Big Five Aspect Personality Scales and Social Anxiety Severity in a Nonpsychiatric Sample

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BIG FIVE ASPECT PERSONALITY SCALES AND SOCIAL ANXIETY SEVERITY IN A NONPSYCHIATRIC SAMPLE

by

SAMANTHA D. SIMPSON
B.S. Clemson University, 2017

A thesis submitted in partial fulfillment of requirements
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Major Professor: Jeffrey Bedwell
ABSTRACT

Personality can be explored hierarchically with higher- and lower-order factors. Recent research suggests the personality hierarchy is comprised of higher-order Big Five traits with two lower-order factors per Big Five trait, termed aspects. There is a lack of research examining the relationship between these lower-order aspects and social anxiety (SA) severity. To better understand these relationships, 443 university undergraduate students (72.2% female; mean age = 20.48, SD = 4.64) completed the Big Five Aspects Scale (BFAS) and the Social Phobia and Anxiety Inventory- 23 (SPAI-23), and were retained following exclusionary criteria. Path analysis, covarying for sex, age, and general anxiety severity, was used to examine the relationship between social anxiety severity and the 10 aspect scores from the BFAS (i.e., volatility, withdrawal, compassion, politeness, industriousness, orderliness, enthusiasm, assertiveness, intelligence, openness). Significant relationships with SA severity were found for withdrawal (positive), orderliness (positive), enthusiasm (negative), and assertiveness (negative). Findings suggest that a unique pattern of lower-order personality is associated with SA severity. Further research is needed to clarify whether personality profiles differ according to diagnostic versus dimensional social anxiety.
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CHAPTER 1: INTRODUCTION

Social anxiety disorder (SAD) is characterized by heightened fear or anxiety surrounding social situations (i.e., engaging in conversation, being observed, or performing) in which an individual may be criticized or negatively evaluated by others (American Psychiatric Association [APA], 2013). Researchers have found a lifetime prevalence of 5-7% for SAD with an average age of onset between 8 and 15 years (Grant et al., 2005; APA, 2013). Grant and colleagues (2005) found several psychiatric disorders to be comorbid with SAD including mood disorders (56.3%), personality disorders (55.4%), other anxiety disorders (54.1%), alcohol use disorders (48.2%), and drug use disorders (22.3%). Further, social anxiety can be conceptualized both categorically and dimensionally. Categorical social anxiety (e.g., SAD) describes diagnostic social anxiety, in which an individual meets diagnostic criteria for SAD based on experienced symptoms and impairment in their life. Dimensional social anxiety (e.g., SA severity) reflects the range of social anxiety an individual may experience. SA severity accounts for presentations of social anxiety ranging from mild to severe. Additionally, using SA severity, we can account for an increased range of individuals experiencing symptoms, not just the individuals who meet diagnostic criteria at a given timepoint.

The Five Factor Model (FFM) describes personality traits according to five higher-order dimensions: Neuroticism, Extraversion, Agreeableness, Conscientiousness and Openness (McCrae & Costa, 1999) with lower-order facets for each of the big five factors. Both higher-order and lower-order personality factors are important to consider when studying SAD. Higher-order personality factors, specifically relationships between the Big Five and personality factors, have been identified as risk and protective factors for developing SAD (Lakuta et al., 2019).
Lower-order personality factors, specifically personality facets, have been shown to improve and contribute to remission of SAD in longitudinal studies when targeted in treatment (Bienvenu et al., 2004).

This study examined relationships between anxiety symptoms, specifically, social anxiety, and lower-order FFM personality traits. The majority of research on social anxiety and personality has focused on relationships with higher-order FFM factor scores and categorically-defined SAD. Individuals with SAD have higher levels of Neuroticism and lower levels of Extraversion compared to healthy controls (Costache et al., 2020; Rosellini & Brown, 2011). Despite ample research on the relationships between higher-order FFM personality factors and SAD, there is less existing research on lower-order personality traits in relation to SAD. A majority of research on the personality facets in relation to SAD is based on two studies examining relationships between scores on the NEO Personality Inventory-Revised (NEO-PI-R; Costa & McCrae, 1992) and lifetime diagnosis of anxiety and depressive disorders in an adult population ($M_{age}=44$, $SD=11$; Bienvenu et al, 2001). Within this study, authors exploratorily examined lower-order personality facet scores from the NEO-PI-R in relation to SAD. Authors found facets of Neuroticism (e.g., anxiety, angry hostility, depression, self-consciousness, impulsiveness, vulnerability) were significantly higher in participants with SAD compared to healthy controls. Additionally, authors found five of six facets of Extraversion (e.g., warmth, gregariousness, assertiveness, excitement-seeking, positive emotions), one facet of Agreeableness (e.g., trust), and four facets of Conscientiousness (e.g., competence, achievement striving, self-discipline, deliberation) were lower in individuals with SAD compared to healthy controls. No relationships were found between the facets of Openness and SAD. However, one
limitation of this study was a small sample size of individuals with either lifetime or current SAD ($n = 42$).

Findings from the original study were replicated in a follow-up study with an increased sample size of individuals with SAD ($n = 81$) across lower-order Neuroticism, Extraversion, Openness, and Agreeableness facets (Bienvenu et al., 2004). However, in the follow-up study, authors found the deliberation facet of Conscientiousness to no longer be significantly related to SAD. Additionally, authors found that scores of warmth (a facet of Extraversion) and trust (a facet of Agreeableness) were significantly higher in participants with fully remitted SAD compared to individuals with currently symptomatic SAD. However, a significant limitation within both of these studies is increased chance of type I error due to the large number of facet level comparisons made. This study addressed this limitation by using path analysis to examine relationships between personality facets and dimensional SA severity. Additionally, path analysis served to minimize suppression effects between predictors.

There is little existing research on relationships between dimensional SA severity and higher- or lower-order personality traits. Dimensional assessment of social anxiety allows researchers to examine relationships between SA severity (e.g., mild versus severe SA) and personality factors. Dimensional assessment allows researchers to capture a more diverse sample in which participants who do not meet full criteria for SAD, yet experience symptoms of social anxiety, are still included. Prior studies on SA severity and higher-order personality traits support a significant negative relationship between Openness to New Experiences and SA severity (Costache et al., 2020; Kaplan et al., 2015). Findings related to Agreeableness and SA severity are mixed with some researchers demonstrating significant positive relationships (Kaplan et al.,
2015), and others finding no relationship (Costache et al., 2020). Research on Conscientiousness supports a significant positive relationship with SA severity (Costache et al., 2020).

There is limited existing research on relationships between SA severity and lower-order personality traits. A study by Kaplan and colleagues (2015) examined lower-order personality facets of trust and self-efficacy using the International Personality Item Pool-NEO (IPIP-NEO-120) in relation to SA severity in a nonpsychiatric sample. Authors found individuals scoring low in trust and self-efficacy had increased SA severity scores. Further, researchers found that high Openness to New Experiences moderated the negative relationship between trust and SA severity. Specifically, researchers found high Openness to New Experiences served as a protective factor against high SA severity for individuals low in trust. However, this study only examined two lower-order facets of personality.

The majority of past personality research in relation to social anxiety has used the NEO-PI-R. The NEO-PI-R is designed to study personality within a two-level hierarchy. Specifically, a hierarchy with the Big Five domains and a variable number of lower-order personality “facets” below the five. However, research suggests a three-level hierarchy not accounted for with the NEO-PI-R. This hierarchy includes “meta-traits” above the Big Five (e.g., alpha/stability and beta/plasticity; DeYoung et al., 2007; Digman, 1997). According to DeYoung (2006), the meta-trait of stability includes Neuroticism, Agreeableness, and Conscientiousness subfactors and represents the ability to maintain stability in emotional, social, and motivational domains. Plasticity includes Extraversion and Openness/Intellect subfactors and represents the tendency to behavioral and cognitively explore and be flexible. Additionally, results from behavior-genetic and factor-analytic studies suggest that each Big Five domain is comprised of two distinct subfactors termed “aspects,” rather than a variable number of facets (DeYoung et al., 2007). The
NEO-PI-R fails to capture the full hierarchy of personality including the meta-trait and aspect level variations. To account for this gap in measurement, researchers DeYoung and colleagues (2007) designed the Big Five Aspect Scales (BFAS) to capture these aspect level variations within the personality hierarchy. Further, both factor-analytic and behavior-genetic studies support the utility of the BFAS in assessing personality (DeYoung et al., 2007; Jang et al., 2002). Research using the BFAS supports its utility in assessing personality traits in order to predict psychopathology, specifically in depression (Allen et al., 2017). However, there is a lack of research on relationships between the Big Five aspects and other mental disorders. This study addressed that gap by using the BFAS to examine relationships between aspect level personality traits and SA severity.

Additional research on relationships between lower-order personality factors examined facets using the NEO-PI-R in relation to mood and anxiety disorders (Rector et al., 2012). Authors found 50% of the variance in differences between disorders to be accounted for by lower-order personality traits. Additionally, authors were able to identify unique personality profiles for various mental disorders (e.g., major depressive disorder, SAD, posttraumatic stress disorder, obsessive-compulsive disorder). The unique personality profile for SAD consisted of high self-consciousness and low assertiveness. Additionally, prior studies have examined relationships between SAD, generalized anxiety disorder (GAD), and personality traits. Rosellini and Brown (2011) observed differing relationships between higher-order personality traits dependent upon presenting disorder using a structural model. Results revealed high Neuroticism and low Extraversion uniquely predicted SAD. However, high Neuroticism and high Conscientiousness uniquely predicted GAD. Bienvenu et al. (2004) found differing significant relationships between personality traits in individuals meeting criteria for any disorder (i.e.,
simple phobia, SAD, panic disorder, obsessive compulsive disorder, GAD, major depressive disorder, and dysthymia) compared to individuals that do not meet diagnostic criteria for any disorder after examining both higher-and lower-order traits. Findings suggest unique higher- and lower-order personality trait relationships dependent upon the presenting disorder. Specifically, results revealed SAD as characterized by significantly lower warmth (facet of Extraversion) and trust (facet of Agreeableness). However, GAD was characterized by significantly higher depression (facet of Neuroticism). Given these findings, the current study assessed General Anxiety (GA) severity and included it within the larger SEM model that focused on SA severity. Controlling for GA severity increased specificity as relationships with personality were relatively specific to social, rather than general anxiety.

The most widely used psychosocial treatment for SAD is Cognitive Behavioral Therapy (CBT). CBT for SAD uses cognitive restructuring, emotional awareness, and exposure to social situations to promote treatment change (Barlow, 2014, Chapter 3). A meta-analytic study comparing treatment effects of CBT compared to placebo controls found small to medium effects (Hedges g = 0.48) of CBT for SAD at treatment completion (Carpenter et al., 2018). A recent review of CBT for anxiety related disorders found similar a similar effect size (Hedges g = 0.38) for SAD at time of treatment completion. Additionally, authors found small to medium treatment effects (Hedges g = 0.42) after long-term follow-up (≥ 12 months; Van Dis et al., 2020). These findings suggest room for improvement in cognitive-behavioral treatment of SAD. Results of the current study can inform clinicians to assess for particular personality traits that commonly relate to SA severity and potentially incorporate that information in treatment.

This study examined relationships between dimensional SA severity and lower-order personality traits, specifically the ten aspect scores from the BFAS. Due to sample size and
statistical limitations of prior studies examining lower-order personality traits in relation to SA severity, hypotheses for the current study were exploratory. However, based on the preliminary research suggesting increased Neuroticism is related to SAD (Costache et al., 2020; Rosellini & Brown, 2011), it was expected that both aspects of Neuroticism (i.e., Volatility and Withdrawal; positive direction) would be related to increased SA severity. Previous findings demonstrating decreased higher-order extraversion and decreased lower-order warmth relating to SAD (Bienvenu et al., 2001; Bienvenu et al., 2004) guided the hypothesis that both aspects of Extraversion (i.e., Enthusiasm and Assertiveness; negative direction) would be related to increased SA severity. Additionally, previous findings on lower-order facets of Conscientiousness and their relationship to SAD (Bienvenu et al., 2001; Bienvenu et al., 2004) led us to hypothesize one aspect of Conscientiousness (i.e., Industriousness, negative direction) would be related to increased SA severity. Given the mixed findings related to Agreeableness and relationships with SA severity (Costache et al., 2020; Kaplan et al., 2015), it was exploratorily hypothesized that one aspect of Agreeableness (i.e., Politeness; negative direction) would be related to increased SA severity. Lastly, based on previous findings suggesting no relationship between lower-order facets of Openness to New Experiences and SAD (Bienvenu et al., 2001), it was hypothesized that no aspects of Openness/Intellect (e.g., Intellect and Openness) would be related to SA severity.
CHAPTER 2: METHODS

Participants

Participants were undergraduate students recruited online from the University of Central Florida Psychology Department’s online research participation system \(N = 563\). Participants received academic credit toward a participating UCF psychology course they were enrolled in at the time of participation in the study. Ethical approval was obtained from the UCF Institutional Review Board prior to participant recruitment. Participants were excluded from analyses for failing to pass at least one of the three validity measures described in the “Measures” below \(N_{excluded} = 44\), completing the online battery faster than the 10\(^{th}\) percentile (Meade & Craig, 2012; \(N_{excluded} = 50\)), having more than 10\% missing data \(N_{excluded} = 19\), or missing data for any of the items on the social anxiety measure, personality measure, and trait anxiety measure \(N_{excluded} = 7\). The final sample included 443 participants (72.2\% female; \(M_{age} = 20.48, SD = 4.64\)). A majority of the participants identified as Caucasian/White (66.1\%, \(n = 293\)), followed by African American/Black (12.6\%, \(n = 56\)), then Asian (8.4\%, \(n = 37\)), then Other (6.8\%, \(n = 30\)), then Mixed (4.5\%, \(n = 20\)) with 6 participants preferring not to answer. With regard to ethnicity, 29.1\% \((n = 129)\) of participants identified their ethnicity as Hispanic/LatinX ethnicity.

Standard power analysis cannot be used for structural equation modeling (SEM), which was used in this study (see Statistical Analyses section below). Kline (2015) addressed power in SEM by examining sample size, number of observations and parameters. Kline recommends a ratio of 20 observations to every 1 parameter. Schreiber (2006) and Bentler and Chou (1987) suggest the same method but suggest smaller ratios for determining sample size of 10:1 and 5:1, subsequently. This study used the recommended ratio of 20:1; given there were 10 parameters in
the proposed model, a total sample size of 200 participants was needed for this study. Our final sample, following exclusions, of 443 participants provided adequate statistical power for the path analysis model.

**Measures**

**Demographic Questionnaire.** Questions included age, biological sex, gender identity, race, and Hispanic/Latinx ethnicity.

**State Trait Anxiety Inventory – Trait Subscale (STAI-T).** The STAI (Form Y) is a 40-item self-report measure that assesses for both state and trait anxiety using a 4-point Likert scale (Spielberger et al., 1983). The STAI produces subscales for both state and trait anxiety. The scale produces subscale scores by totaling state and trait items individually. Higher scores on the STAI indicate more anxiety. The STAI has been found to have good reliability and validity (Spielberger et al., 1983). To estimate GA severity, only the Trait subscale (20 items; STAI-T) was administered. Research on the STAI supports test-retest reliability, internal consistency reliability, and construct validity of the measure (Spielberger, 1989; Spielberger et al., 1983).

**Social Phobia and Anxiety Inventory- 23 (SPAI-23).** The SPAI-23 is a brief version of the original Social Phobia and Anxiety Inventory (SPAI; Turner et al., 1989) and is used as a screening tool for social anxiety disorder in both clinical and nonclinical samples (Roberson-Nay et al., 2007). This measure was used to quantify severity of social anxiety in participants. The SPAI-23 is a 23-item self-report measure that assesses social anxiety on a 5-point Likert Scale (i.e., 1 = never, 5 = always). Factor analysis supports the SPAI-23 social anxiety scale (e.g., difference score) and agoraphobia scale. The difference score is created by subtracting the agoraphobia scale from the total score, resulting in a score specific to social anxiety. For the
purpose of this study, the difference score was calculated and used as an indicator of participants degree of SA severity. Both the difference score and agoraphobia scale of the SPAI-23 have been found to have strong convergent and discriminant validity and adequate test-retest reliability in college students (Schry et al., 2012).

The Big Five Aspect Scales (BFAS). The BFAS consists of 100 statements with a response key asking the participant to rate how accurately the statement reflects how they generally are - ranging from “1 - Very Inaccurate” to “5 - Very Accurate” (DeYoung et al., 2007). The BFAS results in the traditional big five factors along with two aspects for each factor: Neuroticism (Volutility, Withdrawal), Agreeableness (Compassion, Politeness), Conscientiousness (Industriousness, Orderliness), Extraversion (Enthusiasm, Assertiveness), and Openness/Intellect (Openness, Intellect). The validity of BFAS aspect scales have been supported with specific relationships to psychopathology (Allen et al., 2020; Quilty et al., 2014) and self-reported personality disorder symptoms (DeYoung et al., 2010). Further, the BFAS has been found to have excellent test-retest reliability and internal consistency reliability in both clinical and nonclinical populations (DeYoung et al., 2010, 2016; Quilty et al., 2012).

Validity Scale #1: Infrequency Scale. This scale includes 8 items that ask about highly improbable events (e.g., “I eat cement, occasionally.”; Huang et al., 2015). Participants who endorsed two or more items in the wrong direction were excluded from analyses ($n_{excluded} = 3$). Pairs of the items were placed in between scales of interest in the study. Authors of the scale reported support for its reliability and criterion validity (Huang et al., 2015). Three participants were excluded from the initial sample for this scale.

Validity Scale #2: Self-Report of Attention to Study Questions. At the end of the study, participants were provided a statement about how important attention is to the study and were
asked whether we should use their data in the study. We customized the wording used in Meade and Craig’s study (2012), based on their findings and recommendations to be: “Lastly, it is vital to our study that we only include responses from people that devoted their full attention to this study. Otherwise years of effort (the researchers and the time of other participants) could be wasted. Often there are several distractions present during online studies (e.g., other people, television, music). You will receive credit for this study no matter what. In your honest opinion, should we use your data in our analyses in this study? YES/NO. We appreciate your honesty!” We excluded participants who answered “No” \( (n_{\text{excluded}} = 31; \text{Meade} \& \text{Craig, 2012}). \) Authors of the scale reported that this single item had high sensitivity to poor attention based on its relationship with several more sophisticated indices including measures that capture inattention in responding through endorsement of bogus items. Thirty-one participants were excluded from the initial sample for this scale.

**Validity Scale #3: Abbreviated Marlow-Crowne Social Desirability Scale (MCSDS).** The abbreviated MCSDS was used to exclude participants who were unwilling to endorse common minor personal shortcomings (Reynolds, 1982). Participants who scored greater than two standard deviations above the mean from the sample were excluded from analyses to reduce the potential for underreporting psychopathology on our measures of interest \( (n_{\text{excluded}} = 9). \) Confirmatory factor analyses comparing the short forms versions to the full-length version support the factor structure and internal consistency reliability of the short forms of the MCSDS (Loo & Loewen, 2004; Loo & Thorpe, 2000). Nine participants were excluded from the initial sample for this scale.
**Procedure**

The entire study was completed online. Participants began by completing informed consent, followed by the self-report questionnaires. The study ended with a statement that provided further educational material about the study. The online data files did not contain any personally-identifying information.

**Statistical analyses**

Prior to data analyses, statistical outliers were identified for each of the 10 BFAS aspect scales, the SPAI-23 score, and the STAI-T score, using the criterion of \( z \) exceeding +/- 3.0. Any outliers were then removed from the remaining analysis. To address the hypotheses, structured equation modeling in *Mplus* 8.2 (Muthen & Muthen, 2017) was used to examine relationships between the observed personality aspects and SA severity. The 10 aspect scores from the BFAS, connected to their 5 higher-order latent variables, were entered as predictor variables. Social anxiety severity (SPAI-23 scores) was entered as the outcome variable of interest. To partially control for the influence of generalized anxiety, the covariance between trait anxiety and SA severity was accounted for through a latent anxiety variable that included the indicators of SPAI-23 scores and STAI-T scores. Sex and age were entered into the model as covariates. Coefficients between the 10 BFAS aspect scores and SA severity were examined for statistical significance. Standard indices were used to assess model fit including \( X^2 \), Root Mean Square Error of Approximation (RMSEA; <.06), Comparative Fit Index (CFI; >.95), Tucker-Lewis Index (TLI; >.95), and Square Root Mean Residual (SRMR; <.08). Model modifications were added to free paths with poor fit. Appendix A for proposed statistical model.
CHAPTER 3: RESULTS

Descriptive Statistics

A total of 553 participants completed the study. After exclusions, including failing to pass at least one of the three validity measures described in the “Measures” below ($N_{excluded} = 44$), completing the online battery faster than the 10th percentile ($N_{excluded} = 50$), having more than 10% missing data ($N_{excluded} = 19$), or missing data for any of the items on the social anxiety measure, personality measure, and trait anxiety measure ($N_{excluded} = 7$), the final sample consisted of 443 participants. The majority of participants were female (72.2% female). The average age of participants was 20.48 years old ($SD = 4.64$). Descriptive statistics are depicted in Table 1. Bivariate statistics are depicted in Table 2.
Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sex</th>
<th>Age</th>
<th>BFAS-Volatility</th>
<th>BFAS-Withdrawal</th>
<th>BFAS-Compassion</th>
<th>BFAS-Politeness</th>
<th>BFAS-Industriousness</th>
<th>BFAS-Orderliness</th>
<th>BFAS-Enthusiasm</th>
<th>BFAS-Assertiveness</th>
<th>BFAS-Intelligence</th>
<th>BFAS-Openness</th>
<th>Social Anxiety Severity</th>
<th>General Anxiety Severity</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>SD</td>
<td>Lower Range</td>
<td>Upper Range</td>
<td>Skew</td>
<td>Cronbach’s α</td>
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<td></td>
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Note. BFAS = Big Five Aspect Scales. All BFAS aspect scores are average of each 10-item scale. Social Anxiety Severity = Social Anxiety and Phobia Scale - Social Anxiety Severity Score. The social Anxiety Severity score is scale total with agoraphobia scale subtracted out. General Anxiety Severity= State Trait and Anxiety Inventory - Trait Subscale. The General Anxiety Severity score is a scale total. Women (0= male; 1= female) were 72.2% of sample.
Table 2: Bivariate Statistics

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<td>.11*</td>
<td>.15**</td>
<td>.02</td>
<td>.08</td>
<td>.11*</td>
<td>.18**</td>
<td>.14**</td>
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<td>2. Age</td>
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<td>.31**</td>
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<td>.17**</td>
<td>.03</td>
<td>-.03</td>
<td>.02</td>
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<td>.23**</td>
<td>.21**</td>
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<td>.16**</td>
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<td>11. BFAS- Intelligence</td>
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<td>.33**</td>
<td>-.29**</td>
<td>-.31**</td>
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<td>13. Social Anxiety Severity</td>
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Note. BFAS = Big Five Aspect Scales. All BFAS aspect scores are average of each 10-item scale. Social Anxiety Severity = Social Anxiety and Phobia Scale- Social Anxiety Severity Score. The social Anxiety Severity score is scale total with agoraphobia scale subtracted out. General Anxiety Severity= State Trait and Anxiety Inventory- Trait Subscale. The General Anxiety Severity score is a scale total. *p < .05, **p < .01, ***p < .001.
Structural Equation Modeling Fit Indices

First, a measurement model was formed with the 10 aspect scores from the BFAS connected to their 5-higher-order latent variables (Appendix A). Structural equation modeling revealed poor model fit indicated by $X^2 = 11,064.89 \ (p < .001)$, $RMSEA = .05$, $CFI = .49$, $TLI = .47$, $SRMR = .07$. After iterative adding of model modifications, freeing paths with modification indices greater than 25, the analyses for the measurement model remained poor ($X^2 = 6,940.41, \ p < .001$; $RMSEA = .03$; $CFI = .82$; $TLI = .82$, $SRMR = .06$). Due to poor model fit, relationships between the 10 aspect scores and SA severity were examined without the 5-higher-order latent variables using path analysis.

Linear Regression of Social Anxiety Severity and BFAS Aspects

In this model, SA severity was regressed onto the 10 aspect scores from the BFAS (i.e., Volatility, Withdrawal, Compassion, Politeness, Industriousness, Orderliness, Enthusiasm, Assertiveness, Intelligence, Openness) using path analysis. Sex, age, and GA severity were entered into the model as covariates. The final model accounted for 57% of the variance in the relationship between the combination of the 10 lower-order BFAS personality traits and SA severity. Significant relationships with SA severity were found for Withdrawal, $\beta = .32, \ p < .001$, Orderliness, $\beta = .15, \ p = .04$ (see Figure 2), Enthusiasm, $\beta = -.14, \ p = .003$, and Assertiveness, $\beta = -.18, \ p < .001$. Results are depicted in Figure 1. The relationships between SA severity and Volatility, Compassion, Politeness, Industriousness, Intelligence, and Openness were found to be nonsignificant (all $ps > .05$). These results are depicted in Table 2.
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<th>95% CI</th>
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<td>0.06</td>
<td>-0.08</td>
<td>0.19</td>
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Note. All estimates represent standardized beta values. BFAS = Big Five Aspect Scales. All BFAS aspect scores are average of each 10-item scale. General Anxiety Severity = State Trait and Anxiety Inventory- Trait Subscale. General Anxiety Severity score is a scale total. Women (1 = male; 2 = female) were 72.2% of sample.
Figure 1: Social Anxiety Severity in relation to BFAS Aspects

Note. All estimates represent standardized beta values. Model included sex, age, and general anxiety severity as covariates.
*p < .05, **p < .01, ***p < .001.
Figure 2: *Relationship between Social Anxiety Severity and Orderliness*

*Note.* Orderliness = unstandardized residual values from the path analysis of remaining 9 BFAS aspects. Sex, age, and general anxiety severity entered as covariates.
Findings related to aspects of Neuroticism partially supported the hypothesis that both aspects would be positively associated with increased SA severity. As there is a lack of previous research on BFAS aspects and SA severity, exploratorily, it was predicted that both aspects of neuroticism would be related to SA severity. However, only a significant positive relationship was found between Withdrawal and SA severity with no relationship found between Volatility and SA severity. Findings related to the Withdrawal aspect of Neuroticism support the idea that socially anxious individuals engage in increased withdrawal behaviors as a form of emotion regulation in social situations because of perceived failures or fear of social rejection (Kashdan et al., 2011; Kashdan et al., 2013). This explanation suggests social anxiety influences an individual’s expression of personality (e.g., increased withdrawal behavior). However, this is counterintuitive to how personality is typically understood. Generally, personality is thought to appear before an individual experience’s symptoms related to mental health. For example, an individual would receive high scores of Withdrawal before experiencing symptoms of social anxiety. However, it’s possible the relationship between personality and social anxiety is bidirectional, with personality predicting severity of symptoms in some cases while in other cases severity of symptoms predicting personality. Additionally, previous research using the NEO-PI-R to assess relationships between lower-order personality facets and SAD can help potentially explain these findings (Bienvenu, 2001). Researchers found positive relationships between facets of Neuroticism, specifically anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability with SAD. Items from the BFAS Withdrawal scale reflect themes from three of the facets found to be significantly related to SAD (i.e.,...
depression, self-consciousness, and anxiety). However, only one facet from previous findings reflects items from the BFAS Volatility scale (i.e., angry hostility). Further, the BFAS Volatility scale includes themes not reflected in previous research of lower-order personality traits (i.e., emotional control, high and low mood). Therefore, the current finding on the Withdrawal aspect of Neuroticism are consistent with previous research on higher-order relationships between increased Neuroticism and SAD (Costache et al., 2020; Rosellini & Brown, 2011).

Findings related to aspects of Extraversion, supported the hypothesis that both aspects of Extraversion (i.e., Enthusiasm and Assertiveness) would be negatively related to increased SA severity. These hypotheses were exploratory given the lack of research on the BFAS and SA severity. However, these findings are consistent with previous research on lower-order personality traits finding significant relationships between facets of Extraversion using the NEO-PI-R in individuals with SAD (i.e., warmth, gregariousness, assertiveness, excitement-seeking, and positive emotion; Bienvenu et al., 2001). However, this previous research on relationships between lower-order personality traits of Extraversion and SA was specific to diagnostic SAD. Findings from this study suggest that lower-order personality traits are influential in both diagnostic and dimensional SA. Interestingly, warmth (facet of Extraversion), has been found to be significantly lower in individuals with current SAD compared to individuals with remitted SAD (Bienvenu et al, 2001; Bienvenu et al., 2004). Unfortunately, warmth is not a unique scale produced by the BFAS, however, the Enthusiasm scale includes items that reflect an individual’s warmth (e.g., Warm up quickly to others). Given that lower Enthusiasm was associated with greater SA severity, and warmth is reflected in the Enthusiasm aspect, future studies on lower-order personality traits should examine whether the pattern of improvement in warmth following remission of SAD has a similar pattern. Specifically, it would be helpful to know whether
warmth is lower at high levels of dimensional SA severity and higher at low levels of dimensional SA severity. This research could be expanded to include other aspects that are significantly related to SA severity.

Analyses revealed surprising findings for the aspects of Conscientiousness (i.e., Industriousness and Orderliness). It was hypothesized, exploratorily given the lack of research on BFAS aspects and Conscientiousness, that Industriousness would be negatively related to increased SA severity. No relationship between Orderliness and SA severity was expected. However, no relationship was found with Industriousness and a significant positive relationship was found between Orderliness and increased SA severity (see Figure 2). Interestingly, previous research found lower-order personality facets of Conscientiousness (e.g., competence, achievement striving, and self-discipline) to be lower in individuals with SAD compared to healthy controls (Bienvenu et al., 2001; Bienvenu et al., 2004). Achievement striving, competence, and self-discipline facets are reflected in items from the BFAS Industriousness scale of Conscientiousness. As a result, findings from our study contradict previous research related to lower-order personality traits with the findings that Orderliness, not Industriousness, was associated with SA severity. Given previous research examined diagnostic SAD, rather than dimensional SA severity, it’s possible that lower-order personality traits differentially relate to SA depending on whether diagnostic criterion on met. However, future research would be needed to examine these relationships. Another explanation is the Orderliness scale reflects the organization dimension of perfectionism (Frost et al., 1990). A cognitive behavioral model proposed by Clark and Wells (1995) suggests that high standards and rigid rules held by individuals with SAD related to social performance and behavior reflects social perfectionism. Further, authors suggest this perfectionism extends beyond SA into nonsocial situations.
Researchers theorize this is due to the individual holding themselves to high standards out of a fear of not meeting societal standards and negative evaluation. Research has found SAD to be positively related to social perfectionism (Anthony et al., 1998). However, there is a lack of research on nonsocial perfectionism and SAD. Future studies should explore relationships between Orderliness, nonsocial perfectionism, and SA severity.

Findings related to aspects of Agreeableness (i.e., Compassion and Politeness) were contrary to the original exploratory hypothesis that Politeness would be negatively related to increased SA severity. Instead, results revealed no aspects of Agreeableness were found to be significantly related to SA severity. These results add to recent research suggesting higher-order personality trait of Agreeableness does not uniquely relate to SA severity (Costache et al., 2020). However, the findings contradict prior work demonstrating a significant relationship between decreased Agreeableness and increased SA severity (Kaplan et al., 2015). One potential explanation for this lies in the items that comprise the Compassion and Politeness scales. Only one lower-order personality trait of Agreeableness, trust (lower), was found to be significantly related to SA severity in previous research (Bienvenu et al, 2001; Bienvenu et al., 2004; Kaplan et al., 2015).

Further inspection into the items of the Politeness and Compassion scales of the BFAS reveal that trust is not captured within the aspects of Agreeableness. The Politeness scale contains items related to avoiding conflict, respecting others, and acting in an egalitarian manner. The compassion scale contains items related to empathy, sympathy, making time for others, and being interested in others. Neither scale contains items related to trust. This discrepancy suggests that the NEO-PI-R and the BFAS are capturing different lower-order personality factors in their assessment of Agreeableness.
Lastly, no significant relationships were found between the Openness and Intellect aspects (i.e., Openness and Intellect) and SA severity. Previous research on higher-order relationships and Openness to New Experiences and SA severity suggested a significant negative relationship between the two (Costache et al., 2020; Kaplan et al., 2015). However, previous research on lower-order personality facets of Openness to New Experiences and SAD did not find a significant relationship between the two (Bienvenu et al., 2001). Results from this study are consistent with this finding with no significant relationships found between lower-order personality traits of Openness and Intellect and SA severity. One potential explanation for this discrepancy between higher-order and lower-order related findings use of dimensional SA severity in two studies (Costache et al., 2020; Kaplan et al., 2015) and diagnostic SAD (Bienvenu et al., 2001) in one study. Another potential explanation is that after accounting for lower-order personality facets of all Big Five domains in statistical models, higher-order relationships between Openness and SA become no longer significant. This would suggest that SA is more strongly associated with other personality traits.

Together, findings from this study in combination with existing research, suggest an aspect of Neuroticism (i.e., Withdrawal- higher), Conscientiousness (i.e., Orderliness- higher), and both aspects of Extraversion (i.e., Enthusiasm and Assertiveness- lower) are uniquely associated with increased SA severity. Since we covaried for GA severity in the model, this pattern may be relatively unique to social, rather than general, anxiety severity. Previous research on personality profiles that relate to diagnostic SAD have mixed findings. Using lower-order personality factors, Rector and colleagues (2012) found high self-consciousness (Neuroticism facet) and low assertiveness (Extraversion facet) as associated with SAD. Similarly, using higher-order personality factors, Rosellini & Brown (2011) found high Neuroticism and low Extraversion to
uniquely be associated with SAD. However, using both higher- and lower-order personality factors, Bienvenu (2004) found lower warmth (facet of Extraversion) and lower trust (facet of Agreeableness) to uniquely predict SAD. In a recent study by Allen and colleagues (2020) using the BFAS, researchers found similar findings as the present study, with increased Distress and decreased Enthusiasm related to diagnostic SAD. However, they did not find a significant relationship between Assertiveness and SAD. Further, they did not include Orderliness in their model. A small sample size of SAD (n = 32) and potential differences in personality profiles in relation to diagnostic SAD versus dimensional SAD could explain the differences in findings.

The current study is the first to use both higher- and lower-order personality factors in a structural model to examine relationships with dimensional SA severity. These findings are consistent with previous research suggesting increased Neuroticism and decreased Extraversion as being related to SA. The current results are unique in the finding that a lower-order personality factor of Conscientiousness (i.e., high Orderliness) as important in relation to increased SA severity. Additionally, our study did not replicate the finding that lower-order personality factors of Agreeableness would be related to increased SA severity. These findings yield several implications for practice and research. First, the results serve as a basis for assessing lower-order personality traits in relation to dimensional SA severity. Clinicians can use these findings in treatment through the incorporation of skills that target improvement within these aspects. For example, assertiveness training, an existing psychotherapy, could improve assertiveness in individuals presenting for treatment of SAD. Related to this general idea, Bienvenu et al. (2004) found higher lower-order personality level scores of warmth and trust to be lower in individuals with currently symptomatic SAD compared to a group with fully remitted SAD. This suggests change in lower-order personality factors can contribute to or reflect
symptom relief. With regards to research, this study creates a foundation for future research on relationships between lower-order personality factors and dimensional SA.

One avenue of future research with regard to lower-order personality traits and SA severity is on how sex differences may alter their relationships. There is limited research on sex differences in relation to lower-order personality traits and SA. However, research on Big Five, higher-order personality traits, demonstrates a trend towards larger sex differences in developed nations compared to less socially and economically developed nations (Schmitt et al., 2008). Specifically, results show females report higher scores on all Big Five dimensions (e.g., Neuroticism, Extraversion, Conscientiousness, Agreeableness) except Openness to New Experiences compared to males, with the largest sex differences present for Neuroticism. These findings support the theory that societal development (i.e., social, health, economic, education) allows for personalities of males and females to become less alike and diverge (Costa et al., 200; McCrea et al., 2005). Additionally, research demonstrates SAD differentially affects females compared to males. Specifically, females are at an increased likelihood to have SAD, experience SAD at a greater severity, and report increased distress related to symptoms of SAD compared to males (Asher & Aderka, 2018). Future studies should examine whether sex differenced related to lower-order personality traits follow a similar trend as higher-order traits. Additionally, future research could explore whether the trend towards larger sex differences in personality in developed nations replicates in individuals with individuals SAD or increased SA severity.

Weaknesses of this study include the inability to achieve appropriate statistical fit indices for the structural equation model and the lack of inclusion of a diagnostic SAD comparison group. Future studies should include both diagnostic SAD and SA severity to determine whether the higher- and lower- order personality profiles of each are unique. Another limitation is the lack of
inclusion of the NEO-PI-R. The NEO-PI-R was used in most previous studies examining personality factors and SA. Including the NEO-PI-R could serve to inform researchers about differences in the assessment of personality between the NEO-PI-R and BFAS and how these differences relate to relationships with SA. Finally, the reliance on undergraduate students limits the generalizability of the findings from this study. Future studies should seek to replicate findings in a community sample that includes both younger and older adults.

Several diversity issues are relevant to this study. Given the previously stated research on sex differences and SAD (Asher & Aderka, 2018), it was important that sex be considered in the study. This study addressed sex by including it as a covariate in the statistical models. The final sample of this study resulted in a majority female sample (72.2%). Although a more equal sex distribution may have been optimal in generalizing results across sexes, a female majority more accurately represents true prevalence of SAD given it more commonly affects females compared to males (Asher & Aderka, 2018). Additionally, the sample consisted of primarily undergraduate, young adult, students with an average age of 20.48. Further, undergraduate samples typically reflect higher education and higher than average socioeconomic status (SES) compared to non-college educated samples. Further, the undergraduate sample is a limitation given most research in psychology is on undergraduate samples. Research is needed to determine whether findings using undergraduate samples generalize to lower educated and lower SES populations. Additionally, this study was limited in the racial distribution of participants given the sample was largely Caucasian/White (66.1%). However, the sample did include smaller percentages of participants from other racial backgrounds including African American/Black (12.6%), Asian (8.4%), Other (6.8%), and Mixed (4.5%). Interestingly, independent of race, almost one-third of the sample identified as LatinX ethnicity (29.1%). A weakness of the study is
that other aspects of diversity such as religion, disability (e.g., acquired, congenital), national origin, and gender identity were not assessed for. Future studies should assess potential moderation of various types of diversity in the relationships between personality traits and SA.

A number of ethical issues are present in this study. The study underwent review by the UCF Institutional Review Board and was approved as posing minimal risk to participants. Prior to participating in the study, individuals were given the informed consent document to brief them on the nature of the study. Additionally, participants were informed that their participation was voluntary, and they could leave the survey at any point by closing their browser window. Confidentiality of participants was considered through the storage of deidentified data on a password protected computer in an encrypted folder with only the researcher having access to the information. However, participants completed the study in an uncontrolled setting, entirely online, using their personal devices. This poses the risk of other’s watching and viewing participant responses as they completed the study. Another risk lies within technology security, as we cannot ensure complete privacy given the use of the internet. Additionally, we cannot ensure the participant took the study themselves or had another individual complete the study for them. Lastly, a majority of participants were undergraduate general psychology students from UCF and were required to either participate in research or write a research paper for course credit. Although attempts are made to make the effort required to complete both the research paper and research study requirements equal, it cannot be guaranteed. This may result in students viewing research participation as easier or requiring less effort than writing a research paper.

However, despite the limitations, strengths of this study include that it appears to be the first to examine novel relationships between lower-order personality traits in relation to dimensional SA severity. For example, the positive relationship between Orderliness (an aspect of
Conscientiousness) and SA had not yet been documented in research. Further research will be needed to replicate this finding. Another strength is the use of path analysis in a large sample. Path analysis allowed for examination of relationships between the 10 lower-order personality factors of the BFAS and SA severity while controlling for GA severity and minimizing suppression effects between predictors. Additionally, previous studies on personality factors and SA were limited by small sample sizes (Bienvenu et al., 2001; Bienvenu et al., 2004). Another strength of this study is that it appears to be the first to use the BFAS to assess both higher- and lower-order personality factors in relation to SA. The BFAS has factor-analytic and behavior-genetic evidence to support the validity of the aspect scales (DeYoung et al., 2007; Digman 1997; Jang et al., 2002). Overall, findings from the current study suggest lower-order personality traits of withdrawal (higher), orderliness (higher), enthusiasm (lower), and assertiveness (lower) uniquely related to dimensional SA severity in an undergraduate sample. These findings serve as a basis for future research on lower-order personality traits and dimensional SA.
APPENDIX A
PROPOSED STATISTICAL MODEL
Figure 3: Proposed Statistical Model

Note. Sex, age, and general anxiety severity entered into model as covariates.
EXEMPTION DETERMINATION

May 29, 2020

Dear Samantha Simpson:

On 5/29/2020, the IRB determined the following submission to be human subjects research that is exempt from regulation:

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<tr>
<td>Investigator:</td>
<td>Samantha Simpson</td>
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<tr>
<td>IRB ID:</td>
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This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on submitting Modifications and Administrative Check-in are detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Due to current COVID-19 restrictions, in-person research is not permitted to begin until you receive further correspondence from the Office of Research stating that the restrictions have been lifted.

Sincerely,

Kamille Birkbeck
Designated Reviewer
REFERENCES


Kashdan, T. B., Farmer, A. S., Adams, L. M., Ferssizidis, P., McKnight, P. E., & Nezlek, J. B. (2013). Distinguishing Healthy Adults From People With Social Anxiety Disorder:

https://doi.org/10.1037/a0032733


https://doi.org/10.1001/jamapsychiatry.2019.3986