of the covariates in the first step.

Therefore, when regression equations of job satisfaction on the five constructs were compared with each other, Conscientiousness was the only construct to demonstrate significance in predicting job satisfaction after controlling for general mental ability and length of employment. This likely occurred regardless of the measurement tool.

Academic achievement. Recall that the first research question addressed the development of the biodata measure and the ability and differences of both personality and biodata to predict academic achievement.

In order to answer Research Question 1a regarding academic achievement, the five biodata scales were used together in a regression equation to predict academic achievement, while controlling for general mental ability. The biodata results were then compared to the results of using all five personality factors in one equation to predict academic achievement, while controlling for general mental ability (Table 19). When the five factors of personality were added in step 2, the variance accounted for significantly increased from 33.1% to 39.6% ($\Delta R^2 = .065$, $p < .05$). In comparison,

Table 19

Comparison of the Hierarchical Regression Analysis of ACT Score on Five Factors of Personality (N = 148) to Hierarchical Regression Analysis of ACT Score on Five Biodata Scales (N = 143).

Personality				Biodata			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	8.509	0.576	.000	WPT	8.143	0.566	.000
Step 2				Step 2			
WPT	7.620	0.515	.000	WPT	7.467	0.523	.000
PCI- Emotional Stability	-1.135	-0.082	.258	Biodata- Emotional Stability	1.053	0.034	.294
PCI- Extraversion	-0.837	-0.058	.404	Biodata- Extraversion	-0.207	-0.018	.836
PCI- Openness to Experience	3.403	0.246	.001	Biodata- Openness to Experience	.906	0.086	.367
PCI- Agreeableness	-1.125	-0.078	.262	Biodata- Agreeableness	-2.283	-0.177	.024
PCI- Conscientiousness	1.716	0.121	.088	Biodata- Conscientiousness	.948	0.067	.345

Note. WPT - Wonderlic Personnel Test. WPT was used as a covariate.
PCI – Personality Characteristics Inventory.
Personality R^2 = .331 for Step 1; ΔR^2= .065 ($p < .05$) for Step 2, R^2 = .396 ($p < .05$).
Biodata R^2 = .320 for Step 1; ΔR^2= .045 (ns) for Step 2, R^2 = .365 ($p < .05$).

when the five biodata scales were added in step 2, the variance accounted for increased from 32.0% to 36.5%, although not significantly. When these regression results were compared side by side, it is interesting to note that the regression coefficient for Biodata Agreeableness was significant (β = -.177, t = -2.283, p < .05), but the personality counterpart was not significant. In addition, the regression coefficient for PCI Openness to Experience was significant (β = .246, t = 3.403, p < .05), but the biodata counterpart, was not significant. This would indicate that each of these constructs predicts ACT score differently, depending on the measurement tool. Also, note that the regression coefficient for PCI Conscientiousness was marginally significant (β = .121, t = 1.716, p = .09).

Because of the methodological nature of the study, each individual biodata scale and personality factor was used as single predictors after including the covariate. Although personality and biodata researchers would not expect all five constructs to be predictive of academic achievement, to thoroughly assess the research question, all constructs were evaluated. These results were then compared on an individual basis.

The regression equations using Emotional Stability as measured by biodata or personality to predict ACT score, while controlling for general mental ability were compared in Table 20. When PCI Emotional Stability was added to the covariate in Step 2, the variance accounted for increased from 33.1% to 33.2%, although not significantly. Likewise, when Biodata Emotional Stability was added to the covariate in Step 2, the variance accounted for increased from 33.2% to 34.2%, although not significantly. However, when the regression coefficients were compared side by side,

Table 20

Comparison of the Hierarchical Regression Analysis of ACT score on PCI Emotional Stability (N = 148) to Hierarchical Regression Analysis of ACT score on Biodata Emotional Stability (N = 147).

Personality				Biodata			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	8.509	0.576	.000	WPT	8.487	0.576	.000
Step 2				Step 2			
WPT	8.471	0.576	.000	WPT	8.320	0.565	.000
PCI- Emotional Stability	-0.092	-0.006	.927	Biodata- Emotional Stability	1.513	0.103	.132

Note. WPT - Wonderlic Personnel Test. WPT was used as a covariate.
PCI – Personality Characteristics Inventory.
Personality R^2 = .331 for Step 1; ΔR^2= .000 (ns) for Step 2, R^2 = .332 ($p < .05$).
Biodata R^2 = .332 for Step 1; ΔR^2= .010 (ns) for Step 2, R^2 = .342 ($p < .05$).

Emotional Stability was not a significant predictor of ACT score after controlling for general mental ability, regardless of the measurement tool.

The regression equations using Extraversion as measured by biodata or personality to predict ACT score, while controlling for general mental ability were compared in Table 21. When PCI Extraversion was added to the covariate in Step 2, the variance accounted for increased from 33.1% to 33.2%, although not significantly. Likewise, when Biodata Extraversion was added to the covariate in Step 2, the variance accounted for did not increase at all from 31.5%. When the regression coefficients were compared side by side, Extraversion was not a significant predictor of ACT score after controlling for general mental ability, regardless of the measurement tool.

The regression equations using Openness to Experience as measured by biodata or personality to predict ACT score, while controlling for general mental ability were compared in Table 22. When PCI Openness to Experience was added to the covariate in Step 2, the variance accounted for increased significantly from 33.1% to 37.3% ($\Delta R^2 = .041$, $p < .05$). Likewise, when Biodata Openness to Experience was added to the covariate in Step 2, the variance accounted for increased, although not significantly, from 31.6% to 32.1%. However, when the regression coefficients were compared side by side, the regression coefficient for PCI Openness to Experience was significant ($\beta = .208$, $t = 3.093$, $p < .05$), but the biodata counterpart was not significant. This would indicate that Openness to Experience as measured by

Table 21

Comparison of the Hierarchical Regression Analysis of ACT score on PCI Extraversion (N = 148) to Hierarchical Regression Analysis of ACT score on Biodata Extraversion (N = 145).

Personality				Biodata			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	8.509	0.576	.000	WPT	8.114	0.561	.000
Step 2				Step 2			
WPT	8.470	0.576	.000	WPT	8.084	0.562	.000
PCI- Extraversion	-0.052	-0.004	.959	Biodata- Extraversion	0.089	0.006	.929

Note. WPT - Wonderlic Personnel Test. WPT was used as a covariate.
PCI – Personality Characteristics Inventory.
Personality $R^2 = .331$ for Step 1; $\Delta R^2 = .000$ (ns) for Step 2, $R^2 = .332$ ($p < .05$).
Biodata $R^2 = .315$ for Step 1; $\Delta R^2 = .000$ (ns) for Step 2, $R^2 = .315$ ($p < .05$).

Table 22

Comparison of the Hierarchical Regression Analysis of ACT score on PCI Openness to Experience (N = 148) to Hierarchical Regression Analysis of ACT score on Biodata Openness to Experience (N = 146).

Personality				Biodata			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	8.509	0.576	.000	WPT	8.162	0.562	.000
Step 2				Step 2			
WPT	7.908	0.532	.000	WPT	8.018	0.555	.000
PCI- Openness to Experience	3.093	0.208	.002	Biodata- Openness to Experience	0.990	0.069	.324

Note. WPT - Wonderlic Personnel Test. WPT was used as a covariate.
PCI – Personality Characteristics Inventory.
Personality $R^2 = .331$ for Step 1; $\Delta R^2 = .041$ ($p < .05$) for Step 2, $R^2 = .373$ ($p < .05$).
Biodata $R^2 = .316$ for Step 1; $\Delta R^2 = .005$ (ns) for Step 2, $R^2 = .321$ ($p < .05$).

personality is a better predictor of ACT score than Openness to Experience as measured by biodata.

The regression equations using Agreeableness as measured by biodata or personality to predict ACT score, while controlling for general mental ability were compared in Table 23. When PCI Agreeableness was added to the covariate in Step 2, the variance accounted for increased from 33.1% to 33.4%, although not significantly. When Biodata Agreeableness was added to the covariate in Step 2, the variance accounted for increased significantly from 33.7% to 35.5% ($\Delta R^2 = .018$, $p = .05$). However, when the regression coefficients were compared side by side, the regression coefficient for Biodata Agreeableness was significant ($\beta = -.133$, $t = -1.974$, $p = .05$), but the personality counterpart was not significant. This would indicate that Agreeableness as measured by biodata was a better predictor of ACT score than Agreeableness as measured by personality.

The regression equations using Conscientiousness as measured by biodata or personality to predict ACT score, while controlling for general mental ability were compared in Table 24. When PCI Conscientiousness was added to the covariate in Step 2, the variance accounted for increased from 33.1% to 34.1%, although not significantly. Likewise, when Biodata Conscientiousness was added to the covariate in Step 2, the variance accounted for increased from 33.0% to 33.7%, although not significantly. However, when the regression coefficients were compared side by side, Conscientiousness was not a significant predictor of ACT score after controlling for general mental ability, regardless of the measurement tool.

Table 23

Comparison of the Hierarchical Regression Analysis of ACT score on PCI Agreeableness (N = 148) to Hierarchical Regression Analysis of ACT score on Biodata Agreeableness (N = 146).

Personality				Biodata			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	8.509	0.576	.000	WPT	8.560	0.581	.000
Step 2				Step 2			
WPT	8.477	0.575	.000	WPT	8.448	0.570	.000
PCI- Agreeableness	-0.708	-0.048	.480	Biodata- Agreeableness	-1.974	-0.133	.050

Note. WPT - Wonderlic Personnel Test. WPT was used as a covariate.
PCI – Personality Characteristics Inventory.
Personality $R^2 = .331$ for Step 1; $\Delta R^2 = .002$ (ns) for Step 2, $R^2 = .334$ ($p < .05$).
Biodata $R^2 = .337$ for Step 1; $\Delta R^2 = .018$ ($p = .05$) for Step 2, $R^2 = .355$ ($p < .05$).

Table 24

Comparison of the Hierarchical Regression Analysis of ACT score on PCI Conscientiousness (N = 148) to Hierarchical Regression Analysis of ACT score on Biodata Conscientiousness (N = 146).

Personality				Biodata			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	8.509	0.576	.000	WPT	8.415	0.574	.000
Step 2				Step 2			
WPT	8.281	0.563	.000	WPT	8.356	0.570	.000
PCI- Conscientiousness	1.433	0.097	.154	Biodata- Conscientiousness	1.280	0.087	.203

Note. WPT - Wonderlic Personnel Test. WPT was used as a covariate.
PCI – Personality Characteristics Inventory.
Personality R^2 = .331 for Step 1; ΔR^2= .009 (ns) for Step 2, R^2 = .341 ($p < .05$).
Biodata R^2 = .330 for Step 1; ΔR^2= .008 for (ns) Step 2, R^2 = .337 ($p < .05$).

Therefore, when regression equations of ACT score on the five constructs were compared with each other, Agreeableness as measured by biodata was a better predictor of ACT score than Agreeableness as measured by personality, after controlling for general mental ability. The coefficients indicated that lower scores on Agreeableness were related to higher ACT scores. In addition, Openness to Experience as measured by personality was a better predictor of ACT score than Openness to Experience as measured by biodata, after controlling for general mental ability. The coefficients indicated that higher scores on Openness to Experience were related to higher ACT scores.

Research Question 1B

Recall that Research Question 1b intended to explore the participant's perceptions of the fairness and invasiveness of the biodata and personality measures.

Scores on each of the seven dimensions of the Perceptions Measure for both biodata and personality were correlated with their counterpart dimension, and the results are provided in Table 25. For example, the dimension Fairness- Personality was correlated with the dimension Fairness-Biodata. The correlations ranged from .461 to .675, and all were significant, $p < .01$.

Therefore, as scores on a dimension such as Perceptions of Fairness-Personality increase, the scores on Perceptions of Fairness- Biodata also increase. None of the correlations were negative, indicating a general similarity of the participant's perceptions of the measures.

Table 25

Correlations Between the Perceptions of Biodata and Perceptions of Personality with Their Counterpart Dimension

Dimension	r	p
Sum of Perceptions Scale	.675	$p < .01$
Perceptions- Fairness	.613	$p < .01$
Perceptions- Face Validity	.461	$p < .01$
Perceptions- Predictive Validity	.661	$p < .01$
Perceptions- Affect	.672	$p < .01$
Perceptions- Perceived Knowledge of Results	.577	$p < .01$
Perceptions- Perceived Controllability	.485	$p < .01$
Perceptions- Perceived Fakability	.571	$p < .01$

The mean scores on the aggregated answers to the Perceptions Measure answered for both the biodata measure and the PCI were compared using a correlated t-test. The correlation between the two Perceptions Measures was positive and significant, $r = .672$, $p < .01$ ($n = 167$). The paired samples t-test resulted in a $t = 1.901$, $p = .059$, ($df = 166$). Therefore, the participants may overall have slightly different perceptions of the personality measure and the biodata measure.

Therefore, in order more accurately investigate Research Question 1b, to determine if specific differences in the perceptions of the measures existed, paired t-tests were used to compare the means on each perceptions of personality dimension with its perceptions of biodata counterpart dimension. Of the seven dimensions, four comparisons were significantly different, as indicated in Table 26. Recall that each item was rated on a 5-point scale, and each subscale was composed of a sum of the relevant items. Personality was perceived as having higher face validity than biodata ($M = 3.01$, $SD = .71$; $M = 2.83$, $SD = .75$, respectively). However, biodata was perceived as having higher predictive validity than personality ($M = 2.47$, $SD = .72$; $M = 2.36$, $SD = .71$, respectively).

Personality was perceived as providing higher scores on Perceived Knowledge of Results than Biodata ($M = 2.91$, $SD = .78$; $M = 2.75$, $SD = .75$, respectively). In addition, personality was also perceived as being easier to fake than biodata ($M = 3.26$, $SD = .62$; $M = 3.17$, $SD = .61$, respectively).

When examining the means, it is important to recall that the items were rated on a 5-point scale from strongly agree to strongly disagree. Therefore, the significant

Table 26

t-tests of Each of the Dimensions of Perceptions Measures

Dimension	M PCI	M Biodata	t	Sig	df
Perceptions- Fairness	3.08	3.04	.874	.383	161
Perceptions- Face Validity	3.01	2.83	2.905	.004	165
Perceptions- Predictive Validity	2.36	2.47	-2.456	.015	157
Perceptions- Affect	3.28	3.26	.458	.647	165
Perceptions- Perceived Knowledge of Results	2.91	2.75	2.941	.004	167
Perceptions- Perceived Controllability	3.17	3.15	.378	.706	164
Perceptions- Perceived Fakability	3.26	3.17	2.236	.027	164

differences for face validity show that participants viewed biodata as having slightly lower face validity than personality, (3= neither agree nor disagree, and 2 = moderately disagree). When considering predictive validity, biodata was still only slightly higher than personality on the 5-point scale. And, when considering the 5-point scale, personality was only slightly higher than biodata in perceived knowledge of results, and perceived fakability. None of the means of the significant differences approached the extreme ends of the 5-point scale, so the conclusions must be drawn carefully.

Therefore, in general overall terms, personality was perceived as having higher face validity, providing more knowledge of results, and easier to fake than biodata. Biodata was perceived as having higher predictive validity than personality.

Research Question 2A and 2B

Research Question 2A referred to the ability of biodata to add incremental validity to personality in the prediction of both criteria. Research Question 2B referred to the ability of personality to add incremental validity to biodata in the prediction of both criteria.

> Research Question 2a): Does biodata add incremental validity to personality measurement in predicting academic achievement and job satisfaction?
>
> Research Question 2b): Does personality add incremental validity to biodata measurement in predicting academic achievement and job satisfaction?

The second research question addressed whether one measurement system provided better prediction than the other. Therefore, it is the degree to which biodata or personality can add incremental validity to the other measurement tool in predicting the criteria of job satisfaction and academic achievement that was examined.

Again, when job satisfaction was the criterion, two covariates were included, length of employment and general mental ability. However, when academic achievement was the criterion, general mental ability was the only covariate. Results for job satisfaction as the criterion are explained first, and results for academic achievement as the criterion are explained second. Therefore, in these hierarchical regression results to answer research question 2A, the covariate(s) will be in the first step, the personality factor(s) will be in the second step, and the biodata scale(s) will be in the third step. Then, to answer research question 2B, the covariate(s) will be in the first step, the biodata scale(s) will be in the second step, and the personality factor(s) will be in the third step. The results for research questions 2A and 2B will be presented together in order to compare the results when the order of the second and third predictors are reversed.

Job satisfaction. When job satisfaction was regressed on the 10 predictors in a forced hierarchical method, using the two covariates in the first step, five personality factors or biodata scales in the second step, and the five remaining personality or biodata scales in the third step, the addition of either combination in the third step did not add significantly to the variance accounted for (Table 27).

Table 27

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on Five Factors of Personality and Five Biodata Scales (N = 160) with reversed steps.

Biodata First				Personality First			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	0.470	0.037	.639	WPT	0.470	0.037	.639
Tenure	-0.910	-0.072	.364	Tenure	-0.910	-0.072	.364
Step 2				Step 2			
WPT	0.590	0.047	.556	WPT	0.208	0.017	.835
Tenure	-0.848	-0.069	.398	Tenure	-0.866	-0.069	.388
Biodata- Emotional Stability	1.276	0.119	.204	PCI- Emotional Stability	-0.084	-0.007	.933
Biodata- Extraversion	1.029	0.102	.305	PCI- Extraversion	0.614	0.052	.540
Biodata- Openness to Experience	-1.388	-0.146	.167	PCI- Openness to Experience	0.723	0.063	.471
Biodata- Agreeableness	1.302	0.115	.195	PCI- Agreeableness	0.451	0.039	.653
Biodata- Conscientiousness	1.997	0.162	.048	PCI- Conscientiousness	2.378	0.206	.019
Step 3				Step 3			

WPT	0.349	0.028	.727	WPT	0.349	0.028	.727
Tenure	-0.890	-0.074	.375	Tenure	-0.890	-0.074	.375
Biodata- Emotional Stability	0.955	0.122	.341	PCI- Emotional Stability	-0.426	-0.054	.671
Biodata- Extraversion	1.004	0.125	.317	PCI- Extraversion	0.104	0.012	.917
Biodata- Openness to Experience	-1.619	-0.206	.108	PCI- Openness to Experience	1.237	0.125	.218
Biodata- Agreeableness	1.283	0.134	.202	PCI- Agreeableness	-0.270	-0.028	.788
Biodata- Conscientiousness	0.546	0.058	.586	PCI- Conscientiousness	1.601	0.181	.111
PCI- Emotional Stability	-0.426	-0.054	.671	Biodata- Emotional Stability	0.955	0.122	.341
PCI- Extraversion	0.104	0.012	.917	Biodata- Extraversion	1.004	0.125	.317
PCI- Openness to Experience	1.237	0.125	.218	Biodata- Openness to Experience	-1.619	-0.206	.108
PCI- Agreeableness	-0.270	-0.028	.788	Biodata- Agreeableness	1.283	0.134	.202
PCI- Conscientiousness	1.601	0.181	.111	Biodata- Conscientiousness	0.546	0.058	.586

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates.
PCI – Personality Characteristics Inventory.
Biodata First: Step 1: R^2 = .007 (ns); Step 2: ΔR^2= .066 (ns) , R^2 = .073 (ns); Step 3: ΔR^2= .030 , R^2 = .102 (ns).
Personality First: Step 1: R^2 = .007 (ns); Step 2: ΔR^2= .060 (ns), R^2 = .067 (ns); Step 3: ΔR^2= .036 , R^2 = .102 (ns).

However, interesting results occurred in the second steps, which are worth mentioning. When PCI was added as the second step, the PCI Conscientiousness coefficient was significant in the second step ($\beta = .206$, $t = 2.378$, $p < .05$), but was not significant after the Biodata scales were added in the third step. Similarly, when the five Biodata Scales were examined as added in the second step, Biodata Conscientiousness was a significant coefficient in the second step ($\beta = .162$, $t = 1.997$, $p < .05$), but it was not significant in the third step, after the personality factors were added.

The scales were then entered in individual separate steps with their corresponding factor, as follows:

When job satisfaction was regressed in the same three-step manner, using only Emotional Stability, while controlling for general mental ability and length of employment (step 1), all equations were not significant. This result occurred regardless of the order of entry of personality and biodata, illustrated in Table 28. This shows that neither version of Emotional Stability is adding incremental validity to the other.

When job satisfaction was regressed in the same three-step manner, using only Extraversion, while controlling for general mental ability and length of employment (step 1), all equations were not significant. This result occurred regardless of the order of entry of personality and biodata, illustrated in Table 29. This shows that neither version of Extraversion is adding incremental validity to the other.

Table 28

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on Biodata Emotional Stability and PCI Emotional Stability with reversed steps.

Biodata First (n = 162)				Personality First (n = 164)			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	0.517	0.041	.606	WPT	0.517	0.041	.606
Tenure	-0.982	-0.077	.328	Tenure	-0.982	-0.077	.328
Step 2				Step 2			
WPT	0.325	0.026	.746	WPT	0.460	0.036	.646
Tenure	-1.220	-0.097	.224	Tenure	-1.017	-0.080	.311
Biodata- Emotional Stability	1.537	0.0123	.126	PCI- Emotional Stability	1.230	0 097	.221
Step 3				Step 3			
WPT	0.332	0.026	.740	WPT	0.332	0.026	.740
Tenure	-1.186	-0.095	.237	Tenure	-1.186	-0.095	.237
Biodata- Emotional Stability	0.925	0.111	.356	PCI-Emotional Stability	0.137	0.016	.891
PCI- Emotional Stability	0.137	0.016	.891	Biodata-Emotional Stability	0.925	0.111	.356

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates. PCI – Personality Characteristics Inventory. Biodata First: Step 1: $R^2 = .008$ (ns); Step 2: $\Delta R^2 = .014$ (ns), $R^2 = .022$ (ns);Step 3: $\Delta R^2 = .000$ (ns), $R^2 = .022$ (ns).
Personality First: Step 1: $R^2 = .008$ (ns); Step 2: $\Delta R^2 = .009$ (ns), $R^2 = .017$ (ns); Step 3: $\Delta R^2 = .005$ (ns), $R^2 = .022$ (ns).

Table 29

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on Biodata Extraversion and PCI Extraversion with reversed steps.

Biodata First (n = 162)				Personality First (n = 162)			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	0.497	0.039	.620	WPT	0.497	0.039	.620
Tenure	-0.963	-0.076	.337	Tenure	-0.963	-0.076	.337
Step 2				Step 2			
WPT	0.556	0.044	.579	WPT	0.449	0.036	.654
Tenure	-0.747	-0.059	.456	Tenure	-0.754	-0.061	.452
Biodata- Extraversion	1.813	0.143	.072	PCI- Extraversion	0.937	0.076	.350
Step 3				Step 3			
WPT	0.583	0.046	.561	WPT	0.583	0.046	.561
Tenure	-0.789	-0.063	.431	Tenure	-0.789	-0.063	.431
Biodata- Extraversion	1.578	0.166	.117	PCI-Extraversion	-0.327	-0.035	.744
PCI- Extraversion	-0.327	-0.035	.744	Biodata-Extraversion	1.578	0.166	.117

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates. PCI – Personality Characteristics Inventory. Biodata First: Step 1: R^2 = .007 (ns); Step 2: ΔR^2= .020 (F change (1,158) =3.289, p = .07), R^2 = .028 (ns); Step 3: ΔR^2= .001 (ns), R^2 = .028 (ns). Personality First: Step 1: R^2 = .007 (ns); Step 2: ΔR^2= .005 (ns), R^2 = .013 (ns); Step 3: ΔR^2= .015 (ns), R^2 = .028 (ns).

Within the three-step Extraversion results, it is interesting to note that when job satisfaction was regressed on Biodata Extraversion (step 2) and PCI Extraversion (step 3), while controlling for general mental ability and length of employment (step 1), there was a marginally significant R^2 change when Biodata Extraversion was added after the covariates in step 2, ($\Delta R^2 = .020$, $p = .07$), but the R^2 was not significant for the equation.

When job satisfaction was regressed in the same three-step manner, using only Openness to Experience, while controlling for general mental ability and length of employment (step 1), all equations were not significant. This result occurred regardless of the order of entry of personality and biodata, illustrated in Table 30. This shows that neither version of Openness to Experience is adding incremental validity to the other.

When job satisfaction was regressed in the same three-step manner, using only Agreeableness, while controlling for general mental ability and length of employment (step 1), all equations were not significant. This result occurred regardless of the order of entry of personality and biodata, illustrated in Table 31. This shows that neither version of Agreeableness is adding incremental validity to the other. Within the three-step Agreeableness results, it is interesting to note that when job satisfaction was regressed on Biodata Agreeableness (step 2) and PCI Agreeableness (step 3), while controlling for general mental ability and length of employment (step 1), there was a marginally significant R^2 change when Biodata Agreeableness was added after the covariates ($\Delta R^2 = .017$, $p = .09$), but the R^2 was not significant for the entire equation.

Table 30

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on Biodata Openness to Experience and PCI Openness to Experience with reversed steps.

Biodata First (n = 163)				Personality First (n = 163)			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	0.468	0.037	.640	WPT	0.468	0.037	.640
Tenure	-0.967	-0.076	.335	Tenure	-0.967	-0.076	.335
Step 2				Step 2			
WPT	0.400	0.032	.690	WPT	0.224	0.018	.823
Tenure	-0.960	-0.076	.338	Tenure	-0.928	-0.073	.355
Biodata- Openness to Experience	0.685	0.054	.495	PCI- Openness to Experience	1.268	0.102	.207
Step 3				Step 3			
WPT	0.223	0.018	.824	WPT	0.223	0.018	.824
Tenure	-0.924	-0.073	.357	Tenure	-0.924	-0.073	.357
Biodata- Openness to Experience	-0.054	-0.005	.957	PCI-Openness to Experience	1.064	0.105	.289
PCI- Openness to Experience	1.064	0.105	.289	Biodata-Openness to Experience	-0.054	-0.005	.957

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates. PCI – Personality Characteristics Inventory. Biodata First: Step 1: R^2 = .007 (ns); Step 2: ΔR^2= .003 (ns), R^2 = .010 (ns); Step 3: ΔR^2= .007 (ns), R^2 = .017 (ns). Personality First: Step 1: R^2 = .007 (ns); Step 2: ΔR^2= .010 (ns), R^2 = .017 (ns); Step 3: ΔR^2= .000 (ns), R^2 = .017 (ns).

Table 31

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on Biodata Agreeableness and PCI Agreeableness with reversed steps.

Biodata First (n = 163)				Personality First (n = 163)			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	0.550	0.043	.583	WPT	0.550	0.043	.583
Tenure	-0.920	-0.072	.359	Tenure	-0.920	-0.072	.359
Step 2				Step 2			
WPT	0.701	0.055	.484	WPT	0.616	0.048	.539
Tenure	-0.909	-0.071	.365	Tenure	-0.922	-0.072	.358
Biodata- Agreeableness	1.669	0.131	.097	PCI- Agreeableness	1.634	0.128	.104
Step 3				Step 3			
WPT	0.691	0.054	.491	WPT	0.691	0.054	.491
Tenure	-0.912	-0.071	.363	Tenure	-0.912	-0.071	.363
Biodata- Agreeableness	0.941	0.088	.348	PCI-Agreeableness	0.878	0.081	.381
PCI- Agreeableness	0.878	0.081	.381	Biodata-Agreeableness	0.941	0.088	.348

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates. PCI – Personality Characteristics Inventory. Biodata First: Step 1: R^2 = .007 (ns); Step 2: ΔR^2= .017 (F Change (1, 159) = 2.785, p = .09), R^2 = .024 (ns); Step 3: ΔR^2= .005 (ns), R^2 = .029 (ns). Personality First: R^2 = .007 for Step 1; ΔR^2= .016 for Step 2, R^2 = .024 (ns); ΔR^2= .005 for Step 3, R^2 = .029 (ns).

When job satisfaction was regressed in the same three-step manner, using only Conscientiousness, while controlling for general mental ability and length of employment (step 1), the incremental validity equations in step 3 were not significant (Table 32). This result occurred regardless of the order of entry of personality or biodata. This shows that neither version of Conscientiousness is adding incremental validity to the other.

Academic achievement. To reiterate the second research question, it addressed whether one measurement system provided better prediction than the other. Therefore, it is the degree to which biodata or personality can add incremental validity to the other measurement tool in predicting academic achievement that was examined.

Therefore, when academic achievement was the criterion, general mental ability was the only covariate. Again, in these hierarchical regression results to answer research question 2A, the covariate will be in the first step, the personality factor(s) will be in the second step, and the biodata scale(s) will be in the third step. Then, to answer research question 2B, the covariate will be in the first step, the biodata scale(s) will be in the second step, and the personality factor(s) will be in the third step. The results for research questions 2A and 2B will be presented together in order to compare the results when the order of the second and third predictors are reversed.

When ACT score was regressed on the 10 predictors in a forced hierarchical method, using general mental ability in the first step as a covariate, five personality factors or biodata scales in the second step, and the five remaining personality or

Table 32

Comparison of the Hierarchical Regression Analysis of Job Satisfaction on Biodata Conscientiousness and PCI Conscientiousness with reversed steps.

Biodata First (n = 163)				Personality First (n = 163)			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	0.499	0.039	.618	WPT	0.499	0.039	.618
Tenure	-1.024	-0.081	.307	Tenure	-1.024	-0.081	.307
Step 2				Step 2			
WPT	0.488	0.038	.626	WPT	0.336	0.026	.737
Tenure	-0.787	-0.068	.381	Tenure	-1.177	-0.091	.241
Biodata- Conscientiousness	2.450	0.190	.015	PCI- Conscientiousness	2.815	0.218	.005
Step 3				Step 3			
WPT	0.371	0.029	.711	WPT	0.371	0.029	.711
Tenure	-1.058	-0.082	.292	Tenure	-1.058	-0.082	.292
Biodata- Conscientiousness	0.927	0.091	.355	PCI-Conscientiousness	1.648	0.162	.101
PCI- Conscientiousness	1.648	0.162	.101	Biodata-Conscientiousness	0.927	0.091	.355

Note. WPT - Wonderlic Personnel Test, Tenure - number of months in current position. WPT and Tenure were used as covariates. PCI – Personality Characteristics Inventory. Biodata First: Step 1: R^2 = .008 (ns); Step 2: ΔR^2= .036 (F Change (1, 159) = 6.00, p < .05), R^2 = .044 (ns); Step 3: ΔR^2= .016 (ns), R^2 = .060, (F (4, 158) = 2.537, p < .05). Personality First: R^2 = .008 (ns); Step 2: ΔR^2= .047 (F Change (1, 159) = 7.93, p < .05), R^2 = .055 (F (3, 159) = 3.099, p < .05); Step 3: ΔR^2= .005 (ns), R^2 = .060, F (4, 158) = 2.537, p < .05.

biodata scales in the third step, when the Biodata Scales were added in step 3, they added marginally to the PCI Factors (step 2) in the prediction of ACT score (Step 3 $\Delta R^2 = .043$, $p = .07$), $F\ (11, 131)_{\text{step 3}} = 9.559$, $p < .01$. The results are illustrated in Table 33. Therefore, the five PCI Factors when added together to the covariate, accounted for 40.2% of the variance. The five Biodata scales increased the variance accounted for to 44.5%, a marginally significant change (Step 3 $\Delta R^2 = .043$, $p = .07$). By reversing the second and third steps, when the PCI Factors (step 3) were added to the Biodata Scales (step 2) in the prediction of ACT score, the PCI factors added incremental validity to the prediction of ACT score. The five personality scales significantly increased the variance accounted for to 44.5% ($\Delta R^2 = .080$, $p < .05$) in the third step, $F\ (11,131)_{\text{step 3}} = 9.559$, $p < .01$.

Within these results, considering the regression using personality in the second step, and biodata in the third step, some interesting results regarding individual predictors should be noted. In the second step, only the regression coefficient for PCI Openness to Experience was significant ($\beta = .272$, $t = 3.701$, $p < .05$), but the regression coefficient for PCI Conscientiousness approached significance ($\beta = .138$, $t = 1.942$, $p = .054$). When the five biodata scales were added in the third step, four regression coefficients were significant, PCI Emotional Stability ($\beta = -.265$, $t = -2.593$, $p < .05$), PCI Openness to Experience ($\beta = .260$, $t = 3.165$, $p < .05$), Biodata Emotional Stability ($\beta = .219$, $t = 2.117$, $p < .05$), and Biodata Agreeableness ($\beta = -.190$, $t = -2.166$, $p < .05$). Therefore, Biodata Emotional Stability and Biodata Agreeableness were adding significant incremental validity above and beyond PCI

Table 33

Comparison of the Hierarchical Regression Analysis of Academic Achievement (ACT) on Five Factors of Personality and Five Biodata Scales (N = 143) with reversed steps.

Biodata First				Personality First			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	8.143	0.566	.000	WPT	8.143	0.566	.000
Step 2				Step 2			
WPT	7.467	0.523	.000	WPT	7.311	0.499	.000
Biodata- Emotional Stability	1.053	0.084	.294	PCI- Emotional Stability	-1.079	-0.079	.283
Biodata- Extraversion	-0.207	-0.018	.836	PCI- Extraversion	-1.000	-0.070	.319
Biodata- Openness to Experience	0.906	0.086	.367	PCI- Openness to Experience	3.701	0.272	.000
Biodata- Agreeableness	-2.283	-0.177	.024	PCI- Agreeableness	-1.663	-0.117	.099
Biodata- Conscientiousness	0.948	0.067	.325	PCI- Conscientiousness	1.942	0.138	.054
Step 3				Step 3			
WPT	7.004	0.475	.000	WPT	7.004	0.475	.000
Biodata- Emotional Stability	2.117	0.219	.036	PCI- Emotional Stability	-2.593	-0.265	.011
Biodata- Extraversion	0.548	0.057	.585	PCI- Extraversion	-1.217	-0.116	.226

Biodata- Openness to Experience	0.050	0.005	.960	PCI- Openness to Experience	3.165	0.260	.002
Biodata- Agreeableness	-2.166	-0.190	.032	PCI- Agreeableness	-0.203	-0.017	.839
Biodata- Conscientiousness	0.447	0.040	.656	PCI- Conscientiousness	1.176	0.110	.242
PCI- Emotional Stability	-2.593	-0.265	.011	Biodata- Emotional Stability	2.117	0.219	.036
PCI- Extraversion	-1.217	-0.116	.226	Biodata- Extraversion	0.548	0.057	.585
PCI- Openness to Experience	3.165	0.260	.002	Biodata- Openness to Experience	0.050	0.005	.960
PCI- Agreeableness	-0.203	-0.017	.839	Biodata- Agreeableness	-2.166	-0.190	.032
PCI- Conscientiousness	1.176	0.110	.242	Biodata- Conscientiousness	0.477	0.040	.656

Note. WPT - Wonderlic Personnel Test. WPT was used as a covariate. PCI – Personality Characteristics Inventory.
Biodata First: Step 1: $R^2 = .320$, F (1, 141) = 66.302, $p < .05$; Step 2: $\Delta R^2 = .045$ (F Change (5, 136) = 1.943, $p = .09$), $R^2 = .365$ F (6, 136) = 13.039, $p < .05$; Step 3: $\Delta R^2 = .080$ (F Change (5, 131) = 3.782, $p < .05$), $R^2 = .445$, F (11, 131) = 9.559, $p < .05$.
Personality First: Step 1: $R^2 = .320$ F (1, 141) = 66.302, $p < .05$; Step 2: $\Delta R^2 = .082$ (F Change (5, 136) = 3.73, $p < .05$), $R^2 = .402$, F (6, 136) = 15.229, $p < .05$; Step 3: $\Delta R^2 = .043$ (F Change (5, 131) = 2.050, $p = .07$), $R^2 = .445$, F (11, 131) = 9.559, $p < .05$.

Emotional Stability and PCI Openness to Experience. Because PCI Emotional Stability was not significant until the third step, this indicates that suppression may be a consideration in this equation. Suppression can be identified when a nonsignificant coefficient in a previous step appears as a significant coefficient in a subsequent step, or when a coefficient changes direction from one step to the next (i.e. from a positive coefficient in one step, to a negative coefficient in the next step, or vice versa). Suppression can be an indication of different problems, such as the presence of an unidentified variable or relationship, error, or a statistical artifact resulting from the combination of multiple predictors. Another interesting phenomenon is that the beta weight for PCI Emotional Stability was negative, but biodata Emotional Stability had a positive beta weight.

Within these results, considering the regression using biodata in the second step, and personality in the third step, some interesting results regarding individual predictors should be noted. In the second step, the only significant regression coefficient was Biodata Agreeableness ($\beta = -.177$, $t = -2.283$, $p < .05$). Results of the third step are identical to those of the third step described previously.

The scales were then entered in individual separate steps with their corresponding factor, as follows:

When ACT score was regressed in the same three-step manner, using only Emotional Stability, while controlling for general mental ability (step 1), the covariate accounted for 33.2% of the variance in ACT score. When PCI Emotional Stability was added in step 2, the variance accounted for did not increase. When Biodata

Emotional Stability was added to personality in step 3, the variance accounted for increased to 35.7%, a significant increase. When PCI Emotional Stability was added to biodata in step 3, PCI Emotional Stability did not add incremental validity to biodata, although the entire equation was significant (F (3, 143) = 26.494, $p < .05$.) The results are presented in Table 34.

Within these results, it is interesting to note features of the individual regression coefficients. When personality was added in step 2, the regression coefficient for PCI Emotional Stability was not significant in step 2 or 3, but the regression coefficient for Biodata Emotional Stability was significant in step 3 (β = .235, t = 2.372, $p < .05$). Therefore, Biodata Emotional Stability adds to Personality Emotional Stability in the prediction of ACT score. When Biodata was added in step 2, the regression coefficient for Biodata Emotional Stability was not significant. However, when PCI Emotional Stability was added in step 3 to Biodata Emotional Stability (step 2) the regression coefficient for Biodata was significant (β = .235, t = 2.372, $p < .05$), but not the coefficient for PCI. Therefore, suppression may be present. It is also interesting to note that the coefficient for PCI Emotional Stability is marginally significant (p = .07), and it is negative, whereas the Biodata Emotional Stability coefficient is positive. This is an interesting phenomenon, which occurred earlier when all of the factors were included together.

When job ACT score was regressed in the same three-step manner, using only Extraversion, while controlling for general mental ability (step 1), the covariate accounted for 31.5% of the variance in ACT score. When

Table 34

Comparison of the Hierarchical Regression Analysis of Academic Achievement (ACT) on Biodata Emotional Stability and PCI Emotional Stability with reversed steps.

Biodata First (n = 147)				Personality First (n = 147)			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	8.487	0.576	.000	WPT	8.487	0.576	.000
Step 2				Step 2			
WPT	8.320	0.565	.000	WPT	8.451	0.577	.000
Biodata- Emotional Stability	1.513	0.103	.132	PCI- Emotional Stability	-0.123	-0.008	.903
Step 3				Step 3			
WPT	8.336	0.562	.000	WPT	8.336	0.562	.000
Biodata- Emotional Stability	2.372	0.235	.019	PCI-Emotional Stability	-1.821	-0.179	.071
PCI- Emotional Stability	-1.821	-0.179	.071	Biodata-Emotional Stability	2.372	0.235	.019

Note. WPT - Wonderlic Personnel Test, WPT was used as a covariate. PCI – Personality Characteristics Inventory.
Biodata First: Step 1: $R^2 = .332$ F (1, 145) = 72.030, p < .01; Step 2: $\Delta R^2 = .010$ (ns), $R^2 = .342$ F (2, 144) = 37.481, p < .01; Step 3: $\Delta R^2 = .015$, F Change (1, 143) = 3.315, p = .07, $R^2 = .357$, F (3, 143) = 26.494, p < .01. Personality First: Step 1: $R^2 = .332$ F (1, 145) = 72.030, p < .01; Step 2: $\Delta R^2 = .000$ (ns), $R^2 = .332$ F (2, 144) = 35.778, p < .01; Step 3: $\Delta R^2 = .025$ F Change (1, 143) = 5.626, p < .05, $R^2 = .357$, F (3, 143) = 26.494, p < .01.

personality was entered in step 2 and biodata was entered in step 3, Extraversion did not predict ACT score, although the covariate of general mental ability was significant in each equation. The same result occurred when the steps were reversed. This shows that neither version of Extraversion is adding incremental validity to the other. The results are illustrated in Table 35.

When ACT score was regressed in the same three-step manner, using only Openness to Experience, while controlling for general mental ability (step 1), the covariate accounted for 31.6% of the variance in ACT score. When Biodata Openness to Experience was added (step 3) to PCI Openness to Experience (step 2), the increment in R^2 was not significant. However, when the reverse was considered, PCI Openness to Experience added to Biodata Openness to Experience in predicting ACT score ($\Delta R^2 = .043$, $p < .05$). Therefore, Biodata Openness to Experience does not add significantly above and beyond the covariates in predicting ACT score, but PCI Openness to Experience added to Biodata Openness in Experience predicting ACT score. The results are illustrated in Table 36.

Within these results, it is interesting to note features of the individual regression coefficients. In the regressions where personality was entered second, the regression coefficient for PCI Openness to Experience was significant in the second ($\beta = .214$, $t = 3.134$, $p < .05$) and third steps ($\beta = .254$, $t = 3.085$, $p < .05$). However, when Biodata was added in the second step, the regression coefficient for Biodata Openness to Experience was not significant, but in the third step the regression

Table 35

Comparison of the Hierarchical Regression Analysis of Academic Achievement (ACT) on Biodata Extraversion and PCI Extraversion with reversed steps.

Biodata First (n = 145)				Personality First (n = 145)			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	8.114	0.561	.000	WPT	8.114	0.561	.000
Step 2				Step 2			
WPT	8.084	0.562	.000	WPT	8.083	0.562	.000
Biodata- Extraversion	0.089	0.006	.929	PCI- Extraversion	-0.091	-0.006	.927
Step 3				Step 3			
WPT	8.048	0.563	.000	WPT	8.048	0.563	.000
Biodata- Extraversion	0.201	0.019	.841	PCI-Extraversion	-0.202	-0.019	.840
PCI- Extraversion	-0.202	-0.019	.840	Biodata-Extraversion	0.201	0.019	.841

Note. WPT - Wonderlic Personnel Test, WPT was used as a covariate. PCI – Personality Characteristics Inventory.
Biodata First: Step 1: $R^2 = .315$ F (1, 143) = 65.831, p < .01; Step 2: $\Delta R^2 = .000$ (ns), $R^2 = .315$ F (2, 142) = 32.691, p < .01; Step 3: $\Delta R^2 = .000$ (ns), $R^2 = .315$, F (3, 141) = 21.661, p < .01. Personality First: Step 1: $R^2 = .315$ F (1, 143) = 65.831, p < .01; Step 2: $\Delta R^2 = .000$ (ns), $R^2 = .315$ F (2, 142) = 32.692, p < .01; Step 3: $\Delta R^2 = .000$ (ns), $R^2 = .318$, F (3, 141) = 21.661, p < .01.

Table 36

Comparison of the Hierarchical Regression Analysis of Academic Achievement (ACT) on Biodata Openness to Experience and PCI Openness to Experience with reversed steps.

Biodata First (n = 146)				Personality First (n = 146)			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	8.162	0.562	.000	WPT	8.162	0.562	.000
Step 2				Step 2			
WPT	8.018	0.555	.000	WPT	7.587	0.519	.000
Biodata- Openness to Experience	0.990	0.069	.324	PCI- Openness to Experience	3.134	0.214	.002
Step 3				Step 3			
WPT	7.566	0.518	.000	WPT	7.566	0.518	.000
Biodata- Openness to Experience	-0.868	-0.070	.387	PCI-Openness to Experience	3.085	0.254	.003
PCI- Openness to Experience	3.085	0.254	.002	Biodata-Openness to Experience	-0.868	-0.070	.387

Note. WPT - Wonderlic Personnel Test, WPT was used as a covariate. PCI – Personality Characteristics Inventory.
Biodata First: Step 1: $R^2 = .316$ F (1, 144) = 66.617, p < .01; Step 2: $\Delta R^2 = .005$ (ns), $R^2 = .321$ F (2, 143) = 33.794, p < .01; Step 3: $\Delta R^2 = .043$, F Change (1, 142) = 9.520, p < .05, $R^2 = .364$, F (3, 142) = 27.045, p < .01. Personality First: Step 1: $R^2 = .316$ F (1, 144) = 66.617, p < .01; Step 2: $\Delta R^2 = .044$, F Change (1, 143) = 9.821, p < .01, $R^2 = .360$ F (2, 143) = 40.260, p < .01; Step 3: $\Delta R^2 = .003$ (ns), $R^2 = .364$, F (3, 142) = 27.045, p < .01.

coefficient for PCI Openness to Experience was significant ($\beta = .254$, $t = 3.085$, $p < .05$).

When ACT score was regressed in the same three-step manner, using only Agreeableness, while controlling for general mental ability (step 1), the covariate accounted for 33.7% of the variance in ACT score. When the third steps are examined, the ΔR^2 were not significant. This result occurred regardless of the order of entry of personality and biodata, illustrated in Table 37. This shows that neither version of Agreeableness is adding incremental validity to the other.

When ACT score was regressed in the same three-step manner, using only Conscientiousness, while controlling for general mental ability (step 1), the covariate accounted for 33.0% of the variance in ACT score. When the third steps are examined, the ΔR^2 were not significant. This result occurred regardless of the order of entry of personality and biodata, illustrated in Table 38. This shows that neither version of Conscientiousness is adding incremental validity to the other.

In conclusion, when considering biodata as adding incremental validity to its counterpart personality factor in predicting ACT score, Biodata Emotional Stability added to Personality Emotional Stability in the prediction of ACT score. When considering personality as adding incremental validity to its counterpart biodata factor in predicting ACT score, PCI Openness to Experience added to Biodata Openness in Experience in predicting ACT score.

Table 37

Comparison of the Hierarchical Regression Analysis of Academic Achievement (ACT) on Biodata Agreeableness and PCI Agreeableness with reversed steps.

Biodata First (n = 146)				Personality First (n = 146)			
Variable	*t*	β	*p*	Variable	*t*	β	*p*
Step 1				Step 1			
WPT	8.560	0.581	.000	WPT	8.560	0.581	.000
Step 2				Step 2			
WPT	8.448	0.570	.000	WPT	8.547	0.580	.000
Biodata- Agreeableness	-1.974	-0.133	.050	PCI- Agreeableness	-1.045	-0.071	.298
Step 3				Step 3			
WPT	8.411	0.569	.000	WPT	8.411	0.569	.000
Biodata- Agreeableness	-1.663	-0.135	.099	PCI-Agreeableness	0.045	0.004	.964
PCI- Agreeableness	0.045	0.004	.964	Biodata-Agreeableness	-1.663	-0.135	.099

Note. WPT - Wonderlic Personnel Test, WPT was used as a covariate. PCI – Personality Characteristics Inventory. Biodata First: Step 1: R^2 = .337 F (1, 144) = 73.279, p < .01; Step 2: ΔR^2= .018 F Change (1, 143) = 3.896, p = .05, R^2 = .355, F (2, 143) = 39.324, p < .01; Step 3: ΔR^2= .000 (ns), R^2 = .355, F (3, 142) = 26.034, p < .01. Personality First: Step 1: R^2 = .337 F (1, 144) = 73.279, p < .01; Step 2: ΔR^2= .005 (ns), R^2 = .342 F (2, 143) = 37.209, p < .01; Step 3: ΔR^2= .013 (ns), R^2 = .355, F (3, 142) = 26.034, p < .01.

Table 38

Comparison of the Hierarchical Regression Analysis of Academic Achievement (ACT) on Biodata Conscientiousness and PCI Conscientiousness with reversed steps.

Biodata First (n = 146)				Perosnality First (n = 146)			
Variable	*t*	*β*	*p*	Variable	*t*	*β*	*p*
Step 1				Step 1			
WPT	8.415	0.574	.000	WPT	8.415	0.574	.000
Step 2				Step 2			
WPT	8.356	0.570	.000	WPT	8.210	0.562	.000
Biodata- Conscientiousness	1.280	0.087	.203	PCI- Conscientiousness	1.430	0.098	.155
Step 3				Step 3			
WPT	8.199	0.563	.000	WPT	8.199	0.563	.000
Biodata- Conscientiousness	0.489	0.043	.626	PCI-Conscientiousness	0.799	0.071	.425
PCI- Conscientiousness	0.799	0.071	.425	Biodata-Conscientiousness	0.489	0.043	.626

Note. WPT - Wonderlic Personnel Test, WPT was used as a covariate. PCI – Personality Characteristics Inventory.
Biodata First: Step 1: $R^2 = .330$ F (1, 144) = 70.812, p < .01; Step 2: $\Delta R^2 = .008$ (ns), $R^2 = .337$ F (2, 143) = 36.382, p < .01; Step 3: $\Delta R^2 = .003$ (ns), $R^2 = .340$, F (3, 142) = 24.406, p < .01. Personality First: Step 1: $R^2 = .330$ F (1, 144) = 70.812, p < .01; Step 2: $\Delta R^2 = .009$ (ns), $R^2 = .339$, F (2, 143) = 36.685, p < .01;Step 3: $\Delta R^2 = .001$ (ns), $R^2 = .340$, F (3, 142) = 24.406, p < .01.

Overall conclusions from this study are best expressed when considering the perceptions of the measures, and the applications of the use of each measure. Table 39 illustrates the overall incremental results by factor and dependent variable, indicating which factors are adding variance to their counterpart factor in the prediction of job satisfaction or academic achievement. Table 40 illustrates potential recommendations for the uses of each measure from an application perspective.

Table 39

Overall Incremental Results By Factor.

Job Satisfaction				Academic Achievement			
Factor	Biodata Adding?	Personality Adding?	Use Both Measures Together?	Factor	Biodata Adding?	Personality Adding?	Use Both Measures Together?
Emotional Stability	No	No	No	Emotional Stability	Yes	No	Yes
Extraversion	No	No	No	Extraversion	No	No	No
Openness To Experience	No	No	No	Openness To Experience	No	Yes	Yes
Agreeableness	No	No	No	Agreeableness	No	No	No
Conscientiousness	No	No	No	Conscientiousness	No	No	No
Full Measure	No	No	No	Full Measure	Yes	Yes	No

Note. All results are considered after accounting for the covariates: Tenure and Wonderlic Personnel Test score in Job Satisfaction, and Wonderlic Personnel Test score in Academic Achievement.

Table 40

General Recommendations for Use of Five Factor Personality and Biodata Measurement Tools.

Personality		Biodata	
Factor	Recommendations	Factor	Recommendations
Emotional Stability	Not predictive of job satisfaction or academic achievement.	Emotional Stability	Positively correlated with academic achievement. Biodata adds to Personality.
Extraversion	Not predictive of job satisfaction or academic achievement.	Extraversion	Not predictive of job satisfaction or academic achievement.
Openness To Experience	Positively correlated to academic achievement. Recommended use is instead of biodata measure.	Openness To Experience	Does not provide information above and beyond personality measure.
Agreeableness	Not predictive of jobs satisfaction or academic achievement.	Agreeableness	Negatively correlated to academic achievement. Recommended use is instead of personality measure, but could be used in conjunction with other measures of Agreeableness to add incremental validity.
Conscientiousness	Positively related to job satisfaction and academic achievement, although not predictive after accounting for covariates.	Conscientiousness	Positively correlated with job satisfaction, although not predictive after accounting for covariates.

Full Measure	Do not use in conjunction with biodata measure. Perceived with slightly more favorable responses as to Face Validity, Perceived Knowledge of Results, and Perceived Fakability. Use personality measure when these perception dimensions are of importance to the employer.	Full Measure	Do not use in conjunction with personality measure. Perceived with slightly more favorable responses on Perceived Predictive Validity dimension. Use biodata measure when this perception dimension is of more importance to the employer.

Notes.

All constructs have acceptable internal reliability. Each should be used only when related to the criterion of interest and in conjunction with applicant perception considerations.

All results are considered after accounting for the covariates: Tenure and Wonderlic Personnel Test score in Job Satisfaction, and Wonderlic Personnel Test score in Academic Achievement.

Chapter 4: Discussion

A biodata measure was developed to be similar in constructs to the five-factor model of personality and it was used in comparison to a personality measure to predict job satisfaction and academic achievement. Results indicated that the biodata measure was an acceptable measure, with similar psychometric properties to the personality measure. General mental ability and tenure in present job were held constant in the analyses where job satisfaction was the criterion. General mental ability was the only covariate used in the analyses where ACT score was the criterion.

When the regression equations were conducted with each predictor and covariates for job satisfaction, and then compared side by side, Conscientiousness was the only construct to demonstrate significance in predicting job satisfaction, after controlling for general mental ability and length of employment. This occurred regardless of the measurement tool.

When the regression equations were conducted with each predictor and covariate for ACT score, and then compared side by side, Agreeableness as measured by biodata was a better predictor of ACT score than Agreeableness as measured by personality, after controlling for general mental ability. In addition, Openness to Experience as measured by personality was a better predictor of ACT score than Openness to Experience as measured by biodata, after controlling for general mental ability.

When incremental validity of predicting job satisfaction was the focus of the research question, Biodata Conscientiousness was the only factor to add incremental

validity to its personality counterpart factor in predicting job satisfaction. When the reverse was considered, PCI Conscientiousness did not add incremental validity to its biodata counterpart in predicting job satisfaction.

When incremental validity of predicting ACT score was the focus of the research question, Biodata Emotional Stability was the only factor to add incremental validity to its personality counterpart in the prediction of ACT score. When the reverse was considered, PCI Emotional Stability did not add incremental validity to its biodata counterpart in predicting ACT score. However, PCI Openness to Experience added incremental validity to Biodata Openness in Experience in predicting ACT score.

Interestingly, participants' responses showed differences in their perceptions of personality and biodata. Of the seven perceptions dimensions, four comparisons were significantly different. Personality was perceived as having higher face validity than biodata. However, biodata was perceived as having higher predictive validity than personality. Personality was perceived as providing more (perceived) knowledge of results. However, personality was also perceived as being easier to fake than biodata.

It is not clear from this research whether one measurement tool is better than the other. Both personality and biodata seem to predict the criteria equally well, however, it does depend on the situation for which it is used. In general, the choice should be based on the appropriateness of the measurement tool in relation to how well it predicts the criterion. Additionally, the perceptions of the measures provided another dimension from which to gauge the appropriateness of the measures. For

example, if the test administrator is concerned with how the participants perceive the face validity of the measures, the personality measure is more appropriate to use than the biodata measure.

Neither biodata nor personality did a good job of predicting job satisfaction. In addition, the Wonderlic Personnel Test, used as a covariate, seemed to be the strongest predictor of academic achievement.

Social desirability did not appear to be an issue when measuring biodata or personality, however, the results were not in the expected direction to fully support this contention. Differences between social desirability and the two measurement formats were found for Extraversion and Agreeableness, but were not in the expected directions, and were therefore uninterpretable.

Recently, researchers have hinted that social desirability might be accounting for enough variance in personality measures to emerge as another factor, especially when the participants are actual job applicants. In a newly published article, Smith, Hanges, and Dickson (2001) demonstrated that the five-factor model was invariant regardless of the sample of participants- job applicants, incumbents, or college students. A separate social desirability factor did not in fact emerge from the data, nor was it related to personality scores. In a related article, Ellingson, Smith, and Sackett (2001) demonstrated a similar result in four different samples using four different measures of the five factors of personality. Ellingson et al. (2001) determined that social desirability did not have a significant influence on the five-factor model of

personality. The most current research in this area does not provide guidance to interpret the differences reported here.

Limitations and Possible Problems

Several limitations can be identified which may have contributed to the pattern of results that occurred. First, there are measurement issues that are possible confounds to the study. Second, there is the issue of possible errors related to assumptions of linearity in the analysis portion of the study. Third, there are several issues related to the sample of participants used in the study.

First, when measurement issues are considered, although the independent variable measures seemed to be similar as indicated by the significant positive correlations, there may be problems with the dependent variable measures. For example, although a reliable measure of job satisfaction was used, participants may not be able to integrate all of their feelings about their jobs into the responses required on the measure. Participants may have stronger, or more varied feelings toward their jobs in areas that were not measured in the five-item questionnaire used in this study, or specific facets of job satisfaction (as opposed to global job satisfaction) may be better predicted by various personality factors.

When examining job satisfaction as the dependent variable, unsuccessful results may be due in part to range restriction on the job satisfaction scale. The mean on the job satisfaction scale was above the midpoint, and the distribution showed a slight negative skewness toward higher job satisfaction overall. This may have decreased the likelihood of finding significant results with this criterion.

Another limitation may have occurred by examining the relationships of job satisfaction with the independent variables as linear relationships. As stated in the procedure, job satisfaction has been researched in conjunction with tenure and age in the past, without solid conclusions. A recently published article provides empirical support for a U-shaped relationship between age and job satisfaction, such that with that particular sample, the lowest job satisfaction occurred at age 40 (Hochwater, Ferris, Perrewe, Witt, & Kiewitz, 2001). When the relationship was plotted for this sample, a nonlinear trend did not emerge. However, in the professional full-time working population, a U-shaped relationship should still be considered a factor. If that U-shaped relationship were occurring in the current sample, several conclusions and implications could be made. First, it would support the notion that this group of younger workers would be moderately satisfied at work, which they were. Second, the results lend support to the practice of holding tenure constant when measuring job satisfaction, which was also done. Third, Hochwater et al. (2001) support the idea that job satisfaction is a complex variable to study, therefore increasing the chances for inconsistent results across studies. Finally, this study did not use age in a nonlinear fashion, but rather linearly.

Although the biodata measure itself does not have established psychometric properties, the biodata item development phase should not have been a factor in the results presented here, as demonstrated by the strong correlations between the biodata scales and the PCI scales. The psychometric properties of the biodata measure were only explored in the context of this research study, whereas the PCI is a more

established measure with better-understood psychometric properties from exploring its use in a variety of contexts. A recent publication does provide support for the methods used here to establish content and construct validity for the biodata measure (Stokes & Cooper, 2001). Steps were taken to ensure that the biodata measure was developed in accord with respected guidelines for biodata item development. However, as was stated earlier and noticed by a research assistant, certain constructs lend themselves better to be measured by more externally-based biodata items, such as extraversion, while other constructs such as emotional stability may be better suited to be measured by personality-based items.

The second major limitation of this study refers to issues of possible errors in the assumptions of linearity in the study. This research has not explored in-depth the nonlinear relationships of personality constructs and the outcome variables of job satisfaction or academic achievement. Plotting the data from this sample does not support the presence of nonlinear relationships in this sample. However, in a broad, full-time professional population, non-linear relationships should still be considered. Measuring a variable in a linear fashion that may be better explained through a nonlinear fashion could increase the error introduced into the study by incorrectly assessing a relationship by using an inappropriate statistical technique. This limits the power of the study as well.

Although it is better to test only the variables that are expected to predict the criterion, so as not to capitalize on chance and increase Type I errors, the researchers decided to test all of the variables because the research questions were methodological

in nature. This decision also introduces more error into the study, and reduces the power of the overall study. Although increasing the possibility for error is a limitation, this methodological study was necessary as a first step in separating the differences between biodata and personality.

The third major limitation of the study considers the sample of participants used in this study. Although efforts were made to collect data from a working sample of students, these students may not have made stable attachments to their jobs. Participants may have been working in their jobs in order to "make-do" through college, and may not have established significant opinions regarding satisfaction in their jobs. In addition, due to the length of the data collection process, the students may have been fatigued by the time they reached the last measure, the Job Satisfaction Scale.

In debriefing the participants, many seemed indifferent to the notion that the personality and biodata measures were indeed different forms of pre-employment assessments. This may have affected their responses to the perceptions measure. Because participants were not exposed to an actual application and pre-employment assessment situation, they may not have responded to the measures as seriously as they would have if the measures had significant bearing on their future. In the future, the study could be conducted in the field, incorporating a more realistic condition wherein the participants believe an employment decision will be made from their results.

It would be worth noting that possibly the perceptions of the applicants should be considered or weighted more heavily when selecting a pre-employment measure. If the measures are similar and the prediction is similar, the measure with more positive perceptions ratings should be selected. Because participants represented a multiple range of jobs, their perceptions of the measures could have been affected by their job-related history. In the future, differences in participants perceptions could be assessed better if all participants held similar jobs, thus decreasing the variance and error that could be attributed to their current job.

Future Research

Future research can extend the current study in several ways. First, the issue of hard and soft biodata should be examined further. Second, a factor analysis of the measure would provide researchers with more confidence regarding the biodata measure. Third, more specific aspects of job satisfaction should be examined, as well as the possible nonlinear relationship it may hold with other variables. Lastly, other criteria such as job performance could be examined in regards to the current research questions. Each of these ideas is explored below.

In the current research, the biodata scales were examined separately for hard and soft items in the pilot tests. Substantial differences were not found; therefore, they were combined for the remainder of the study. Judges could not agree on how to differentiate the hard items from the soft items in this study. Future research could examine these research questions in relationship to possible differences attributable to

the item type. Hard and soft biodata scales would need to be matched for length, which could not be accomplished with the current item pool.

As a result of the measurement limitations found in this study, perhaps more participants are warranted so that a construct validation via factor analysis or principal components analysis could be performed on the biodata measure. Conducting a factor analysis would enable researchers to be more confident in the biodata measure used in this study. Researchers would be able to assess whether the items were indeed classified into the construct they best represent, and if not, researchers could reanalyze the results with scales developed from a statistical methodology, the factor analysis. Using a factor analysis with a rational approach to biodata engages the researcher into thinking about the items in a different way, if the items fall into a construct other than the one for which they were intended. In the future, this process would allow the researchers to examine the results in another manner.

As a result of limitations due to measurement issues with job satisfaction, in future research, steps should be taken to measure job satisfaction in participants by including more specific aspects of their job, i.e. satisfaction with co-workers, supervisor, tasks, etc. Global job satisfaction was used in the current study due to its widespread use in the past. However, the participants may not have been able to aggregate all of the factors cognitively to globally rate their satisfaction. In addition, due to the newest research on the U-shaped relationship between job satisfaction and age (Hochwater, Ferris, Perrewe, Witt, & Kiewitz, 2001), other statistical

methodology and analysis should be incorporated into the research to account for potential nonlinear relationships, such as a polynomial analysis.

As a result of limitations due to the sample of participants, future research could focus the current research questions using one job industry, job function, or position across the participants. In addition, when one job position is examined across participants, job performance could be incorporated as another criterion variable to be studied. In this manner, research could focus on the conditions under which each measure is appropriate, in order to differentiate specifically the conditions under which the measures should be used. Although using job performance on one specific position as a criterion may limit the generalizability of the results, it expands the research questions to another criterion.

Chapter 5: References

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Chapter 6: Appendices

Appendix A

Biodata Measure

1 How often have you been described as always being cheerful?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

2 When problems arose at work or school, to what extent did you try to take your mind off things for a while?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

3 How many different kinds of music do you listen to?
A) none
B) 1
C) 2
D) 3
E) 4 or more

---

4 To what extent have you been annoyed when your goals for the week were not achieved?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

5 Relative to your friends, how active has your social life been?
A) very active
B) somewhat active
C) active
D) somewhat inactive
E) not at all active

---

6 How often have you missed what someone was saying because you were thinking about other things?
A) very often
B) often
C) sometimes
D) seldom
E) never

7 To what extent have you made friends with people from rather different backgrounds?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

8 To what extent have the comments or criticisms of others affected how you view yourself?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

9 How often have you introduced yourself to strangers at a party?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

10 To what extent have you felt that your personality changes from situation to situation?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

11 Relative to your friends, to what extent have you planned social activities or made social plans?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

12 In the past when a coworker has done something that causes you more work, to what extent do you feel that they "owe you"?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

13 How often have you read a book just to learn something about a topic?
A) very often
B) often
C) sometimes
D) seldom

E) never

---

14 How often has a problem at work or school led you to dwell on a similar problem?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

15 To what extent would your friends describe you as "easy going"?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

16 To what extent do you need variety in your work to keep from getting bored?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

17 To what extent have you been distracted by noises in the hallway at school or at work?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

18 How likely have you been to look forward to changes in your work environment or personal life?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

19 Relative to others, when a supervisor or teacher needed help, how likely were you to volunteer?
A) very likely
B) often
C) sometimes
D) seldom
E) never

---

20 How often have you found that a problem is not as bad as it seemed at first?
A) very often

B) often
C) sometimes
D) seldom
E) never

---

21 How often have you failed to fulfill minor obligations?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

22 How often have you found yourself getting frustrated by social commitments that disrupted your day?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

23 How much time have you typically spent reading?
A) extremely long time
B) very long time
C) about average
D) very short time
E) extremely short time

---

24 How likely is a bad event or failure at work to remind you of other bad things in your life?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

25 In the past when friends have come to you for advice in a "losing battle", how sympathetic have you been?
A) very sympathetic
B) quite sympathetic
C) moderately sympathetic
D) slightly sympathetic
E) not at all sympathetic

---

26 How long has it taken you to "become yourself" again after a prolonged period of work?
A) extremely long time
B) very long time
C) about average
D) very short time
E) extremely short time

27 In the past when a coworker or fellow student has asked to borrow something (e.g. a pencil, pen, paper), how often have you helped?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

28 To what extent would your friends say that you have been sensitive or easily hurt?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

29 How often have you had to be reminded of periodic chores at home or work?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

30 In past work or school experiences, how upset have you become when a supervisor or teacher changed a project at the last minute?
A) very upset
B) quite upset
C) moderately upset
D) slightly upset
E) not at all upset

---

31 How many different hobbies have you had?
A) 0
B) 1
C) 2
D) 3
E) 4 or more

---

32 Compared with others, to what extent do you try to achieve to the limits of your abilities?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

33 Relative to others, how often have you been described as generous?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

34 To what extent have unexpected changes in home or work requirements tended to upset you?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

35 How often have you had to work late (or work more) because other people did not complete their assignments?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

36 Relative to others, to what extent have you found changes in your environment exciting?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

37 Compared to others, to what extent have you done a broad range of activities?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

38 When a co-worker or peer has asked you for your opinion, and you didn't agree with your co-worker's or peer's opinion, to what extent were you straightforward with your answer?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

39 How often have friends and family referred to you as "stubborn?"
A) very often
B) often
C) sometimes
D) seldom
E) never

---

40 To what extent have you tended to dwell on accidents or mishaps that happened during the day?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

41 How often have you attended cultural events when you were uncertain of whether or not you would like them?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

42 How likely have you been to find yourself getting bored with activities once you have figured out what to do?
A) much more likely than most people
B) somewhat more likely than most people
C) about as likely as others
D) somewhat less likely than most people
E) a good bit less likely than most people

---

43 When dining out, how likely have you been to order a dish that you have never tried before?
A) much more likely than most people
B) somewhat more likely than most people
C) about as likely as others
D) somewhat less likely than most people
E) a good bit less likely than most people

---

44 Relative to others, to what extent would you rather "go with the flow"?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

45 When given a new assignment how likely were you to discuss project requirements with coworkers?
A) very likely
B) likely
C) somewhat
D) unlikely

E) very unlikely

---

46 How much effort have you devoted to new ideas that you have not yet tried?
A) much more effort than others
B) more effort than others
C) about the same amount of effort as others
D) less effort than others
E) much less effort than others

---

47 In the past, when friends have planned a group activity that you did not enjoy, how often did you participate anyway?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

48 How likely have you been to compromise on important issues?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

49 Relative to others, to what extent do you go out of your way to help a co-worker?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

50 To what extent have you been willing to try new things even when you knew it might not go well?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

51 Relative to others, about how many friends do you have?
A) many more than most people
B) a few more than most people
C) about the same as most people
D) a few less than most people
E) many less than most people

---

52 To what extent have you found yourself drained at the end of a work or school day?
A) great extent
B) large extent

C) moderate extent
D) slight extent
E) not at all

---

53 How likely are you to introduce yourself first in any given situation?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

54 How at ease do you feel at a large party with a lot of strangers?
A) very at ease
B) somewhat at ease
C) at ease
D) somewhat uneasy
E) very uneasy

---

55 In the past, how likely have you been to agree with someone just to avoid a confrontation?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

56 To what extent have you found yourself becoming fascinated with new ways of doing tasks?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

57 How often have you altered your plans at the request of a friends or family member?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

58 To what extent does being around a lot of people all day wear you out?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

59 Relative to others, about how fast have you usually worked?
A) much faster than others

B) slightly faster than others
C) about the same as others
D) slightly slower than others
E) much slower than others

---

60 How often have you been uncomfortable around people who are easily excited?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

61 How often have you found it necessary to avoid certain kinds of foods (not due to allergies)?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

62 To what extent have you been bothered by rejection or undue criticism?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

63 How often has your sleep schedule been disrupted by problems cropping up at work or home?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

64 To what extent do "touchy-feely" family members make you uneasy?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

65 In college or high school, how likely have you been to speak up during class discussions?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

66 Compared to others, how likely is it that you would find new situations exciting?
A) much more likely than most people
B) somewhat more likely than most people
C) about as likely as others
D) somewhat less likely than most people
E) a good bit less likely than most people

---

67 To what extent has it been typical of you to seek out new activities or people even when this might cause problems?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

68 To what extent have you been bothered by the need to turn in work that you feel required more time?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

69 In general, how strong a sense of responsibility do you have?
A) extremely strong
B) quite strong
C) moderately strong
D) somewhat weak
E) quite weak

---

70 To what extent have you preferred to set your own goals?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

71 How likely have you been to suggest an alternative place to go for dinner (out-on-the-town, etc.)?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

72 When trouble arises on a project, how often have you found yourself taking a chance?
A) very often
B) often
C) sometimes
D) seldom

E) never

---

73 In the past year, how often have you been told that you are irresponsible?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

74 To what extent have you enjoyed working with new tools or products?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

75 Relative to others, how organized do you keep your things (bedroom, car, dorm)?
A) much more organized than others
B) slightly more organized than others
C) about the same as others
D) slightly less organized than others
E) much less organized than others

---

76 In the past, how nervous have you become when required to give a speech or presentation?
A) never had to give a speech
B) very nervous
C) moderately nervous
D) slightly nervous
E) not at all nervous

---

77 To what extent would your coworkers say you have had difficulty working with people from different backgrounds?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

78 How likely have you been to get excited about a new idea or concept?
A) much more likely than most people
B) somewhat more likely than most people
C) about as likely as others
D) somewhat less likely than most people
E) a good bit less likely than most people

79 How likely have you been to withhold judgement about a friend's opinion even if you didn't really agree with it?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

80 To what extent have you found failure embarrassing?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

81 How often have friends told you that you talk too much?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

82 In the past year, how often have you felt that stress often gets the best of you?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

83 How likely have you been to attend a meeting or organized event alone when a friend cancelled or could not go?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

84 How nervous have you become when you have had to stand up and introduce yourself in front of a group of mostly strangers?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

85 How often have you gone out of your way to help a friend?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

86 Relative to others, how likely are you to be easily embarrassed?
A) much more likely than most people
B) somewhat more likely than most people
C) about as likely as others
D) somewhat less likely than most people
E) a good bit less likely than most people

---

87 In high school and thus far in college, how often have you waited until the last minute to complete a class project or paper?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

88 How often have you been able to appear calm even when you weren't on the inside?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

89 How often have people asked to see your notes when they missed class?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

90 How likely have you been to dwell on mistakes that you have made?
A) much more likely than most people
B) somewhat more likely than most people
C) about as likely as others
D) somewhat less likely than most people
E) a good bit less likely than most people

91 How often have teachers, bosses, friends, etc. asked you to share your opinions more often during class, meetings, etc.?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

92 To what extent does it bother you when time demands force you to "wing it"?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

93 When on vacation, how often do you go to new places (restaurants, stores, cities)?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

94 How easy has it been for you to work together with other people to accomplish a goal (group project)?
A) very easy
B) quite easy
C) moderately easy
D) slightly easy
E) not at all easy

---

95 Compared to others, how often have you been effective in planning out a project and then successfully following that plan?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

96 In past projects, how much have you preferred to have rules and standards over general instructions?
A) very much preferred rules
B) preferred rules
C) slightly preferred rules
D) did not prefer rules
E) never prefer rules

---

97 How likely have you been to leave extra early to ensure that you arrive at your destination on time?
A) very likely
B) likely

C) somewhat
D) unlikely
E) very unlikely

---

98 How often have you felt the urge to share a personal story when a friend was telling you one (of their own)?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

99 How likely have you been to change your mind about something important, because someone you care about did not approve?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

100 To what extent have you avoided relationships for fear of rejection?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

101 In the past year, how many of the following topic areas (of books) have you read: popular fiction, classic literature, biographies/autobiographies, science fiction/fantasy, self-improvement/self-help, business-related, financial, spiritual/mystical, cooking, sports, historical, travel, mythology, poetry,
A) 0
B) 1
C) 2
D) 3
E) 4 or more

---

102 How often have you worried about not fitting in with others at an event (e.g. party) and decided not to go to the event?
A) very often
B) often
C) sometimes
D) seldom
E) never

103 Thinking back, how likely were your friends to characterize you as someone that is easy to get along with?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

104 In the past, how often have you become easily distracted when trying to complete a school paper or project?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

105 In the past month how often have you gone out with your friends?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

106 To what extent have you found "to-do" lists to be a waste of time to make?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

107 How likely have you been to ask for a time extension for a project or an assignment?
A) very likely
B) likely
C) somewhat
D) unlikely
E) very unlikely

---

108 How often do you like to try new ways of doing things?
A) very often
B) often
C) sometimes
D) seldom
E) never

109 When a coworker or another student has asked you for help, how often have you been willing to help them?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

110 How difficult has it been for you to be nice to people who have offended you?
A) extremely difficult
B) very difficult
C) difficult
D) not very difficult
E) not at all difficult

---

111 How long have you followed a structured exercise program?
A) never
B) about 1 month
C) 1-6 months
D) 6-12 months
E) over a year

---

112 How often have you wondered how people can possibly wait until the last minute to start a paper or an assignment?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

113 Relative to others, in how many clubs or other organized activities were you involved in the past year?
A) many more than most people
B) a few more than most people
C) about the same as most people
D) a few less than most people
E) many less than most people

---

114 Compared to your friends, how quickly have you bounced back and improved your performance after receiving a bad grade or criticism?
A) extremely quickly
B) very quickly
C) quickly
D) not very quickly
E) not at all quickly

---

115 Compared to your friends, how likely have you been to blow-up when you have become upset?
A) much more likely than most people
B) somewhat more likely than most people
C) about as likely as others

D) somewhat less likely than most people
E) a good bit less likely than most people

---

116 In the past, to what extent have you felt envious of someone who you thought had "no worries"?
A) never envious, or I think that others do not have worries
B) slight extent
C) moderate extent
D) large extent
E) great extent

---

117 When you have moved in the past, how long has it taken you to make new friends?
A) never moved
B) very long time
C) about average
D) very short time
E) extremely short time

---

118 When you have found that you don't know much about a topic (not including school work), how likely have you been to shrug it off because you don't have time to learn about everything?
A) much more likely than most people
B) somewhat more likely than most people
C) about as likely as others
D) somewhat less likely than most people
E) a good bit less likely than most people

---

119 To what extent have you tried to schedule everything you do in a planner/calendar?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

120 During the last year, how often have you thought it would be better to just stay in bed all day?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

121 How often do you find yourself doing something (such as telling a joke) to get attention?
A) very often
B) often
C) sometimes
D) seldom
E) never

122 Relative to others, how difficult is it for you to make new friends?
A) extremely difficult
B) very difficult
C) difficult
D) not very difficult
E) not at all difficult

---

123 To what extent have you proofread your homework (or work) before turning it in?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

124 In the past when an acquaintance has said something to upset you, how difficult has it been to "shrug it off"?
A) extremely difficult
B) very difficult
C) difficult
D) not very difficult
E) not at all difficult

---

125 To what extent have your friends or coworkers described you as comfortable to be around?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

126 How much have you enjoyed trying new restaurants even when you were unsure you would like the food?
A) very much enjoyed it
B) enjoyed it
C) slightly enjoyed it
D) did not enjoy it at all
E) never enjoyed it

---

127 When you are with a few friends, how likely are you to be the most talkative one in the group?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

128 When confronted with a personal problem, how difficult has it been for you to think about your work?
A) extremely difficult
B) very difficult
C) difficult

D) not very difficult
E) not at all difficult

---

129 How likely was your supervisor to ask you to help when he/she was shorthanded?
A) very likely
B) likely
C) somewhat
D) unlikely
E) very unlikely

---

130 How often do you have trouble sleeping the night before you take an exam?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

131 How likely were you to volunteer to do extra work because it needed to be done?
A) very likely
B) likely
C) somewhat
D) unlikely
E) very unlikely

---

132 How much have you enjoyed being in situations you haven't experienced before?
A) very much enjoyed it
B) enjoyed it
C) slightly enjoyed it
D) did not enjoy it at all
E) never enjoy it

---

133 How likely are you to go to a movie or shopping by yourself?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

134 How often have you regretted a past behavior because you acted irrationally or too emotionally?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

135 To what extent have you preferred things around you to stay the same or remain predictable?

A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

136 To what extent have you felt guilty when you couldn't keep a promise because of unforeseen events?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

137 To what extent have you preferred environments where you knew how to act and what was expected of you over environments where things were changing and you had to constantly adapt?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

138 To what extent have you enjoyed thinking about or finding out about what "makes people tick" or behave in a certain manner?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

139 When people around you have been whispering and/or laughing, how often have you felt that they were laughing at you, or talking negatively about you?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

140 To what extent have you enjoyed games like charades or pictionary?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

141 How difficult has it been for you to work in an unorganized area?
A) extremely difficult
B) very difficult
C) difficult
D) not very difficult

E) not at all difficult

---

142 How often do you feel that you need time alone?
A) very often
B) often
C) sometimes
D) seldom
E) never

---

143 When there is silence in a group, how likely are you to start up a conversation?
A) very likely
B) likely
C) neither likely nor unlikely
D) unlikely
E) very unlikely

---

144 To what extent have setbacks affected your mood for the day?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

145 How long has it taken you to relax after a long day at school or work?
A) very long amount of time
B) long amount of time
C) average amount of time
D) short amount of time
E) very short amount of time

---

146 In the past, to what extent have you enjoyed being the center of attention?
A) great extent
B) large extent
C) moderate extent
D) slight extent
E) not at all

---

147 How often have you had something to contribute to a conversation but decided it was not worth the effort?
A) very often
B) often
C) sometimes
D) seldom
E) never

Appendix B

Job Satisfaction Measure

Instructions:
Using the following scale, please rate the items on your feelings about your job by marking your answer on your scantron sheet.

1 = strongly disagree
2 = disagree
3 = neither disagree nor agree
4 = agree
5 = strongly agree

I feel fairly satisfied with my present job.

Most days I am enthusiastic about my work.

Each day at work seems like it will never end.

I find real enjoyment in my work.

I consider my job to be rather unpleasant.

Appendix C

Demographics Sheet with Academic Achievement Measure

1. Please Circle: Male Female

2. Age: _____

3. Current Overall GPA: _____

4. What is your Major? _____

5. Overall High School GPA _____

6. Year in which you graduated from high school _____

7. ACT composite score _____
   OR
   SAT score: Composite: ____ Verbal: _____ Quantitative: ____

8. Please indicate your job title ***: _____

*** (If you have more than one job, please answer the question related to the job in which you work the most hours per week.)

9. Please provide a short description of your major responsibilities and duties in your job:

_____

_____

_____

_____

10. Please indicate how long you have been employed in this job:
__Years ___Months.

11. Approximately how many hours per week do you work in this job?
____Hours/week.

Appendix D

Perceptions Measure

Instructions:
The exam you just completed is used for selecting employees for various jobs. We are interested in your reactions to the test as a job applicant. We are interested in your general reactions to the use of this test as part of applying for employment *in general.*

Please answer the following questions as you think about the exam you just completed, keeping in mind that it is used for selecting employees.

Please rate the items using the following scale. Use your scantron sheet!

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

1. Overall, I believe that this test is fair.

2. The actual content of the examination was clearly related to any job.

3. This is a useful test for a company to give before they hire someone.

4. I am confident that the examination can predict how well an applicant will perform on the job.

5. If a company used this test as part of the application (hiring) process, I would expect them to make a fair decision.

6. I think that this test measures events I have been able to control.

7. This test should not be used in an application process for a job.

8. I enjoyed the examination to a great degree.

9. I think that I could improve my score on this test if I took it again.

10. This procedure allowed me to increase my chances of being hired.

11. I can see that this test is related to any job.

12. It would be difficult to know what an employer wants on this test.

13. This test makes me uncomfortable.

14. After I finished the examination it was clear to me how well I performed.

15. I cannot control my score on this test.

16. If I were applying for a job, I would be able to fake the test to get the job.

17. If I knew that a company used this test as part of the hiring process, I would still be interested in applying for the job.

18. I knew exactly on what aspects of the examination I performed well and poorly.

19. Applicants who perform well on this type of examination are more likely to perform well on any job than applicants who perform poorly.

20. If I wanted a specific job, I think I could answer this test in a way that would get me the job.

21. This test does not reflect events I have made choices about.

22. Anyone who went through the examination would know clearly how well or poorly they did.

23. This procedure allowed me to present myself in the best way possible.

24. Overall, I think this test asks too many personal questions.

25. This selection procedure allowed me to control a lot about the amount and type of information gathered about me.

26. The employer can tell a lot about the applicant's ability to do the job from the results of the examination.

27. Most people would say that this test is fair.

28. A company needs this kind of information to select the right employees.

29. I think I can answer the questions on this test the way an employer would want me to.

30. I think that using this test is a fair way to determine abilities.

31. Doing well on this test means a person can do a job well.

32. I was able to show what I can do on this test.

33. The test itself did not seem too personal or private.

34. The content of the test seemed appropriate.

35. A person who scores well on this test will be good at a job.

Appendix E

Marlowe-Crowne Social Desirability Scale

Instructions: Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you.

On the scantron sheet, fill in A for True and B for False.

1. Before voting I thoroughly investigate the qualifications of all the candidates.
2. I never hesitate to go out of my way to help someone in trouble.
3. It is sometimes hard for me to go on with my work if I am not encouraged.
4. I have never intensely disliked anyone.
5. On occasion I have had doubts about my ability to succeed in life.
6. I sometimes feel resentful when I don't get my way.
7. I am always careful about my manner of dress.
8. My table manners at home are as good as when I eat out at a restaurant.
9. If I could get into a movie without paying and be sure I was not seen, I would probably do it.
10. On a few occasions, I have given up doing something because I thought too little of my ability.
11. I like to gossip at times.
12. There have been times when I felt like rebelling against people in authority even though I knew they were right.
13. No matter who I'm talking to, I'm always a good listener.
14. I can remember "playing sick" to get out of something.
15. There have been occasions when I took advantage of someone.
16. I'm always willing to admit it when I make a mistake.

17. I always practice what I preach.
18. I don't find it particularly difficult to get along with loudmouthed, obnoxious people.
19. I sometimes try to get even, rather than forgive and forget.
20. When I don't know something I don't at all mind admitting it.
21. I am always courteous, even to people who are disagreeable.
22. At times I have really insisted on having things my own way.
23. There have been occasions when I felt like smashing things.
24. I would never think of letting someone else be punished for my wrongdoings.
25. I never resent being asked to return a favor.
26. I have never been irked when people expressed ideas very different from my own.
27. I never make a long trip without checking the safety of my car.
28. There have been times when I was quite jealous of the good fortune of others.
29. I have almost never felt the urge to tell someone off.
30. I am sometimes irritated by people who ask favors of me.
31. I have never felt that I was punished without cause.
32. I sometimes think when people have a misfortune they only got what they deserved.
33. I have never deliberately said something that hurt someone's feelings.