

LOOKING BEYOND THE FIVE-FACTOR MODEL:  
COLLEGE SELF-EFFICACY AS A MODERATOR OF THE RELATIONSHIP  
BETWEEN TELLEGEN'S BIG THREE MODEL OF PERSONALITY AND  
HOLLAND'S MODEL OF VOCATIONAL INTEREST TYPES

By Elizabeth A Barrett

The Five-Factor Model (FFM) of personality and Tellegen's Big Three Model of personality were compared to determine their ability to predict Holland's RIASEC interest types. College self-efficacy was examined as a moderator of the relationship between Tellegen's Big Three model and the RIASEC interest types. A sample of 194 college freshmen (i.e., less than 30 credits completed) was drawn from the psychology participant pool of a mid-sized Midwestern university. Instruments included the International Personality Item Pool (IPIP) to measure the FFM; the Multidimensional Personality Questionnaire Brief Form (MPQ-BF) to measure Tellegen's Big Three model of personality; the College Self-Efficacy Inventory (CSEI) to measure college self-efficacy; and the Self Directed Search (SDS) to measure Holland's RIASEC model of vocational interests. Findings from correlational analyses supported previous research regarding relationships among the FFM and the RIASEC interest types, and relationships among Tellegen's Big Three and the RIASEC interest types. As hypothesized and tested via regressions for each of the six interest types, Tellegen's Big Three model predicted all six vocational interests types ( $p < .001$  for all), while the FFM only predicted two types at  $p < .05$ . College self-efficacy did not moderate the relationship between Tellegen's Big Three and the RIASEC interest types. Implications and future research are discussed.

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## INTRODUCTION

Personality traits and vocational interests are two major individual difference domains that influence numerous outcomes associated with work and life success. For example, research has shown that congruence between personality traits and one's vocation is related to greater job performance and job satisfaction (Barrick, Mount, & Judge, 2001; Hogan & Blake, 1999; Zak, Meir, & Kraemer, 1979). Additionally, specific personality traits are hypothesized to play a role in determining job success within related career domains (Sullivan & Hansen, 2004). Personality is a relatively enduring characteristic of an individual, and therefore could serve as a stable predictor of why people choose particular jobs and careers.

Personality traits and vocational interests are linked by affecting behavior through motivational processes (Holland, 1973, 1985). Personality traits and vocational interests influence choices individuals make about which tasks and activities to engage in, how much effort to exert on those tasks, and how long to persist with those tasks (Holland, 1973, 1985; Mount, Barrick, Scullen, & Rounds, 2005). Research has shown that when individuals are in environments congruent with their interests, they are more likely to be happy because their beliefs, values, interests, and attitudes are supported and reinforced by people who are similar to them (Mount, Barrick, Scullen, & Rounds, 2005). Furthermore, research has demonstrated that personality and interests may shape career decision making and behavior; personality and interests guide the development of

knowledge and skills by providing the motivation to engage in particular types of activities (Sullivan & Hansen, 2004).

As relatively stable dispositions, personality traits influence an individual's behavior in a variety of life settings, including work (Dilchert, 2007). Individuals often prefer jobs requiring them to display behaviors that match their stable tendencies. Thus individuals will indicate a liking for occupations for which job duties and job environments correspond to their personality traits. Such a match between personal tendencies and job requirements can support adjustment and eventually occupational success, making the choice of a given job personally rewarding on multiple levels (Dilchert, 2007).

People applying for jobs need to try to understand themselves more fully in order to determine if they will be satisfied with their career choices based on their personality traits. This process can be aided by vocational counselors who conduct vocational assessments. The purpose of vocational assessment is to enhance client self-understanding, promote self-exploration, and assist in realistic decision making (Carless, 1999). According to a model proposed by Carless (1999), career assessment is based on the assumption that comprehensive information about the self (e.g., knowledge of one's personality) in relation to the world of work is a necessary prerequisite for wise career decision making.

Self-efficacy beliefs--personal expectations about the ability to succeed at tasks (Bandura, 1986)--are often assessed by vocational counselors. This study examines college self-efficacy--belief in one's ability to perform tasks necessary for success in

college (Wang & Castaneda-Sound, 2008). Self-efficacy determines the degree to which individuals initiate and persist with tasks (Bandura, 1986), and research has found that personality may influence exploration of vocational interests, through high levels of self-efficacy (Nauta, 2007).

There is an abundance of literature supporting that the Five-Factor Model (FFM) (discussed in depth in following sections) of personality predicts Holland's theory of vocational interest types; however, there is little literature that extends beyond use of the Five-Factor Model. This is due to the adoption of the FFM as an overriding model of personality over the past fifteen years. However, as will be demonstrated later, several criticisms of the model have surfaced. In light of these criticisms the purpose of this study is to extend the existing literature that has established links between the FFM and Holland's vocational interest types, while examining the relationship between an alternate personality model, Tellegen's Big Three (as measured by the Multidimensional Personality Questionnaire (MPQ)) and Holland's types. Furthermore, this study will examine the moderating role that college self-efficacy plays on the relationship between Tellegen's Big Three and Holland's interest types.

## THEORY AND LITERATURE REVIEW

### Personality Traits and Vocational Interests Defined

Personality traits refer to characteristics that are stable over time and are psychological in nature; they reflect who we are and in aggregate determine our affective, behavioral, and cognitive styles (Mount, Barrick, Scullen, & Rounds, 2005). Vocational interests reflect long-term dispositional traits that influence vocational behavior primarily through one's preferences for certain environments, activities, and types of people (Mount, Barrick, Scullen, & Rounds, 2005).

### The Five-Factor Model (FFM) of Personality

The FFM, often referred to as the Big Five personality dimensions, is a major model that claims personality consists of five dimensions: Openness to Experience (i.e., imaginative, intellectual, and artistically sensitive), Conscientiousness (i.e., dependable, organized, and persistent), Extraversion (i.e., sociable, active, and energetic), Agreeableness (i.e., cooperative, considerate, and trusting), and Neuroticism, sometimes referred to positively as emotional stability (i.e., calm, secure, and unemotional) (Harris, Vernon, Johnson, & Jang, 2006; McCrae & Costa, 1986; McCrae & Costa, 1987; Mount, Barrick, Scullen, & Rounds, 2005; Nauta, 2004; Sullivan & Hansen, 2004). The FFM provides the foundation for several personality measures (e.g., NEO-PI, NEO-PI-R, NEO-FFI) that have proved to be valid and reliable and are widely utilized in research today (Costa & McCrae, 1992). There appears to be a large degree of consensus

regarding the FFM of personality and the instruments used to measure the model. For instance, the FFM has been shown to have a large degree of universality (McCrae, 2001), specifically in terms of stability across adulthood (McCrae & Costa, 2003) and cultures (DeFruyt & Mervielde, 1997; Hofstede & McCrae, 2004, McCrae, 2001).

### Holland's Theory of Vocational Interest Types

Holland's theory of vocational interests has played a key role in efforts to understand vocational interests, choice, and satisfaction. Holland was very clear that he believed personality and vocational interests are related:

If vocational interests are construed as an expression of personality, then they represent the expression of personality in work, school subjects, hobbies, recreational activities, and preferences. In short, what we have called 'vocational interests' are simply another aspect of personality...If vocational interests are an expression of personality, then it follows that interest inventories are personality inventories. (Holland, 1973, p.7)

Vocational interest types, as classified by Holland, are six broad categories (discussed later in the section) that can be used to group occupations or the people who work in them. Holland's theory of vocational interest types and work environments states that employees' satisfaction with a job as well as propensity to leave that job depends on the degree to which their personalities match their occupational environments (Holland, 1973, 1985). Furthermore, people are assumed to be most satisfied, successful, and stable in a work environment that is congruent with their vocational interest type. Two of

Holland's basic assumptions are: (a) individuals in a particular vocation have similar personalities, and (b) individuals tend to choose occupational environments consistent with their personality (Holland, 1997).

A fundamental proposition of Holland's theory is that, when differentiated by their vocational interests, people can be categorized according to a taxonomy of six types, hereinafter collectively referred to as RIASEC (Holland, 1973, 1985). Holland's theory states that six vocational interest types--Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC)--influence people to seek environments which are congruent with their characteristics (Harris, Vernon, Johnson, & Jang, 2006; Holland, 1973, 1985; Nauta, 2004; Roberti, Fox, & Tunick, 2003; Sullivan & Hansen, 2004; Zak, Meir, & Kraemer, 1979). Holland used adjective descriptors to capture the distinctive characteristics of each interest type (Hogan & Blake, 1999). These are summarized in Table A-1. Holland's approach to the assessment of vocational interest types was based on the assumption that members of an occupational group have similar work-related preferences and respond to problems and situations in similar ways (Carless, 1999).

Realistic types like the systematic manipulation of machinery, tools, or animals. Investigative types have interests that involve analytical, curious, methodical, and precise activities. The interests of Artistic types are expressive, nonconforming, original, and introspective. Social types want to work with and help others. Enterprising types seek to influence others to attain organizational goals or economic gain. Finally, Conventional types are interested in systematic manipulation of data, filing records, or reproducing materials (Tokar, Vaux, & Swanson, 1995).

According to Holland's theory, these interest types differ in their relative similarity to one another, in ways that can be represented by a hexagonal figure with the types positioned at the six points (see Figure B-1). Adjacent types (e.g., Realistic and Investigative) are most similar; opposite types (e.g., Realistic and Social) are least similar, and alternating types (e.g., Realistic and Artistic) are assumed to have an intermediate level of relationship (Holland, 1973, 1985; Tokar, Vaux, & Swanson, 1995).

#### Overlap between the FFM and RIASEC

Many studies provide evidence of the links between the FFM of personality and the RIASEC interest types. An extensive review of the research investigating the links between the FFM and the RIASEC types identified ten studies that found Extraversion predicts interest in jobs that focus on Social and Enterprising interests. Ten studies showed Openness to Experience predicts interest in jobs that focus on Investigative and Artistic interests. Six studies found Agreeableness predicts interest in jobs that focus on Social interest; six studies showed Conscientiousness predicts interests in jobs that focus on Conventional interests; and one study found Neuroticism predicts interests in jobs that focus on Investigative interests (see Table A-2 for the citations). One discrepancy in this research has been Costa and McCrae's claims that the FFM applies uniformly to all adult ages, but Mroczek, Ozer, Spiro, and Kaiser (1998) found substantial differences between the structures emerging from older individuals as compared to undergraduate students, in that the five factor structure failed to emerge in the student sample (i.e., agreeableness failed to emerge) as it did with the older sample.

All of the links discussed between the FFM of personality and the RIASEC interest types provide the foundation for hypotheses 1a – 1e. Hypotheses 1a – 1e will add to the literature, previously discussed, by assessing current college students early in their college careers. These are the people who have the potential to be most influenced by vocational and career counselors. Given that research has found a discrepancy in FFM profiles of younger and older individuals, it is important to test its efficacy in predicting vocational interests.

*Hypothesis 1a (H1a):* Extraversion will significantly positively correlate with Social and Enterprising types, but not Realistic, Investigative, Artistic, and Conventional types.

*Hypothesis 1b (H1b):* Openness to Experience will significantly positively correlate with Investigative and Artistic types, but not Realistic, Conventional, Social, and Enterprising types.

*Hypothesis 1c (H1c):* Agreeableness will significantly positively correlate with Social types, but not Realistic, Conventional, Enterprising, Investigative, and Artistic types.

*Hypothesis 1d (H1d):* Conscientiousness will significantly positively correlate with Conventional types, but not Realistic, Enterprising, Investigative, Social, and Artistic types.

*Hypothesis 1e (H1e):* Neuroticism will significantly negatively correlate with Investigative types, but not Realistic, Enterprising, Conventional, Social, and Artistic types.

### Criticisms and Limitations of the FFM

The whole enterprise of science depends on challenging accepted views, and the FFM has become one of the most accepted models in personality research. Many critiques of the FFM ask “Why are there five and only five factors? Five factor protagonists say: it is an empirical fact...via the mathematical method of factor analysis, the basic dimensions of personality have been discovered.” (McCrae & Costa, 1989, p. 120). Has psychology as a science achieved a *final* and absolute way of looking at personality or is there a way to further our conceptualization of personality? In the article by Costa and McCrae (1997) explaining the anticipated changes to the NEO in the new millennium, they anticipate only minor wording modifications and simplifications. Thus it appears as if the FFM is viewed as a final or almost final achievement (Block, 2001). One claimed benefit of the FFM is evidence of heritability is strong for all 5 factors, but evidence is strong for all personality factors studied; it does not single out the Costa and McCrae factors (Eysenck, 1992). In other words, all the criteria suggested by Costa and McCrae are necessary but not sufficient to mark out one model from many which also conform to this criteria.

The debate that has been most prominent over the past 15 years, and which has probably attracted the most attention, concerns the number and description of the basic, fundamental, highest-order factors of personality. Evidence from meta-analyses of factorial studies provide evidence that three, not five personality factors, emerge at the highest level of analysis (Royce & Powell, 1983; Tellegen & Waller, 1991; Zuckerman, Kuhlman, & Camac, 1988; Zuckerman, Kuhlman, Thornquist, & Kiers, 1991).

Altogether, Eysenck (1992) has surveyed many different models, questionnaires and inventories, reporting in most cases a break-down into 2 or 3 major factors; but never 5. Additionally, Jackson, Furnham, Forde, and Cotter (2000) and Tellegen (1985) have contradicted Costa and McCrae's (1995) assertions that a five-factor model seems most appropriate, with results showing that a three-factor solution is both more clear and parsimonious.

Another critique of the FFM lies in its development. The initial factor-analytic derivations of the Big Five were not guided by explicit psychological theory, and therefore some have asked the question, "Why these five?" (e.g., Revelle, 1987; Waller & Ben-Porath, 1987). As Briggs (1989) points out, the original studies leading to the FFM "prompted no *a priori* predictions as to what factors should emerge, and a coherent and falsifiable explanation for the five factors has yet to be put forward" (p. 249).

A further developmental critique of the FFM is the lack of lower order factors. Theoretically, factors exist at different hierarchical levels, and the FFM only measures five higher order factors (Block, 2001). The FFM operates at a broadband level to measure the main (i.e., higher order) categories of traits (McAdams, 1992). Within each of the five categories, therefore, may be many different and more specific traits, as traits are nested hierarchically within traits (McAdams, 1992).

Another limitation of the FFM lies in researchers' inability to consistently link the personality traits to the Holland interest types. Research has found that although there is a significant overlap between the FFM and RIASEC interest types, the RIASEC types do not appear to be entirely encompassed by the Big-Five personality dimensions (Carless,

1999; Church, 1994; DeFruyt & Mervielde, 1999; Tokar, Vaux, & Swanson, 1995). Three personality dimensions in the FFM predict the RIASEC types, but there is less evidence to support that the other two predict the RIASEC types. Specifically, there appears to be significant overlap with Conscientiousness, Openness, and Extraversion in predicting the RIASEC interest types, but less research has been able to find links between Agreeableness and Neuroticism with the RIASEC interest types. This is a limitation of the FFM in relating to vocational interests (Costa, McCrae, & Holland, 1984; Gottfredson, Jones, & Holland, 1993; Tokar, Vaux, & Swanson, 1995).

#### Looking Beyond the FFM: Tellegen's Big Three Model of Personality

In light of these criticisms of the FFM, it seems attention could be paid to alternate models of personality to investigate the dimensions underlying Holland's interest types. The literature base is sparse here, and alternative personality models warrant further study, particularly with regard to vocational interests (Blake & Sackett, 1999; Church, 1994; Larson & Borgen, 2002; Staggs, Larson, & Borgen, 2003). One such model is Tellegen's Big Three which addresses many of the criticisms of the FFM.

Many vocational psychology researchers use the Big Five model of personality, often measured by the NEO-PI or NEO-PI-R, but less often the Big Three model of personality measured by the Multidimensional Personality Questionnaire (MPQ) is used (Tellegen, 1985; Tellegen & Waller, 1991). This model of personality resulted from ten years of research on focal dimensions in the personality literature (Tellegen, 1985; Tellegen & Waller, 1991). Tellegen's (1985; Tellegen & Waller, 1991) Big Three model

defines three higher order factors. These represent the clusters of items from a factor analysis that composed the three higher order traits. The lower order factors consist of items clustered in each of the higher order factors. The higher order factors are: Positive Emotionality (PEM), Negative Emotionality (NEM), and Constraint (CT) (Tellegen, 1985; Tellegen & Waller, 1991). These higher order traits correlate minimally with one another and encompass 11 lower order traits. Refer to Table A-3 for a description of the three higher order traits and the 11 lower order traits.

There are only three published studies that have examined the Big Three model as relating to vocational interests. Blake and Sackett (1999) reported that the Artistic type moderately related with the MPQ Absorption lower order trait (Larson & Borgen, 2002). The Social type negatively related to the MPQ Aggression lower order trait; the Enterprising type related moderately to the MPQ Social Potency lower order trait; and the Conventional type related moderately to the MPQ Control lower order trait.

Staggs, Larson, and Borgen (2003) also analyzed the lower order traits, specifically, as opposed to the higher order factors of PEM, NEM, and CT. They identified seven personality dimensions that have a substantial relationship with vocational interests: Absorption predicted interest in Artistic occupations; Social Potency predicted interest in Enterprising occupations; Harm Avoidance predicted interest in science and mechanical activity occupations; Achievement predicted interest in science and mathematic occupations; Social Closeness predicted interest in mechanical activity occupations; Traditionalism predicted interest in religious activities; and Stress Reaction predicted interest in athletic careers. Staggs, Larson, and Borgen (2003) used a college

student sample, but were not studying the RIASEC types; they were using a different conceptualization of vocational interests as measured by the Strong Interest Inventory which measures General Occupational Themes.

Larson and Borgen (2002) found that the PEM factor was more strongly correlated with Social interests than with Enterprising interests; however, PEM did strongly correlate with all six RIASEC types ( $p < .001$ ). This finding shows strong evidence that the PEM higher order trait relates to the RIASEC types. Larson and Borgen (2002) also found that the CT factor was negatively related to Realistic and Artistic interest types, and that the NEM factor was negatively related to Artistic interest types. Larson and Borgen (2002) utilized a sample of “gifted” adolescent students, which is a very limited and non-generalizable sample. In contrast, the current study tests a freshman college student sample, which is more generalizable to the population of students who are seeking vocational guidance.

The links between the MPQ and the RIASEC interest types are under-researched. Although some vocational research has utilized the MPQ, more needs to be done to determine the relationships between Tellegen’s Big Three and Holland’s RIASEC interest types. However, the research provides support for the idea that there are alternative personality dimensions (i.e., Tellegen’s Big Three), outside of the FFM, that can significantly predict vocational interests, in particular the RIASEC types. Hypotheses 2a – 2c will test relationships between the Tellegen’s Big Three (as measured by the MPQ-BF) and the RIASEC interest types.

*Hypothesis 2a (H2a):* The PEM factor will significantly positively correlate with all six RIASEC types.

*Hypothesis 2b (H2b):* The CT factor will significantly negatively correlate with Realistic and Artistic types, but not with Investigative, Social, Enterprising, and Conventional types.

*Hypothesis 2c (H2c):* The NEM factor will significantly negatively correlate with Artistic types, but not with Investigative, Social, Enterprising, Realistic, and Conventional types.

### Comparing Tellegen's Big Three and the FFM

An earlier discussion proposed criticisms of the FFM. In light of these criticisms an alternate personality model was considered: Tellegen's Big Three, measured by the MPQ. This model of personality resolves all the previous criticisms of the FFM: five versus 3 factors, lack of lower order factors, and model development issues.

Tellegen's (1985) understanding of personality differs from the conception of the FFM. Tellegen believes personality can be summed by three overriding traits or factors versus the 5 factors of the FFM. This is an inherent difference in the two models of personality, which guided the development of instruments used to measure these models, in terms of a three versus a five factor structure. Furthermore, Tellegen (1985) utilized a bottom-up approach to development of the MPQ, in which constructs were based on iterative cycles of data collection and item analyses designed to better differentiate the primary scales. In contrast, Tupes and Christal (1961) emphasized deductive, top-down

approach in which they first specified the broad, higher-level trait domains (originally Neuroticism, Extraversion, and Openness to Experience, and later Agreeableness and Conscientiousness). This point shows the inherent difference in the way the two personality measures were constructed, and possibly a benefit to the MPQ, in light of this developmental criticism of the FFM.

Due to these criticisms of the FFM and the resolution of Tellegen's Big Three with these issues, there is evidence to suggest that the MPQ may more strongly predict the RIASEC types compared to the FFM, particularly with college students. Holland (1985) theorized that the greater the match between individuals and their environments, the greater their satisfaction, achievement, and tenure in that job. From this perspective, then, "match" is considered the indicator of a "good" vocational decision (Phillips & Jome, 1997). The goal of vocational counseling is to provide individuals with the resources and information to make a "good" or the "best" vocational decision they can. Therefore, providing the best match between personality and vocational interests can be imperative in producing successful employees. This rationale led to hypothesis 3:

*Hypothesis 3 (H3):* The Tellegen's Big Three will more strongly predict the RIASEC interest types, overall, compared with the FFM's ability to predict the RIASEC interest types.

## College Self-Efficacy: Moderating Role

### *Self-Efficacy: Background and Theory*

Social cognitive career theory (SCCT) (Lent, Brown, & Hackett, 1994) has been recently applied in vocational psychology to help explain how individuals' career interests develop, how they make career choices, and how they determine their level of performance (Lent, Lopez, & Sheu, 2008). Individuals' confidence in their ability to perform tasks (i.e., self-efficacy) moderates the relationship between what they know and how they act (Lent, Brown, & Hackett, 1994). Sources of self-efficacy include: personality, gender, race, and disability/health status; and background/contextual variables (Lent, Brown, & Hackett, 1994). Applying self-efficacy theory, in terms of SCCT, can further our understanding of the role self-efficacy plays in the relationship between personality and vocational interests and choices.

Despite the fact that Holland's theory has had one of the greatest impacts on our understanding of the career development process, it had been criticized on some fronts for lacking explanatory and predictive power for certain populations including women and racial and ethnic minorities (Tokar, Vaux, & Swanson, 1995; Tracy & Rounds, 1992). The theory has also been criticized for not addressing how socialization affects the development of a particular interest type or the selection of an environment for expression of the interest (Hackett & Betz, 1981). Furthermore, the theory has been criticized for not specifically addressing how counselors and clinicians may intervene to help clients broaden their range of interests (Srsic & Walsh, 2001).

It is within this context that researchers have begun to develop career guidance strategies that draw from both Holland's theory and SCCT, originating from Bandura's self-efficacy theory. This trend in career assessment attempts to integrate the use of vocational self-efficacy and vocational interests, and is based on empirical evidence that vocational self-efficacy is a significant predictor of career choice and vocational behavior and may serve as a foundation for interventions to broaden the range and facilitate the development of new interests (Srsic & Walsh, 2001).

Self-efficacy is a widely studied explanatory variable in career development research as well as an important basis for career interventions and is increasingly used jointly with vocational interest measures in career counseling. Self-efficacy theory posits that a target behavior will likely be produced if people believe they are able to organize their behavior in a manner that will produce the desired outcome (Bandura, 1986). Self-efficacy is not simply the possession of a skill, but the belief that the skill can be effectively produced under a variety of circumstances. Therefore, self-efficacy expectations refer to "one's beliefs concerning one's ability to successfully perform a given task or behavior" (Betz & Borgen, 2000, p. 330). In the context of career decision making, belief that one can successfully perform a task or behavior is especially crucial because the tasks or behaviors refer to those activities, educational majors, and occupations that the individual is willing to try or to pursue.

#### *Self-Efficacy: Mediating and Moderating Relationships*

Research has found support for both moderating and mediating effects of self-efficacy on the relationship between personality and vocational interests. Self-efficacy

expectations may mediate the development and/or exploration of interests through the mechanism of the avoidance behavior hypothesized to be a consequence of low self-efficacy (Betz & Borgen, 2000). That is, if an individual avoids an occupation or career because of perceived inability to accomplish the behavior or tasks involved, it is also unlikely that the individual will gain enough familiarity with the task required of the occupation or career to give interest a chance to develop. Nauta (2004) provided evidence that self-efficacy mediated the relationship between the FFM personality dimensions and the RIASEC interest types.

While there is research to support the mediating effects of self-efficacy on the relationship between personality and vocational interests, a mediational model is not in line with SCCT research, which provides the theoretical basis for this study. Therefore, a mediational approach would not be appropriate for the purposes of this research. There is further research to support the moderating effects of self-efficacy. Betz and Hackett (1981) found that both self-efficacy and personality predicted the kind of career options college students considered. Furthermore, based on literature that self-efficacy can increase interests, there is evidence that personality formation precedes the development of self-efficacy (Lapan, Boggs, & Morrill, 1989). The idea is that personality is a driver of the acquisition of vocational self-efficacy, and vocational self-efficacy moderates the relationship between personality variables and vocational interests. For instance, the relationship between Openness to Experience and Investigative interests is moderated by lower vocational self-efficacy with respect to Investigative career interests (Lapan, Boggs, & Morrill, 1989).

### *College Self-Efficacy*

College self-efficacy has been operationally defined as a student's degree of confidence in performing various college related tasks (Solberg, O'Brien, Vikkareal, Kennel, & Davis, 1993). Russell and Petrie (1992) consider self-efficacy expectations as an important academic factor in the promotion of personal adjustment and development of vocational interests in college students. In a meta-analytic study, Multon, Brown and Lent (1991) found that the relationship between college performance and self-efficacy yielded a moderate effect size of 0.35. Additionally, across all school levels, self-efficacy accounted for 14% of the variance in academic performance, and 12% of the variance in academic persistence. Therefore, consistent with self-efficacy theory, research has demonstrated a predictive relationship between academic self-efficacy and academic performance and persistence (Multon, Brown, & Lent, 1991). Bandura (1986) argued that strong self-efficacy expectations about a given behavior increase the likelihood that a behavior will be performed when appropriate, as preceded by sources of self-efficacy which includes personality.

This research provides the foundation for hypothesis 4:

*Hypothesis 4 (H4):* College self-efficacy will moderate the relationships between the Tellegen's Big Three personality dimensions (as measured by the MPQ-BF) and the RIASEC interest types previously stated (i.e., H2a-2c), such that all relationships will be stronger when college self-efficacy is high.

## Conclusion

Research has provided clear evidence that people prefer careers and organizational cultures that match their personality attributes (Warr & Pearce, 2004). Therefore, furthering our understanding of the associations between personality traits and Holland's vocational interest types can help us gain a better understanding of how certain groups of personality and interests may comprise a convergence of preferences, tendencies, and motivations to pursue certain careers. Although the FFM is prominent in the literature, there are several criticisms of the model. This led to analyzing an alternate model of personality that addresses many of the issues with the FFM: Tellegen's Big Three model, which may more strongly predict Holland's RIASEC types. However, the literature is sparse here and development of this relationship needs to be further explored, hence a contribution of this study. Providing a personality inventory (i.e., the MPQ) that possibly better predicts the RIASEC interest types, compared with the FFM, can aid vocational researchers and counselors in being better equipped to predict an individual's vocational interests and, suggest jobs that individuals will find to be most satisfying. Furthermore, no other study has directly compared the relationships between the FFM and the RIASEC interest types to the relationships between the MPQ and the RIASEC interest types. Another contribution of this study is utilizing a more generalizable sample (i.e., general college freshmen), compared with other studies that have looked at relating the MPQ to the RIASEC interest types. Although Costa and McCrae consider the FFM to apply uniformly to all adult ages, Mroczek, Ozer, Spiro, and Kaiser (1998) found substantial differences between the structures emerging from older

individuals as compared to undergraduate students. This could be an argument for the use of the MPQ with college students seeking career counseling, and as such is another contribution of this study which uses a college student sample.

Additionally, this research explores the moderating role that college self-efficacy can play in the relationship between personality traits and vocational interest types. Because the literature has shown the integral role of self-efficacy in the relationship between personality and vocational interests, one needs to examine this relationship as well. This can aid vocational/career counselors when directing people toward career paths, based on their personality traits and vocational interests. Vocational psychologists have drawn heavily on Parson's (1909) recommendation that individuals need to acquire self-knowledge and knowledge of the world of work. Through this understanding, a match can be made between the characteristics of the person and the characteristics of appropriate jobs. Therefore, by furthering self-awareness and understanding, people will be better equipped to choose jobs and/or careers with which they will be most satisfied and happy.

## METHOD

### Participants

A sample of 194 individuals was drawn from the psychology participant pool from a mid-sized Midwestern university. College students who are considered in freshmen academic standing (i.e., less than 30 credits completed) were utilized for the sample in order to test people who are starting to formulate their vocational interests and desired career path. The participants included 120 women (61.5 %) and 74 men (37.9%). In this sample, 91.3% indicated they associated their ethnicity most with being Caucasian (n=178); 3.1% said they were Asian or Asian American (n=6); 2.6% indicated they were Hispanic or Latino (n=5); 0.5% of participants said they considered themselves multi-racial (n=1); and 2.1% said they associate themselves with some other ethnicity (n=4). The mean age was 18.79 ( $SD = 1.33$ ), with a range of 18-27 years old, and the average GPA for participants is 2.88 ( $SD = 0.61$ ), with a range of, 0.37-4.00. With regard to work, 45.6% said they currently have a job, besides being a student (n=89); 53.8% indicated they are solely a student with no other job (n=105); 40.5% indicated they were currently seeking employment (n=79); and 58.5% said they were not seeking employment outside of being a student (n=114) (one participant did not respond to this question).

## Procedure

Participants were given a copy of the study information sheet for their records. The experimenter reviewed the study information sheet explaining the purpose of the study and providing participants with knowledge of their confidentiality, anonymity, and right to refuse participation. Participants then completed four inventories designed to assess the variables in the study. The four inventories were counterbalanced in terms of order of presentation. Participants were thanked for participating and were excused.

## Measures

### *The International Personality Item Pool*

The International Personality Item Pool (IPIP) abbreviated form is a 50-item self-report measure of the Big Five personality traits (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, & Gough, 2006). The IPIP items are short, easy to understand phrases that assess personality traits central to the FFM of personality: Conscientiousness, Extraversion, Neuroticism, Openness to Experience, and Agreeableness. Participants rate their responses to each item on a 5-point Likert-type scale, with 1 = strongly disagree to 5 = strongly agree. Scores for Conscientiousness, Extraversion, Neuroticism, Openness to Experience, and Agreeableness were obtained by averaging the responses to the 10 items measuring each trait. Alpha reliability coefficients for the scales are 0.88, 0.79, 0.82, 0.84, and 0.81, for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively, resulting in a mean alpha reliability coefficient of 0.83 for all scales (Goldberg, Johnson, Eber,

Hogan, Ashton, Cloninger, & Gough, 2006). Standardized validity coefficients for the scales are 0.94, 0.92, 0.92, 0.90, and 0.92, for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness, respectively, resulting in a mean standardized validity coefficient of 0.92 for all scales (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, & Gough, 2006).

### *MPQ-BF*

The Multidimensional Personality Questionnaire Brief Form (MPQ-BF) is a 155 item self-report scale developed to mirror as closely as possible the MPQ. It consists of 11 personality scales loading on three major factors (Patrick, Curtin, & Tellegen, 2002). The MPQ-BF is based on the original MPQ, a 276-item measure developed by Tellegen (1985). Factor 1, PEM, is composed of scales measuring Well-being, Social Potency, Achievement, Social Closeness, and Absorption. Scales composing this factor identify individuals with clear extroverted features. Those high on these scales tend to be more involved in active, pleasurable, and effective dealings in their environment. In addition, they are ready to experience the positive emotions associated with these involvements. Factor 2, NEM, is composed of scales measuring Stress reaction, Alienation, Aggression, and Absorption (note that Absorption is encompassed by both PEM and NEM factors). Those scoring high on these scales tend to be unpleasurably engaged, stressed, harassed, and prone to negative emotions. Factor 3, CT, is composed of scales measuring Control, Harm Avoidance, and Traditionalism. Those who scores high on these scales tend to be restrained, cautious, avoidant of dangerous kinds of excitement and thrills, conventional,

and tend to submit to others' wishes (Tellegen, Lykken, Bouchard, Wilcox, Segal, & Rich, 1988).

Participants indicated whether the statement is true or false of their attitudes, opinions, interests, and other characteristics. Scores for PEM, NEM and CT are obtained by summing self-ratings of "true" for each item. Alpha reliability coefficients were calculated for the MPQ-BF factors: PEM (0.86), NEM (0.81), and CT (0.83) (Patrick, Curtin, & Tellegen, 2002). Research has shown that there is a high degree of correspondence between the MPQ and MPQ-BF trait scales which ensures a high degree of comparability of results for the two versions (Patrick, Curtin, & Tellegen, 2002).

#### *Self-Directed Search*

The Self-Directed Search (SDS) is a 228-item self-report measure specifically designed to estimate an individual's resemblance to each of Holland's six personality types (Holland, 1985a). Scores for Realistic, Investigative, Artistic, Social, Enterprising, and Conventional types are obtained by summing self-rating of preferences for activities, competencies, occupational preferences, and abilities. All six interest types are measured with 38 items each. KR-20 internal consistency reliability estimates for the SDS summary scales range from 0.86 to 0.91 and from 0.87 to 0.91 for younger and older adult samples (Holland, 1985a). Extensive validity evidence is reported in the manual (Holland, 1985a).

#### *College Self-Efficacy Instrument*

The College Self-Efficacy Instrument (CSEI) consists of 20-items related to college self-efficacy (Solberg, O'Brien, Villareal, Kennel, & Davis, 1993). Originally,

items were selected from various academic self-help books. Using a sample of Hispanic college students, a total of 26 items were submitted to a principal components analysis, and 20 items were found to load (0.50 or above) on one of three factors: Course or Academic Efficacy, Roommate Efficacy, and Social Efficacy (Solberg, et al., 1993). Each of the 20 items were phrased in such a manner as to follow the statement: “How confident are you that you could successfully complete the following tasks:....” Items were rated using an 8-point scale ranging from 1 (Not at all confident) to 8 (Extremely Confident). Using a second-order principal components analysis, Solberg et al. (1993) found that the three subscales converged with other college adjustment indices (loadings on the adjustment sub-factor ranged from 0.84-0.68) and discriminated from other indices such as acculturation and social support. The principal components analyses indicate that the CSEI possesses adequate construct validity. Internal consistency reliability estimates using coefficient alpha were found to be 0.88 for each subscale and 0.93 for the total scale scores. Although the CSEI was validated for a Hispanic population, the developers state that the items were developed to address episodes common to all students because: (a) much of the episodic experiences at college are not culture-specific but are expected to play a role in college adjustment, and (b) developing a pool of items that address common episodes, will allow future research have the flexibility needed to address the role of college self-efficacy within Hispanic as well as Non-Hispanic cultures (Solberg, et al., 1993).

For the purposes of this study, only 14 items were retained for use: all 7 items measuring Course or Academic Efficacy (academically social items, e.g., participate in

class discussions) and 7 items measuring Social Efficacy (social items, e.g., ask a professor or instructor a question outside of class). For the purposes of this study, a total score was used as a single index of college self-efficacy and was generated by averaging score of the 14 retained items.

#### *Demographic information sheet*

After completing the instruments, participants also indicated their sex, age, race, ethnicity, class standing, GPA, and if they are employed or are currently seeking employment.

#### Methods of Data Analysis and Missing Data

Descriptive statistics ( $M$  and  $SD$ ) were derived. Hypotheses 1a-1e and 2a-2c were tested via correlations, to determine if the IPIP Big Five measure of personality significantly relate to the RIASEC types (Hypothesis 1a-1e) and if the MPQ-BF personality dimensions significantly relate to the RIASEC types (Hypothesis 2a-2c). Hypothesis 3 was tested via linear regression, to compare the FFM and the MPQ-BF in their ability to predict the RIASEC interest types. Hypothesis 4 was tested via hierarchical multiple moderated regression (HMMR). HMMR was utilized to determine if self-efficacy moderated the relationships between the MPQ-BF personality dimensions and the RIASEC types.

Research suggests that for comparable studies, more than 20% missing data would be troublesome (Downey & King, 2001). Although there was minimal missing data (i.e., 1%) in the current study, methods were used to replace missing data. Mean

substitution was used to replace missing values with the mean for the variable from all individuals completing that variable. This approach retains the original mean but reduces the variance for the new scale (Downey & King, 2001).

## RESULTS

### Descriptive Statistics

Means, standard deviations and intercorrelations for all measured variables are shown in Table 4.

#### Relationship between FFM and the RIASEC Interest Types: Hypotheses 1a-1e

Hypotheses 1a-1e were tested via correlations (refer to Table A-4). H1a was fully supported. In line with H1a, Extraversion was significantly positively correlated with Social ( $r = .21, p < .05$ ) and Enterprising ( $r = .17, p < .05$ ) interest types, but Extraversion was not related to Realistic ( $r = .07, ns$ ), Investigative ( $r = -.05, ns$ ), Artistic ( $r = -.09, ns$ ), and Conventional ( $r = .09, ns$ ) types. H1b was fully supported. In line with H1b, Openness to Experience was significantly positively correlated with Investigative ( $r = .19, p < .05$ ) and Artistic ( $r = .14, p < .05$ ) types, but Openness to Experience was not related to Realistic ( $r = .06, ns$ ), Conventional ( $r = -.01, ns$ ), Social ( $r = .15, ns$ ), and Enterprising ( $r = .13, ns$ ) types. In support of H1c, Agreeableness is significantly correlated with Social ( $r = .23, p < .01$ ) types. Also in line with H1c, Agreeableness was not significantly related to Realistic ( $r = .09, ns$ ), Conventional ( $r = .05, ns$ ), Enterprising ( $r = .05, ns$ ), Investigative ( $r = .05, ns$ ), and Artistic ( $r = .10, ns$ ) types. The data fully support H1c that Agreeableness significantly positively correlates with Social types, but not with the other RIASEC interest types. In support of H1d, Conscientiousness was significantly correlated with Conventional types ( $r = .18, p <$

.05). Also, in line with H1d Conscientiousness was not significantly related to Realistic ( $r = -.11, ns$ ), Enterprising ( $r = .08, ns$ ), Investigative ( $r = -.03, ns$ ), Social ( $r = .07, ns$ ), and Artistic ( $r = .09, ns$ ) types. The data fully supports H1d that Conscientiousness significantly positively correlates with Conventional types, but not with the other RIASEC types. H1e was fully supported, in that Neuroticism was significantly negatively correlated with Investigative ( $r = -.16, p < .05$ ) types. However, in line with H1e, Neuroticism was not related to Realistic ( $r = -.12, ns$ ), Enterprising ( $r = -.11, ns$ ), Conventional ( $r = .01, ns$ ), and Social ( $r = .10, ns$ ) types. Although, not in line with H1e, Neuroticism was significantly correlated to Artistic ( $r = .18, p < .05$ ) types.

#### Relationship between Tellegen's Big Three and the RIASEC Interest Types: Hypotheses 2a-2c

Hypotheses 2a-2c were tested via correlations (refer to Table A-4). H2a was partially supported. In line with H2a, the PEM factor was significantly correlated to Social ( $r = .35, p < .01$ ), Enterprising ( $r = .46, p < .01$ ), and Conventional ( $r = .18, p < .05$ ) types. However, contrary to H2a, the PEM factor was not significantly correlated with Realistic ( $r = .14, ns$ ), Investigative ( $r = .06, ns$ ), and Artistic ( $r = .08, ns$ ) types. Therefore, the data partially supports H2a. H2b was partially supported, in that the CT factor was significantly negatively correlated with the Realistic ( $r = -.26, p < .01$ ) type. Also, in line with H2b, CT was not related to Investigative ( $r = .02, ns$ ) and Enterprising ( $r = .06, ns$ ) types. However, not in line with H2b, CT was not significantly correlated to the Artistic ( $r = -.10, ns$ ) type, and CT was significantly related to Social ( $r = .25, p <$

.01) and Conventional ( $r = .16, p < .05$ ) types. Thus CT failed to significantly correlate with Investigative and Enterprising types as hypothesized. H2c was fully supported: the NEM factor was significantly negatively correlated with the Artistic ( $r = -.16, p < .05$ ) type, but NEM was not related to Investigative ( $r = .00, ns$ ), Social ( $r = -.05, ns$ ), Enterprising ( $r = -.04, ns$ ), Realistic ( $r = .14, ns$ ), and Conventional ( $r = -.03, ns$ ) types.

### Comparing the FFM and Tellegen's Big Three: Hypothesis 3

Hypothesis 3 was tested via twelve linear regressions (refer to Tables A5-A10). Due to the high risk of Type I error, the modified Bonferroni procedure was used to control for this. Some authors have pointed out that the Bonferroni adjustment formula (i.e., 0.05 divided by the # of analyses) of controlling for Type I error becomes very conservative, perhaps too conservative, when the number of comparisons grows too large (Jaccard & Wan, 1996). Jaccard and Wan (1996) suggest the modified Bonferroni procedure which works as follows: rank order the significance values obtained from the multiple tests from smallest to largest. Evaluate the significance of the test with the smallest p-value at alpha divided by the number of tests (12 for the current study). If the test statistic result is significant after this adjustment has been performed, then move onto the next smallest p-value. Evaluate this test statistic at alpha divided by the number of tests minus 1. If this test statistic is still significant then move onto the next test statistic using alpha divided by the number of tests minus 2. Proceed in this fashion until a non-significant test statistic result is obtained.

H3 states that the Tellegen's Big Three will more strongly predict the RIASEC interest types than the FFM. Factors for the two models were combined: Extraversion, Agreeableness, Conscientiousness, Openness to Experience, and Neuroticism for the FFM and PEM, NEM, and CT for Tellegen's Big Three. Each set of factors were run as the independent variable against each of the six RIASEC interest types as the dependent variable. Analyses supported the hypothesis. Tellegen's Big Three significantly predicted the Realistic ( $R^2 = .15, p < .001$ ) interest type, the Investigative interest type ( $R^2 = .14, p < .001$ ), the Artistic interest type ( $R^2 = .12, p < .001$ ), the Social interest type ( $R^2 = .07, p < .001$ ), the Enterprising interest type ( $R^2 = .08, p < .001$ ), and the Conventional interest type ( $R^2 = .12, p < .001$ ) whereas the FFM only predicts the Artistic ( $R^2 = .09, p < .05$ ) and Social ( $R^2 = .07, p < .05$ ) interest types. This provides support that Tellegen's Big Three as measured by the MPQ-BF could more strongly predict the RIASEC interest types compared to the FFM, but caution should be exercised when interpreting these results.

#### College Self-Efficacy as a Moderator: Hypothesis 4

Hypothesis 4 was tested via 18 HMMR (refer to Tables A11-A16). Due to the high risk of Type I error, the modified Bonferroni procedure was used to control for this. The same procedure was used for H4 as was for H3. H4 states that college self-efficacy will moderate the relationships between the Tellegen's Big Three personality dimensions (as measured by the MPQ-BF) and the RIASEC interest types previously stated (i.e., hypotheses 2a-2c), such that all relationships will be stronger when college self-efficacy

is high. The results provide partial support for H4. College self-efficacy moderated the relationship between PEM and the Social interest type ( $\Delta R^2 = .02, p < .05$ ) (refer to Table 14); however college self-efficacy did not moderate the relationship between PEM and any other RIASEC type (refer to Tables 11-13, 15, and 16). College self-efficacy moderated the relationship between CT and the Realistic interest type ( $\Delta R^2 = .02, p < .05$ ) (refer to Table 11); however college self-efficacy did not moderate the relationship between CT and the Artistic interest type ( $\Delta R^2 = .02, ns$ ), or any other interest type (refer to Table 13). College self-efficacy did not moderate the relationship between NEM and the Artistic interest type ( $\Delta R^2 = .00, ns$ ), nor did it moderate the relationship between NEM and any other RIASEC type (refer to Tables 11-16). Therefore, the data do not fully support H4, in that college self-efficacy does not moderate the relationships between Tellegen's Big Three and all of the RIASEC interest types.

## DISCUSSION

This study examined the relationship between the FFM of personality and Tellegen's Big Three model of personality as they related to Holland's RIASEC interest types. It also compared these relationships, hypothesizing that Tellegen's Big Three model would be more strongly related to Holland's interest types compared to the FFM. This study also examined the moderating role of college self-efficacy in the relationship between Tellegen's Big Three and Holland's RIASEC interest types.

### The Relationship between the FFM and the RIASEC Interest Types

Findings on the relationship between the FFM of personality and the RIASEC interest types provided further support for several already established relationships in previous research. In line with previous research (refer to Table A1 for references), the current study found that: Extraversion was significantly correlated with Social and Enterprising interest types, Openness to Experience was significantly correlated with Investigative and Artistic interest types, Agreeableness was significantly correlated with Social interest types, and Conscientiousness was significantly correlated with Conventional interest types.

The relationship of Neuroticism with the RIASEC interest types reflected previous research in that neuroticism was significantly correlated with the Investigative interest type, as hypothesized. However, there was also a significant positive correlation with the Artistic type. This finding does make sense in that individuals scoring high on

Neuroticism are often characterized as emotional and people with Artistic career interests are said to be emotional and impulsive (Holland, 1985a). Impulsivity need not be viewed as negative, but rather can indicate energy for creative expression (e.g., careers such as artist, poet, or musician). Overall, the current study supports the idea that the FFM predicts vocational interest among the current cohort of first year college students at an upper Midwest state university.

#### The Relationship between Tellegen's Big Three and the RIASEC Interest Types

Findings on the relationship between Tellegen's Big Three model of personality and the RIASEC interest types provides insight into an alternate personality model's relationship with Holland's model of interest types. Links between Tellegen's Big Three and the RIASEC interest types have been under-researched, and the current study is a step toward establishing links between this personality model and the interest types measuring vocational interests. The hypothesized relationships among Tellegens' Big Three and Holland's interest types were based on one previous study (Larson & Borgen, 2002), and many of the hypothesized relationships were supported. The hypothesis (H2a) regarding the relationship between PEM and the RIASEC types was partially supported: PEM was significantly correlated with three of the six interest types (i.e., Social, Enterprising, and Conventional). Furthermore, NEM was related to the Artistic interest type, as hypothesized (H2c). The CT personality factor was significantly correlated with the Realistic interest type (H2b), as hypothesized, but not with the Artistic interest type. CT was significantly positively correlated with both Social and Conventional interest

types. The relationship found between CT and Social interest types make sense in that individuals scoring high on CT are reflective and would logically be interested in Social type careers that involve reflecting on issues and concerns such as counselor, psychologist, or social worker. Also, the relationship between CT and Conventional interest types make sense because individuals scoring high on CT are detail oriented and would be inclined to be interested in Conventional type careers that involve orderliness, such as a CPA, bookkeeper, or credit investigator.

The relationships established between Tellegen's Big Three model and Holland's RIASEC interest types suggest that this model predicts vocational interests among college students. The current study extends on previous research in this area, and lends insight into relationships that have not been found between Tellegen's Big Three and the RIASEC interest types.

### Comparing Tellegens' Big Three and the FFM

There have been several criticisms of the FFM, which suggest the need to examine an alternate personality model to predict vocational interests. Tellegen's Big Three could more strongly predict the RIASEC interest types compared with the FFM. The current study finds partial support for the hypothesis (H3). Tellegens' Big Three model appeared to successfully address all the issues regarding the FFM summarized below.

Evidence from meta-analyses of factorial studies shows that three, not five personality factors, emerge at the highest level of analysis (Royce & Powell, 1983;

Tellegen & Waller, 1991; Zuckerman, Kuhlman, & Camac, 1988; Zuckerman, Kuhlman, Thornquist, & Kiers, 1991). Jackson, Furnham, Forde, and Cotter (2000) and Tellegen (1985) questioned Costa and McCrae's (1995) conclusions that a 5-factor model seems most appropriate, by stating that a 3-factor solution is both more clear and parsimonious. There has also been an inability of researchers to consistently link the personality traits in the FFM to Holland's interest types. Another critique of the FFM lies in its development. The initial factor-analytic derivations of the Big Five were not guided by explicit psychological theory, which has led to questions of why these five factors were selected. Refer to the future research section for further discussion of the implications of these results.

#### College Self-Efficacy as a Moderator

The current study found minimal support for the hypothesis (H4) that college self-efficacy moderates the relationship between Tellegen's Big Three and the RIASEC interest types. Only two of the eighteen tested relationships showed significance: college self-efficacy moderated the relationships between PEM and the Social interest type and CT and the Realistic interest type. However, college self-efficacy accounted for little variance when it was entered into the hierarchical regression equation (refer to tables 11 and 14).

There are several possible reasons why the current study found minimal support for the moderating effects of college self-efficacy on the relationship between Tellegen's Big Three and the RIASEC interest types. First, the sample was mostly first year, first

semester college students. These individuals may have an inflated and unrealistic sense of college self-efficacy. This may be because they are just coming from high school and have not had to work very hard in their academic careers up to this point in their lives, and may not have had their self-efficacy in their ability to do well in college tested yet. This may be why self-efficacy did not have a significant impact on the relationship between personality and vocational interests. Second, the major support for this hypothesis was based on SCCT, which only examined general self-efficacy, not a specific form of self-efficacy as used in the current study. Additionally, most research on personality as it relates to vocational interests has focused on measuring vocational self-efficacy as a moderator, which would be more applicable for individuals already in the business world. Because traditional freshmen level college students have had little exposure to the world of work, they have had little time to develop vocational self-efficacy which is the reason this variable was not used in the current study (Betz, Borgen, & Harmon, 2006; Betz & Hackett, 1981). Lastly, self-efficacy has been shown to be a mediator of the relationship between personality and vocational interests, as well as a moderator (Betz & Borgen, 2000; Nauta, 2004). Due to the mixed findings regarding the role of self-efficacy in this relationship, more research needs to be done.

### Limitations

There are a number of limitations that must be considered when drawing conclusions from the current study, particularly because of the cross-sectional nature of the current study. Using freshmen college students as the sample could be a potential

drawback, due to their limited range of world of work experience and the fact that their college self-efficacy may not be completely formulated at this time in their lives. The length of the data collection questionnaire, in that it was quite lengthy, should also be noted as a limitation to the current study potentially causing students to experience testing fatigue while filling out the questionnaire. Furthermore, there is a high risk of common method variance, in the current study that could impact the correlations derived from the data.

### Implications and Future Research

The current study has implications for further research into the role of the use of the MPQ-BF in vocational research, and its ability to predict vocational interests. The current study provides support that Tellegen's Big Three model, as measured by the MPQ-BF, is related to the RIASEC interest types, and therefore could be used in vocational counseling to aid students in designating a vocational field to study in college. Vocational researchers should conduct further studies of the MPQ-BF and how it relates to the RIASEC types with other samples such as senior level college students and individuals new in their professional careers.

Although these findings support Tellegen's Big Three model compared to the FFM, one should exercise caution when interpreting the results of the current study. There is some question about recommending the use of a personality measure and an interest measure that correlate so highly with each other. Future research should address the benefits for vocational counselors who use both measures: do the personality and

interest measures uniquely predict anything? Personality is defined as a stable characteristic of a person in adulthood (McCrae & Costa, 2003; Tellegen, 1985), but is it more stable than interests? People *can* change over time and interests can change as well. Future research should address the issue of change and stability in adult personality as related to change and stability in vocational interests.

More research needs to be done on the lower order factors of Tellegen's model of personality and their relation to vocational interests. The MPQ-BF's two levels of analysis-ability to measure higher order and lower order personality constructs-could provide vocational counselors with the ability to delve further into understanding how personality can have an impact on vocational interests and eventually one's chosen career. However, first there must be research relating the eleven lower order factors of Tellegen's model to vocational interests.

Future research should also address the problem of common method variance in studies like the current one. Although counterbalancing was done as a precaution in the current study, research has suggested that statistical controls can be utilized to further minimize this bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Such research has cited partial correlation procedures, use of multiple method factors such as a multitrait - multimethod model, and factor analysis as ways to measure common method variance.

Additionally, more research should be done in establishing the role of self-efficacy, specifically college self-efficacy, in the relationship between personality and vocational interests. If there is an impact of college self-efficacy on the relationship between personality and vocational interests, then more should be done to increase this

self-efficacy in college students so these individuals can develop the vocational interests that will best match their personality. In general, research suggests that the better we are at measuring personality and how it predicts vocational interests, the more successfully we can predict and guide academic progress (Kahn, Nauta, Gailbreath, Tipps, & Chartrand, 2002) and employability (De Fruyt & Mervielde, 1999).

### Conclusions

The current study shows that Tellegen's Big Three model of personality could more strongly predict vocational interests (as measured by the RIASEC interest types), compared with the FFM. This information may be used in vocational research and counseling. It suggests that future research should examine the MPQ-BF's ability to predict vocational interests, specifically among freshmen level college students. During this time in college students' careers, they need guidance about what academic path could reflect the best match between their personality and vocational interests (Holland, 1997; Kahn, et al, 2002), this match (tested using the FFM) has been shown to predict academic progress (Kahn, Nauta, Gailbreath, Tipps, & Chartrand, 2002), employability (De Fruyt & Mervielde, 1999), and eventually greater job satisfaction and performance (Barrick, Mount, & Judge, 2001; Hogan & Blake, 1999; Zak, Meir, & Kraemer, 1979). However, more research needs to be done to examine Tellegen's Big Three model and its links to vocational interests.

**APPENDIX A:****TABLES**

Table A-1

*Holland's Vocational Personality Types Described: RIASEC*

Vocational Personality Types	Description
Realistic	Asocial, inflexible, practical, and uninsightful
Investigative	Analytical, curious, intellectual, introspective, rational, and unpopular
Artistic	Imaginative, impulsive, introspective, nonconforming, and open
Social	Sociable, empathetic, persuasive, and responsible
Enterprising	Ambitious, agreeable, extroverted, and self-confident
Conventional	Conforming, inflexible, orderly, persistent, and practical

*Note.* Hogan and Blake (1999).

Table A-2

*Overlap Between the FFM and RIASEC*

Finding	Citation
Extraversion correlates with Social and Enterprising interests.	Betz, Borgen, & Harmon, 2006; Blake & Sackett, 1999; Costa, McCrae, & Holland, 1984; De Fruyt & Merveilde, 1997; Dilchert, 2007; Gottfredson, Jones, & Holland, 1993; Hartman & Betz, 2007; Miller & Miller, 2005; Nauta, 2004; Sullivan & Hansen, 2004.
Openness to Experience correlates with Investigative and Artistic interests.	Betz, Borgen, & Harmon, 2006; Blake & Sackett, 1999; Costa, McCrae, & Holland, 1984; De Fruyt & Merveilde, 1997; Dilchert, 2007; Gottfredson, Jones, & Holland, 1993; Hartman & Betz, 2007; Nauta, 2004; Miller & Miller, 2005; Sullivan & Hansen, 2004.
Agreeableness correlates with Social interests.	Betz, Borgen, & Harmon, 2006; Blake & Sackett, 1999; Dilchert, 2007; Hartman & Betz, 2007; Nauta, 2004; Sullivan & Hansen, 2004.
Conscientiousness correlates with Conventional interests.	Blake & Sackett, 1999; Dilchert, 2007; Gottfredson, Jones, & Holland, 1993; Hartman & Betz, 2007; Miller & Miller, 2005; Nauta, 2004.
Neuroticism correlates with Investigative interests.	Dilchert, 2007.

Table A-3

*The Big Three of Tellegen measured by the MPQ: Higher Order and Primary Trait Scales*

Higher Order Factors	Primary Trait Scales Encompassed by Higher Order Factors	Description
Positive Emotionality (PEM)	Well-being	High scorers: Have a cheerful, happy disposition; feel good about themselves; see a bright future ahead; are optimistic.
	Social Potency	High scorers: Are forceful and decisive; persuasive and like to influence others; enjoy leadership roles and being the center of attention.
	Achievement	High scorers: Work hard and enjoy it; welcome difficult and demanding tasks; are persistent; set high standards and tend to be perfectionists.
	Social Closeness	High scorers: Are sociable; take value and pleasure in close personal ties; are warm and affectionate.
Negative Emotionality (NEM)	Stress Reaction	High scorers: Are tense and nervous; sensitive and vulnerable; easily upset; fluctuating moods; troubled by feelings of guilt and unworthiness.
	Alienation	High scorers: Believe others wish them harm; behave betrayed and deceived; feel they are pushed around and have bad luck.
	Aggression	High scorers: Are physically aggressive; enjoy

upsetting and frightening others; enjoy violent scenes.

Both PEM and NEM	Absorption	High scorers: Are responsive to evocative sights and sounds; tend to think in images; readily captured by entrancing stimuli; become deeply immersed in own thoughts and imaginings.
Constraint (CT)	Control	High scorers: Are reflective; cautious; rational; like to plan activities in detail.
	Harm Avoidance	High scorers: Do not enjoy participating in dangerous activities; prefer safe activities.
	Traditionalism	High scorers: Endorse high moral standards; express positive regard for their parents; value a good reputation; oppose rebelliousness and unrestricted freedom of expression.

*Note.* Information gathered from Tellegen (1985).

Table A-4  
Means, Standard Deviations, and Intercorrelations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Extraversion	3.06	0.25	(.87)														
2. Agreeableness	3.18	0.30	.10	(.79)													
3. Conscientiousness	3.16	0.30	-.10	-.01	(.81)												
4. Neuroticism	2.89	0.56	-.02	.17*	.17*	(.83)											
5. Openness to Experience	3.15	0.31	-.04	.12	.06	.03	(.81)										
6. Realistic	34.15	7.01	.07	.09	-.11	-.12	.06	(.83)									
7. Investigative	43.64	8.47	-.05	.05	-.03	-.16*	.19*	.29**	(.85)								
8. Artistic	33.43	6.17	-.09	.10	.09	.18*	.14*	-.05	.04	(.84)							
9. Social	23.40	5.27	.21*	.23**	.07	.10	.15	-.06	.02	.26**	(.80)						
10. Enterprising	33.04	7.55	.17*	.05	.08	-.11	.13	.17*	.12	.18*	.43**	(.82)					
11. Conventional	43.92	6.23	.09	.05	.18*	.01	-.01	.16*	.24**	.02	.24**	.53**	(.83)				
12. PEM	74.26	14.76	.01	.19*	.23**	-.19*	.13	.14	.06	.08	.35**	.46**	.18*	(.89)			
13. NEM	42.36	17.03	.02	.22**	.10	.60**	.03	.14	.00	-.16*	-.05	-.04	-.03	-.12	(.94)		
14. CT	74.48	15.58	-.01	.01	.28**	.23**	.04	-.26**	.02	-.10	.25**	.06	.16*	.02	-.05	(.95)	
15. College SE	5.17	0.94	-.04	-.01	.24**	-.17*	.20**	-.06	.10	.10	.13	.25**	.08	.43**	-	.12	(.82)
																	.21**

Note.  $N=194$ . \*  $p < 0.05$ . \*\*  $p < 0.01$ . Alpha reliability coefficients were in parentheses on the diagonal. PEM = Positive Emotionality; NEM = Negative Emotionality; CT = Constraint; College SE = College Self-Efficacy.

Table A-5  
*Regression Analysis: Realistic Interest Type as Dependent Variable*

Predictors		<i>B</i>	$\beta$	<i>R</i> <sup>2</sup>
FFM	Openness to Experience	2.31	.08	.06
	Neuroticism	-3.46	-.12	
	Extraversion	2.09	.06	
	Conscientiousness	-3.12*	-.20*	
	Agreeableness	2.12	.05	
Tellegen's Three Factor Model	PEM	.36**	.22**	<b>.15***</b>
	NEM	.22	.13	
	CT	-.48***	-.32***	

*Note.* *N*=194; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001. Bold *R*<sup>2</sup> indicates factor model more strongly predicts the DV. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-6  
*Regression Analysis: Investigative Interest Type as Dependent Variable*

Predictors		<i>B</i>	$\beta$	<i>R</i> <sup>2</sup>
FFM	Openness to Experience	1.42	.05	.02
	Neuroticism	-1.10	-.06	
	Extraversion	-1.43	-.04	
	Conscientiousness	-1.37	-.09	
	Agreeableness	2.49	.08	
Tellegen's Three Factor Model	PEM	.42***	.23***	<b>.14***</b>
	NEM	.28*	.19*	
	CT	.37**	.24**	

*Note.* *N*=194; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001. Bold *R*<sup>2</sup> indicates factor model more strongly predicts the DV. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-7  
*Regression Analysis: Artistic Interest Type as Dependent Variable*

Predictors		<i>B</i>	$\beta$	<i>R</i> <sup>2</sup>
FFM	Openness to Experience	3.34	.09	.09*
	Neuroticism	2.12	.09	
	Extraversion	-1.96	-.04	
	Conscientiousness	3.48**	.24	
	Agreeableness	3.22	.12	
Tellegen's Three Factor Model	PEM	.38**	.24**	<b>.12***</b>
	NEM	-.17	-.11	
	CT	-.37**	-.23**	

*Note.* *N*=194; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001. Bold *R*<sup>2</sup> indicates factor model more strongly predicts the DV. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-8  
*Regression Analysis: Social Interest Type as Dependent Variable*

Predictors		<i>B</i>	$\beta$	<i>R</i> <sup>2</sup>
FFM	Openness to Experience	1.75	.05	.07*
	Neuroticism	5.58*	.17*	
	Extraversion	1.35	.09	
	Conscientiousness	1.96	.07	
	Agreeableness	3.22	.14	
Tellegen's Three Factor Model	PEM	.23*	.16*	<b>.07***</b>
	NEM	-.26**	-.19**	
	CT	.27*	.18*	

*Note.* *N*=194; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001. Bold *R*<sup>2</sup> indicates factor model more strongly predicts the DV. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-9  
*Regression Analysis: Enterprising Interest Type as Dependent Variable*

Predictors		<i>B</i>	$\beta$	$R^2$
FFM	Openness to Experience	2.05	.07	.06
	Neuroticism	-2.89	-.12	
	Extraversion	3.49	.13	
	Conscientiousness	2.22	.13	
	Agreeableness	3.61	.12	
Tellegen's Three Factor Model	PEM	.17	.11	<b>.08***</b>
	NEM	-.23*	-.17*	
	CT	.30**	.22**	

*Note.*  $N=194$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . Bold  $R^2$  indicates factor model more strongly predicts the DV. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-10  
*Regression Analysis: Conventional Interest Type as Dependent Variable*

Predictors		<i>B</i>	$\beta$	$R^2$
FFM	Openness to Experience	-3.53	-.14	.05
	Neuroticism	1.82	.02	
	Extraversion	5.50*	.23*	
	Conscientiousness	2.39	.04	
	Agreeableness	1.23	.04	
Tellegen's Three Factor Model	PEM	.40**	.25**	<b>.12***</b>
	NEM	-.30*	-.16*	
	CT	.28*	.17*	

*Note.*  $N=194$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ . Bold  $R^2$  indicates factor model more strongly predicts the DV. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-11  
*Hierarchical Multiple Moderated Regression Analysis: Realistic Interest Type as Dependent Variable*

Predictor	Step 1			Step 2		
	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$
PEM	.14**	.04*	.04*	.12*	.04	.00
College Self-Efficacy	1.01			.97		
PEM * College Self-Efficacy				.03		
NEM	.07	.02	.02	.07	.03	.01
College Self-Efficacy	.17			.04		
NEM * College Self-Efficacy				.05		
CT	-.15	.06**	.06**	-.15	.09**	.02*
College Self-Efficacy	.16			.25		
CT College Self-Efficacy				-.10		

*Note.* *N*=194; Regression weights are un-standardized; \**p* < .05; \*\**p* < .01. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-12  
*Hierarchical Multiple Moderated Regression Analysis: Investigative Interest Type as Dependent Variable*

Predictor	Step 1			Step 2		
	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$
PEM	.02	.02	.02	.03	.02	.00
College Self-Efficacy	.92			.89		
PEM * College Self-Efficacy				.03		
NEM	.01	.02	.02	.02	.02	.01
College Self-Efficacy	1.09			1.20		
NEM * College Self-Efficacy				.04		
CT	.00	.02	.02	.00	.02	.00
College Self-Efficacy	1.04			1.06		
CT College Self-Efficacy				.02		

*Note.* *N*=194; Regression weights are un-standardized; \**p* < .05; \*\**p* < .01. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-13  
*Hierarchical Multiple Moderated Regression Analysis: Artistic Interest Type as Dependent Variable*

Predictor	Step 1			Step 2		
	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$
PEM	.03	.01	.01	.04	.01	.00
College Self-Efficacy	.62			.58		
PEM * College Self-Efficacy				.03		
NEM	-.10*	.04*	.04*	-.10*	.04	.00
College Self-Efficacy	1.20			1.20		
NEM * College Self-Efficacy				-.00		
CT	-.04	.01	.01	-.04	.02	.01
College Self-Efficacy	.87			.81		
CT College Self-Efficacy				-.06		

*Note.* *N*=194; Regression weights are un-standardized; \**p* < .05; \*\**p* < .01. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-14  
*Hierarchical Multiple Moderated Regression Analysis: Social Interest Type as Dependent Variable*

Predictor	Step 1			Step 2		
	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$
PEM	.23**	.13**	.13**	.19**	.15**	.02*
College Self-Efficacy	.16			.06		
PEM * College Self-Efficacy				.09		
NEM	-.03	.02	.02	-.03	.04	.01
College Self-Efficacy	1.21			1.07		
NEM * College Self-Efficacy				-.06		
CT	.13	.07**	.07**	.13	.08**	.00
College Self-Efficacy	1.10			1.07		
CT College Self-Efficacy				.03		

*Note.* *N*=194; Regression weights are un-standardized; \**p* < .05; \*\**p* < .01. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-15

*Hierarchical Multiple Moderated Regression Analysis: Enterprising Interest Type as Dependent Variable*

Predictor	Step 1			Step 2		
	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$
PEM	.23**	.20**	.20**	.23**	.20**	.00
College Self-Efficacy	.78			.80		
PEM * College Self-Efficacy				.02		
NEM	-.02	.07**	.07**	-.02	.07**	.00
College Self-Efficacy	2.38			2.32		
NEM * College Self-Efficacy				-.02		
CT	.01	.07**	.07**	.01	.07**	.00
College Self-Efficacy	2.27			2.24		
CT College Self-Efficacy				.03		

*Note.* *N*=194; Regression weights are un-standardized; \**p* < .05; \*\**p* < .01. Modified Bonferroni procedure was used to correct for Type I error rate.

Table A-16

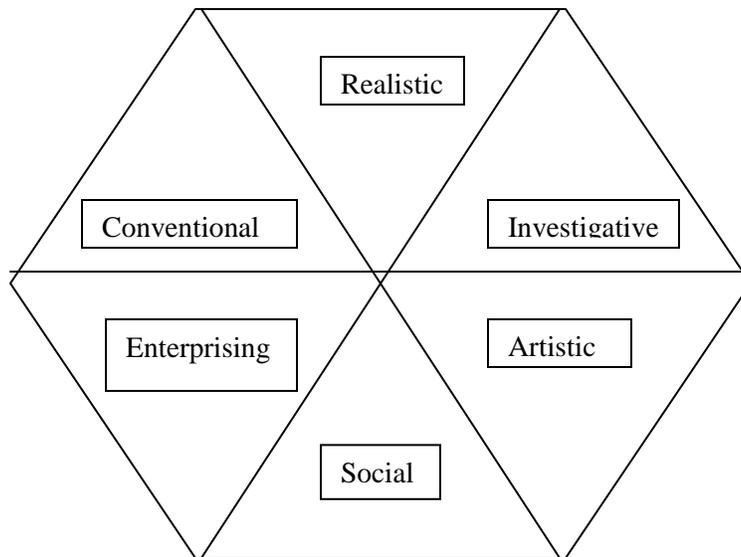
*Hierarchical Multiple Moderated Regression Analysis: Conventional Interest Type as Dependent Variable*

Predictor	Step 1			Step 2		
	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>B</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$
PEM	.06	.01	.01	.05	.02	.00
College Self-Efficacy	.12			.15		
PEM * College Self-Efficacy				.03		
NEM	-.00	.00	.00	-.00	.00	.00
College Self-Efficacy	.52			.51		
NEM * College Self-Efficacy				-.00		
CT	.07	.02	.02	.07	.04	.02
College Self-Efficacy	.37			.30		
CT College Self-Efficacy				.08		

*Note.* *N*=194; Regression weights are un-standardized; \**p* < .05; \*\**p* < .01. Modified Bonferroni procedure was used to correct for Type I error rate.

APPENDIX B:

FIGURE



*Figure B-1. Holland's Hexagonal Model.*  
*Note.* Information gathered from Holland (1985a).

APPENDIX C:  
STUDY INFORMATION SHEET AND SURVEYS

## Study Information Sheet

### PURPOSE

The purpose of this study is to determine the relationships between personality and vocational interests, and the role that academic belief's that one can succeed in college will have on these relationships. Participants will be presented with self-report questionnaires/inventories designed to measure all variables previously stated. In addition, there will be one demographic sheet at the end of all the questionnaires/inventories.

### RISKS AND BENEFITS OF PARTICIPANTS IN THE STUDY:

There are no foreseeable risks or discomfort associated with participating in this study.

### CONFIDENTIALITY:

Your responses to the following questionnaires and test items will be kept completely confidential. Other students and faculty, including your instructor will not have access to your answers. Student's response will be coded with a unique number so that it will be impossible for others to track your responses. The information that you provide in this study will be combined with that of other participants. Responses of individual participants will not be published and will be made available only to the researchers.

### RIGHT TO REFUSE:

Your decision to participate in this study is completely voluntary and you may withdraw at any time without penalty. Remember, for your psychology course there is an alternative assignment that you can complete to receive credit.

### PERSON TO CONTACT FOR QUESTIONS CONCERNING THIS STUDY

Elizabeth Barrett      (231) 590-7742      barree00@uwosh.edu

Dr. Susan McFadden      mcfadden@uwosh.edu

I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary.

## IPIP

**Directions:** Please read each statement carefully and circle the one answer that best describes the extent to which you agree or disagree ('1' = Strongly Disagree, '2' = Disagree, '3' Neutral, '4' = Agree, '5' = Strongly Agree). Please answer every question.

	SD	D	N	A	S
1. Am the life of the party.	1	2	3	4	5
2. Am quiet around strangers.	1	2	3	4	5
3. Feel comfortable around people.	1	2	3	4	5
4. Don't like to draw attention to myself.	1	2	3	4	5
5. Start conversations.	1	2	3	4	5
6. Keep in the background.	1	2	3	4	5
7. Talk to a lot of different people at parties.	1	2	3	4	5
8. Have little to say.	1	2	3	4	5
9. Don't mind being the center of attention.	1	2	3	4	5
10. Don't talk a lot.	1	2	3	4	5
11. Am interested in people.	1	2	3	4	5
12. Feel little concern for others.	1	2	3	4	5
13. Sympathize with others' feelings.	1	2	3	4	5
14. Have a soft heart.	1	2	3	4	5
15. Am not interested in other people's problems.	1	2	3	4	5
16. Take time out for others.	1	2	3	4	5
17. Make people feel at ease.	1	2	3	4	5
18. Insult people.	1	2	3	4	5
19. Feel others' emotions.	1	2	3	4	5
20. Am not really interested in others.	1	2	3	4	5
21. Am always prepared.	1	2	3	4	5
22. Leave my belongings around.	1	2	3	4	5
23. Pay attention to details.	1	2	3	4	5
24. Make a mess of things.	1	2	3	4	5
25. Get chores done right away.	1	2	3	4	5
26. Often forget to put things back in their proper place.	1	2	3	4	5
27. Like order.	1	2	3	4	5
28. Follow a schedule.	1	2	3	4	5
29. Shirk my duties.	1	2	3	4	5
30. Am exacting in my work.	1	2	3	4	5
31. Get stressed out easily.	1	2	3	4	5
32. Worry about things.	1	2	3	4	5
33. Am relaxed most of the time.	1	2	3	4	5
34. Am easily disturbed.	1	2	3	4	5
35. Get upset easily.	1	2	3	4	5
36. Change my mood a lot.	1	2	3	4	5
37. Have frequent mood swings.	1	2	3	4	5
38. Seldom feel blue.	1	2	3	4	5
39. Get irritated easily.	1	2	3	4	5
40. Often feel blue.	1	2	3	4	5
41. Have a rich vocabulary.	1	2	3	4	5
42. Have a vivid imagination.	1	2	3	4	5
43. Am not interested in abstract ideas.	1	2	3	4	5
44. Have difficulty understanding abstract ideas.	1	2	3	4	5

45. Have excellent ideas.	1	2	3	4	5
46. Am quick to understand things.	1	2	3	4	5
47. Use difficult words.	1	2	3	4	5
48. Do not have a good imagination.	1	2	3	4	5
49. Spend time reflecting on things.	1	2	3	4	5
50. Am full of ideas.	1	2	3	4	5

**MPQ-BF**

**Directions:** Circle either true or false to each statement if that statement with does or does not best describe your attitudes, opinions, and interests.

1. It is easy for me to become enthusiastic about things I am doing. (A) True (B) False
2. I am quite effective at talking people into things. (A) True (B) False
3. Some people say that I put my work ahead of too many other things. (A) True (B) False
4. I have occasionally felt discouraged about something. (A) True (B) False
5. I usually like to spend my free time with friends rather than alone. (A) True (B) False
6. Often I get irritated at little annoyances. (A) True (B) False
7. Many people try to push me around. (A) True (B) False
8. Often when I get angry I am ready to hit someone. (A) True (B) False
9. I like to stop and think things over before I do them. (A) True (B) False
10. I am often nervous for no reason. (A) True (B) False
11. I might enjoy riding in an open elevator to the top of a tall building under construction. (A) True (B) False
12. I don't like to see religious authority overturned by so-called progress and logical reasoning. (A) True (B) False
13. I can be deeply moved by a sunset. (A) True (B) False
14. My table manners are not always perfect. (A) True (B) False
15. I enjoy being in the spotlight. (A) True (B) False
16. I set very high standards for myself in my work. (A) True (B) False
17. When I am unhappy about something, (A) I tend to seek the company of a friend (B) I prefer to be alone
18. My mood often goes up and down. (A) True (B) False
19. I know that certain people would enjoy it if I got hurt. (A) True (B) False
20. When someone hurts me, I try to get even. (A) True (B) False
21. I am more likely to be fast and careless than to be slow and plodding. (A) True (B) False
22. It might be fun and exciting to be in an earthquake. (A) True (B) False

23. Strict discipline in the home would prevent much of the crime in our society. (A) True (B) False
24. When listening to organ music or other powerful music, I sometimes feel as if I am being lifted into the air.  
(A) True (B) False
25. I have always been extremely courageous in facing difficult situations. (A) True (B) False
26. I often feel happy and satisfied for no particular reason. (A) True (B) False
27. I often keep working on a problem even if I am very tired. (A) True (B) False
28. I am usually happier when I am alone. (A) True (B) False
29. I suffer from nervousness. (A) True (B) False
30. People often try to take advantage of me. (A) True (B) False
31. I admit that I sometimes enjoy hurting someone physically. (A) True (B) False
32. Basically I am a happy person. (A) True (B) False
33. I often prefer to "play things by ear" rather than to plan ahead. (A) True (B) False
34. Of these two situations I would dislike more: (A) Having a pilot announce that the plane has engine trouble and it may be necessary to make an emergency landing, (B) Working in the fields digging potatoes.
35. The best way to achieve a peaceful world is to improve people's morals. (A) True (B) False
36. Sometimes thoughts and images come to me without any effort on my part. (A) True (B) False
37. At times I have been envious of someone. (A) True (B) False
38. I live a very interesting life. (A) True (B) False
39. People find me forceful. (A) True (B) False
40. I am a warm person rather than cool and distant. (A) True (B) False
41. I often find myself worrying about something. (A) True (B) False
42. People often say mean things about me. (A) True (B) False
43. I see nothing wrong with stepping on people's toes a little if it is to my advantage. (A) True (B) False
44. When faced with a decision I usually take time to consider and weigh all possibilities. (A) True (B) False
45. I usually do not like to be a "follower." (A) True (B) False
46. I would enjoy trying to cross the ocean in a small but seaworthy sailboat. (A) True (B) False

47. I am opposed to more censorship of books and movies because it would go against free speech. (A) True (B) False
48. If I wish I can imagine (or daydream) some things so vividly that it's like watching a good movie or hearing a good story. (A) True (B) False
49. My opinions are always completely reasonable. (A) True (B) False
50. Every day I do some things that are fun. (A) True (B) False
51. When I work with others I like to take charge. (A) True (B) False
52. People say that I drive myself hard. (A) True (B) False
53. I am too sensitive for my own good. (A) True (B) False
54. My "friends" have often betrayed me. (A) True (B) False
55. I enjoy a good brawl. (A) True (B) False
56. I am very level-headed and usually have both feet on the ground. (A) True (B) False
57. Of these two situations I would dislike more: (A) Having to walk around all day on a blistered foot, (B) Sleeping out on a camping trip in an area where there are rattlesnakes.
58. It is a pretty unfeeling person who does not feel love and gratitude toward her/his parents. (A) True (B) False
59. Sometimes I can change noise into music by the way I listen to it. (A) True (B) False
60. If I have a humiliating experience I get over it very quickly. (A) True (B) False
61. I have at times eaten too much. (A) True (B) False
62. I usually find ways to liven up my day. (A) True (B) False
63. In most social situations I like to have someone else take the lead. (A) True (B) False
64. I am not a terribly ambitious person. (A) True (B) False
65. I am more of a "loner" than most people. (A) True (B) False
66. I would be more successful if people did not make things difficult for me. (A) True (B) False
67. Sometimes I hit people who have done something to deserve it. (A) True (B) False
68. I almost never do anything reckless. (A) True (B) False
69. Of the these two situations I would dislike more: (A) Being out on a sailboat during a great storm at sea, (B) Having to stay home every night for two weeks with a sick relative.

70. I would prefer to see: (A) Stricter observance of major religious holidays (B) Greater acceptance of nontraditional families, like single-parent families
71. I can often somehow sense the presence of another person before I actually see or hear her/him. (A) True (B) False
72. I have always been completely fair to others. (A) True (B) False
73. People rarely try to take advantage of me. (A) True (B) False
74. Most mornings the day ahead looks bright to me. (A) True (B) False
75. I am very good at influencing people. (A) True (B) False
76. I enjoy putting in long hours. (A) True (B) False
77. For me one of the best experiences is the warm feeling of being in a group of good friends. (A) True (B) False
78. Occasionally I have strong feelings (like anxiety or anger) without really knowing why. (A) True (B) False
79. I would rather turn the other cheek than get even when someone treats me badly. (A) True (B) False
80. I often act on the spur of the moment. (A) True (B) False
81. Of these two situations I would dislike more: (A) Being at the circus when two lions suddenly get loose down in the ring, (B) Bringing my whole family to the circus and then not being able to get in because a clerk sold me tickets for the wrong night.
82. Higher standards of conduct are what this country needs most. (A) True (B) False
83. The sound of a voice can be so fascinating to me that I can just go on listening to it. (A) True (B) False
84. I have at times been angry with someone. (A) True (B) False
85. Most days I have moments of real fun or joy. (A) True (B) False
86. I often act without thinking. (A) True (B) False
87. When it is time to make decisions, others usually turn to me. (A) True (B) False
88. I often keep working on a problem long after others would have given up. (A) True (B) False
89. I prefer to work alone. (A) True (B) False
90. Minor setbacks sometimes irritate me too much. (A) True (B) False
91. People often just use me instead of treating me as a person. (A) True (B) False

92. I don't like to start a project until I know exactly how to do it. (A) True (B) False
93. Of these two situations I would dislike more: (A) Riding a long stretch of rapids in a canoe, (B) Waiting for someone who's late.
94. I am disgusted by dirty language. (A) True (B) False
95. Some music reminds me of pictures or changing patterns of color. (A) True (B) False
96. I always tell the entire truth. (A) True (B) False
97. I often feel sort of lucky for no special reason. (A) True (B) False
98. I do not like to be the center of attention on social occasions. (A) True (B) False
99. I work just hard enough to get by without overdoing it. (A) True (B) False
100. I have few or no close friends. (A) True (B) False
101. I sometimes get very upset and tense as I think of the day's events. (A) True (B) False
102. Some people are against me for no good reason. (A) True (B) False
103. I can't help but enjoy it when someone I dislike makes a fool of herself/himself. (A) True (B) False
104. I seldom feel really happy. (A) True (B) False
105. Of these two situations I would dislike more: (A) Being chosen as the "target" for a knife-throwing act, (B) Being sick to my stomach for 24 hours.
106. No decent person could ever think of hurting a close friend or relative. (A) True (B) False
107. I can so completely wander off into my own thoughts while doing a routine task that I actually forget that I am doing the task and then find a few minutes later that I have finished it. (A) True (B) False
108. Sometimes I'm a bit lazy. (A) True (B) False
109. Every day interesting and exciting things happen to me. (A) True (B) False
110. I am quite good at convincing others to see things my way. (A) True (B) False
111. I push myself to my limits. (A) True (B) False
112. I am happiest when I am with people most of the time. (A) True (B) False
113. I am often troubled by guilt feelings. (A) True (B) False
114. I know that people have spread false rumors about me on purpose. (A) True (B) False
115. I like to watch a good, vicious fight. (A) True (B) False

116. Before I get into a new situation I like to find out what to expect from it. (A) True (B) False
117. I perform for an audience whenever I can. (A) True (B) False
118. I am not at all sorry to see many of the traditional values change. (A) True (B) False
119. I can sometimes recall certain past experiences in my life so clearly and vividly that it is like living them again,  
or almost so. (A) True (B) False
120. Never in my whole life have I taken advantage of anyone. (A) True (B) False
121. In my spare time I usually find something interesting to do. (A) True (B) False
122. In social situations I usually allow others to dominate the conversation. (A) True (B) False
123. I like to try difficult things. (A) True (B) False
124. I prefer not to "open up" too much, not even to friends. (A) True (B) False
125. My mood sometimes changes from happy to sad, or sad to happy, without good reason. (A) True (B) False
126. I have often been lied to. (A) True (B) False
127. Sometimes I just like to hit someone. (A) True (B) False
128. I am a cautious person. (A) True (B) False
129. Of these two situations I would dislike more: (A) Being in a flood, (B) Carrying a ton of bricks from the backyard into the basement.
130. At times I somehow feel the presence of someone who is not physically there. (A) True (B) False
131. I have sometimes felt slightly hesitant about helping someone who asked me to. (A) True (B) False
132. My feelings are hurt rather easily. (A) True (B) False
133. For me life is a great adventure. (A) True (B) False
134. I do not like to organize other people's activities. (A) True (B) False
135. I find it really hard to give up on a project when it proves too difficult. (A) True (B) False
136. I often prefer not to have people around me. (A) True (B) False
137. I often lose sleep over my worries. (A) True (B) False
138. When people are friendly they usually want something from me. (A) True (B) False
139. When people insult me, I try to get even. (A) True (B) False
140. I usually make up my mind through careful reasoning. (A) True (B) False

141. Of these two situations I would dislike more: (A) Being seasick every day for a week while on an ocean voyage, (B) Having to stand on the window ledge of the 25th Floor of a hotel because there's a fire in my room.
142. People should obey moral laws more strictly than they do. (A) True (B) False
143. I have never felt that I was better than someone else. (A) True (B) False
144. I always seem to have something exciting to look forward to. (A) True (B) False
145. I don't enjoy trying to convince people of something. (A) True (B) False
146. I like hard work. (A) True (B) False
147. Never in my whole life have I wished for anything that I was not entitled to. (A) True (B) False
148. I am rather aloof and maintain distance between myself and others. (A) True (B) False
149. There are days when I'm "on edge" all of the time. (A) True (B) False
150. I have had a lot of bad luck. (A) True (B) False
151. Sometimes I seem to enjoy hurting people by saying mean things. (A) True (B) False
152. I generally do not like to have detailed plans. (A) True (B) False
153. It might be fun learning to walk a tightrope. (A) True (B) False
154. High moral standards are the most important thing parents can teach their children. (A) True (B) False
155. Sometimes I am so immersed in nature or in art that I feel as if my whole state of consciousness has somehow been temporarily changed. (A) True (B) False

## CSEI

**Directions:** Using the scale provided please circle the number which best represents the degree to which you feel confident performing the following tasks. (0 = totally unconfident, 1 = very unconfident, 2 = unconfident, 3 = somewhat unconfident, 4 = undecided, 5 = somewhat confident, 6 = confident, 7 = very confident, 8 = totally confident)

1. Talk to your professors/instructors.	0	1	2	3	4	5	6	7	8
2. Take good class notes.	0	1	2	3	4	5	6	7	8
3. Research a term paper.	0	1	2	3	4	5	6	7	8
4. Understand your text books.	0	1	2	3	4	5	6	7	8
5. Ask a professor or instructor a question outside of class.	0	1	2	3	4	5	6	7	8
6. Write a course paper.	0	1	2	3	4	5	6	7	8
7. Work on a group project.	0	1	2	3	4	5	6	7	8
8. Do well on your exams.	0	1	2	3	4	5	6	7	8
9. Talk with a school academic and support (e.g. advising) staff.	0	1	2	3	4	5	6	7	8
10. Manage your time effectively.	0	1	2	3	4	5	6	7	8
11. Use the library.	0	1	2	3	4	5	6	7	8
12. Ask a question in class.	0	1	2	3	4	5	6	7	8
13. Participate in class discussions.	0	1	2	3	4	5	6	7	8
14. Keep up to date with your school work.	0	1	2	3	4	5	6	7	8

### SDS

**Directions:** For the following phrases circle “Like” for those activities you would like to do. Circle “Dislike” for those things you would dislike doing or would be indifferent to.

1. Fix electrical things	Like	Dislike
2. Repair cars	Like	Dislike
3. Fix mechanical things	Like	Dislike
4. Build things with wood	Like	Dislike
5. Take a Technology Education (Industrial Arts, Shop) course	Like	Dislike
6. Take a Mechanical Drawing course	Like	Dislike
7. Take a Woodworking course	Like	Dislike
9. Take an Auto Mechanics course	Like	Dislike
10. Work with an outstanding mechanic or technician	Like	Dislike
11. Work outdoors	Like	Dislike
13. Operate motorized machines or equipment	Like	Dislike
14. Read scientific books or magazines	Like	Dislike
15. Work in a research office or laboratory	Like	Dislike
16. Work on a scientific project	Like	Dislike
17. Study a scientific theory	Like	Dislike
18. Work with chemicals	Like	Dislike
19. Apply mathematics to practical problems	Like	Dislike
20. Take a Physics course	Like	Dislike
21. Take a Chemistry course	Like	Dislike
22. Take a Mathematics course	Like	Dislike
23. Take a Biology course	Like	Dislike
24. Study scholarly or technical problems	Like	Dislike
25. Sketch, draw, or paint	Like	Dislike
26. Design furniture, clothing, or posters	Like	Dislike
27. Play in a band, group, or orchestra	Like	Dislike
28. Practice a musical instrument	Like	Dislike
29. Create portraits or photographs	Like	Dislike
30. Write novels or plays	Like	Dislike
31. Take an Art course	Like	Dislike
32. Arrange or compose music of any kind	Like	Dislike
33. Work with a gifted artist, writer, or sculptor	Like	Dislike
34. Perform with others (dance, sing, act, etc.)	Like	Dislike
35. Read artistic, literary, or musical articles	Like	Dislike
36. Meet important educators or therapists	Like	Dislike
37. Read sociology articles or books	Like	Dislike
38. Work for a charity	Like	Dislike
39. Help others with their personal problems	Like	Dislike
40. Study juvenile delinquency	Like	Dislike
41. Read psychology articles or books	Like	Dislike
42. Take a Human Relations course	Like	Dislike
43. Teach in high school	Like	Dislike
44. Supervise activities for mentally ill patients	Like	Dislike
45. Teach adults	Like	Dislike
46. Work as a volunteer	Like	Dislike
47. Learn strategies for business success	Like	Dislike
48. Operate my own service or business	Like	Dislike

49. Attend sales conferences	Like	Dislike
50. Take a short course on administration or leadership	Like	Dislike
51. Serve as an officer of any group	Like	Dislike
52. Supervise the work of others	Like	Dislike
53. Meet important executives and leaders	Like	Dislike
54. Lead a group in accomplishing some goal	Like	Dislike
55. Act as an organizational or business consultant	Like	Dislike
56. Read business magazines or articles	Like	Dislike
57. Fill out income tax forms	Like	Dislike
58. Add, subtract, multiply, and divide numbers in business or bookkeeping	Like	Dislike
59. Operate office machines	Like	Dislike
60. Keep detailed records of expenses	Like	Dislike
61. Set up a record-keeping system	Like	Dislike
62. Take an Accounting course	Like	Dislike
63. Take a Commercial Math course	Like	Dislike
64. Take an inventory or supplies or products	Like	Dislike
65. Check paperwork or products for errors or flaws	Like	Dislike
66. Update records or files	Like	Dislike
67. Work in an office	Like	Dislike

**Directions:** For the following phrases circle "Yes" for those activities you can do well or competently. Circle "No" for those activities you have never performed or perform poorly.

68. I have used wood shop power tools such as a power saw, lathe, or sander	Yes	No
69. I can make a scale drawing	Yes	No
70. I can change a car's oil or tire	Yes	No
71. I have operated power tools such as a drill press, grinder, or sewing machine	Yes	No
72. I can refinish furniture or woodwork	Yes	No
73. I can make simple electrical repairs	Yes	No
74. I can repair furniture	Yes	No
75. I can use many carpentry tools	Yes	No
76. I can make simple plumbing repairs	Yes	No
77. I can build simple articles of wood	Yes	No
78. I can paint rooms of a house or an apartment	Yes	No
79. I can use algebra to solve mathematical problems	Yes	No
80. I can perform a scientific experiment or survey	Yes	No
81. I understand the "half-life" of a radioactive element	Yes	No
82. I can use logarithmic tables	Yes	No
83. I can use a computer to study a scientific problem	Yes	No
84. I can describe the function of the white blood cells	Yes	No
85. I can interpret simple chemical formulae	Yes	No
86. I understand why man-made satellites do not fall to earth	Yes	No
87. I can write a scientific report	Yes	No
88. I understand the "Big Bang" theory of the universe	Yes	No
89. I understand the role of DNA in genetics	Yes	No
90. I can play a musical instrument	Yes	No
91. I can participate in two- or four-part choral singing	Yes	No
92. I can perform as a musical soloist	Yes	No
93. I can act in a play	Yes	No
94. I can do interpretive reading	Yes	No

95. I can do a painting, watercolor, or sculpture	Yes	No
96. I can arrange or compose music	Yes	No
97. I can design clothing, posters, or furniture	Yes	No
98. I write stories or poetry well	Yes	No
99. I can write a speech	Yes	No
100. I can take attractive photographs	Yes	No
101. I find it easy to talk with all kinds of people	Yes	No
102. I am good at explaining things to others	Yes	No
103. I could work as a neighborhood organizer	Yes	No
104. People seek me out to tell me their troubles	Yes	No
105. I can teach children easily	Yes	No
106. I can teach adults easily	Yes	No
107. I am good at helping people who are upset or troubled	Yes	No
108. I have a good understanding of social relationships	Yes	No
109. I am good at teaching others	Yes	No
110. I am good at making people feel at ease	Yes	No
111. I am much better at working with people than with things or ideas	Yes	No
112. I know how to be a successful leader	Yes	No
113. I am a good public speaker	Yes	No
114. I can manage a sales campaign	Yes	No
115. I can organize the work of others	Yes	No
116. I am an ambitious and assertive person	Yes	No
117. I am good at getting people to do things my way	Yes	No
118. I am a good salesperson	Yes	No
119. I am a good debater	Yes	No
120. I can be very persuasive	Yes	No
121. I have good planning skills	Yes	No
122. I have some leadership skills	Yes	No
123. I can file correspondence and other papers	Yes	No
124. I have held an office job	Yes	No
125. I can use an automated posting machine	Yes	No
126. I can do a lot of paperwork in a short time	Yes	No
127. I can use simple data processing equipment	Yes	No
128. I can post credits and debits	Yes	No
129. I can keep accurate records of payment or sales	Yes	No
130. I can enter information at a computer terminal	Yes	No
140. I can write business letters	Yes	No
141. I can perform some routine office activities	Yes	No
142. I am a careful and orderly person	Yes	No

**Directions:** Show the occupations that interest or appeal to you by circling “Yes.” Show the occupations that you dislike or find uninteresting by circling “No.”

143. Airplane Mechanic	Yes	No	184. Career Counselor	Yes	No
144. Auto Mechanic	Yes	No	185. Sociologist	Yes	No
145. Carpenter	Yes	No	186. High School Teacher	Yes	No
146. Truck Driver	Yes	No	187. Substance Abuse	Yes	No
			188. Counselor		
147. Surveyor	Yes	No	189. Juvenile Delinquency	Yes	No
			Expert		
148. Construction Inspector	Yes	No	190. Speech Therapist	Yes	No
149. Radio Mechanic	Yes	No	191. Marriage Counselor	Yes	No

150. Locomotive Engineer	Yes	No	192. Clinical Psychologist	Yes	No
151. Machinist	Yes	No	193. Social Science Teacher	Yes	No
152. Electrician	Yes	No	194. Personal Counselor	Yes	No
153. Farmer	Yes	No	195. Youth Camp Director	Yes	No
154. Helicopter Pilot	Yes	No	196. Social Worker	Yes	No
155. Electronic Technician	Yes	No	197. Rehabilitation Counselor	Yes	No
156. Welder	Yes	No	198. Playground Director	Yes	No
157. Meteorologist	Yes	No	199. Buyer	Yes	No
158. Biologist	Yes	No	200. Advertising Executive	Yes	No
159. Astronomer	Yes	No	201. Manufacturer's Representative	Yes	No
160. Medical Laboratory Technician	Yes	No	202. Business Executive	Yes	No
161. Anthropologist	Yes	No	203. Master of Ceremonies	Yes	No
162. Chemist	Yes	No	204. Salesperson	Yes	No
163. Independent Research Scientist	Yes	No	205. Real Estate Salesperson	Yes	No
164. Writer of Scientific Articles	Yes	No	206. Department Store Manager	Yes	No
165. Geologist	Yes	No	207. Sales Manager	Yes	No
166. Botanist	Yes	No	208. Public Relations Executive	Yes	No
167. Scientific Research Worker	Yes	No	209. TV Station Manager	Yes	No
168. Physicist	Yes	No	210. Small Business Owner	Yes	No
169. Social Science Researcher	Yes	No	211. Legislator	Yes	No
170. Environmental Analyst	Yes	No	212. Airport Manager	Yes	No
171. Poet	Yes	No	213. Bookkeeper	Yes	No
172. Musician	Yes	No	214. Budget Reviewer	Yes	No
173. Novelist	Yes	No	215. Certified Public Accountant	Yes	No
174. Actor/Actress	Yes	No	216. Credit Investigator	Yes	No
175. Free-Lance Writer	Yes	No	217. Bank Teller	Yes	No
176. Musical Arranger	Yes	No	218. Tax Expert	Yes	No
177. Journalist	Yes	No	219. Inventory Controller	Yes	No
178. Artist	Yes	No	220. Computer Operator	Yes	No
179. Singer	Yes	No	221. Financial Analyst	Yes	No
180. Composer	Yes	No	222. Cost Estimator	Yes	No
181. Sculptor/Sculptress	Yes	No	223. Payroll Clerk	Yes	No
182. Playwright	Yes	No	224. Bank Examiner	Yes	No
183. Cartoonist	Yes	No	225. Accounting Clerk	Yes	No
Entertainer	Yes	No	226. Audit Clerk	Yes	No

**Directions:** Rate yourself on each of the following traits as you really think you are when compared with other persons your own age. Give the most accurate estimate of how you see yourself. Circle the appropriate number and avoid rating yourself the same in each ability (227 and 228).

	Mechanical Ability	Scientific Ability	Artistic Ability	Teaching Ability	Sales Ability	Clerical Ability
High	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
Average	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
Low	1	1	1	1	1	1

	Manual Skills	Math Ability	Musical Ability	Understanding of Others	Managerial Skills	Office Skills
High	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
Average	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
Low	1	1	1	1	1	1

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