THE DEVELOPMENT OF AN IDEAL POINT MEASURE OF EXTRAVERSION TO BETTER UNCOVER CURVILINEARITY

by

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(Under the Direction of Nathan T. Carter)

ABSTRACT

Although extraversion is generally seen as a positive trait, recent research has suggested that seemingly positive traits may have an inflection point, at which they result in negative outcomes. To maximize accuracy when examining possible curvilinear relationships, research suggests the utilization of an ideal point approach should be used both in scale development and in scoring. This study describes the development of the first ideal point scale of extraversion, which is tested for curvilinear relationships with common correlates at the general factor level and the facet level. Notably, the ideal point approach and the traditional dominance point approach are compared in regards to their capabilities of identifying curvilinear relationships. Implications for facet level examination of curvilinear relationships are discussed.

INDEX WORDS: Extraversion, curvilinearity, ideal point process, facets, IRT, GGUM

DEVELOPMENT AND EVIDENCE OF VALIDITY OF AN EXTRAVERSION MEASURE FROM AN IDEAL POINT PROCESS PERSPECTIVE

by

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DEDICATION

To my parents, for your unwavering support. I love you both.

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CHAPTER 1

INTRODUCTION

The structure and function of personality has been studied scientifically for nearly a century and has been used in numerous studies to predict an array of psychological and behavioral outcomes. Historically, the personality literature has operated under the assumption that persons with the highest levels of positive or socially desirable personality traits (e.g., conscientiousness, extraversion) will have the most positive psychological and behavioral outcomes, such as subjective well-being (Weiss, Freund & Wiese, 2012), recovery from negative emotions (Javaras et al., 2012), and job performance in a variety of occupations (Bhatti, Battour, Ismali, & Sundram, 2014; Barrick & Mount, 1991; Judge, Rodell, Klinger, Simon, & Crawford, 2013; Barrick, Mount & Judge, 2001). However, researchers have begun to question this assumption, and recently strong theoretical (e.g., Pierce & Aguinis, 2013; Grant & Schwartz, 2011) and empirical (e.g., Carter et al., 2014; Grant, 2013) evidence suggests the most favorable outcomes are sometimes found in individuals with moderately high, rather than extremely high, standing on these personality traits.

One reason for the persistence of the assumption that persons with the highest levels of desirable personality traits will have more positive outcomes is rooted in the psychometric model typically used for personality assessment. Almost all of the personality assessments currently used in research and practice are based on the method of scaling proposed by Likert (1932), which implies the assumption of a *dominance* response process (Coombs, 1964). The dominance response process rests on the assumption that individuals higher on the trait continuum are likely

to “Strongly Agree” with any items that are positively worded, regardless of the item’s extremity level, and “Strongly Disagree” with any negatively-worded items (Drasgow et al., 2010a; Tay, Drasgow, Rounds, & Williams, 2009). However, a number of recent articles have been published advocating for the importance of a transition from a dominance process assumption to an assumption of an *ideal point* process for self-report personality assessment (Borman, 2010; Carter et al., 2014; Drasgow et al., 2010b; Weekers & Meijer, 2008). An ideal point process relies on the assumption that individuals only agree with items reflecting the “ideal point” of their own beliefs, behaviors, thoughts, or feelings (Drasgow et al., 2010a; Tay et al., 2009). Thus, they are the most likely to agree with items that reflect their own trait levels, and are less likely to agree with items as they increase in distance from their actual ideal point.

Switching from a dominance response process to an ideal point process has a number of benefits. A major benefit of using an ideal point process model is designing more accurate measures that are able to differentiate between various levels of a trait continuum (Drasgow et al., 2010a). Importantly, the use of an ideal point approach to scoring has been shown to produce better model-data fit (Stark, Chernyshenko, Drasgow, & Williams, 2006) and its use in scale development shows higher reliability across the trait continuum (Chernyshenko et al., 2007). Despite of these benefits, researchers lamented that ideal point scoring did not appear to increase criterion-related validity (e.g., Stark et al., 2006; Chernyshenko et al., 2007). More recently, Carter et al. (2014) showed that scoring traditional personality tests using an ideal-point-based item response theory (IRT) model (i.e., the generalized graded unfolding model; GGUM) produced personality test scores with higher criterion-related validity through a curvilinear predictive model, resulting in more consistent predictions about job performance compared to dominance-based scoring approaches (i.e., classical sum-scores, factor analysis, and traditional

IRT). Further, recent simulations have shown that the use of GGUM scoring along with the use of ideal point measures (i.e., measures designed to have positively-, negatively, and moderately-worded items) results in increased power in testing for curvilinearity (Carter, Guan, Dalal, LoPilato, & Withrow, unpublished manuscript).

The purpose of the current study is to apply these recent findings to better understand the personality trait of extraversion by developing measurement tools for this trait according to ideal point specifications, resulting in better measurement. Extraversion is an important trait that can have desirable correlates, such as higher positive affect (DeNeve & Cooper, 1998) and organizational citizenship behaviors (OCBs; Chiaburu, Oh, Berry, Li, & Gardner, 2011), but is also associated with a number of undesirable correlates, such as negative affect (Longua, DeHart, Tennen, & Armeli, 2009), narcissistic traits (O'Boyle, Forsyth, Banks, Story, & White, in press) and counterproductive workplace behavior (CWB; Hastings & O'Neill, 2009).

Research on extraversion has primarily operated under the assumption that relationships between extraversion and its outcomes are linear. However, recent theoretical and empirical research has suggested that certain relationships between extraversion and outcome variables may actually be curvilinear, such that the most positive outcomes are observed for those with moderate, rather than extremely high, levels of extraversion. Research has shown evidence of such curvilinear relationships between extraversion a number of outcome variables, such as sales performance as measured by revenue (Grant, 2013), well-being, and positive affect (McFatter, 1994). However, research on curvilinear relations involving extraversion has been mixed, indicating the need for more research to provide a better understanding of possible curvilinear relationships between extraversion and other important variables.

In this paper, I suggest and explore whether adopting an ideal point perspective for scale construction and scoring will be efficacious in uncovering true curvilinear relationships where they exist, while minimizing the likelihood of type 1 errors. Further, research in the domain of conscientiousness has suggested that curvilinear relationships are stronger at the facet level, compared with the domain level (see Carter, Guan, Maples, Williamson, & Miller, in press). Therefore, in this study I construct and establish evidence of validity for ideal point measures of the facets of extraversion. These measures include items encompassing the entire trait continuum of each facet, rather than simply extremely negative items or extremely positive items (the dominance response approach). I use this new measure to estimate curvilinear relationships between extraversion facets and variables that have generally been assumed to be more favorable with extraversion, namely: positive and negative affect, OCBs, CWBs, narcissistic traits, and subjective socioeconomic status. These findings are compared with measures developed from the same item pool based on dominance assumptions, allowing the direct comparison of predictive merits of each method of scale construction.

CHAPTER 2

LITERATURE REVIEW

Extraversion and Its Structure

Extraversion is one trait of the five-factor model (FFM) of personality, one of the most widely applied models of personality (Ones, Viswesvaran, & Dilchert, 2005; Judge et al., 2013). Jung initially introduced the psychological construct of extraversion almost a century ago (1923), which is generally thought of as how sociable or outgoing someone is (Eysenck, 1970). Research shows that extraverted people are assertive, sociable, and energetic; tendencies that can positively contribute to daily interactions, such as connecting with others and entertaining others (McCabe & Fleeson, 2012). Notably, research also shows extraverts can be narcissistic (O'Boyle et al., in press), and have increased negative affect (Longua et al., 2009), both of which could have negative consequences in social interactions and relationships.

The structure of each trait in the FFM is generally considered to take a hierarchical form referred to as the 6-2-1 structure (Judge et al., 2013). Although the five general factors of the FFM are widely accepted, the lower-order traits and facets are still disputed. In the past decade, DeYoung and colleagues have attempted to reconcile this debate through two main methods: psychometrically (i.e. factor analysis/data reduction) and genetically (i.e. analyzing traits in monozygotic twins, cf. Judge et al., 2013). The authors concluded that there are 10 lower-order factors (two for each of the five general factors) that are rooted in biology (DeYoung, Quilty, & Peterson, 2007; DeYoung & Gray, 2009; DeYoung et al., 2010). Finally, each of these lower-order factors subsumes six different facet level traits. Extraversion consists of two lower-order

factors, *assertiveness* and *enthusiasm* (DeYoung et al., 2007). The lowest level of this hierarchy is the six lower-level facets of extraversion: (1) warmth; (2) gregariousness; (3) assertiveness; (4) activity (level); (5) excitement-seeking; and (6) positive emotions (Costa & McCrae, 1995). These six lower-level facets reflect the structure of the two higher-order factors; assertiveness, activity, and excitement-seeking facets are subsumed by the assertiveness factor, while warmth, gregariousness, positive emotions, and excitement-seeking facets are subsumed by the enthusiasm factor (DeYoung et al., 2007; Judge et al, 2013).

In the 1980's McCrae and Costa conducted several studies, which examined numerous personality facets to identify which adjectives were attributed to which facet (1985a, b; 1987). Based on these findings, here are brief descriptions of each of the six facets of extraversion. Warmth is a quality reflecting being affectionate, compassionate, and sentimental; gregariousness persons are sociable, outgoing, and affable; an individual who is assertive tends to be confident and dominant or forceful; positive emotions reflects a general cheerfulness and optimism; persons high in activity are energetic and vigorous; and finally, persons high in excitement-seeking are spontaneous, adventurous, and seek stimulation from their external environment.

Correlates of Extraversion: General and Facet Level

Past work has suggested that there are several variables that seem to be consistently correlated with the general trait of extraversion. As mentioned previously, extraversion is correlated with both desirable outcomes and qualities, such as positive affect (DeNeve & Cooper, 1998) and organizational citizenship behaviors (OCBs; Chiaburu et al., 2011), as well as undesirable things such as negative affect (Longua et al., 2009), narcissistic traits (Miller & Campbell, 2008; O'Boyle et al., in press), and counterproductive workplace behavior (CWB;

Hastings & O'Neill, 2009). However, recent work has shifted the focus of personality research from general trait level to facet level, arguing the importance of facet level personality traits above and beyond general traits (Judge et al., 2013). In 1995, Ashton and colleagues found that the facet scales of the FFM yield significantly higher validity than simply relying on the broad factor scales of the FFM (Ashton, Jackson, Paunonen, Helmes, & Rothstein, 1995; see also Schneider, Hough, & Dunnette, 1996; Paunonen, 1998). More recently, Judge and colleagues showed that the facet scales are able to predict job performance above and beyond what the broad factors predict (Judge et al., 2013). The purpose of this next section is to review what the literature to date has found regarding the general factor of extraversion, as well as any research on the facet level of extraversion with these variables.

Positive and Negative Affect. As mentioned, positive affect is positively related to extraversion. This relationship is supported by multiple meta-analyses (DeNeve & Cooper, 1988; Kaplan, Bradley, Luchman, & Haynes, 2009). For instance, DeNeve and Cooper (1988) examined over 130 traits using nine different literature search strategies and found that extraversion (as well as agreeableness) were the strongest predictors of positive affect (r = .20). Though this provides promising support for the relationship between extraversion and positive affect, examining how different facets of extraversion are more or less related to positive affect will result in deeper understanding in regards to whether specific facets of extraversion play a bigger role in individuals' positive affect.

Typically, extraversion is considered a predictor of positive affect and neuroticism is a predictor of negative affect (Finch, Baranik, Liu & West, 2012; Verduyn & Brans, 2012). However, the literature on extraversion and negative affect is inconsistent. Whereas one study did not find evidence of a significant relationship (Zautra, Affleck, Tennen, Reich, & Davis,

2005), another study found that extraversion moderated the relationship between negative events and negative affect (Longua eta l., 2009). In other words, negative affect resulting from negative events was buffered by the experience of positive events, but only for individual high in extraversion. This buffer was not found for those low in extraversion. Thus, more research is needed to fully understand the link between extraversion and negative affect, particularly at the facet level, as no literature of which the author is aware examines those links.

Interpersonal Performance Domains. Another common theme in personality research is examining the FFM's ability to predict various dimensions of performance in organizations, particularly performance related to interpersonal interaction. An example of these types of classifications is organizational citizenship behaviors (OCB's), which are various extra-role behaviors that are generally prosocial in nature (Organ, 1997). One of the major typologies of OCBs that past research has focused on is viewing two major forms: OCBs directed at an individual (OCB-I) or OCBs directed at an organization (OCB-O) (Smith, Organ, & Near, 1983). Recently, a meta-analysis analyzing 87 samples was conducted examining the relationship between OCBs and the FFM (Chiaburu et al., 2011). The authors found a small positive relationship between extraversion OCB-I ($\hat{\rho}$ = .10), and but no relationship between extraversion and OCB-O ($\hat{\rho}$ = .02).

Recent work has argued the need for studying extraversion's relationship with OCB at the facet level (Moon et al., 2008). Moon and colleagues focused on the relationship between general citizenship behaviors and extraversion at both the general and facet levels. The general factor of extraversion was not significantly related to citizenship behaviors, but the same was not true for specific extraversion facets. Across three different extraversion facets, there was a range of positive, negative, and null relationships with citizenship behaviors. Specifically, sociability

was not related to OCB, positive emotion was positively related to OCB (ΔR^2 = .06), and surgency (which is meant to capture the facets assertiveness and activity level, Goldberg, 1993) was negatively related to OCB (ΔR^2 = .06). This finding provides critical support for the necessity of examining extraversion and other traits at the facet level. Revisiting Judge et al.'s meta-analysis involving personality and contextual performance, which includes OCBs, results suggested the relationship between extraversion and various measures of performance are complex when examined at the facet level (2013). The correlations for the facets of extraversion varied in strength and direction for job performance (e.g., positive emotions: r = .16, excitement-seeking: r = -.04), task performance (e.g., warmth: r = .00, activity level: r = .10), and contextual performance (e.g., positive emotions: r = .22, excitement-seeking: r = -.05).

CWBs are a performance domain reflecting discretionary behaviors in which an individual makes a conscious choice to engage in behavior intended to have a negative impact on either the organization (CWB-O) or toward an individual (CWB-I) (Robinson & Bennett, 1995). An ample amount of research has examined the FFM and CWBs (Chiaburu et al., 2011; Salgado, 2002). When examined at the general trait level, extraversion was not significantly related to CWB, but when examined at the facet level, warmth was negatively related to CWB (r = -.18), whereas excitement-seeking was positively related to CWB (r = .21; Hastings & O'Neill, 2009). While CWB and specific facets of extraversion have not been studied often, other research has proposed that certain relationships with CWB and personality factors such as narcissism should be examined at the facet level, as a general personality factor may mask facet level findings (c.f. Wu & LeBreton, 2011).

Narcissistic Tendencies. Another unfavorable correlate of extraversion is narcissistic traits (Jonason, Kaufman, Webster, & Geher, 2013). One of the many ways to classify

narcissistic traits is the viewpoint of two major dimensions: vulnerable narcissism and grandiose narcissism (Wink, 1991). Vulnerable narcissists tend to be hostile, defensive, and insecure, whereas grandiose narcissists are overly confident and may be aggressive or cruel. Research suggests extraversion is related to both forms of narcissistic traits, but in differing directions, such that extraversion is negatively related to vulnerable narcissistic tendencies (r = -.13) and positively related to grandiose narcissism (r = .19; Miller, Gentile, & Campbell, 2013). However, research has also suggested the relationship between extraversion and narcissistic traits differ at the facet level of extraversion. For instance, a study examining the nomological network of narcissism found a significant difference between vulnerable and grandiose narcissism was present in all but one facet, warmth (Miller, Hoffman, Vaughan, Gentile, Maples, & Campbell, 2011). Specifically, four of the facets were negatively related to vulnerable narcissism but positively related to grandiose narcissism (gregariousness, assertiveness, activity level, and positive emotions). The fifth facet that exhibited a significant difference was positive for both vulnerable narcissism (r = .01) and grandiose narcissism (r = .43).

Curvilinear Correlates: Can Extraversion be Too Much of a Good Thing?

In the past decade, a new body of research has gained attention centering on the idea that seemingly beneficial traits may actually have a point of inflection that, when reached, can result in undesirable outcomes. This meta-theory has come to be known as the too-much-of-a-good-thing (TMGT) effect (Grant & Schwartz, 2011; Pierce & Aguinis, 2013). As the TMGT effect is a meta-theory, hypothetically it could be examined across an unlimited amount of variables, and has already been looked at in terms of variables such as leadership (Ames & Flynn, 2007), personality (Carter et al., 2014; Whetzel, McDaniel, Yost, & Kim, 2010), new venture planning (Fredrickson & Iaquinto, 1989; Hayward, Shepherd, & Griffin, 2006; Vesper, 1993), and

experience in personnel selection decisions (Sturman, 2003; c.f. Pierce & Aguinis, 2013). Importantly, Pierce and Aguinis (2013) point out those curvilinear relationships could apply to all seemingly beneficial predictors, and not just those related to the workplace. Although there has been some research examining curvilinearity between extraversion and its correlates, to date all have relied on the dominance model and its assumptions in doing so (e.g., Chiaburu et al., 2011; Grant, 2013; Prinzie, Stams, Deković, Reijntjes, & Belsky, 2009).

Table 2.1 summarizes the small body of published research that has examined curvilinear relationships between extraversion and outcome variables. This Table summarizes 8 articles involving a total of 10 studies, including sample information, predictor and criteria, as well as any findings of linear or curvilinear relationships. For all of these articles that provided the necessary information, the R^2 for any significant linear relationship were reported, as well as the change in the R^2 for curvilinear effects beyond the linear effects that showed significance.

Day and Silverman examined the trait of interpersonal orientation as a predictor for five different criteria, such as potential for success and cooperation (1989). Interpersonal orientation had significant linear effects with each of the five criteria, but no significant curvilinear relationships were found (Day & Silverman, 1989). Notably, the sample only consisted of 43 participants, and did not directly measure the specific construct of extraversion. Rather, they used interpersonal orientation, which included potential for success and client relations. While this is not explicitly extraversion, the variable “client relations” is reflective of a few of the extraversion facets, especially the facet warmth. However, potential for success is more reflective of another personality factor – conscientiousness. This multidimensionality could be an underlying reason that significant curvilinear relationships were not found.

In 1994, McFatter conducted a study to examine the relationship between personality and affect centered on the finding that positive affect is generally related to extraversion, whereas negative affect is generally related to neuroticism. Specifically, he focused on separating two aspects of extraversion: impulsivity and sociability, to examine linear and curvilinear relationships. He also examined two additional outcome variables: depressive symptoms and general wellbeing. For the impulsivity aspect of extraversion, he found a significant curvilinear relationship for three of the four outcome variables. For positive affect as well as for well-being, impulsivity was positively related to positive affect as well as well-being to a point, at which it began to display a negative relationship with each outcome variable. On the other hand, McFatter found a significant positive relationship when the quadratic term of impulsivity was added to the linear regression equation of impulsivity and depressive symptoms. This indicates that impulsivity is generally negatively related to depressive symptoms, until a point at which it begins to have a positive relationship with depressive symptoms. The sociability dimension of extraversion did not present any significant curvilinear relationships with any of the four outcome variables. These findings support the idea that extraversion should be broken down into its facets, as different relationships occur at the facet level.

In 2004, Waldman and colleagues examined the FFM and performance in leaderless group discussions (LGD) at both the individual level and the team level (Waldman, Atwater, & Davidson). They predicted that extraversion was the FFM trait that best predicted LGD performance, per past research findings. Interestingly, they found linear and curvilinear effects at both the individual and group levels of performance. Notably, extraversion was the only FFM trait that had a significant curvilinear relationship in both cases. Of particular interest to the current study, the authors noted in the discussion the possibility of different findings if

Table 2.1 *Summary of findings of past studies examining curvilinearity in extraversion with any outcome variable.*

Source	Sample #	Sample	Predictor(s)	Criterion	L(R^2)	C(ΔR^2)
1. Day & Silverman (1989)	1 of 1	Accountants (*N* = 43)	Interpersonal orientation[a]	Potential for success	X(n/a)	
				Technical ability	X(n/a)	
				Timeliness of work		
				Client relations	X(n/a)	
				Cooperation	X(n/a)	
				Work ethic		
				Global performance	X(n/a)	
2. McFatter (1994)	1 of 1	Undergraduate psychology students (*N* = 384)	EPI Extraversion	Beck Depression Inventory	X(n/a)	X(n/a)
				Well-being	X(n/a)	X(n/a)
				Positive affect		
			EPI Impulsivity	Negative affect		X(n/a)
				Beck Depression Inventory		
				Well-being		
			EPI Sociability	Positive affect		
				Negative affect		X(n/a)
				Beck Depression Inventory		X(n/a)
				Well-being		
				Positive affect		
				Negative affect		
3. Waldman et al. (2004)	1 of 1	Undergraduate students at a public university (*N* = 152)	IPIP Extraversion	Individual performance	X(.084)	X(n/a)
				Group Performance	X(n/a)	X(.080)
4. Cucina & Vasilopoulos (2005)	1 of 1	Undergraduate psychology students (*N* = 262)	IPIP Extraversion	Grade point average		
5. Kristof-Brown et al. (2005)	1 of 2	MBA students (*N* = 324)	BFI Extraversion	Attraction to MBA team		X(n/a)
	2 of 2	Employees at	BFI	Attraction to		X(n/a)

		manufacturing firms (*N* = 217)	Extraversion	manufacturing team		
6. Whetzel et al. (2010)[b]	1 of 2	Financial service professionals (*N* = 576)[b]	OPQ Affiliative	Job performance	X(.015)	
			OPQ Outgoing	Job performance	X(.007)	
			OPQ Persuasive	Job performance	X(.001)	
			OPQ Socially confident	Job performance	X(.019)	
			OPQ Controlling	Job performance	X(.082)	
			OPQ Emotionally Controlling	Job performance	X(.022)	
	2 of 2	Financial service professionals (*N* = 576)[b]	OPQ Affiliative	Job performance	X(.004)	
			OPQ Outgoing	Job performance	X(.000)	
			OPQ Persuasive	Job performance	X(.008)	
			OPQ Socially confident	Job performance	X(.006)	
			OPQ Controlling	Job performance	X(.080)	
			OPQ Emotionally Controlling	Job performance	X(.020)	
7. Grant (2013)	1 of 1	Call center organization (*N* = 340)	MINI-IPIP Extraversion	Revenue earned	X(.015)	X(.020)
8. Ferguson et al. (2014)	1 of 1	Medical students in the UK (*N* = 243)	BFI Surgency	Pre-clinical knowledge		X(.020)

Note. Column "L" represents significance of the linear relationship, and column "C" represents significance of the curvilinear relationship. An X in a cell represents a significant effect; the effect is linear if in the "L" column, or curvilinear if in the "C" column. n/a indicates was not reported and was unable to be calculated based on the article's information. BFI = Big Five Inventory; IPIP = International Personality Item Pool; EPI = Eysenck Personality Inventory; OPQ = Occupational Personality Questionnaire

[a] Indicates the scale was developed by the researchers and not a standard scale (e.g., IPIP)

[b] Indicates that Whetzel et al. (2010) differed in how they evaluated significance, they used rules based on change in variance explained. In the table, we present the findings as significant if it met either rule they had ($\Delta R^2 > .01$ or .025)

extraversion had been measured at the facet level. Specifically, Waldman et al. suggested the facet of assertiveness might be positively correlated with the desire to work alone, while the facet of gregariousness may negatively correlate with the desire to work alone. In sum, significant curvilinear relationships between extraversion and LGD performance were identified, but the relationships may be more complex if disentangled at the facet level.

In 2005, Cucina and Vasilopoulos examined the relationship of extraversion with grade point average in a sample of undergraduates, but did not find a significant linear effect or curvilinear effect in this case (2005). The use of a general measure of the extraversion factor may have cancelled out significant findings that exist at the facet level. Another study from 2005 examined linear and curvilinear effects of extraversion and team fit perception/attraction (Kristof-Brown, Barrick, & Stevens). The authors examined two different samples: one of MBA students and their attraction to an MBA team, and another of manufacturing firm employees and their attraction to a manufacturing team. In both samples, the use of extraversion as a predictor resulted in significant curvilinear effects, which included the factors of both individual extraversion and team-level extraversion. Specifically, the results suggested that the highest attraction occurs when either the individual is high in extraversion and the team is low in extraversion, or the individual is low in extraversion and the team is high in extraversion. In sum, introverts seem to be more attracted to teams of extroverts, and extroverts seem to be more attracted to teams of introverts.

Whetzel, McDaniel, Yost, and Kim examined two different samples of financial service professionals using the OPI/OPQ scale and its facets such as affiliative, persuasive, and socially confident (2010). These facets are approximately the same or comparable to certain extraversion

traits, namely, gregariousness, assertiveness, and warmth. However, significant linear effects were found, but no significant curvilinear effects were found (Whetzel et al., 2010).

Most recently, Ferguson and colleagues looked at the extraversion factor of surgency as a predictor of pre-clinical knowledge (2014). They examined both linear and curvilinear effects. They found a significant curvilinear effect, such that higher surgency resulted in decreased pre-clinical knowledge, but at an inflection point, an increase in surgency resulted in higher pre-clinical knowledge. Notably, this study examines an aspect of extraversion: surgency, which may have aided in the ability to detect curvilinear results.

A recent study examined curvilinear relationships between extraversion and sales performance using an organizational sample of employees at various call centers (N = 340; Grant, 2013) and found significant curvilinearity between extraversion and sales performance such that those with average levels of extraversion showed the highest sales performance. Although Grant attributes this fining to the general factor of extraversion, it is notable that he used a 4-item measure of extraversion (see Donnellan et al., 2006) that only utilizes items reflecting the assertiveness and gregariousness facets of extraversion, lending further support to the notion that curvilinearity would be stronger at the facet-level compared to the general trait-level as suggested by Carter et al. (2015).

Overall, Table 2.1 shows that 11 (28.9%) out of 38 regression analyses showed significant curvilinear effects. These studies examined a variety of samples, extraversion measures (both at the general factor level and at the facet level), and outcome variables. However, each of these studies used a dominance approach and its assumptions. As prior research has shown that an ideal point approach can better detect curvilinear relationships (Carter et al., 2014; Carter et al., in press), it is likely that there is a larger percentage of curvilinear

relationships that were not identified due to the use of the dominance approach to measurement in all studies.

The above review indicates that more research is needed to arrive at a consistent view of curvilinear relations between extraversion and its relevant correlates. Importantly, the review indicates that curvilinearity is more likely to be found at the facet-level of extraversion rather than the general trait level. Second, the ubiquitous use of dominance approaches to measurement may have obscured curvilinearity in these studies, as has been suggested in regard to curvilinear relationships between conscientiousness and performance (Carter et al., 2014), and psychological well-being (Carter et al., in press). Below, I elaborate on my expectations regarding curvilinearity at the facet-level of extraversion by detailing which facets seem most likely to have positive outcomes for those with moderately high standing on the trait versus extremely high trait standing.

Expected Findings

I predict that one of facets most likely to demonstrate curvilinear relationships is excitement-seeking. Excitement-seeking, often referred to as risk taking or sensation seeking, could very likely be a facet of extraversion where the too-much-of-a-good-thing effect is playing out. In some instances, a moderate level of excitement-seeking could be beneficial, as individuals at this level would be willing to try new things and take calculated risks (Zuckerman & Kuhlman, 2000). However, extremely high excitement-seeking might result in negative consequences. For example, De Bruin and Rudnick found that excitement-seeking (interacting with high conscientiousness) predicted a significant proportion of those who cheat academically (2007).

Another facet, assertiveness, may exhibit the too-much-of-a-good-thing effect, particularly in jobs with a high premium on interpersonal interaction (Grant, 2013). Previous research has found that extremely assertive individuals can actually be ineffective in leadership positions because they tend to focus on instrumental outcomes rather than balancing instrumental and relational outcomes (Ames & Flynn, 2007; Ames, 2008; Bendersky & Shah, 2013).

Extremely high levels of the positive emotions facet may indicate a masking of negative situations. Indeed, studies have shown that individuals who have bipolar disorder actually indicate a higher level of positive affect or positive emotions in regards to their daily lives (Bagby et al., 1996; Hofmann & Meyer, 2006; Gruber, 2013). This does not mean that everyone who scores extremely high on positive emotions should be characterized as possibly having bipolar disorder. Rather, it is possible that individuals with a moderately high level of positive emotions have the ideal amount of positive emotions. In further support of this explanation, the association between bipolar disorder and positive affect could be due to the personality trait of neuroticism, which is associated with bipolar disorder. Past research has suggested that people high in neuroticism are likely to experience higher variability in other traits such as extraversion, due to the increased instability associated with higher neuroticism or in certain cases, bipolar disorder (Judge, Simon, Hurst, & Kelley, 2014).

As mentioned, the best gains in measurement of attitudes occur when an ideal point approach is applied in both the score *and* development of the measure (Carter et al., unpublished manuscript). Specifically, an ideal point approach produces higher reliability across the trait continuum (Chernyshenko et al., 2007), better flexibility and model-data fit compared to dominance models (Stark et al., 2006), and the resulting scores can better detect curvilinearity (Carter et al., 2014; Carter et al., unpublished manuscript). In this investigation, I examine

curvilinearity of extraversion facets with the correlates of affect, OCBs, workplace deviance, and narcissistic traits, and compare the efficacy of measures developed and scored under the dominance versus the ideal point approaches. In the next section, I will detail the ideal point approach to scale construction and scoring.

CHAPTER 3

THE IDEAL POINT APPROACH TO PSYCHOLOGICAL SCALING

Dating back to the early 1900's, Thurstone (1928) argued that for graded agree/disagree scales, a participant will tend to agree with items near their own level of an attitude (or personality trait), and disagree with items on either end of the spectrum that are far from their standing on the construct. As Spector, Van Katwyk, Brannick and Chen (1997) have explained, this concept is now known as the ideal point (Coombs, 1964) or the unfolding principle (Andrich, 1988). More commonly, however, measures of attitudes and personality are rooted in the dominance model of measurement, associated with Likert (1932). The dominance model rests on the assumption that the more a person agrees with an item; the higher they are on that trait. As Stark and colleagues (2006) pointed out, this assumption makes logical sense for certain tests measuring achievement (e.g., cognitive ability). Nonetheless, thinking about this assumption in the context of an individual's personality does not seem as appropriate. The ideal point principle is superior to the dominance model for attitude testing, or any trait involving introspection, as the ideal point approach assumes persons compare themselves to the item content and agree with statements that reflect them (Drasgow et al., 2010). Dominance models on the other hand assume persons will try to "dominate" or "respond above" the item, as with ability tests. The case for the superiority of ideal point models has been made in the context of personality, attitude, and interesting testing, both theoretically (Drasgow et al., 2010a; Dalal, Withrow, Gibby, & Zickar, 2010) and empirically (Roberts, Laughlin, & Wedell, 1999; Stark et al., 2006; Tay et al., 2009; Carter et al., 2014).

The flexibility of the ideal point model is perhaps best understood through hypothetical comparisons against the dominance model. For instance, an item expressing an extremely high level of the warmth facet such as “I am an inviting person to everyone I meet,” can be reflected by point *d* in Figure 3.1. For an individual with an ideal point located at approximately *d*, both the dominance model and the ideal point model would assume the individual would strongly agree with this item. However, a moderately high item such as “Typically I come off as welcoming, unless I’m in a really bad mood,” would reflect *c* in Figure 3.1. The ideal point approach would expect the individual extremely high in warmth to only somewhat agree with the moderately high item, because it reflects a level of warmth that is lower than they are, *d*. However, the dominance approach would expect the same individual to strongly agree with this moderately high item, *c*, as it is closer on the trait continuum to high extraversion than low extraversion.

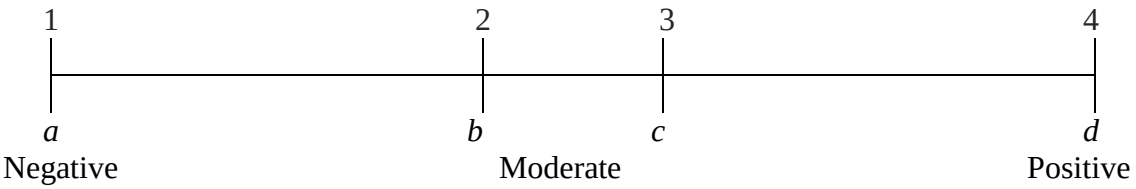

Figure 3.1. Illustration of the ideal point principle, adapted from Spector et al., 1997.

The ideal point model readily reflects this slight difference in the extremity of item content for these hypothetical items, whereas the dominance approach cannot account for the difference in these items. The result of this fact is the incorrect rank-ordering of individuals (Carter et al., 2014; Roberts et al., 1999) due to assigning too low an item score the extremely warm person who somewhat disagrees the more moderate item. As noted by Carter et al. (2014), although the group of individuals incorrectly rank-ordered would be a small group, this is the

very group that matters most when testing for curvilinearity. Using contemporary dominance-based scaling, such as classical sum-scoring and traditional IRT, it is difficult to differentiate between those moderately high or extremely high on a trait. However, using the ideal point approach can lead to more accurate distinctions, resulting in more accurate tests for curvilinearity.

Historically, the majority of measurement models have relied on dominance assumptions, such as classical test theory (CTT) and the majority of factor analytic (FA) models and IRT models (e.g., the two-parameter logistic, or 2PL model; Birnbaum, 1968; and the graded response model, or GRM; Samejima, 1969). In 2000, an ideal point IRT model was developed that was founded in ideal point assumptions, namely, the GGUM (Roberts et al.), acting as a catalyst to resurge interest in Thurstonian measurement theory (e.g., Carter et al., 2014; Chernyshenko et al., 2007; Drasgow et al., 2010; Stark et al., 2006; Tay et al., 2012). A primary focus of this study is to compare the GGUM IRT model with dominance-based models to identify whether an ideal point approach to scale development and scoring results in better identification of curvilinear relationships compared to traditional dominance-based approaches.

In essence, it is critical to identify which model most consistently identifies curvilinear relationships, as this has an enormous impact on the ability of future research to appropriately identify curvilinear relationships. As Carter and colleagues showed, an ideal point scoring approach is capable of producing results that are more consistent with the theory behind it (2014). Furthermore, recent simulations show that the most accurate results are attained when ideal point approaches to scoring *and* scale construction are used in conjunction with one another (Carter et al., unpublished manuscript).

CHAPTER 4

METHODS

Development of the Item Pool for the Ideal Point Extraversion Measure

One goal of the study was to create an extraversion measure that reflects the latest theory and research on the structure of the trait and best practices for the development of ideal point measures. I began by having three trained undergraduate item writers develop 60 items for each of the six facets of extraversion. For each of the six facets, each writer wrote 20 extremely negative items, 20 moderate items, and 20 extremely positive items. This resulted in a total of 1,080 items. I eliminated any items that were too similarly written or were poorly written. This process resulted in 380 items remaining.

Next, I had four research assistants rate each of the 380 items in two different ways. First, raters indicated on a 7-point scale how extreme the item seemed in regard to the extraversion trait (1 = extremely low in extraversion, 7 = extremely high in extraversion). I utilized an interclass correlation index, ICC, to assess interrater reliability across the four raters. Results support strong reliability for all six facets (warmth: $\rho = .878$; gregariousness: $\rho = .903$; excitement-seeking: $\rho = .947$; assertiveness: $\rho = .940$; activity level: $\rho = .946$; positive emotions: $\rho = .962$). I also examined the means of the extremity ratings and the *SD* of raters from the mean. I only chose items for which the extremity rating had a standard deviation of 1.5 or less. Fifty-two (52) items were eliminated based on these criteria, leaving 338 items. Raters also classified each item based on which of the six sub-facets of extraversion they believed the item was measuring to establish content-related validity. Items were retained if 75% of raters showed

agreement in regards to which sub-facet the item was measuring. I found 42 additional items that did not meet this 75% agreement, which left me with a pool of 296 items.

Before examining the remaining 296 items with all of these properties in mind, I decided for my final measure of extraversion, each facet would contain 10 negative, 10 moderate and 10 positive items, resulting in 180 items. From these 296 items, I identified 127 items that met the aforementioned criteria, but whose relevant area of the trait continuum had already been filled. This resulted in a pool of 169 items out of the desired 180 items needed. I wrote 33 additional items and repeated the original process and identified 11 items that met the criteria for inclusion. The 180 items were then administered as part of the primary data collection described below.

Data Collection

Sample. Subjects for this study were recruited through the Amazon Mechanical Turk (MTurk) crowdsourcing mechanism. A participant was eligible for the study if they met the following criteria: must be living in the United States, be able to read English, and be 18 years of age or older. Each respondent was paid $0.75 upon completion of the survey.

I requested 1,400 participants to complete the survey. To clean the data, I first removed cases where there was a significant portion of the survey missing. When developing my survey, I had included three items to serve as checks for insufficient effort responding. These included items like “Please select strongly agree” where typically an item would be located. I removed cases that had incorrectly responded to at least one manipulation check, which resulted in a final sample size of 1,282 participants.

Of the participants, 62.7% were female; the mean age of a participant was 35.55 years old (*SD* = 12.02). The majority of the sample (84.3%) was white (Non-Hispanic). Education level

ranged from completing less than high school to M.D., and 79.5% reporting being employed at the time they took the survey.

Measures. Unless noted otherwise, all measures were administered using a six-point Likert-type scale ranging from Strongly Agree to Strongly Disagree, consistent with research showing theoretically and empirically that a response scale with middle options is not consistent with ideal point measurement principles (Dalal, Carter, & Lake, 2014).

Ideal Point Extraversion Item Pool. The ideal point extraversion item pool contained thirty items, each intended to tap one of the six facets of extraversion: warmth, gregariousness, assertiveness, activity level, excitement-seeking, and positive emotions. As the item pool reflects an ideal point approach, each facet contains items reflecting the entire trait continuum. Examples of a negative, moderate, and positive item for the facet gregariousness, respectively, are: "I am considered a loner;" "I enjoy being social but I also want time to myself;" and "I love having company at my house, no matter who or when."

Narcissistic Personality Inventory – Likert Version (NPI-L). The NPI (Raskin & Terry, 1988) consists of 40 items assessing levels of narcissistic tendencies. The NPI measures seven components: a) authority; b) self-sufficiency; c) exploitativeness; d) superiority; e) entitlement; f) vanity; and g) exhibitionism (Raskin & Terry, 1988). Recent literature has introduced a revised NPI using a Likert-type scale, the NPI-L (Gentile, 2013) as opposed to the traditional forced-choice format of the NPI. Research has shown that the NPI-L has acceptable construct validity, with two samples producing nearly identical patterns in regards to relations (r_{icc} = .98 and r_{icc} = .99). Although the NPI-L can be assessed using two to seven factors, I chose to use the three-factor solution that had the best fit in its initial development (Ackerman et al., 2011). The three subscales showed acceptable evidence of reliability: leadership/authority (LA, α = .89),

exploitativeness/entitlement (EE, α = .65), and exhibitionism (GE, α = .84) (Corry et al., 2008; Gentile, 2013).

The Positive and Negative Affect Schedule (PANAS) Scales. The PANAS (Watson, Clark, & Tellegen, 1988) consists of 20 items measuring moods on a scale, 10 measuring positive affect (PA) and 10 measuring negative affect (NA). Both dimensions presented acceptable evidence of reliability (PA, α = .94; NA, α = .94).

The mini-IPIP. The mini-IPIP (Goldberg et al., 2006) is a shortened version of the original IPIP, intended to measure the Big Five personality traits. There are versions containing 10 or 20 total items, with some items reverse-scored. I used the 10-item version for four factors (conscientiousness, openness, agreeableness, and neuroticism), and the 20-item version for extraversion, as it was the focus of this study. All factors had acceptable evidence of reliability: conscientiousness, α = .86; openness, α = .87; extraversion, α = .95; agreeableness, α = .90; and neuroticism, α = .93.

Workplace deviance. The workplace deviance measure (Bennett & Robinson, 2000) consists of 7 items measuring WD-I (e.g. “cursed at someone at work”) and 12 items measuring WD-O (e.g. “littered your work environment”). Respondents rate how often they have performed each item on a 7-point Likert scale (1 = never, 7 = daily).

Organizational citizenship behavior checklist (OCB-C). The OCB-C (Fox, Spector, Goh, Bruursema, & Kessler, 2012) consists of 10 items measuring OCB-I (e.g. “picked up a meal for others at work”) and 10 items measuring OCB-O (e.g. “volunteered for extra work assignments”). Respondents rate how often they have performed each item on the same 7-point Likert scale utilized for the workplace deviance measure.

CHAPTER 5

DEVELOPMENT OF THE UNFOLDING FIVE FACTOR MODEL INVENTORY (UFFM-I) EXTRAVERISON FACET SCALES AND PRELIMINARY ANALYSES

In this chapter I will explain the development of two sets of facet-level extraversion measures. One set was developed using ideal point assumptions, and the second was developed using dominance assumptions. In both approaches, IRT models were utilized. To reflect the ideal point approach, I utilized the commonly applied GGUM (Roberts et al., 2000). To reflect the dominance approach, I used the commonly applied graded response model (GRM; Samejima, 1969). In the following, I describe each of these IRT models in detail, and then move onto a discussion of how scale development was carried out.

Scoring Methods

GGUM IRT application. The GGUM rests on four basic premises regarding the response process (Roberts et al., 2000). The first premise posits that when an individual is responding to an attitude item in terms of their agreement with the item, they will agree or endorse the item to the degree it is closely located to their actual standing on the latent trait of the attitude at hand. This can be reflected through the terms in the GGUM equation. Let δ_i represent the location of the i^{th} item on the latent trait continuum, θ_j, which represents the location of person *j* on the same latent trait continuum. As the distance between θ_j and δ_i approaches 0, an individual is more likely to endorse the item (Coombs, 1964; Roberts et al., 2000).

The second premise of the GGUM postulates that an individual will respond to an observable category for one of two reasons. Think of a person who is approximately average on

the extraversion facet of assertiveness. This individual might strongly disagree with the negative item "I find it difficult to communicate my point of view," while also strongly disagreeing with the positive item "I am usually the first person to take action or speak up." Thus, the negative item is far below the individual's level of assertiveness, while the positive item is far above their level of assertiveness. The GGUM recognizes that a single observable response (such as strongly disagree) therefore has two subjective responses that are possible: disagreeing *from below* the item or disagreeing *from above* the item (Roberts et al., 2000).

The third premise of the GGUM is that subjective responses should follow a cumulative item response model (Roberts et al., 2000). An array of cumulative response models may be used, but the initial development of the GGUM incorporates Muraki's (1992) generalized partial credit model (GPCM).

$$P[Y_i = y|\theta_j] = \frac{\exp\{\alpha_i[y(\theta_j - \delta_i) - \sum_{k=0}^{z}\tau_{ik}]\}}{\sum_{w=0}^{M}\{exp\{\alpha_i[w(\theta_j - \delta_i - \sum_{k=o}^{w}\tau_{ik}]\}\}} \quad . \tag{1}$$

The GPCM (Muraki, 1992). Y_i represents a subjective response to item i, $y = 0$ ($y = 0, 1, 2, 3, 4 \ldots M$) represents the strength of disagreement from below the item, while $y = M$ represents the strength of disagreement from above the item. M refers to the number of subjective response categories (SRCs) minus 1. α_i is an item parameter of the discrimination of items i, and τ_{ik} represents the location of the kth threshold on the continuum of the attitude, relative to item i's location on the same continuum.

Thus, imagine an attitude item with four ORCs: *strongly disagree, disagree, agree, and strongly agree.* This item would have eight possible SRCs, because each ORC is subsumed of two SRCs (Roberts et al., 2000). These thresholds can be considered intervals on the latent trait continuum with various SRCs having different probabilities of endorsement, which is determined by α_i, the discrimination parameter. Therefore, the third premise of the GGUM views the two

possible subjective response options for an ORC are mutually exclusive, meaning that the probability of endorsing a particular ORC can be calculated by summing the probabilities for that individual in each of the two possible SRCs (Roberts et al., 2000).

Finally, the fourth premise of the GGUM suggests that a person is equally likely to endorse an item that is the same units above or below their standing on the continuum (e.g., *–h* or *+h* units away) (Roberts et al., 2000). In other words, this premise relates back to the first premise, such that the τ_{ik}s can be considered symmetric to the point (θ_j - δ_i) is 0 (Roberts et al., 2000). This results in the full GGUM, which is an extension of the previously discussed GPCM (i.e., the GGUM is an ideal point version of the GPCM):

$$P[Z_i = z|\theta_j] = \frac{\exp\{\alpha_i[z(\theta_j-\delta_i)-\sum_{k=0}^{z}\tau_{ik}]\}+\exp\{\alpha_i[(M-z)(\theta_j-\delta_i)-\sum_{k=0}^{z}\tau_{ik}]\}}{\sum_{w=0}^{C}\{exp\{\alpha_i[w(\theta_j-\delta_i-\sum_{k=o}^{w}\tau_{ik}]\}+\exp\{\alpha_i[(M-w)(\theta_j-\delta_i-\sum_{k=0}^{w}\tau_{ik}]\}\}} \quad , \tag{2}$$

where Z_i is an observable response to an item *i*. *z* = 0 (*z* = 0, 1, 2, 3, 4…*C*) represents the level of disagreement, with 0 representing the strongest level of disagreement, and *C* representing the strongest level of agreement. α is an item parameter describing the discrimination of the item across options. δ is an item parameter describing the location of an item. (Note: the *a* and *b* item parameters in the GRM are capturing the same information as the α and δ item parameters in the GGUM). τ is also an item parameter, which describes the location of an option *k* for item *i*. θ (theta) represents person *j*'s standing on the latent trait. *z* is an observable option to an item *i*. *M* is the number of (SRCs) minus 1.

GRM IRT application. The GRM (Samejima, 1969) was selected, as it is an IRT that reflects the dominance response process. The GRM is stated:

$$P[Z_i = z|\theta_j] = \frac{1}{1+\exp[-a_i(\theta_j-b_{i,k-1})]} - \frac{1}{1+\exp[-a_i(\theta_j-b_{i,k})]} \quad . \tag{3}$$

The first part of the equation is equivalent to the GGUM, $P[Z_i = z|\theta_j]$, reflecting the probability of endorsing an observable response *z* to item *i* given person *j*'s standing on the latent

trait θ. The *a* parameter reflects the discrimination of the item across options and *b* is an item threshold parameter describing the location of point where an item's options cross on the trait continuum. The GRM is an indirect difference model in that it has two steps which, when put together, require subtraction. The two steps reflect two boundary response functions, which reflect the probability of an individual endorsing an option relative to the other options below it, where *k* reflects the option boundary. Thus, if we are interested in finding the probability of endorsing the response option Strongly Disagree, $\frac{1}{1+\exp[-a_i(\theta_j - b_{i,k-1})]}$, we would consider this in relation to the probability of Disagree, and $\frac{1}{1+\exp[-a_i(\theta_j - b_{i,k})]}$.

For both the GRM and GGUM, I used a marginal maximum likelihood (MML) approach to estimate item parameters and expected a posteriori (EAP) approach for the person parameters. Estimation of GRM parameters was conducted via IRTPro (Cai, Thissen, & du Toit, 2011) and GGUM2004 (Roberts, Fang, Cui, & Wang, 2006).

Development of the ideal point and dominance scales.

In this next section, I explain the development of two sets of measures; one utilizing the ideal point approach, and a second utilizing the dominance approach. As the GGUM and GRM are both IRT models, similar criteria were used in building both sets of measures. Specifically, I examined item parameters (item location and item discrimination) and overall model data fit statistics. Items with extreme locations or low discrimination were most likely to be eliminated.

As mentioned previously, the ideal point approach and dominance approach differ in their assumptions, which result in a different item selection process in the two approaches. The ideal point approach assumes an individual will strongly agree to an item that is relatively close in location to the individual's level of θ, thus the ideal point approach emphasizes negative, moderate, and positive items to reflect the entire trait continuum. The dominance approach

assumes an individual's response process seeks to dominate the item, thus only extremely positive or extremely negative items are included. For instance, the excitement-seeking facet scale for both the ideal point and dominance approach includes the extreme item "I don't like following routines." However, only the ideal point scales include moderate items, such as the excitement-seeking item "I will try new things if I know all possible risks."

Ideal point scales. In developing the ideal point scales, I utilized the item parameters previously mentioned. Specifically, I selected items with high discrimination while simultaneously accounting for a balance of item location across the trait continuum. I addressed item location parameters through item characteristic curves (ICC's) and test characteristic curves (TCC's). An ICC displays the probability of endorsing an item on a latent trait continuum, which in this case are facets of extraversion (Baker, 2001). Therefore, the TCC for excitement-seeking (Figure 5.1) is capturing how the scale capturing a trait such as excitement-seeking is functionally related to an individual's true score of assertiveness (Baker, 2001). To address the item discrimination parameters, I utilized the test information function (TIF), which represents the reliability of scores on the entire trait continuum. Through examining the TIF for each measure, such as the UFFM-I excitement-seeking facet (Figure 5.2), I was able to determine that each measure provided adequate information across the trait continuum.

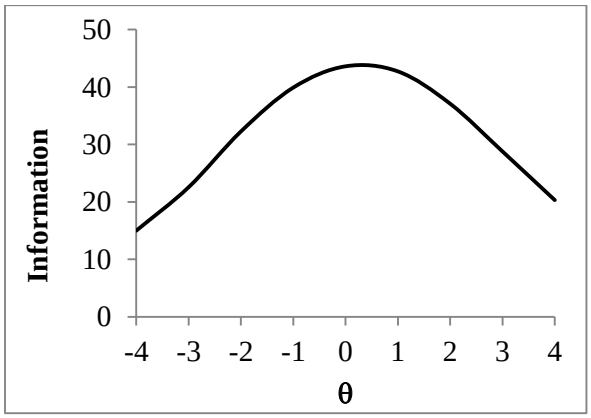

Figure 5.1. Test characteristic curve for the UFFM-I excitement-seeking scale.

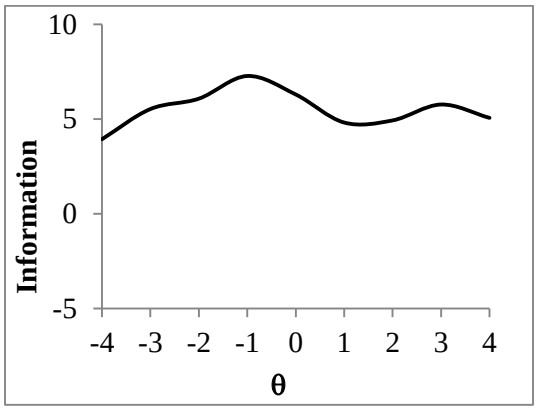

Figure 5.2. Test information function for the UFFM-I excitement-seeking scale.

The final items in all UFFM-I scales had acceptable item parameters. The ranges for each UFFM-I scale can be found in Table 5.1, or refer to Appendix B for specific item parameter details. The aim was to include items that covered a range of the respective trait, which was indicated by a range of δ parameters. Additionally, the items in each scale had varying α parameters, indicating a balance of item sensitivity in regards to variation of the trait.

Table 5.1. Range of item parameters UFFM-I scales.

UFFM-I facet scale	δ range	α range
Warmth	-2.26, 2.24	0.23, 2.32
Gregariousness	-2.77, 2.51	0.38, 1.45
Excitement-seeking	-2.02, 1.91	0.27, 0.94
Assertiveness	-1.98, 2.28	0.27, 1.65
Activity Level	-2.23, 2.72	0.22, 1.14
Positive Emotions	-3.01, 1.95	0.37, 1.87

Dominance scales. As mentioned, the dominance approach utilizes two types of items: extremely positive or extremely negative. To build my dominance scales, I utilized items from the IPIP extraversion measure, as well as extreme items from my UFFM-I extraversion scale. Extremity of items was reflected by the respective θ values for each individual using GRM through the program IRTPro (Cai et al., 2011). Thus, I started with a pool of extremely positive

and extremely negative items for each facet, drawn from both the UFFM-I extraversion scale and the IPIP. The dominance scales all had acceptable δ values (see Table 5.2); specific item parameter values for the dominance facet scales can be found in Appendix C.

Table 5.2. Ranges of δ parameters for dominance facet scales

Dominance facet scale	δ range
Warmth	-1.35, 2.00
Gregariousness	-2.21, 2.75
Excitement-seeking	-1.74, 3.33
Assertiveness	-2.17, 2.00
Activity Level	-1.50, 1.49
Positive Emotions	-2.33, 2.63

Evidence of internal structural validity. To establish internal structural validity, I estimated CFAs for each set of measures reflecting the expected 6-2-1 form (see Judge et al., 2013). This model was estimated using θ estimates from each set of facet measures as observed variables to estimate the two higher-order latent factors of assertiveness and enthusiasm and their latent interfactor correlation.

I ran CFA's with the aforementioned model using the GRM scores and the GGUM scores (see Figure 5.3). Common fit indices considered when analyzing a CFA are the normed-fit index (NFI) the comparative fit index (CFI), and the relative fit index (RFI). All three of these indices provide a comparative fit index with slight variations in the penalties they impose on a model. All fit indices indicated that the GGUM fit significantly better than the GRM, in that χ^2 was smaller for the GGUM, and the NFI, CFI, and RFI were larger for the GGUM (see Table 5.3), and met recommended fit index cutoffs (Hu & Bentler, 1999). Additionally, the factor loadings for the GGUM scoring were closer or even exactly the same as factor loadings found in a recent meta-analysis (e.g., assertiveness = 0.65, gregariousness = 0.68 in both; Judge et al., 2013).

Further, the previous meta-analysis found a small loading of warmth onto enthusiasm as well (0.21), so the low loading of warmth was not surprising.

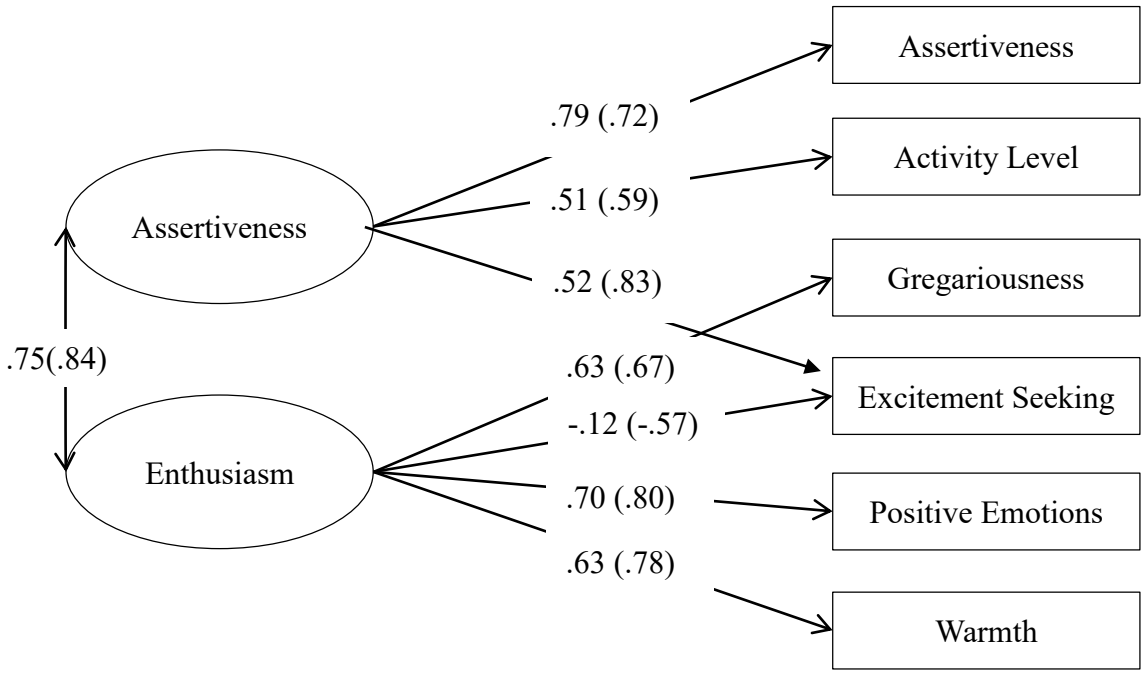

Figure 5.3. CFA of GGUM scores (values outside parentheses) and GRM scores (values inside parentheses).

Table 5.3. Model-data fit for CFA's by scoring approach

			Fit Statistics		
Scoring approach	χ^2	*Df*	NFI	CFI	RFI
GRM	213.630	7	.907	.910	.802
GGUM	95.906	7	.937	.941	.866

Note. N=1,282

Preliminary Analyses of Other Measures

After developing facet level scales from both a dominance approach and an ideal point approach, I compared the measurement amongst the various scales. As can be seen in Table 5.4, there was acceptable evidence of construct measurement between the CTT and GRM scales, the CTT and GGUM scales, and finally the GRM and GGUM scales. High correlation between the

dominance and ideal point measures indicates that the addition of moderate items in the ideal point measure did not decrease construct measurement (Chernyshenko et al., 2007). There was additional evidence of acceptable construct measurement between the three models and all outcome variables, except for OCB-O (Table 5.5). This difference is likely attributable to behavioral frequency format of OCB-O. Theoretically, this type of measure does not leave any room for ambiguity, a person either partakes in these behaviors or they do not. For this reason, the GGUM should not be used with frequency type measures. Therefore, for the GRM predictive model all outcome variables utilize GRM scoring, while for the GGUM predictive model, all outcome variables utilize GGUM scoring *except* OCB and WD, which utilized GRM scoring.

Table 5.4. Correlations between scoring approaches for each facet

Facet	CTT/GRM	CTT/GGUM	GRM/GGUM
Assertiveness	.99	.92	.93
Activity Level	.97	.83	.86
Gregariousness	.99	.95	.96
Positive Emotions	.98	.92	.92
Warmth	.97	.82	.87
Excitement-Seeking	.95	.85	.77

Note. N=1,282. *All significant at the p>.01 level

Table 5.5. Correlations between scoring approaches for each outcome

Outcome	CTT/GRM	CTT/GGUM	GRM/GGUM
Positive Affect	.99	.99	.99
Negative Affect	.95	.96	.99
*Organizational Citizenship Behavior-I**	.97	.97	.98
*Organizational Citizenship Behavior -O**	.96	.46	.55
*Workplace Deviance-I**	.91	.91	.99
*Workplace Deviance-O**	.95	.96	.99
Narcissism - Grandiose Exhibitionism	.98	.97	.99
Narcissism - Exploitativeness Entitlement	.97	.96	.98
Narcissism - Leadership Authority	.98	.98	.99

Note. All significant at the p>.01 level. N=1,282
* Indicates severe misfit in the GGUM model

Additionally, I compared the CTT, GRM and GGUM model-data fit for all UFFM-I extraversion facet scales and all outcome variables (see Table 5.6). The log likelihood, AIC, and BIC are all indices of comparative fit, with lower values indicating better model-data fit. The fit indices confirmed by decision to utilize the GGUM scoring approach for all UFFM-I scales and outcome variables, as these had the lowest fit indices, in bold in Table 5.6. The fit indices also confirmed the utilization of the GRM approach for OCB and WD, as there was evidence of better model-data fit for the GRM scoring approach over the GGUM scoring approach.

Table 5.6. Model-data fit of CTT, GRM, and GGUM scoring approaches for all facet scales and outcome variables.

		CTT	GRM			GGUM		
		α	-2loglikelihood	AIC[1]	BIC[2]	Mloglikelihood[3]	AIC[1]	BIC[2]
UFFM-I	Activity Level	.83	59022.36	59202.36	59666.41	-20493.53	**51197.05**	**42489.85**
Extraversion	Assertiveness	.90	55746.50	55926.50	56390.56	-19670.08	**49550.15**	**40842.46**
	Excitement-Seeking	.88	55497.53	55683.53	56163.06	-19650.23	**49510.47**	**40803.26**
	Gregariousness	.92	53465.23	53645.23	54109.29	-18787.94	**47785.88**	**39078.68**
	Positive Emotions	.92	51742.98	51922.98	52387.04	-18486.59	**47183.17**	**38475.97**
	Warmth	.86	54172.09	54352.09	54816.15	-18429.13	**47068.25**	**38361.05**
PANAS	Positive Affect	.94	31106.12	31226.12	31535.49	-7765.67	**25651.34**	**16389.14**
	Negative Affect	.94	25134.55	25254.55	25563.92	-5319.30	**20758.60**	**11481.45**
IPIP	Openness	.87	28140.79	28260.79	28570.16	-6365.04	**22850.09**	**13588.73**
	Conscientiousness	.86	29829.39	29949.39	30258.76	-7115.80	**24351.61**	**15090.25**
	Extraversion	.95	59772.04	60012.04	60630.78	-22403.55	**55047.11**	**46524.40**
	Agreeableness	.90	26458.72	26578.72	26888.09	-5500.42	**21120.83**	**11859.48**
	Neuroticism	.93	29234.90	29354.90	29664.27	-6894.04	**23908.08**	**14646.73**
WD	Interpersonal Deviance	.85	15445.94	**15543.94**	**15796.60**	-1911.69	23935.37	4582.34
	Organizational Deviance	.83	27518.55	**27668.55**	**28055.26**	-7372.13	24920.26	15977.28
OCB	Interpersonal	.91	35951.71	**36077.71**	**36402.55**	-12228.57	34617.14	25598.85
	Organizational	.90	39927.87	**40067.87**	**40428.80**	-12353.20	34866.40	25846.83
NPI-L	Leadership Authority	.89	30167.44	30269.44	30532.40	-5010.17	20128.35	10779.69
	Grandiose Exhibitionism	.84	28203.52	28293.52	28525.54	-6315.76	**22739.53**	**13403.97**
	Exploitativeness Entitlement	.65	13981.19	14021.19	14124.31	-14219.99	**38607.99**	**29641.71**

[1]AIC = Akaike Information Criterion, [2]BIC = Bayesian Information Criterion, [3]Mloglikelihood = Marginal log likelihood

Note. N=1,282. Bold indicates the model selected for each outcome variable in all analyses.

CHAPTER 6

RESULTS

Comparison of Predictive Models

I analyzed six possible models representing two predictive models: a) a model in which only linear relations are tested, and b) a model in which curvilinear terms are added; these two models were estimated for each of the three scoring approaches (CTT, GRM, and GGUM). The curvilinear models for the CTT and GRM scoring approaches showed similar model-data fit as evidenced by the overlap in their RMSEA 90% confidence intervals (see Table 6.1). However, the GGUM curvilinear model fit the data substantially better than the CTT or GRM model. The GGUM curvilinear model has an RMSEA of .039, significantly smaller than either the CTT or GRM as indicated by only miniscule overlap with the CTT or GRM models. Thus, there is evidence that the GGUM curvilinear model outperformed the CTT and GRM linear and curvilinear models.

6.1. Model-data fit for linear and curvilinear saturated models

				Fit Statistics			RMSEA 90% CI	
Scoring approach	Predictive Model	χ^2	*Df*	TLI	CFI	RMSEA	Low	High
CTT	Linear	15102.805	120	.940	.974	.072	.066	.079
	Curvilinear	17080.531	231	.954	.979	.048	.043	.053
GRM	Linear	14263.381	120	.935	.971	.074	.068	.081
	Curvilinear	16612.061	231	.952	.978	.049	.045	.054
GGUM	Linear	11901.697	120	.951	.978	.061	.054	.068
	Curvilinear	14707.822	231	.967	.985	.039	.034	.044

Note. N=1,282.

Although I had established that the GGUM curvilinear predictive model outperformed the others, I still sought to understand why this was occurring, specifically in regards to differences at the outcome level. As can be seen in Table 6.2, the GGUM identified significant curvilinear relationships for 8 out of the 9 outcome variables examined (WD-O was not significant), whereas both CTT and GRM identified only 5 (62.5%) of those identified by the GGUM. This finding is consistent with previous research comparing scoring approaches ability to identify curvilinear relationships of conscientiousness (Carter et al., 2014; Carter et al., 2015).

Table 6.2. Variance explained by linear and curvilinear models by facet and outcome variables

	R^2								
	GGUM			GRM			CTT		
Outcome	L	C	ΔR^2	L	C	ΔR^2	L	C	ΔR^2
PA	34.6%	36.1%	**1.50%**	40.1%	40.4%	0.30%	38.2%	38.5%	0.30%
NA	24.2%	26.1%	**1.90%**	28.4%	29.2%	**0.80%**	29.3%	30.3%	**1.00%**
*OCB-I**	13.0%	13.9%	**0.90%**	12.3%	12.9%	**0.60%**	12.0%	12.9%	**0.90%**
*OCB-O**	18.7%	20.1%	**1.40%**	17.1%	17.7%	**0.60%**	17.9%	18.3%	0.40%
NPI-GE	25.0%	26.0%	**1.00%**	28.2%	29.1%	**0.90%**	24.6%	25.6%	**1.00%**
NPI-EE	16.8%	18.1%	**1.30%**	20.2%	20.7%	0.50%	23.1%	23.9%	**0.80%**
NPI-LA	58.0%	58.9%	**0.90%**	57.6%	58.3%	**0.70%**	57.2%	58.3%	**1.10%**
*WD-O**	9.6%	10.1%	0.50%	14.0%	14.5%	0.50%	15.7%	16.4%	**0.70%**
*WD-I**	10.8%	11.6%	**0.60%**	11.1%	11.5%	0.40%	12.2%	12.6%	0.40%

Note. L = Linear, C = curvilinear
*Indicates the values under the GGUM columns reference a model where the UFFM-I Extraversion scale uses a GGUM model, while the outcome variables use a GRM model. Bold values indicate significant change in R^2 from linear to curvilinear model. The underlining of the linear or curvilinear model indicates the best fitting model.
Note. N=1,282

To extend this finding to specific interrelations at the facet level, I list the path coefficients for all six models in Table 6.3. For each significant relationship, I calculated the inflection point (the point of the respective extraversion facet where the seemingly positive relationship becomes negative) and the percent of the population affected by the inflection point.

Table 6.3. Path coefficients for the linear and curvilinear terms by facet and outcome variable

		Scoring Approach								
		GGUM			GRM			CTT		
Outcome	Facet	γ_L	γ_C	Inflection Point (Percent affected)	γ_L	γ_C	Inflection Point (Percent affected)	γ_L	γ_C	Inflection Point (Percent affected)
Positive Affect	Assertiveness	**.12**	.03		**.14**	.04		**.13**	.02	
	Activity Level	**.24**	**-.10**	**1.20(11.51%)**	**.18**	-.01		**.21**	.01	
	Gregariousness	-.05	.05		**-.07**	.04		-.05	.03	
	Positive Emotions	**.34**	-.08	2.13(1.66%)	**.39**	.01		**.38**	.01	
	Warmth	**.14**	.00		**.12**	-.03		**.09**	.00	
	Excitement-Seeking	-.01	.01		.04	.02		.01	.01	
Negative Affect	Assertiveness	-.01	-.01		-.03	.02		.01	.04	
	Activity Level	.02	-.03		-.02	-.02		-.02	-.04	
	Gregariousness	-.05	.03		**-.13**	.03		**-.13**	**.06**	
	Positive Emotions	**-.54**	**.17**	**1.59(5.59%)**	**-.56**	.02		**-.58**	.03	
	Warmth	**.14**	-.06	1.67(4.75%)	**.24**	-.10	1.20(11.51%)	**.18**	-.10	0.90(18.41%)
	Excitement-Seeking	**.08**	-.02		**.17**	.00		**.14**	.00	
*OCB-I**	Assertiveness	**.19**	-.04		**.17**	-.01		**.18**	-.01	
	Activity Level	**.12**	.01		**.06**	.00		.05	.02	
	Gregariousness	-.05	.04		**-.09**	**.06**		**-.09**	**.07**	
	Positive Emotions	-.05	.03		-.06	.02		-.04	.04	
	Warmth	**.25**	**-.10**	**1.25(10.57%)**	**.30**	-.05		**.27**	-.07	1.93(2.68%)
	Excitement-Seeking	.03	.01		**.06**	.05		**.06**	.02	
*OCB-O**	Assertiveness	**.33**	-.06	2.75(0.30%)	**.30**	-.03		**.29**	-.02	
	Activity Level	**.11**	-.05		**.06**	-.01		**.09**	.00	
	Gregariousness	-.04	.03		**-.08**	.04		**-.10**	.04	
	Positive Emotions	-.02	.06		-.03	.03		.00	.03	
	Warmth	**.20**	**-.11**	**.91(18.14%)**	**.24**	-.06		**.22**	-.03	
	Excitement-Seeking	-.03	.05		.01	**.06**		.01	.04	
*WD-I**	Assertiveness	**.19**	-.06		**.17**	-.03		**.17**	.00	
	Activity Level	.03	-.02		-.02	.01		-.04	.01	
	Gregariousness	.02	.05		.03	.02		**.10**	.01	

	Positive Emotions	**-.14**	-.05		**-.08**	-.03		**-.11**	-.04	
	Warmth	**-.28**	.07	2.00(2.28%)	**-.27**	.04		**-.29**	.05	
	Excitement-Seeking	**.06**	.01		**.16**	.04		**.16**	.04	
*WD-O**	Assertiveness	-.03	-.01		-.01	.03		.03	.02	
	Activity Level	**-.09**	-.01		**-.21**	.01		**-.22**	.00	
	Gregariousness	-.02	.05		.00	.04		.03	.03	
	Positive Emotions	**-.14**	-.01		-.07	.00		**-.10**	-.02	
	Warmth	**-.14**	.01		**-.14**	.03		**-.19**	**.06**	
	Excitement-Seeking	**.17**	-.05		**.26**	.01		**.25**	.01	
NPI- GE	Assertiveness	**.20**	.05		**.18**	**.09**		**.18**	**.09**	
	Activity Level	**.06**	**-.07**	**.43(33.36%)**	**-.06**	-.04		-.05	-.03	
	Gregariousness	**.34**	.02		**.33**	.02		**.33**	.01	
	Positive Emotions	-.02	.04		.04	.00		.01	-.02	
	Warmth	**-.15**	.01		**-.10**	-.03		**-.09**	**-.07**	
	Excitement-Seeking	**.12**	**-.07**	**.86(19.49%)**	**.28**	-.04		**.23**	-.03	
NPI-EE	Assertiveness	**.36**	.02		**.41**	.02		**0.5**	.02	
	Activity Level	**.12**	-.03		-.01	.02		-.02	.01	
	Gregariousness	**.07**	.01		.02	.04		.01	.05	
	Positive Emotions	**-.12**	**.10**	**.60(27.43%)**	**-.09**	.01	4.5(0.00%)	**-.14**	-.03	
	Warmth	**-.17**	**-.07**	**-1.21(11.49%)**	**-.16**	**-.06**	**-1.33 (9.68%)**	**-.19**	**-.07**	**-1.36(9.31%)**
	Excitement-Seeking	.03	**-.07**	**.21(41.68%)**	**.20**	-.03		**.17**	-.04	
NPI-LA	Assertiveness	**.68**	-.02		**.68**	.02		**.69**	.02	
	Activity Level	**.10**	-.04		.03	.00		.03	-.01	
	Gregariousness	**.09**	-.03		.04	-.03		.05	-.01	
	Positive Emotions	.03	.03		**.06**	.01		**.05**	-.03	
	Warmth	**-.15**	-.04	-1.88(3.00%)	**-.08**	-.06	-0.07(47.21%)	**-.13**	-.07	-.93(17.62%)
	Excitement-Seeking	.12	**-.04**	**1.50(6.68%)**	**.15**	-.03		**.14**	-.04	1.75(4.01%)

Note. Values in bold are significant at $p < .05$. N=1,282

*Indicates the values under the GGUM columns reference a model where the UFFM-I Extraversion scale uses a GGUM model, while the outcome variables use a GRM model. Inflection Point (Percent affected) in bold indicates that the inflection point of the significant relationship affected at least 5% of the population. If the GGUM relationship is not significant at this level, the GRM and CTT relationships are not bolded/considered regardless of their inflection point.

At the facet level, the GGUM approach identified 15 significant curvilinear relationships. However, a significant relationship was only considered practically significant if the inflection point affected 5% of the population or more, resulting in the analysis of 10 significant relationships. The GRM and CTT approach were both only able to identify 1 of these significant curvilinear relationships, which interestingly was the same relationship for both approaches (warmth and Narcissism-EE).

GGUM Significant Linear Relationships

Although the purpose of this study is to examine significant curvilinear relationships under the GGUM, it is important to point out the significant linear relationships the GGUM identified, as these relationships are just as meaningful. This section focuses on the facet level relationships that had a significant linear term, but a non-significant curvilinear term (Table 6.3).

The facet of assertiveness had the most significant linear relationships (7), with a range of positive (positive affect, OCBs) and negative (WD-I, narcissism) outcomes. Notably, all seven relationships were positive, suggesting the facet of assertiveness has a linear relationship to both positive and negative outcomes. The facet of warmth had six significant linear relationships, of which five were with negative outcome variables (e.g., negative affect, WD, narcissism). While warmth had a negative linear relationship with four of these negative outcome variables, which we would expect, it interestingly had a positive relationship with negative affect ($\gamma_L = .14$). This relationship did have a significant curvilinear term, but had an inflection point that affected less than 5% of individuals, and thus was not addressed in the significant curvilinear section. This suggests that typically there is a positive relationship between warmth and negative affect, but at the extreme high end of warmth (the top 4.75% of individuals), there is a negative relationship between warmth and negative affect. This is a surprising finding, as we would expect a negative

linear relationship between negative affect and warmth. One explanation for this finding is resource depletion, such that individuals higher in warmth have less emotional resources to give to their affect, resulting in higher negative affect.

The facet of activity level had five significant linear relationships, including both positive (OCB) and negative (narcissism) outcomes. Four of these relationships were positive (OCB-I, OCB-O, narcissism-EE, narcissism-LA), suggesting the facet of activity level is linked to positive outcomes for the organization while simultaneously associated with the negative outcome of narcissistic tendencies. The fifth relationship (activity level and WD-O) was negative (γ_L = -.09). Taken together with the relationships of activity level and OCB, this suggests that those higher in activity level are more likely to partake in positive behavior (OCBs) and less likely to partake in negative behavior (WD).

Each of the final three facets (gregariousness, positive emotions, excitement-seeking) had three significant linear relationships. Gregariousness had a positive relationship with all three dimensions of narcissism, suggesting gregariousness is a key facet for narcissistic tendencies. Positive emotions had a positive relationship with positive affect, and two negative relationships with the two dimensions of WD, all of which were expected. Finally, excitement-seeking had three positive relationships: negative affect, WD-I and WD-O. This suggests that in regards to linear relationships, the facet of excitement-seeking is related to negative outcome variables.

GGUM Significant Curvilinear Relationships

Next, I examined the significant curvilinear relationships between the extraversion facets and three types of outcome variables: psychological well-being (captured by affect), narcissistic tendencies, and the performance variables OCB and WD.

For positive affect, one significant curvilinear relationship was identified with the facet of activity level. This relationship had an expected inverted-U relationship with positive affect (Figure 6.1), with an inflection point at 1.2 *SD* above the mean activity level. This finding suggests that for most respondents, higher activity level is associated with higher positive affect, but that for the top 11.5% of respondents, activity level has a negative relationship with positive affect. Additionally, only one significant curvilinear relationship was identified for negative affect. The expected negative (U-shaped) curvilinear relationship with negative affect was found between positive emotions and negative affect, with an inflection point at 1.59 *SD* above the mean positive emotions level (Figure 6.1). This suggests that in general, increased levels of positive emotions are associated with decreased levels of negative affect, but the top 5.59% of individuals exhibit a positive relationship between negative affect and positive emotions.

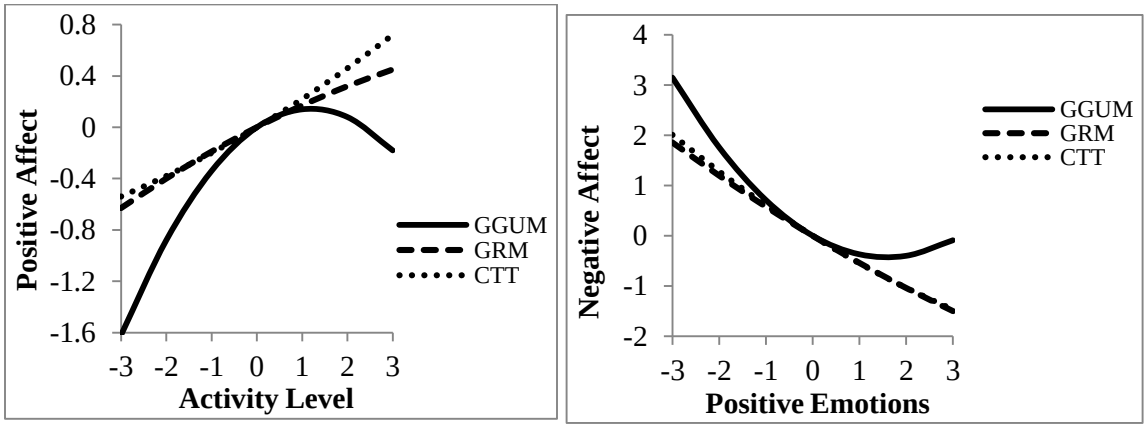

Figure 6.1. Curvilinear relationship of activity level with positive affect and positive emotions with negative affect.

The three narcissistic tendencies variables displayed the most complex significant curvilinear relationships with the extraversion facets. EE narcissism had significant curvilinear relationships with three facets: positive emotions, excitement-seeking, and warmth (Figure 6.2). The relationship between EE narcissism and positive emotions was a U-shape, with an inflection

point at .60 *SD* above the mean level of positive emotions. This suggests that the majority of respondents have a negative relationship between positive emotions and EE narcissistic tendencies, but that the top 27.43% of respondents exhibit a positive relationship between these two traits. The second significant curvilinear relationship for EE narcissism was with the facet of excitement-seeking, which exhibited an inverted-U shape with an inflection point at .21 *SD* above the mean level of excitement-seeking. Thus, the majority of respondents have a positive relationship between EE narcissism and excitement-seeking, but the top 41.68% of individuals exhibit a negative relationship between these two traits. The final significant curvilinear relationship for EE narcissism was with the facet of warmth; this relationship exhibited an inverted-U shape with an inflection point of 1.21 *SD* below the average level of warmth. This suggests the bottom 11.49% of respondents' exhibit a positive relationship between warmth and EE narcissism, while the rest of respondents exhibit a negative relationship.

GE narcissism exhibited significant curvilinear relationships with the facets activity level and excitement-seeking, both of which had an inverted-U shape (Figure 6.3). The inflection points were .43 for activity level and .86 for excitement-seeking. This suggests that GE narcissism has positive relationships with activity level and excitement-seeking, but the percentage of the population above their inflection points (33.36% and 19.49%, respectively) exhibit a negative relationship between GE narcissism and the respective facet of extraversion.

Finally, LA narcissism presented a significant curvilinear relationship with only one facet of extraversion: excitement-seeking (Figure 6.4). This relationship had an inverted-U shape, with an inflection point at 1.50. This suggests that LA narcissism and excitement-seeking are positively related, but the top 6.68% of respondents exhibit a negative relationship between these two traits.

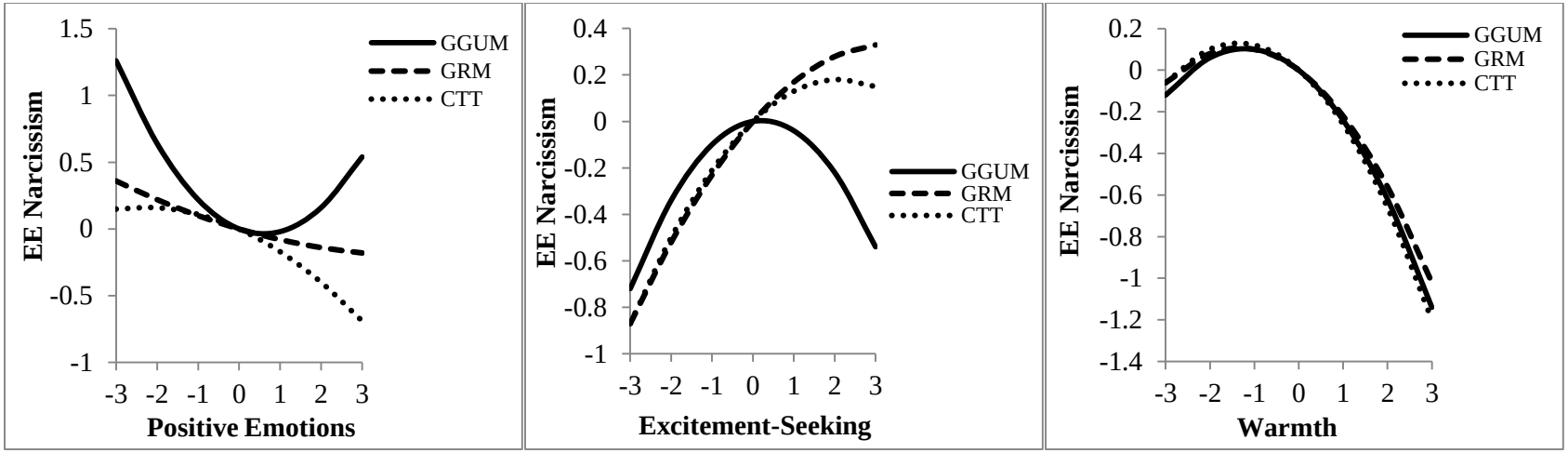

Figure 6.2. Curvilinear relationships of positive emotions, excitement-seeking, and warmth with EE narcissism.

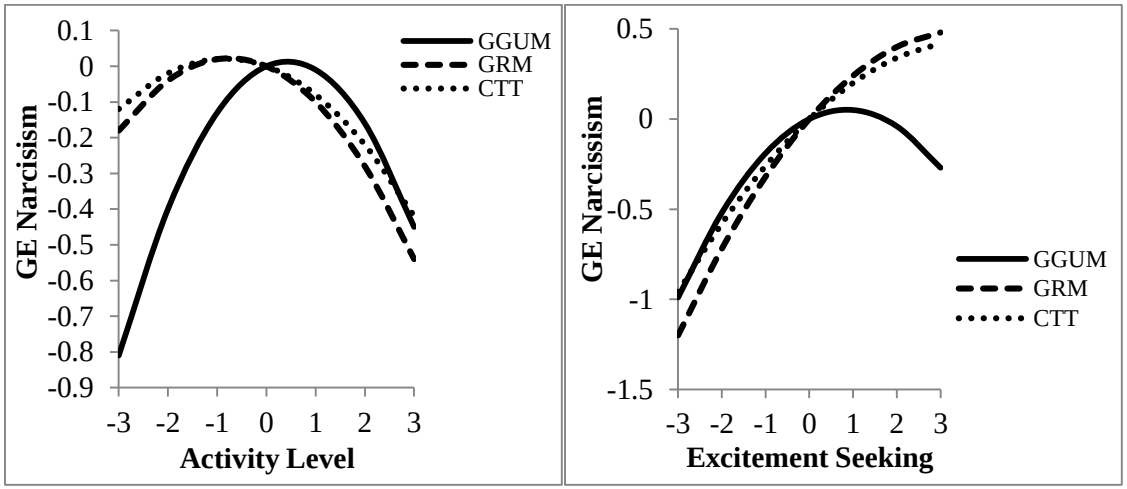

Figure 6.3. Curvilinear relationships of activity level and excitement-seeking with GE narcissism.

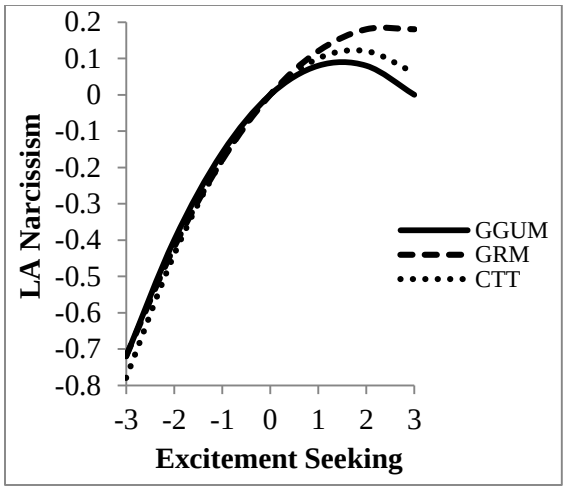

Figure 6.4. Curvilinear relationship of excitement-seeking with LA narcissism

Out of the two performance variables (OCB and WD), only OCB presented significant curvilinear relationships with certain facets of extraversion. Interestingly, both OCB-I and OCB-O were only significantly related to one facet: warmth (see Figure 6.5). The inflection point for OCB-I and OCB-O were 1.25 *SD* and .91 *SD*, respectively, above the mean level of warmth. This suggests that there is a positive relationship between both forms of OCB and warmth, but that the top 10.57% of respondents exhibit a negative relationship between OCB-I and warmth, and the top 18.14% of respondents exhibit a negative relationship between OCB-O and warmth.

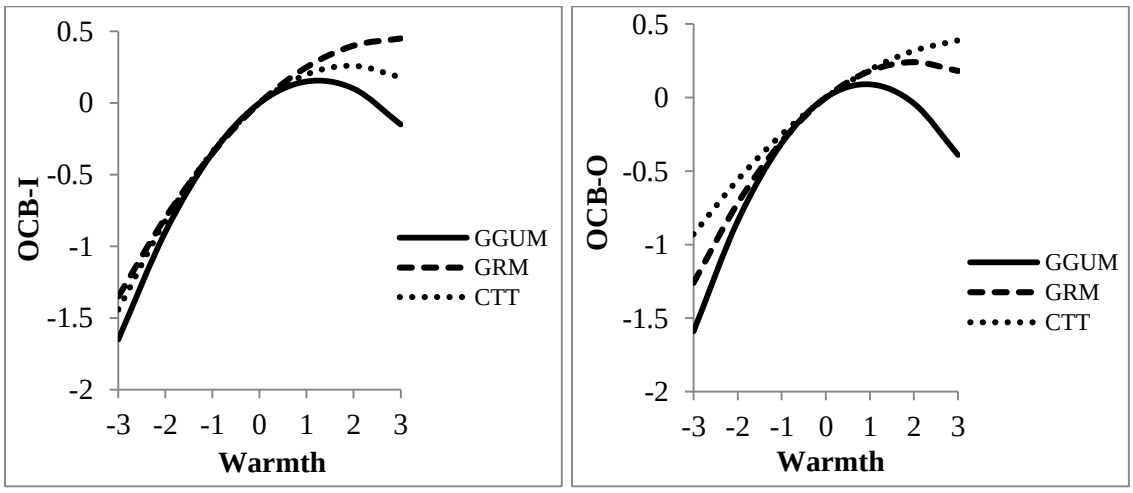

Figure 6.5. Curvilinear relationships of warmth with OCB-I and OCB-O.

CHAPTER 7

DISCUSSION

General Conclusions

The focus of this study was the development of a set of ideal point measures of the facets of extraversion and a comparison of those measures to measures constructed under dominance assumptions in detecting curvilinear relationships between extraversion and commonly associated correlates. I compared six predictive models: linear and curvilinear models of the three scoring approaches (GGUM, GRM, and CTT). Across model-data fit indices, the curvilinear GGUM predictive model outperformed the other models tested. This supports past research that the GGUM should be utilized when curvilinear relationships are expected (Carter et al., 2014). I addressed both linear and curvilinear relationships at the facet level, to uncover relationships that might otherwise be masked if extraversion was examined from a general perspective, as well as those that appear to be simply linear. Interestingly, I found 10 significant curvilinear relationships utilizing the ideal point approach, which I discuss below.

First, I examined aspects of psychological well-being through the measurement of positive and negative affect. Positive affect had a significant curvilinear relationship with one facet: activity level. For the majority of respondents, there was a positive relationship between positive affect and activity level, which is consistent with past research (Pasco et al., 2011; Samson, Solomon, & Stewart, 2013). However, the curvilinearity suggests that the top 11.5% of respondents exhibited a negative relationship between positive affect and activity level. Although this specific curvilinear relationship has not been studied before, a recent study found an

inverted-U curvilinear relationship between positive affect and proactive behaviors (Lam, Spreitzer, & Fritz, 2014). Interestingly, Lam and colleagues defined proactive behaviors in terms of action – which relates itself back to the action associated with the activity level facet. The authors suggested those highest in positive affect will perceive all situations as positive, and thus would not feel the need to engage in proactive behavior, as there is nothing to address or fix. Applied to this study, this rationale would suggest that compared to those moderately high in positive affect, individuals highest in positive affect will have a lower activity level due to the perception that all situations or environments are positive, meaning there is less activity type behavior to consider.

Negative affect had a significant curvilinear relationship with only one facet of extraversion: positive emotions. Although there was generally a negative relationship between negative affect and positive emotions, the top 5.59% of respondents indicated a positive relationship between these two traits. This curvilinear relationship could be due to the concept of resource depletion, such that individuals with extremely high positive emotions experience resource depletion, resulting in increased negative affectivity. This finding extends past research, which has linked resource depletion and state levels of affect (Martinez-Inigo, Poerio, & Totterdell, 2013; Tice, Baumeister, Shmueli, & Muraven, 2007). This is an interesting finding in regards to well-being, as typically we would assume the more positive emotions an individual experiences the more positive affect they would have.

As mentioned previously, the curvilinear relationships between the three narcissistic traits and the facets of extraversion were by far the most complex. The facet of excitement-seeking was the only facet with significant curvilinear relationships with all three narcissistic traits. Whereas past research has suggested a positive relationship between excitement-seeking and

narcissism (c.f. Miller et al., 2009), this finding suggests that those highest in narcissistic tendencies are only moderately high in excitement-seeking. Past research has argued the relationship between narcissism and excitement-seeking was positive due to the approach orientation of narcissists (as opposed to avoidance orientation) (Miller et al., 2009), such that individuals with an approach orientation are guided by behavior leading to positive outcomes (Elliott & Thrash, 2002). However, research suggests that narcissists partake in both adaptive and maladaptive behavior (c.f. Myers, Zeigler-Hill, & Barry, 2013). Thus, the finding of the current study, that those highest in narcissism are only moderately high in excitement-seeking, may be tapping into both the adaptive and maladaptive aspects of narcissism.

EE Narcissism was the only narcissism dimension with significant curvilinear relationships to the facets of positive emotions and warmth, such that those with the highest levels of EE Narcissism would have *either* very low or very high levels of positive emotion and moderately low warmth. This finding of two extreme levels of positive emotions associated with EE narcissism supports recent literature that has demonstrated differences between those high in exploitativeness (more likely to accept transgressions, use personal reasoning over moral reasoning) and those high in entitlement (less likely to accept transgressions, use prudential reasoning over personal reasoning) (Daddis & Brunell, 2015). Furthermore, the significantly curvilinear relationship between EE narcissism and excitement-seeking suggests those with the highest levels of EE narcissism are moderately high in excitement-seeking. This finding supports recent research, which suggests that one aspect of EE, exploitativeness, is associated with risk-taking, while the other aspect, entitlement, was associated with immediate rewards and less risk (Buelow & Brunell, 2014). Thus, individuals high in EE narcissism have attributes of both exploitativeness and entitlement, which balances out to a moderate level of excitement-seeking.

Additionally, GE narcissism was only narcissism dimension with a significant curvilinear relationship to the facet activity level. Typically, GE narcissism is related to superiority, self-absorption and a need for attention or admiration. The curvilinearity suggests that those highest in GE narcissism have a decreased level of activity, supporting previous findings of self-absorption (Ackerman et al., 2011). In other words, the self-absorption aspect of GE narcissism may result in a decreased desire for activity or a fast-paced life. Notably, those highest in GE narcissism show only moderate levels of excitement-seeking. One explanation for this finding is that those high in GE narcissism due tend to be impulsive (Wink, 1991), while simultaneously possessing a constant need for attention (Ackerman et al. 2011). Thus, those high in GE narcissism may be moderately high in excitement-seeking in that they are naturally impulsive, but their need for attention may produce a counter effect for excitement-seeking or impulsivity. In other words, those highest in GE narcissism have a stronger need to be the center of attention than their need for excitement-seeking.

As mentioned previously, LA narcissism had only one significant curvilinear relationship at the facet level: excitement-seeking, which interestingly was also significant for the other dimensions of narcissism. This relationship had an inverted-U shape, with an inflection point at 1.50 SD above the mean of excitement-seeking. This suggests that LA narcissism and excitement-seeking are positively related, but the top 6.68% of respondents exhibit a negative relationship between these two traits. This supports past research, which found the leadership component and desire for career success of LA narcissism was negatively related to arousal procrastination, a type of thrill-seeking behavior in the workplace (Lyons & Rice, 2014).

The performance variables of OCB-I and OCB-O, both showed an inverted-U shape relationship with the facet of warmth. This finding supports past research that identified

significant curvilinear relationships between OCB and extraversion facets such as surgency (Moon et al., 2008). The nature of the curvilinear relationships was inverted-U shaped for both dimensions of OCB, suggesting that those who exhibit the highest level of OCBs are actually lower in warmth than those who participate in a moderately high amount of OCBs. Like the negative affect and positive emotions curvilinear relationship, this finding may also be explained through resource depletion. Thus, those highest in warmth are constantly depleting their resources, and therefore aren't able to partake in as many OCBs as their moderately high warmth counterparts. Taken together with the previous finding that those highest in positive emotions have higher levels of negative affect than their moderately high counterparts, this suggests that those highest in warmth and positive emotions also experience resource depletion in the form of increased negative affect and decreased OCBs. These individuals may feel underappreciated for the OCBs they perform, as well as negative affectivity when others lower in warmth do not provide the same level of warmth when in need. In sum, individuals with extreme positive emotions and extreme warmth also experience more extreme affect in general, which depletes their resources and in turn limits their performance.

After examining curvilinear findings at the specific facet level, I analyzed the significant findings for both the linear and curvilinear aspects of the facets in regards to specific outcome variables to better paint the "big picture" of these findings, and so as not to ignore linear relations in focusing on curvilinearity. First, I computed the percent of variance that was shared amongst the six facets and four outcomes: increased narcissism, decreased narcissism, increased affective well-being and decreased affective well-being (Table 7.1). For instance, the percent variance shared between increased narcissism and assertiveness was computed as the sum of the squared path coefficients any linear or curvilinear term that was both significant and positive for the three

dimensions of narcissism (found in Table 6.3). For example, to compute the total variance contributing to decreased narcissism from the facet of low warmth, I only examined coefficients that were significantly and negatively related. Specifically, I used the three significant linear coefficients from each dimension of narcissism (EE: γ_L =-0.17, GE: γ_L =-0.15, LA: γ_L =-0.15), and the one curvilinear coefficient that was significant (EE: γ_C =-0.07) which resulted in 7.9%.

I then computed the correlation between the facet level percentages of variance shared by each outcome. As can be seen in Table 7.1, increased affective well-being was not significantly related to increased or decreased narcissism, but decreased affective well-being was significantly related to both increased narcissism ($r(6) = .57$)[1] and decreased narcissism ($r(6) = .52$). In other words, increased narcissism leads to higher well-being, while decreased narcissism leads to decreased well being. This finding is in line with recent research, which found that narcissist's positive affect is not susceptible to the emotional contagion of others, due to their lack of empathy (Czarna, Wrobel, Dufner, & Zeigler-Hill, 2015). In regards to narcissism, the results of the current study suggest a positive outcome of narcissism is increased well-being compared to those low in narcissism. At the same time, this highlights one of the negative consequences of extraversion. Individuals high in certain facets of extraversion that are linked to narcissistic traits may personally benefit from increased well-being. However, this may negatively effect individuals they interact with, as their lack of empathy will lead to an inability to comfort others experiencing negative affect. As our findings suggest those low in narcissism experience decreased well-being, interaction with someone high in narcissism who is unable to provide the empathy they need may result in even lower levels of well-being, while the individual high in narcissism is unaffected by the interaction.

[1] Note. The Pearson correlation is computed as measure of consistency. The small number of observations, N=6, should be considered in interpretation.

Table 7.1 Summary of overlap of each Extraversion facet with increased and decreased narcissism and overlap with increased and decreased affective well-being.

Extraversion facet	% Variance shared with Increased Narcissism	% Variance shared with Decreased Narcissism	% Variance shared with Increased Affective Well-Being	% Variance shared with Decreased Affective Well-Being
Assertiveness	**63.2%**	.0%	1.4%	.0%
Activity Level	2.8%	.5%	**5.8%**	1.0%
Gregariousness	**12.9%**	.0%	.0%	.0%
Positive Emotions	1.0%	1.4%	**40.7%**	2.9%
Warmth	.0%	**7.9%**	2.0%	2.0%
Excitement-Seeking	1.4%	1.1%	.0%	.6%
Correlation with Increased Narcissism			-.27	**-.57**
Correlation with Decreased Narcissism			-.06	**.52**

Note. Values in bold indicate variance explained greater than 5% or correlations greater than .50.

Finally, I extended the findings of Table 7.1 by examining the overlap of variance between each extraversion facet, narcissism, and performance. Notably, the first, second, and third columns in Table 7.2 are identical to those in Table 7.1. Performance was measured at two levels: increased and decreased individual-oriented performance (OCB-I and WD-I), and increased and decreased organization-oriented performance (OCB-O and WD-O). The examination of the overlap between narcissism and performance at the facet level is especially of interest. Three of these narcissism-performance relationships were highly correlated (decreased narcissism and increased individually-oriented performance = 0.94; increased narcissism and decreased individually-oriented performance = 0.92; increased narcissism and increased organizational-oriented performance = .79). These findings suggest that to the extent a given extraversion facet shares variance with increased narcissism, the more the specific facet will share variance with decreased interpersonal performance. However, the opposite is true for increased narcissism and increased performance; the extent to which a given extraversion facet

shares variance with decreased narcissism, the more the specific facet will share variance with decreased performance.

Past research has suggested that extraversion can initially result in positive outcomes such as emergence as a leader, but that there are negative consequences associated with extraversion, such as narcissistic tendencies (Brunell, Gentry, Campbell, Hoffmann, Kuhnert, & DeMarree, 2008). This finding is critically important for the workplace; it suggests that the facets of extraversion that lead to increased organizational performance also leads to decreased individual performance. Moreover, this supports past research on narcissism rooted in socioanalytic theory and self-presentation strategies: that narcissists are oriented toward getting ahead (decreased individually-oriented performance) rather than getting along (increased organizational-oriented performance) (Campbell, Rudich, & Sedikies, 2002; Raskin, Novacek, & Hogan, 1991; Roberts & Robins, 2000).

In sum, the personality trait of extraversion presents a paradox for researchers and practitioners alike; it can result in positive outcomes for the organization such as increased performance, but can result in negative outcomes for other employees, such as interpersonal conflict and workplace incivility. This highlights the strength of the relationship between extraversion and narcissistic tendencies, as past research has viewed narcissism as a paradox (Morf & Rhodewalt, 2001). For instance, narcissists are constantly attempting to improve their standing in regard to the perceptions of others, while simultaneously turning others away through characteristics such as a lack of empathy. This study extends these previous findings by examining these relationships at the facet level and questioning the conventional assumption of linearity to gain a deeper insight as to which facets of extraversion are truly driving each relationship.

Table 7.2 Summary of overlap of each Extraversion facet with increased and decreased narcissism, overlap with increased and decreased interpersonally-bound performance (OCB-I and WD-I), and overlap with increased and decreased organization-bound performance (OCB-O and WD-O).

Extraversion Facet	% Variance shared with Increased Narcissism	% Variance shared with Decreased Narcissism	% Variance shared with Increased Performance (Individual)	% Variance shared with Decreased Performance (Individual)	% Variance shared with Increased Performance (Organizational)	% Variance shared with Decreased Performance (Organizational)
Assertiveness	**63.2%**	.0%	3.6%	**3.61%**	**10.9%**	.0%
Activity Level	2.8%	.5%	1.4%	.0%	2.0%	.0%
Gregariousness	**12.9%**	.0%	.0%	.0%	.0%	.0%
Positive Emotions	1.0%	1.4%	2.0%	.0%	2.0%	.0%
Warmth	.0%	**7.9%**	**14.1%**	1.0%	**6.0%**	1.2%
Excitement-Seeking	1.4%	1.1%	.0%	.4%	.0%	2.9%
Correlation with Increased Narcissism			-.08	**.92**	**.79**	-.35
Correlation with Decreased Narcissism			**.94**	-.04	.20	.30

Note. Values in bold indicate variance explained greater than 5% and correlations greater than .50.

Limitations

Though this study is the first to develop ideal point extraversion measures for each of its six facets, there are always limitations. Two of the outcome variables that captured areas of performance (OCB and WD) were measured via self-report. Past meta-analyses have shown that for variables regarding behavior such as these, there is often over-reporting of positive or prosocial behavior in self-report situations versus the reporting of other raters (Carpenter, Berry, & Houston, 2014). However, this difference is usually small and thus likely does not contribute to a significant change in variance (Carpenter et al., 2014). Still, future research should examine curvilinear relationships between extraversion and behavioral outcomes such as OCB's or WD behaviors that are measured by raters others than the individuals themselves.

Finally, although the results showed evidence of construct validity, evidence of validity is never finished or complete. Future research is needed to provide additional psychometric evidence of validity and reliability of these measures. Furthermore, the findings indicate a need for future research to confirm the curvilinear relationships found in this sample can be replicated in other samples.

Conclusion

The study at hand has taken a small step to better our understanding of the personality trait of extraversion in regards to the point at which it begins to result in negative outcomes instead of the expected positive outcomes. This study supports recent findings that facets of personality traits explain above and beyond what we can predict at the general trait level (Judge et al., 2013; Carter et al., unpublished manuscript). The results suggest there are unique relationships at the facet level of extraversion related to the outcome variables mentioned.

Although future research is needed, this study adds to the literature in three major ways. First, it supports recent findings that the use of an ideal point process for scale development as well as scoring results in increased ability to detect curvilinear relationships (Carter et al., unpublished manuscript). Second, this study opens the door to a new realm of questions regarding specific extraversion facet level relationships with all outcome variables. Specifically, even relationships between general extraversion and outcome variables that are typically accepted should be re-examined at the facet level, where curvilinear relationships may be masked. Finally, this is the first study to examine specific facets of extraversion in relation to both narcissism and performance related outcomes, such as OCBs and WD behaviors. This extends previous research on extraversion and narcissism in relation to getting along or getting ahead by examining specific facets of extraversion that are driving these personality-performance relationships.

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APPENDIX A: POOL OF DOMINANCE EXTRAVERISON ITEMS

Warmth facet items

Item #	Item	Mean	SD	% Agree
1	I do not want to be involved in other people's problems.	1	0	1
2	I get uncomfortable if others share their feelings with me.	1.25	0.5	1
3	I hold myself and others at a distance.	1.5	1	0.75
4	I am bad at keeping in touch with people.	1.75	0.96	1
5	I am often negative towards people.	1.75	0.5	1
6	I find it difficult to show that I care.	1.75	0.5	1
7	I only share my feelings with close friends.	2	0.81	1
8	I only smile at strangers when I feel like it.	2.25	1.26	1
9	I am only interested in the lives' of people I am close to.	2.25	0.96	1
10	I am shy until I get to know someone well.	2.75	1.23	1
11	Occasionally I make an effort to reach out to people.	3	1.41	1
12	I can grow to trust people with time.	3	1.41	1
13	Occasionally I can show a warm and caring side.	3.25	0.5	1
14	I can comfort someone if I know them well.	3.5	0.58	1
15	When I have the energy I can cheer people up.	4.25	0.96	0.75
16	Typically I come off as welcoming, unless I'm in a really bad mood.	4.5	0.58	1
17	Most of the time I enjoy when others share their feelings with me.	5.25	0.5	1
18	I would say I'm a bit more caring than the average person.	5.25	1.26	1
19	The majority of the time I am a caring person.	5.5	0.58	1
20	Most of the time I am in a good mood.	5.5	0.58	1
21	Most of the time I am positive towards others.	5.75	0.5	1
22	I naturally make eye contact and smile at strangers.	6	1.15	1
23	People find it easy to talk to me.	6.25	0.96	1
24	I show my gratitude to others often.	6.25	0.5	1
25	I always give people the benefit of the doubt.	6.5	0.58	1
26	People come to me in their time of need.	6.5	0.58	1
27	I easily empathize with others.	6.75	0.5	15t
28	I like people instantly.	6.75	0.5	0.75
29	I am an inviting person to everyone I meet.	6.75	0.5	0.75

30	I am sincerely interested in the well-being of others.	7	0	1

Gregariousness facet items

Item #	Item	Mean	SD	% Agree
1	I do not enjoy having company over.	1	0	1
2	I am considered a loner.	1	0	1
3	I am uncomfortable around others.	1.25	0.5	1
4	I actively avoid large gatherings.	1.25	0.5	1
5	I prefer solitary activities.	1.5	0.58	1
6	I like to work in places where I can be left alone.	1.75	0.5	1
7	I typically stick to myself.	1.75	0.5	1
8	Sometimes I make up excuses to get out of large group activities.	2.5	1	1
9	Sometimes I prefer to stay in rather than go out with friends.	2.5	0.58	1
10	I prefer small gatherings over large parties.	2.5	0.58	1
11	I do not mind being alone.	3	0.82	1
12	I don't need to be around people, but I definitely prefer it.	3	1.26	1
13	I can tolerate large crowds if there is a purpose for it.	3.5	1	1
14	I enjoy being social but I also want time to myself.	3.75	0.5	1
15	I enjoy being around friends, but I need alone time as well.	3.75	0.5	1
16	I don't dislike large crowds but I don't love them either.	4	0	1
17	I sometimes enjoy being out in public depending on my mood.	4.25	0.96	1
18	I enjoy being around people as much as the average person.	4.25	0.96	1
19	A lot of the things I do in my spare time are with other people.	5.25	0.5	1
20	Most of the time I prefer to work with others rather than alone.	5.5	0.58	1
21	I try to avoid being alone.	5.75	0.96	1
22	I feel compelled to be around people.	6	0.82	1
23	When I am sad I prefer to be around others rather than being alone.	6	1.4	1
24	I find the company of others stimulating and rewarding.	6.25	0.96	1
25	I want to involve everyone in my plans.	6.5	0.56	1
26	I'm always finding an excuse to go out to anything social.	6.75	0.5	1
27	My favorite time of the day is when I get to be around people.	6.75	0.5	1

28	I go to large parties every chance I get.	6.75	0.5	1
29	I love having company at my house, no matter who or when.	7	0	1
30	I am excited by large groups of people.	7	0	1

Excitement-Seeking facet items

Item #	Item	Mean	SD	% Agree
1	I hate being out of my comfort zone.	1	0	1
2	I don't take part in reckless behavior.	1	0	1
3	I never want to put my life in danger.	1.25	0.5	1
4	I always want things planned out and scheduled.	1.5	0.56	1
5	Loud music bothers me.	1.5	0.58	1
6	I am not spontaneous.	1.75	0.96	1
7	Surprise parties are fun in theory, but I would never want one.	2	0.82	1
8	I prefer to know what I will encounter from day to day.	2	0.82	1
9	I want to try skydiving or bungee jumping but my fear keeps me from doing them.	2.25	0.96	1
10	If I am going somewhere new, I need the trip to be planned.	2.5	1	1
11	Occasionally I will seek adventure.	3	1.4	1
12	I will try new things if I know all possible risks.	3.25	1.5	1
13	I will take a risk if it doesn't have any major consequences.	3.25	1.26	1
14	I believe life needs to be experienced, but within certain limits.	3.75	1.5	1
15	I will try things out of the ordinary but nothing too crazy.	3.75	0.96	1
16	I want to try new things but I don't want to risk getting hurt.	4	0.82	1
17	I am afraid of heights but I enjoy being on planes.	4	0.82	1
18	I am open to new experiences, as long as it is not illegal.	4.25	1.26	1
19	I prefer flexibility over structure.	5.5	1.29	1
20	I like jobs that present me with different challenges every day.	5.5	1.29	0.75
21	I don't like following routines.	5.75	0.96	1
22	I frequently speed when I'm driving.	5.75	0.96	1
23	I would try anything at least once.	6	0.82	1
24	Loud noises excite me.	6	0.82	1
25	I prefer adventurous vacations over a relaxing vacation.	6.25	0.96	1
26	I am an adrenaline junkie.	6.75	0.5	1
27	I prefer to be in new and unfamiliar places.	6.75	0.5	1

28	I enjoy being reckless.	6.75	0.5	1
29	I seek adventure at all times.	7	0	1
30	Danger makes me feel alive.	7	0	1

Assertiveness facet items

Item #	Item	Mean	SD	% Agree
1	I will not go up and talk to someone even if I want to.	1	0	0.75
2	I would never want to be a boss.	1.25	0.5	1
3	Even when I have something to say I almost always keep it to myself.	1.25	0.5	1
4	I do not want attention drawn to me.	1.5	0.58	1
5	I am often taken advantage of or pushed around.	1.5	0.56	1
6	I find it difficult to share my ideas in group discussions.	1.75	0.5	1
7	I find it difficult to communicate my point of view.	2	0.82	1
8	I am uncomfortable expressing criticism.	2.25	0.96	1
9	I find it hard to stand up for things I believe in unless I have support.	2.25	0.95	1
10	I don't enjoy telling people what to do.	2.25	0.96	1
11	Sometimes I ask for advice, but I am never the leader.	2.5	1	1
12	I don't mind voicing my opinion when I believe others will agree.	2.75	1.26	1
13	I will share my opinion if asked.	2.75	1.26	1
14	I sometimes raise my voice, but not often.	3	1.41	1
15	I only want to be the center of attention if I have something important to say.	3.5	0.58	0.75
16	I don't mind telling people what to do but I prefer not to.	3.75	0.96	1
17	Sometimes I will give constructive criticism.	4	0.82	1
18	I will not force my way on others, but I usually have decent plans.	4	0.82	1
19	I would never be a bully, but I'm not a pushover either.	4.25	0.5	1
20	I will sometimes take control of situations when a leader is needed.	4.25	0.96	1
21	I enjoy delegating tasks on projects.	5.5	1.3	1
22	I am known to fight for things I think are unfair.	5.5	1.3	1
23	I am usually the first person to take action or speak up.	6.25	0.96	1
24	I love telling people what to do.	6.25	0.96	1
25	I do not let myself get bossed around by others.	6.25	0.96	1
26	I am aggressive in my endeavors.	6.5	1	1
27	I constantly find myself stepping up as a leader.	6.75	0.5	1
28	I can easily talk people into doing what I want them to.	6.75	0.5	1

29	I know what I want and I go for it.	6.75	0.5	0.75
30	I always state my opinion.	7	0	1

Activity Level facet items

Item #	Item	Mean	SD	% Agree
1	I constantly procrastinate	1.25	0.5	0.75
2	I tire easily.	1.25	0.5	1
3	I don't put myself in any type of situation requiring vigorous activity.	1.25	0.5	1
4	I spend a significant amount of time just sitting around.	1.5	0.58	1
5	I take things at a slow pace.	1.5	0.58	1
6	I need a push to get started.	1.5	0.58	0.75
7	I don't like being busy, it stresses me out.	1.75	0.96	1
8	I do not see the point of overworking myself.	2	0.82	0.75
9	I tend to walk slower than most people.	2	0.82	1
10	I savor my leisure time.	2.25	0.96	1
11	I do a couple of activities outside of work, but I still have plenty of free time.	3	0	1
12	I have hobbies because I enjoy them, not to stay busy.	3.25	1.5	1
13	I often procrastinate but I have learned to manage my time well enough.	3.25	0.5	0.75
14	I have times when I can get hyper but not often.	3.5	0.58	1
15	I am not lazy, but I do not fill every single second of my day.	3.5	0.58	1
16	I sometimes keep myself busy but I like to relax too.	3.75	0.5	1
17	I prefer a mixture of being busy and having nothing to do.	4	0	1
18	Sometimes I lose track of time, but then I catch back up.	5	1.41	1
19	Most of the time I try to keep myself busy.	5.25	0.96	1
20	I do things a little faster than the average person.	5.5	1	1
21	I have a little free time on my workdays but not much.	5.5	0.58	1
22	I enjoy filling my spare time with activities.	5.75	0.96	1
23	I always seem to be in a rush.	6	0.82	1
24	I accomplish a lot of work during my day compared to others.	6	0.82	1
25	I don't like to relax when I could be getting things accomplished.	6.25	0.96	1
26	I like to be constantly on the move.	6.5	0.58	1
27	I prefer to always be busy doing something.	6.5	1	1
28	I get restless if I do not have enough to do.	6.75	0.5	1
29	I prefer to live a fast paced life.	6.75	0.5	1

30	I am a very energetic person.	7	0	1

Positive Emotions facet items

Item #	Item	Mean	SD	% Agree
1	I prepare myself for failure instead of success.	1.25	0.5	1
2	I often feel overwhelmed by everyday stressors in my life.	1.25	0.96	1
3	I often lose my temper.	1.5	0.58	1
4	I am not easily amused.	1.5	0.58	1
5	I am typically pessimistic.	1.75	0.5	1
6	I find it hard to focus on positive things.	1.75	0.5	1
7	I prefer to expect nothing rather than get my hopes up on anything.	2	0.82	1
8	I often let small things dampen my mood.	2	0.82	1
9	It is hard for me to stay in good spirits when things don't go as planned.	2.25	0.96	1
10	I try to learn from my mistakes although I tend to beat myself up when I make them.	2.25	0.96	1
11	I look forward to the future only when it seems bright.	2.75	1.26	1
12	My emotions vary just like everyone else's.	3.25	1.5	1
13	I would say I'm a healthy mix of optimistic and pessimistic.	3.75	0.5	1
14	I laugh as often as the average person.	3.75	0.5	1
15	I think I am as happy as the next person.	4	0.82	1
16	I enjoy life, but it can be stressful.	4.25	0.96	1
17	I try to be as optimistic as my peers.	4.25	1.26	1
18	I am not naturally optimistic but I try to be.	4.5	0.58	1
19	I sometimes get sad but not too often.	4.5	0.58	1
20	Everything happens for a reason, sometimes good and sometimes bad.	5	1.41	1
21	I know I will face problems throughout the day but I will get through them.	5.5	1.3	1
22	I am easily amused.	6.25	0.96	1
23	I am enthusiastic in my daily life.	6.25	0.96	1
24	I am more optimistic than most people.	6.25	0.5	1
25	I remain in good spirits even if things don't go as planned.	6.5	0.58	1
26	I am always in high spirits	6.5	1	1
27	I believe there is always a silver lining.	6.5	1	1
28	I believe anything is possible.	6.75	0.5	1
29	I can still feel childlike joy.	6.75	0.5	1
30	I am a joyful person.	7	0	1

APPENDIX B: UFFM-I EXTRAVERSION MEASURES

UFFM-I Ideal Point Facet Scales

Warmth facet items

Item #	Item	δ	α
10	Occasionally I can show a warm and caring side.	1.15	0.89
12	I am often negative towards people.	-2.26	0.58
38	The majority of the time I am a caring person.	1.87	2.32
46	I can grow to trust people with time.	1.98	0.62
49	I always give people the benefit of the doubt.	2.46	0.57
60	Occasionally I make an effort to reach out to people.	1.54	0.81
61	I only smile at strangers when I feel like it.	-1.24	0.24
77	I am shy until I get to know someone well.	0.65	0.27
86	I find it difficult to show that I care.	-1.98	0.89
88	I would say I'm a bit more caring than the average person.	1.70	1.45
91	I get uncomfortable if others share their feelings with me.	-2.23	0.79
98	I am sincerely interested in the well-being of others.	2.24	1.91
110	I only share my feelings with close friends.	-0.54	.24
172	Typically I come off as welcoming, unless I'm in a really bad mood.	1.69	0.78
177	I am bad at keeping in touch with people.	-1.45	0.23

Gregariousness facet items

Item #	Item	δ	α
1	I am considered a loner.	-2.71	0.84
11	I prefer small gatherings over large parties.	-2.32	0.69
19	I don't dislike large crowds but I don't love them either.	0.59	0.40
22	I actively avoid large gatherings.	-2.67	1.02
44	I find the company of others stimulating and rewarding.	2.16	1.23
55	I don't need to be around people, but I definitely prefer it.	2.07	1.45
68	I am uncomfortable around others.	-2.39	0.81
87	Most of the time I prefer to work with others rather than alone.	1.89	0.73
97	When I am sad I prefer to be around others rather than being alone.	2.51	0.59
102	I do not mind being alone.	-2.50	0.65
104	I enjoy being around friends, but I need alone time as well.	0.12	0.38
138	I enjoy being social but I also want time to myself.	0.60	0.50
142	Sometimes I prefer to stay in rather than go out with friends.	-2.77	0.71
155	I prefer solitary activities.	-2.72	1.32
170	I am excited by large groups of people.	2.19	1.21

Excitement-Seeking facet items

Item #	Item	δ	α

3	Occasionally I will seek adventure.	1.57	0.85
14	I prefer adventurous vacations over a relaxing vacation.	1.62	0.82
31	I prefer to know what I will encounter from day to day.	-1.66	0.62
52	I would try anything at least once.	1.50	0.61
83	Loud noises excite me.	1.29	0.55
103	I never want to put my life in danger.	-1.75	0.64
107	I want to try new things but I don't want to risk getting hurt.	-0.82	0.78
115	I don't like following routines.	1.91	0.42
118	I believe life needs to be experienced, but within certain limits.	-0.94	0.50
120	I want to try skydiving or bungee jumping but my fear keeps me from doing them.	0.12	0.40
133	I hate being out of my comfort zone.	-2.02	0.64
153	I will try things out of the ordinary but nothing too crazy.	-0.40	0.27
156	I will try new things if I know all possible risks.	0.01	0.40
168	I always want things planned out and scheduled.	-1.79	0.53
174	I prefer to be in new and unfamiliar places.	1.68	0.94

Assertiveness facet items

Item #	Item	δ	α
62	I am usually the first person to take action or speak up.	2.28	1.13
69	I find it hard to stand up for things I believe in unless I have support.	-1.27	0.81
89	I only want to be the center of attention if I have something important to say.	0.43	0.27
109	Sometimes I ask for advice, but I am never the leader.	-1.98	1.29
111	I don't mind telling people what to do but I prefer not to.	-0.59	0.55
124	I will not go up and talk to someone even if I want to.	-1.72	0.73
126	I do not want attention drawn to me.	-2.5	0.53
141	I constantly find myself stepping up as a leader.	2.23	1.36
149	I am uncomfortable expressing criticism.	-1.61	0.59
154	I love telling people what to do.	1.72	0.74
158	I enjoy delegating tasks on projects.	1.81	0.90
167	I find it difficult to share my ideas in group discussions.	-1.87	1.13
173	I will sometimes take control of situations when a leader is needed.	2.26	1.65
175	Sometimes I will give constructive criticism.	2.61	0.82
180	I find it difficult to communicate my point of view.	-1.58	0.86

Activity Level facet items

Item #	Item	δ	α
17	I like to be constantly on the move.	1.47	0.90
23	Sometimes I lose track of time, but then I catch back up.	0.24	0.27
39	I savor my leisure time.	-0.39	0.24
59	I do things a little faster than the average person.	1.83	0.55
74	I sometimes keep myself busy but I like to relax too.	0.84	0.35
84	I don't like to relax when I could be getting things accomplished.	2.5	0.57
90	I prefer to live a fast paced life.	1.37	0.78
93	I accomplish a lot of work during my day compared to others.	2.72	0.51

105	I don't put myself in any type of situation requiring vigorous activity.	-2.13	0.22
116	I have hobbies because I enjoy them, not to stay busy.	-0.30	0.30
117	I do not see the point of overworking myself.	-1.53	0.34
137	I am not lazy, but I do not fill every single second of my day.	-0.69	0.46
145	I prefer a mixture of being busy and having nothing to do.	-0.27	0.45
152	I take things at a slow pace.	-2.23	0.65
179	I prefer to always be busy doing something.	2.08	1.14

Positive Emotions facet items

Item #	Item	δ	α
18	I am always in high spirits.	1.88	1.25
20	I know I will face problems through the day but I will get through them.	1.52	0.91
32	I would say I'm a healthy mix of optimistic and pessimistic.	0.43	0.77
33	I am not naturally optimistic but I try to be.	-0.74	0.66
53	I find it hard to focus on positive things.	-2.37	1.45
65	I think I am as happy as the next person.	1.42	1.87
73	It is hard for me to stay in good spirits when things don't go as planned.	-2.82	0.96
85	I remain in good spirits even if things don't go as planned.	1.95	1.27
96	I often feel overwhelmed by everyday stressors in my life.	-2.58	0.65
101	I often lose my temper.	-2.45	0.39
125	I am typically pessimistic.	-3.01	1.20
150	I sometimes get sad but not too often.	0.94	0.53
159	I laugh as often as the average person.	1.29	0.83
162	I try to be as optimistic as my peers.	1.51	1.44
169	I enjoy life, but it can be stressful.	-0.14	0.37

APPENDIX C: DOMINANCE EXTRAVERSION MEASURES

UFFM-I Dominance Scales

Warmth facet items

Item #	Item	δ
12	I am often negative towards people.*	-1.35
42	I easily empathize with others.	1.70
47	Most of the time I am positive towards others.	1.73
54	People find it easy to talk to me.	1.65
61	I only smile at strangers when I feel like it.*	-0.70
63	I am an inviting person to everyone I meet.	1.84
70	I do not want to be involved in other people's problems.*	-0.90
77	I am shy until I get to know someone well.*	-0.71
91	I get uncomfortable if others share their feelings with me.*	-1.35
92	I am only interested in the lives' of people I am close to.*	-1.03
98	I am sincerely interested in the well-being of others.	2.00
140	I like people instantly.	1.26
143	I hold myself and others at a distance.*	-1.10
144	I show my gratitude to others often.	1.54
171	I naturally make eye contact and smile at strangers.	1.43

** Indicates a reverse scored item*

Gregariousness facet items

Item #	Item	δ
1	I am considered a loner.*	-1.86
6	Sometimes I make up excuses to get out of large group activities.*	-1.41
22	I actively avoid large gatherings.*	-1.90
30	I do not enjoy having company over.*	-1.55
41	I feel compelled to be around people.	1.89
44	I find the company of others stimulating and rewarding.	2.08
51	I typically stick to myself.*	-2.21
68	I am uncomfortable around others.*	-1.70
82	I go to large parties every change I get.	1.81
97	When I am sad I prefer to be around others rather than being alone.	1.31
112	I like to work in places where I can be left alone.*	-1.62
155	I prefer solitary activities.*	-2.16
160	I love having company at my house, no matter who or when.	1.70
164	My favorite time of the day is when I get to be around people.	2.75
170	I am excited by large groups of people.	2.10

** Indicates a reverse scored item*

Excitement-Seeking facet items

Item #	Item	δ
14	I prefer adventurous vacations over a relaxing vacation.	1.41
35	Danger makes me feel alive.	3.07
48	I don't take part in reckless behavior.*	-1.74
50	I am an adrenaline junkie.	2.81
52	I would try anything at least once.	1.31
58	If I am going somewhere new, I need the trip to be planned.*	-0.79
66	I enjoy being reckless.	3.33
80	I am not spontaneous.*	-1.04
83	Loud noises excite me.	1.26
103	I never want to put my life in danger.*	-1.43
115	I don't like following routines.	0.92
133	I hate being out of my comfort zone.*	-0.91
151	I seek adventure at all times.	2.07
168	I always want things planned out and scheduled.*	-0.73
174	I prefer to be in new and unfamiliar places.	1.24

** Indicates a reverse scored item*

Assertiveness facet items

Item #	Item	δ
4	I don't enjoy telling people what to do.*	-1.20
7	Even when I have something to say I almost always keep it to myself.*	-1.72
45	I always state my opinion.	1.82
62	I am usually the first person to take action or speak up.	2.00
69	I find it hard to stand up for things I believe in unless I have support.*	-1.39
113	I can easily talk people into doing what I want them to.	1.12
124	I will not go up and talk to someone even if I want to.	1.43
134	I would never want to be a boss.*	-1.79
141	I constantly find myself stepping up as a leader.	1.98
149	I am uncomfortable expressing criticism.*	-1.29
154	I love telling people what to do.	1.34
158	I enjoy delegating tasks on projects.	1.56
165	I know what I want and I go for it.	1.24
167	I find it difficult to share my ideas in group discussions.*	-2.17
180	I find it difficult to communicate my point of view.*	-1.65

** Indicates a reverse scored item*

Activity Level facet items

Item #	Item	δ
5	I tire easily.*	-0.94
17	I like to be constantly on the move.	1.24
25	I tend to walk slower than most people.*	-0.75
72	I constantly procrastinate.*	-0.91
84	I don't like to relax when I could be getting things accomplished.	1.26
90	I prefer to live a fast paced life.	0.96
105	I don't put myself in any type of situation requiring vigorous activity.*	-0.77

108	I don't like being busy, it stresses me out.*	-1.46
117	I do not see the point of overworking myself.*	-0.90
136	I need a push to get started.*	-1.05
146	I get restless if I do not have enough to do.	1.07
152	I take things at a slow pace.*	-1.31
163	I enjoy filling my spare time with activities.	1.49
178	I spend a significant amount of time just sitting around.*	-1.50
179	I prefer to always be busy doing something.	2.20

** Indicates a reverse scored item*

Positive Emotions facet items

Item #	Item	δ
18	I am always in high spirits.	2.22
20	I know I will face problems through the day but I will get through them.	1.26
53	I find it hard to focus on positive things.*	-2.33
56	I believe anything is possible.	1.28
64	I believe there is always a silver lining.	1.83
67	I am more optimistic than most people.	2.34
71	I prefer to expect nothing rather than get my hopes up on anything.*	-0.87
73	It is hard for me to stay in good spirits when things don't go as planned.*	-1.63
85	I remain in good spirits even if things don't go as planned.	2.00
96	I often feel overwhelmed by everyday stressors in my life.*	-1.24
114	I am enthusiastic in my daily life.	2.63
125	I am typically pessimistic.*	-2.30
135	I prepare myself for failure instead of success.*	-1.50
148	I often let small things dampen my mood.*	-1.68
157	I am a joyful person.	2.58

** Indicates a reverse scored item*