DECIPHERING THE GENERAL FACTOR IN INTEREST
MEASURES: RESPONSE STYLE OR ATTITUDE

BY

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THESIS

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ABSTRACT

Unrotated factor analyses of interest data have consistently yielded a general factor of interests, an overarching factor with uniformly high loadings across interest subscales and individual items. The theoretical significance of this general factor of interest is still debated. In this paper, we aim to discriminate between two dominant interpretations of the general factor of interest—as either a substantive factor with meaning in the field of personality and interest, or as a measurement artifact which should be disregarded. Across four independent samples, we evaluate these competing interpretations of the general factor. We compare the general factor with broad personality measures that represent a general propensity for 'liking' stimuli, as well as an index of acquiescent response styles. More specifically, we test the general factor against measures of dispositional attitudes, neutral objects satisfaction, and acquiescent responding. Our results support the idea that the general factor of interests can be explained more from the standpoint of a general dispositional attitude to respond favorably towards objects and activities, rather than an acquiescence response style or neutral objects satisfaction. The general factor of interests can thus be used to offer insight into an individuals' personality and is worth reporting in interest assessment results.

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TABLE OF CONTENTS

INTRODUCTION

There has been a steady upward trend in research on general factors (superordinate latent factors with positive loadings on all subscales of a construct) within the study of intelligence (*g;* Spearman, 1904), personality (GFP; Musek, 2007; Rushton & Irwing, 2008), and more recently, within Industrial-Organizational Psychology (Newman, Joseph & Hulin, 2010; Ree, Carretta & Teachout, 2015). One of the long-standing controversies in general factor research has been the interpretation of these higher order factors as either a substantive individual difference trait or construct-irrelevant response style (Cronbach, 1946; Jackson & Messick, 1958; Rorer, 1965). General factor research is still producing evidence supporting both interpretations (Davies et al., 2015; Irwing, 2013), and some believe that general factors of different constructs are not alike (Campbell, 2015). Thus, more research should be devoted to identifying general factors within different disciplines. This paper addresses these conflicting interpretations of the general factor for the construct of vocational interests—a field markedly underrepresented within general factor research.

The General Factor of Interest (GFI) was reported by Jackson (1977) and can be found in many interest measures (Prediger, 1982; Rounds & Tracey, 1993). This factor heavily influences interest measurement, accounting for approximately 40% of the variance in scale scores (Prediger, 1982, p. 264). In contrast to the other general factors like the GFP, general factor research in vocational interests is underdeveloped. In the subsequent years since its discovery, less than forty journal articles have been published on the topic (there were over 100 scholarly articles on the GFP and over 300 on *g* in the past decade alone). The general factor of interest remains an enigma as vocational psychologists have yet to come to a consensus on what it stands

1

for and its theoretical relevance to the field (Tracey, 2012). There is a need for personality psychologists and vocational psychologists alike to devote more research into the interpretation of general factors, and collect empirical evidence to support their claims about these factors.

The General Factor of Interest (GFI) can be found in many interest measures (Rounds & Tracey, 1993). When people respond to interest questionnaires, their answers can be based on the substantive meaning of the inventory items or be influenced by content-irrelevant factors such as the rating scale and response format, or both (Cronbach, 1946; Lentz, 1938). In this paper, we aim to discriminate between two dominant interpretations of the GFI—as either a substantive factor with meaning in the field of personality and interest, or as a measurement artifact which should be disregarded. This paper first summarizes the characteristics of the GFI and its varied interpretations to the field of vocational psychology. The review is followed by an evaluation of the GFI's substantive validity; we investigate its relationship with common personality variables to develop a nomological network for the latent factor. Across four different studies, we compare the GFI with indices for acquiescent response styles and broad attitudinal constructs like the dispositional attitude (Hepler & Albarracin, 2013) and Neutral Objects Satisfaction (Judge & Bretz, 1992). We also apply contemporary methods to describe the strength of the GFI using the omega hierarchical coefficient (ω_h; Zinbarg, Revelle, Yovel, & Li, 2005), and investigate the structure of vocational interests under different levels of the GFI (Tracey, Rounds, & Gurtman, 1996). By drawing comparisons with attitudinal variables in personality discourse, we argue for a substantive interpretation of the overarching factor in interest measures.

Interests and the General Factor

Interests can be defined as trait-like preferences for activities, contexts, or outcomes associated with these activities (Rounds & Su, 2014), and they motivate approach-oriented

behaviors and orient individuals towards specific environments (Su, Rounds & Armstrong, 2009). Interests can be organized into a hexagon of six interest types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC; Holland, 1997). The spatial distance between each interest type is inversely proportional to the degree of similarity between them. Prediger (1982) examined the dimensions underlying these six interests and extracted three factors—two substantive dimensions of interest towards People-Things and Data-Ideas, and a general interest factor. Holland's six interest types and Prediger's two substantive dimensions of interests are still commonly used today to describe vocational interests.

Interests are usually assessed by self-report questionnaires of liking towards various activities or objects (Dawis, 1991). Interest inventories usually list activities, occupations, or objects and request the reader to rate on a scale how much he or she likes each item. Unlike personality items, which can be rephrased in an opposite manner and thus be reversed scored, interest items such as "managing a department store" or "building kitchen cabinets" cannot be reverse-worded unless the format of the inventory is changed. Even then, using an agree-disagree response scale for "I dislike building kitchen cabinets" may not assess interest equivalently to a like-dislike scale.

One byproduct of the format of most interest inventories is that, like most questionnaires with a Likert-type response scale, the first component of an unrotated principal components analysis for interest measures yields large loadings for all items, which suggests that there is a higher-order factor (Jackson & Messick, 1958). Evidence for this GFI is found within the structure of different measures of interest (Rounds & Tracey, 1993). This ubiquitous factor explains the largest portion of variance in interest scores (approximately 40%), and is characterized by large correlations between all subscales and items (Cole, Whitney & Holland,

3

1971; Lunneborg & Lunneborg, 1975). As a result, the GFI is commonly operationalized as interest profile elevation—the sum or mean across all interest subscales for each individual (Holland, Johnston, & Asama, 1993). Profile elevation is conventionally used to represent the general factor because it exhibits correlations of over .95 with the GFI (Šverko & Babarović, 2016).

Interpretations of the General Factor of Interests (GFI)

There have been varied interpretations of the GFI. The high factor correlations associated with the GFI indicate an individual's pattern of endorsing many different interest items as positive or negative in general (Tracey, 2012). Jackson and Messick (1958) noted that this tendency to 'like' diverse things could represent either an acquiescence response style caused by the inventory format or an actual 'cognitive differentiation or capacity' (p. 250) to do different things derived from the individual's personality. Scholars today are still undecided on whether this phenomenon is attributable to an artifactual method bias called a response style (individuals exhibit a systematic tendency to mark the 'agree' or 'disagree' response options independent of item content; Paulhus, 1991) or a substantive individual difference construct (individuals respond to the items to reflect a true marked interest or disinterest in those activities, objects and occupations).

Supporters of the interpretation that the GFI is an artifactual response style argue that a global interest in all things is incongruent with the definition of interests as having a target, and should therefore be dismissed as theoretically irrelevant (Cole, Whitney & Holland, 1971; Lunneborg & Lunneborg, 1975; Prediger, 1982). Response styles distort research results by skewing means in univariate distributions and influencing correlations between variables (Van Vaerenbergh & Thomas, 2012). A subcategory of response styles includes the Net Acquiescence

Response Style (NARS)—the systematic tendency to use the 'agree', 'like' or 'true' response to items, regardless of item content (Greenleaf, 1992; Baumgartner & Steenkamp, 2001; Weijters, Cabooter & Schillewaert, 2010). In studying interest inventories, Torr (1953) noted that the high correlation between inventory scores within-individuals could be explained by the "generousness with which a 'like' response was used" (p. 30), thereby alluding to the GFI being a form of acquiescence bias. Researchers who believe that the GFI is a nuisance or bias offer several solutions to deal with this factor. One approach is to simply ignore it because it is equally spread across interest scales, so it will not affect the rank-order scale score of the individual (e.g., high point RIASEC codes; Holland, 1997). Another approach to deal with systematic bias would be to remove it through multi-dimensional scaling techniques (Davison, 1985), using forced choice items (Jackson, 1977), or multiple broad interest measures (Tracey, 2012).

Researchers with an opposing perspective believe that the GFI possesses valuable information about people's interests or personality. Hammond (1945) contended that the GFI represented the degree of widespread interest in activities—more mundane activities would attract people with overall higher general interest whereas more niche activities would tend to attract those of lower general interest. Vernon (1964) factor analyzed an occupational interest inventory and interpreted the GFI as "the general acceptability of the occupations, their degree of community vs. specialization of interests" (p. 91). Presumably, this meant that the general factor was the general likeability of each occupation based on public opinion and how well-known it was. Rounds and Tracey (1993) wrote that the general factor could be an indicator of broad versus narrow interests, with those high in profile elevation showing a broader scope of activities they were interested in. Darcy and Tracey (2003) suggested that the GFI represented an individual's interest flexibility. Individuals high in profile elevation would be equally enthralled

in pursuing different activities. Because interest profile elevation was related to enthusiasm and achievement in school (Bullock & Reardon, 2005; Fuller et al., 1999), Im (2011) believed the general factor to be useful in counseling situations for identifying people who have broader interests and are less able to decide on what careers they want to pursue in future. Overall, the multiple interpretations run in the similar vein that the general factor of interests is a substantive construct indicating an individual difference affecting ones' interests.

Thus far, no primary studies have produced compelling empirical evidence to support either camp's beliefs about the identity of the general factor, be it a substantial construct or response style. Regardless of its interpretation, proper construal of the general factor is important for the sake of accuracy in research and practical applications. Ignoring the general factor may result in overemphasis on the magnitude, influence, and importance of specific interest dimensions (Ree, Carretta & Teachout, 2015). Incremental validity regression analysis with multiple interest subscales would be rendered inaccurate if the incremental variance was due to the general factor rather than the specific factors (Ree & Carretta, 2011). Factor analysis of interest measures can yield an uninterpretable factor structure because the variance associated with the GFI can be confounded with the true individual substantive variance (Tracey, 2012). If the general factor is artifactual, it should be excluded in interest measurement through a statistical correction or alternative test format. Counselors and researchers must be wary of interpreting interest profile level as interest intensity (Prediger, 1998), as endorsing more items does not necessarily mean liking each item to a greater degree. Employers will also want to know the difference between high elevation profiles and low elevation profiles and if they should preferentially hire one over the other. Calculations of person-job fit and congruence rely on matching individuals' three highest-scoring interest (RIASEC) scale scores with the job in

6

question. This rank-order assignment cannot differentiate between individuals with higher general interest and individuals with lower general interest, which may result in inaccuracy of congruence measurement. In summary, more effort should be devoted to characterizing and interpreting the GFI within different contexts.

This section established that if the GFI were a substantive factor, it would represent an important individual difference for showing interest towards all items and activities in general. If it is instead an acquiescence response style, the GFI would be a pattern of responding that does not take into account the item content or relate to behavior. This nuanced distinction has implications for how vocational psychologists should handle the GFI in their research. We proceed by comparing the GFI to substantive personality variables in order to distinguish it from a response style. The next section explains two broad personality constructs that could share similarities with a general interest towards all things—Dispositional attitude (Hepler & Albarracin, 2013) and Neutral Objects Satisfaction (Judge & Bretz, 1993).

Dispositional Attitude

Interpretations of the GFI as interest breadth (Rounds & Tracey, 1993), interest flexibility (Darcy & Tracey, 2003), and systematic display of global interest, bear similarities to the definition of a dispositional attitude. An attitude refers to one's evaluative association of positive or negative affect with a stimulus (Albarracin & Vargas, 2010). Dispositional attitudes then represent a "systematic variation in attitude valence as a function of individuals" (Hepler & Albarracin, 2013, p. 1). Hepler and Albarracin simplify this definition, describing dispositional attitudes as broad, trait-like tendencies to have positive or negative attitudes towards all independent objects in general. Dispositional attitudes may arise due to personality, cognitive and social factors affecting the individual's evaluation of the world. The tendency to experience

7

positive or negative affect is a robust personality difference that can affect dispositional attitudes (Cacioppo & Gardner, 1999). Cognitive factors include schema and evaluative routines that, when habitually used, can tint the subjective assessment of stimuli in general (Hepler & Albarracin, 2013). Social pressure from peers and culture can also influence attitudes towards various objects and activities (Terry & Hogg, 1996).

Thus far, the relationship between vocational interests, and the GFI, with dispositional attitudes has not been studied. The theoretical relationships between dispositional attitudes and behavior seem to indicate that interests and dispositional attitudes should be correlated. Dispositional attitudes have been shown to manifest as specific attitudinal differences in the domains of politics, business, health, and entertainment (Hepler, 2015). Interest scales often contain items asking if respondents like specific activities relevant to the fields of business (enterprising interests), health (social and investigative interests) and entertainment (leisure interest measures), thus it is conceivable that the two constructs should be similar or identical. Hepler and Albarracin (2013) reported significant correlations between dispositional attitudes and openness, variety-seeking, extraversion, positive and negative affect, and behavioral activation and inhibition. Some studies have shown that interest profile elevation is also related to openness (Bullock & Reardon, 2008; Fuller, Holland & Johnston, 1999). Dispositional attitudes also predict the variety of behaviors performed each week and the broad tendency to engage in many daily activities (Hepler & Albarracin, 2014). If the GFI is interpreted as interest breadth (Rounds & Tracey, 1993), it should thus relate to dispositional attitudes and the number of activities performed daily. Because the construct of dispositional attitudes is relatively new in the field of personality, studying its relation with interest measures is beneficial to both the

8

elucidation of the dispositional attitude and the GFI. Thus we developed the following hypothesis:

H_1: *A measure of dispositional attitude will be positively correlated with interest profile elevation.*

Neutral Objects Satisfaction

Neutral Objects Satisfaction is a construct originating from the job satisfaction literature and refers to a stable predisposition to be satisfied or dissatisfied. The construct was originally called affective dispositions by Weitz (1952); he proposed that a person's tendency to 'gripe' about anything in general influences a person's self-reported job satisfaction (p. 203). More specifically, if a person perceives more sources of satisfaction than dissatisfaction regarding his or her job, he or she would have a bias to develop a positive attitude in the future. Indeed, more evidence for a dispositional basis of job satisfaction is accumulating. Job satisfaction behaves like a stable trait (Staw & Ross, 1985), has genetic underpinnings (Arvey et al., 1989), and is significantly correlated with personality characteristics in adolescence (Staw et al., 1986). Judge and Bretz (1993) improved upon Weitz's theory of affective dispositions and operationalized the construct as the tendency to view even neutral objects as either positive or negative, thus the construct was renamed 'neutral objects satisfaction' (Eschleman & Bowling, 2011). Individuals' satisfaction towards neutral objects was found to be significantly correlated with turnover (Judge, 1993), job stress (Zickar, Gibby & Jenny, 2003), and job avoidance (Judge & Locke, 1993). Neutral objects satisfaction is an affective-oriented personality characteristic—a person's average level of a given emotion and tendency to experience the same type of emotion across situations (Judge & Larsen, 2001), and this construct has exhibited significant relationships with positive and negative affectivity and Big Five personality traits (Eschleman & Bowling, 2011).

Although satisfaction towards neutral items may not mean interests towards activities, job satisfaction is an outcome variable frequently studied with vocational interests (Assouline & Meir, 1987; Tranberg, Slane & Ekeberg, 1993; Tsabari, Tziner & Meir, 2005). Thus, it is conceivable that neutral objects' satisfaction could account for some variance in the GFI. Comparing the relationship between the GFI and neutral objects' satisfaction can not only help shed light on the substantive value of the GFI, but also offer a potential area for distinction between dispositional attitudes and neutral objects' satisfaction, which some researchers contend to be essentially the same construct (Eschleman, Bowling & Judge, 2015). Eschleman, Bowling, and Judge conducted four studies in online samples and found that both dispositional attitudes and neutral objects satisfaction correlated with attitudes such as job satisfaction and life satisfaction. They reported high correlations between dispositional attitudes and neutral objects satisfaction (mean $r = .73$). However, their confirmatory factor analyses supported that measures of the two constructs loaded onto separate latent factors. The two constructs also showed diverging relationships between some personality variables such as efficacy, anger, anxiety and depression (Eschleman & Bowling, 2011; Hepler & Albarracin, 2013). More research is needed to clarify the relationship between these two constructs, especially in the context of vocational interests and the GFI. Thus, we devised the following hypotheses and research questions:

H_2: *A measure of neutral objects' satisfaction will be positively correlated with interest profile elevation.*

RQ_1: *Using convergent and discriminant validity analyses, we compare the GFI, neutral objects' satisfaction, and profile elevation with other personality constructs to investigate if they are measures of the same underlying construct.*

10

Acquiescence Response Style

Response styles are biases that result in systematic individual differences in scale responding, independent of item content or the measured trait level (Wetzel et al., 2013; Paulhus, 1991). Simply put, response styles are patterns of answering questions without truly processing the question content. A variety of response styles exist, but we chose to focus on the acquiescent response style—the tendency to endorse or agree with multiple items regardless of content. As specified earlier, the general factor manifests as high endorsement of items across scales and we want to determine if this is due to a substantive individual difference or response style. Thus acquiescent responding best fits the competing interpretation of the general factor of interests. Acquiescent responding is also a common competing explanation for common variance in factor analytic research of personality measures (Bentler, Jackson & Messick, 1971).

A challenge in creating an index for acquiescent responding is to avoid confounding stylistic variance with substantive variance (Baumgartner & Steenkamp, 2001). One recommended method is to use a sample of extremely heterogeneous items as a measure of acquiescence or overgeneralization (Jackson & Messick, 1958; Stern, Stein & Bloom, 1956). Heterogeneous item sets can be created by selecting items with low inter-item correlations drawn from multiple scales irrelevant to the construct of interest (De Beuckelaer, Weijters & Rutten, 2010). The Likert responses to these items can be coded such that '*agree*' and '*strongly agree*' responses contribute different positive weights to the overall acquiescence index (Baumgartner & Steenkamp, 2001; Greenleaf, 1992). The relationship between this acquiescence index and the GFI can then be evaluated against the relationship with dispositional attitude and neutral objects' satisfaction using stepwise regression, to see which variable best explained profile elevation in

interest scores. Thus we developed the following research questions to distinguish between a substantive versus artifactual interpretation of the general factor of interests:

RQ₂: If the GFI is more interpretable as a substantive construct, an index of acquiescent responding will be a worse predictor of interest profile elevation compared to dispositional attitudes or neutral objects' satisfaction.

Further characterization of the GFI

To facilitate our interpretation of the general factor, we applied two relatively new methods to describe the GFI. The first involves estimating the strength of the general factor via structural equation modeling (SEM). The traditional use of the first unrotated principal component associated with principal components analysis (PCA) to estimate general factor strength can be inaccurate (Gignac, 2015). Within the context of multidimensional models, the strength of a general factor can be estimated via McDonald's coefficient omega hierarchical (ω_h), which represents the ratio of common variance to total variance within interest data (Zinbarg, et al., 2005). Gignac and Watkins (2013) found ω_h for an intelligence scale to be .86, suggesting that *g* accounted for 86% of intelligence scale variance. We contribute to the literature by describing the strength of the GFI using ω_h, which has thus far never been estimated for interest scales.

The second way we further characterize the GFI is to investigate the structure of vocational interests at different levels of the general factor. At the time of writing, it is unknown if Holland's (1997) circumplex structure of vocational interests remains the same across different levels of the general factor (profile elevation) within samples. General factors can be differentially confounded with scale scores, resulting in the theorized structure of the construct being more valid for the lower quartile or upper quartile of any sample (Gurtman, 1992). Typical

assessments of circumplex models assume identical circularity and variance accounted for at all levels of the general factor (Tracey, Rounds & Gurtman, 1996). It is important to verify this assumption by studying the three-dimensional shape of Holland's RIASEC interests when the GFI is incorporated into the model. We thus developed the following research question:

RQ_3: *To investigate the structure of RIASEC interests at different levels of the general factor.*

Overview of the Present Studies

From the reviews of the general factor of interests, dispositional attitudes, and neutral objects' satisfaction, we note several theoretical and empirical commonalities. Some attitude theorists believe that positive and negative attitudes can be learned through stimulus-response feedback with liking and disliking stimuli as a type of reinforcer to the attitude (Lott & Lott, 1968). Cognitive integration theorists believe that attitudes result from ascribing weights to stimuli based on their psychological importance (Anderson, 1971), which could be based on liking towards these stimuli. Theoretically, both dispositional attitude and neutral objects' satisfaction are personality constructs that summarize an individual's average emotional response towards a heterogeneous set of objects or activities (Eschleman, Bowling & Judge, 2015). Similarly, the GFI alludes to a tendency to display either high or low interest towards a broad array of objects and activities, and is thus operationalized as profile elevation—the sum or mean of all interest subscales (Holland, Johnston, & Asama, 1993). Interests are stable over time, influence behavior through motivational mechanisms, and contribute significantly to a person's self-identity (Low, Yoon & Roberts, 2005; Savickas, 1999). These components of interest bear similar qualities to dispositions and reflect favorably on the possibility that general interest can be framed in terms of a dispositional attitude or neutral objects' satisfaction. Separate studies on

the general factor and dispositional attitudes have shown similar patterns of correlation with personality and other variables (Fuller, Holland & Johnston, 1999; Gottfredson & Jones, 1993; Hepler & Albarracin, 2013). However, no primary research thus far has directly compared general interest and dispositional attitudes. We therefore conducted a set of consecutive studies to elucidate the relationships between the GFI, dispositional attitudes and neutral objects' satisfaction.

Study 1. We measured vocational interests, dispositional attitudes, neutral objects' satisfaction, and general self-efficacy in a student sample. We aimed to investigate if there was indeed a correlation between the general interest factor, dispositional attitudes, and neutral objects' satisfaction. This study addressed Hypothesis 1 and 2.

Study 2. We measured vocational interests, dispositional attitudes, neutral objects' satisfaction, and Big Five personality traits in an online sample from Amazon's MTurk. This study aimed to replicate Study 1 using a different sample and investigate the construct overlap between the GFI, dispositional attitudes and neutral objects satisfaction (RQ_1). We also performed post-hoc subgroups analysis of the structure of vocational interests on this sample to describe Holland's (1997) structure of vocational interests (RQ_3) at different levels of profile elevation.

Study 3. Using a student sample, we evaluated the incremental validity of using measures of dispositional attitude, neutral objects' satisfaction, and a dedicated index for acquiescent response style to predict profile elevation in interest scale scores. This study addressed RQ_2 and allowed us to distinguish between a substantive GFI versus an artifactual GFI.

Study 4. We complement the previous studies with a convergent-discriminant validity comparison of dispositional attitudes and the GFI on more specific personality facets and

14

constructs in an online sample. These included measures of grit, subjective vitality, extraversion

facets of activity and excitement seeking, openness facet of actions, variety seeking, curiosity,

and inquisitiveness. At the end of this study, we summarize all the known correlations between

different personality constructs with the DAM and the GFI.

STUDY 1

The aim of Study 1 was to investigate the relationships between the general factor of interests, and dispositional attitudes and neutral objects' satisfaction. This was the first study to measure these three constructs within the same sample.

Method

Participants. Psychology students ($N = 510$) from a large Midwestern university participated in an online survey of their interests and attitudes. After removing students who failed the quality control items, the final sample comprised four hundred and eighty-nine psychology students (189 Male, 300 Female, $M_{age} = 19.59$, $SD_{age} = 1.43$). 60% of the sample identified as White, 28% as Asian, 7% as Black and 4% as 'Other'. Participants completed the O*NET Interest Profiler Short-Form (Rounds et al., 2010), Hepler and Albarracin's (2013) Dispositional Attitude Measure (DAM), and Judge and Bretz's (1993) Neutral Objects' Satisfaction Questionnaire (NOSQ) through the online survey website Qualtrics (www.qualtrics.com). The order of the scales administered was randomized. Participants were compensated with extra course credit.

Measures

Vocational Interest. The O*NET Interest Profiler Short-Form (Rounds et al., 2010), developed by O*NET, is a 60-item interest measure compatible with Holland's (1997) RIASEC structure. Participants were instructed to report on a 5-point scale (1 = Strongly Dislike, 5 = Strongly Like) with regard to activity items such as "Compose new music" or "Manage a retail store". Additionally, they were instructed to disregard the education, training, and salary involved in the interest items. The sum of the RIASEC scales was used to calculate profile

16

elevation. Past psychometric testing on the O*NET Interest Profiler Short-Form showed Cronbach's alpha ranging from .78-.87 (Rounds et al., 2010). For this study, each RIASEC interest scale had an alpha reliability ranging from .83-.89.

Dispositional Attitude. Hepler and Albarracin (2013) developed and validated a Dispositional Attitude Measure (DAM), an instrument where participants report their attitudes on a 7-point scale (1 = Extremely Unfavorable, 7 = Extremely Favorable) towards independent attitude-objects such as "soccer" or "taxes". Possessing favorable attitudes towards items such as "camping" and "doing crossword puzzles" equates to displaying some form of interest towards those activities and can be imagined as items on an interest inventory, but this distinction becomes less clear for other items such as "receiving criticism," "taxes," and "Japan". Nevertheless, factor analysis of these independent object items produced a factor in which almost all items loaded positively (Hepler & Albarracin, 2013). This factor was deemed separate from response bias because the dispositional attitude measure maintained good reliability and construct validity when including reverse-scored items. The dispositional attitude measure has been correlated previously with curiosity-related traits, need for cognition, and behavioral activation but did not seem reducible to a combination of these other constructs. Previous studies on the DAM have reported alpha reliabilities of .77-.83 (Eschleman & Bowling, 2015; Hepler & Albarracin, 2013). The DAM scores in the current study showed an alpha reliability of .78.

Neutral Objects Satisfaction. The Neutral Objects Satisfaction Questionnaire (NOSQ) was developed by Weitz (1952), refined by Judge and Bretz (1993), and validated by Eschleman and Bowling (2011) as a measure of affective oriented personality towards neutral, everyday stimuli. The revised Neutral Objects Satisfaction Questionnaire (Judge & Bretz, 1993) is a 25-item measure that instructs respondents to rate if they were "satisfied", "dissatisfied", or "neutral"

towards 25 heterogeneous items such as "public transportation". Responses are coded on a 3-point scale (1 = dissatisfied, 2 = neutral, 3 = satisfied). Past studies using the revised NOSQ have reported alpha reliabilities of .83-.89 (Eschleman & Bowling, 2011, Eschleman, Bowling, & Judge, 2015). The NOSQ scores in the current study had an alpha reliability of .76.

Self-Efficacy. Also included in this study, but not integral to hypothesis 1 & 2 was a measure of general self-efficacy. Chen's 8-item New General Self Efficacy Scale (NGSE; Chen, Gully & Eden, 2001) is an instrument where participants respond on a five-point scale of '*strongly disagree*' to '*strongly agree*' to items such as "I will be able to achieve most of the goals that I have set for myself" and "I will be able to successfully overcome many challenges". Chen's NGSE scale was included because self-efficacy items shared a similar structure with vocational interests (Armstrong & Vogel, 2009) and had previously been shown to have diverging relationships between dispositional attitudes and neutral objects satisfaction (Eschleman & Bowling, 2011; Hepler & Albarracin, 2013). We believed that self-efficacy would serve as an informative variable that could potentially differentiate the GFI, DAM and NOSQ. Reliability of the NGSE ranged from .83-.90 from past studies (Chen, 2001; Eschleman & Bowling, 2011). The NGSE scores in the current study had an alpha reliability of .91.

Participants were told that they would be completing "a survey about interests and attitudes" and then answered demographic questions followed by our four measures presented in a randomized order. After the survey, participants were thanked and debriefed on the full aim of the study.

Results and Discussion

Table 1 shows the means, standard deviation, and correlations among the variables in this study. Data analysis was conducted using RStudio, SYSTAT, and IBM SPSS software packages.

To estimate the saturation of the general factor of interests, two different approaches were used. The standard method put forward by Jackson (2003) and Ree, Carretta, and Teachout (2015) suggested using the first unrotated principal component from a principal components analysis (PCA) to estimate the strength of a general factor. Our PCA showed high positive loadings on the first factor for all subscales in the range of .57 to .78, with the exception of social (which had a loading of .23). A total of 37.5% of the variance in scores was explained by the first component. A more contemporary approach to assessing the general factor in multidimensional tests was to estimate McDonald's omega hierarchical coefficient from the scale scores (ω_h; Zinbarg, Revelle, Yovel, & Li, 2005). While the variance explained by the first component of the PCA represents the ratio of the eigenvalue to the rank of the data matrix, omega hierarchical represents the ratio of the common variance to total variance across all interest scales. ω_h is calculated in R using the 'psych' package and structural equation modeling. The saturation of the general factor in this dataset estimated using omega hierarchical and Prediger's two-factor model of People-Things, Data-Ideas was 0.32. Both these estimates were comparable to the 40% variance explained by the general factor found by Prediger in 1982. The relatively small value of ω_h indicates that scales of vocational interests are less saturated by a general factor compared to scales of other constructs such as intelligence, where ω_h was found to be .86 (Gignac & Watkins, 2013).

In accordance to the hypothesis H_1, that dispositional attitudes would be related to interest profile elevation, we found a significant positive correlation between profile elevation and dispositional attitude scores (r (488) = .43, $p < .01$). Contrary to H_2, profile elevation from the O*NET interest profiler was uncorrelated with the NOSQ. Furthermore, the NOSQ showed only a small positive relationship with dispositional attitudes (r (488) = .11, $p < .05$). The NOSQ showed small positive correlations with the individual interest scales of Social, Enterprising, and

Conventional. Similar to Eschleman and Bowling (2011), the NOSQ correlated positively with the measure of general self-efficacy (r (485) = .21, $p < .05$), whereas the dispositional attitude measure did not correlate significantly with self-efficacy. These findings support that dispositional attitudes and neutral objects' satisfaction are conceptually different constructs, and that the general factor of interests is more similar to dispositional attitudes than neutral objects' satisfaction.

The main discrepancy in this study's results was that it did not replicate the large positive correlation reported by Eschleman, Bowling and Judge's (2015) between dispositional attitudes and neutral objects' satisfaction. One possible explanation was a difference in the instructions and survey anchors. In our study, we used instructions and response anchors from the Weitz's 1952 version of the NOSQ, which were in the order of "satisfied", "dissatisfied", "neutral" rather than "dissatisfied", "neutral", "satisfied". Eschleman, Bowling & Judge (2015) used a different, 7-point scale (1 = 'dissatisfied', 7 = 'satisfied') for the NOSQ in their studies. The difference in response anchors between our studies could possibly account for finding low correlations between the NOSQ and the DAM. We recoded our NOSQ data to exclude the 'neutral' responses and re-ran the correlational analysis but found similar correlations between the NOSQ, DAM and GFI. We repeated Study 1 in an online sample in Study 2, which also included a brief measure of Big Five personality to further study convergent and discriminant validity involving the GFI, DAM and NOSQ. We addressed the response scale discrepancy directly in Study 3 by administering the DAM and NOSQ using either 3-point or 7-point scales.

The aim of Study 2 was to replicate Study 1 using a non-student sample and investigate the construct overlap between the general factor of interests, dispositional attitudes and neutral objects satisfaction (RQ_1) by using the Big Five personality traits as benchmarks. We also performed post-hoc subgroups analysis of the structure of vocational interests on this sample to investigate if Holland's (1997) RIASEC structure of interests held at different levels of the general factor (RQ_3).

Method

Participants. Participants within the United States were recruited from the Amazon's Mechanical Turk (MTurk; www.mturk.com) platform to complete a survey on personality and interests ($N = 600$). After filtering out twenty-four responders who failed at least one of two quality control items, the final sample comprised five hundred and seventy-six respondents (297 Males and 278 Females), of which 78% were White, 9% were Black or African American, and 9% were Asian. The average age of the sample was 36.43 ($SD = 12.32$). Participants were compensated USD 2.00 for completing the survey.

Measures

Vocational Interests. As in Study 1, we included the O*NET Interest Profiler Short-Form (Rounds et al., 2010). Cronbach's alpha for the RIASEC scales ranged from .85 to .90.

Dispositional Attitudes. As in Study 1, we also administered Hepler and Albarracin's (2013) Dispositional Attitude Measure. Cronbach's Alpha for the DAM was .77.

Neutral Objects Satisfaction. We used the adapted version of the NOSQ from Judge and Bretz (1993) and as seen in Eschleman and Bowling (2011). This version of the NOSQ had response options of "Dissatisfied", "Neutral" and "Satisfied". The measures for dispositional

attitude and neutral objects satisfaction were presented consecutively, with their order

randomized. Cronbach's Alpha for the NOSQ was .85.

Big Five Personality. A measure of personality was included in the survey to aid in

establishing convergent and discriminant validity between the GFI as operationalized by profile

elevation, dispositional attitude, and neutral objects satisfaction. The Mini-IPIP (Donnellan,

Oswald, Baird & Lucas, 2006) is a 20-item brief version of the 50-item International Personality

Item Pool Five Factor Model Measure (Goldberg, 1999). Participants used a 5-point scale to

indicate how well each statement described them on the scales of extraversion, conscientiousness,

intellect, agreeableness, and neuroticism. Donnellan et al. validated the Mini IPIP across five

studies and found adequate internal consistencies above .6. The Mini IPIP also behaved like the

longer personality measure and showed criterion related validity with measures of positive and

negative affect, and life satisfaction. Cronbach's alpha for the Mini IPIP Personality Scales in

this study ranged from .73 to .86.

Results and Discussion

Table 2 shows the means, standard deviations, and correlations among the variables in

this study. We first estimated the saturation of the general factor. The first component from a

principal components analysis of the RIASEC scale data explained 42.03% of the total variance

explained by components. Omega hierarchical for the general factor was 0.31. These results

support the presence and estimated size of the general factor of interests, similar to Study 1.

Similar to Study 1, we found a moderate positive correlation between the GFI

operationalized as profile elevation, and dispositional attitudes (r (576) = .40, $p < .01$). There

was a significant but small correlation between the DAM and NOSQ (r (576) = .20, $p < .01$),

which was similar to the .11 found in Study 1 (if not slightly inflated due to the two measures

presented back to back with one another) but much smaller than the .70 reported by Eschleman and Bowling (2015). Once again, Neutral Objects Satisfaction was uncorrelated with the GFI. The correlations between profile elevation and the personality scales showed small significant relationships with extraversion (r (576) = .19, p < .01), agreeableness (r (576) = .21, p < .01), and openness (r (576) = .21, p < .01). Profile elevation showed the same pattern of correlations as the DAM, with the minor difference that the DAM exhibited a stronger positive correlation with extraversion (r (576) = .31, p < .01), weaker correlation with agreeableness (r (576) = .13, p < .01) and a significant negative correlation with neuroticism (r (576) = -.17, p < .01). Another argument for the non-overlapping nature of dispositional attitudes and neutral objects satisfaction was established in this study—the DAM was positively correlated with Intellect/Openness (r (576) = .19, p < .01) whereas the NOSQ was not. The NOSQ was positively correlated with conscientiousness (r (576) = .25, p < .01), but the DAM was not. This pattern of differences contrasts with those reported in Eschleman, Bowling and Judge (2015). Eschleman et al. reported that the DAM was negatively correlated with conscientiousness and openness (r = -.17 and -.15 respectively), whereas the NOSQ was unrelated to either construct. Either way, the correlations provide evidence for discriminant validity between the two constructs of dispositional attitudes and neutral objects' satisfaction.

Given the larger sample size for this particular study, we decided to perform additional subgroups analysis of the general factor of interests to investigate RQ$_3$—if Holland's (1997) RIASEC structure of interests varied at different levels of profile elevation. If the general factor is independent of the circular structure of interests, the RIASEC inter-scale correlation matrices for each subset will show similar structures from multidimensional scaling in terms of circular shape and radius. Our method was based on Tracey, Rounds & Gurtman's (1996) investigation

of the structure of interpersonal problems at different levels of the general factor of interpersonal problems.

We subdivided the sample into quartiles (N = 142-146) based on the level of profile elevation and centered each correlation matrix by subtracting the grand mean correlation of all the matrices ($\bar{x}$ = -.089). Mean-centering removes any residual variance attributable to the general factor. We then took absolute values of each correlation because our analysis would only compare the magnitude and order relations between each subset matrix. Table 3a-3d show the means, standard deviations, and correlations between RIASEC scales for each profile elevation quartile. The standard deviations of the subsets representing each quartile were similar throughout, thus decreasing the probability of restriction of range as a possible confound. The correlations between subscales showed large differences between quartiles, as well as disparities with correlations using the combined dataset. Most striking was that the Investigative subscale was uncorrelated with the realistic subscale in all but the lowest quartile of profile elevation, while the entire dataset shows a correlation of r = .38 between the R and I subscale. The lower and upper quartile of profile elevation showed the least number of significant correlations, and the magnitude of the correlations did not exceed .30. The interquartiles showed much larger correlations overall compared to the lower and upper quartiles. While the correlations themselves may vary individually, more important are the inter-relationships between correlations within each subset matrix, as those would contribute to the circular structure of interest scales.

We first examined the circular shape of interests at different levels of profile elevation using multidimensional scaling (Kruskal and Wish, 1978) to visualize the two-dimensional spatial relationships between RIASEC scales for each subgroup. Even though the matrix of correlations showed stark differences, the two-dimensional representation of the inter-scale

relationships obtained from Kruskal Monotonic Multidimensional Scaling were similar (see

Figure 1). This suggests that the shape of Holland's (1997) circular structure of interests remains

consistent throughout different levels of profile elevation even though bivariate correlations

between two scales may be quite different depending on the level of one's general factor of

interests.

As noted by Wiggins et al. (1981), a circumplex model reflex both the angular dispersion

of points on a circle (i.e. circular shape) and the proportion of variance accounted for by the

circular structure (i.e. radius of the circle or circular communality). To evaluate the circular

communality, we adapted Hubert & Arabie's (1987) randomization test of hypothesized order

relations to test for differences in circular communality as a function of the general factor of

interests. Where there is greater circular communality, the absolute value of the correlations

within the centered correlation matrix will be higher. Comparing correlations of adjacent and

opposite scales across matrices will allow us to test if the radius of the circular structure of

interests differed at different levels of the general factor. If the radius remains constant through

different levels of profile elevation, the two-dimensional circular structure of interests would

adopt a three-dimensional cylindrical shape across the general factor of interests. If the radius

changes at higher or lower profile elevation, the three dimensional structure would appear more

conical or funnel-shaped.

To test for a conical representation for the data, we made the prediction that all adjacent

correlations (e.g. R-I and I-A) in subsets high in the general factor should be greater than all

adjacent correlations in subsets lower in the general factor. This resulted in 36 unique order

predictions for comparisons of adjacent correlations between each pair of matrices. Similarly, all

correlations between scales one step apart on Holland's hexagon should exhibit the same pattern

(i.e. higher in upper quartile subsets of the general factor compared to the lower quartiles). This resulted in another 36 unique predictions. Conversely, correlations between opposite scales in Holland's hexagon (R-S, I-E, A-C) should exhibit the opposite pattern by being lower in subsets high in the general factor and high in subsets low in the GFI. This resulted in 9 unique predictions, resulting in a total of 81 directional predictions made when comparing two matrices from different levels of the general factor. The majority of these predictions will be supported if a conical representation of the data is acceptable; null findings would suggest that a cylindrical model of interest data is more suitable. A spherical representation would be viable if the greatest magnitude in correlations occurred at moderate levels of the general factor and a symmetrical drop in magnitude occurred with higher and lower levels of the GFI.

Results of the randomization test are presented in Table 4. A conical representation of the data was not supported by any of the pairwise comparisons between matrices. Instead, a cylindrical representation seems more apt because of the low correspondence indices. Although the magnitude of the mean-centered correlations for the interquartile subsets showed larger range (going up to .40), the average correlation within each matrix did not differ much ($r_{0-25\%} = .15$, $r_{25-50\%} = .19$; $r_{50-75\%} = .20$; $r_{75-100\%} = .14$) thus a cylindrical three-dimensional structure seems most applicable.

This study is the first to provide evidence that the two-dimensional circular structure of interests proposed by Holland (1997) remains constant across different levels of the general factor of interests. This evidence suggests that it is okay for researchers and counselors to group people displaying flat interest profiles (i.e. similar scores across interest scales) together regardless if they showed overall high flat profiles or low flat profiles. The relationships between interest scales and hence other constructs should remain the same regardless of profile elevation.

The next study will continue to add to our knowledge about the general factor of interests by comparing it to a dedicated index of acquiescence.

STUDY 3

This study addressed RQ$_2$—If the general factor of interests was a substantive construct, an index of acquiescent responding should be a worse predictor of interest profile elevation compared to dispositional attitudes or neutral objects' satisfaction. A secondary aim was to replicate the interrelationships found in Study 1 using Eschleman and Bowling's (2015) more contemporary 7-point scale options for the Neutral Objects Satisfaction Questionnaire (NOSQ), and explore if there was a difference in correlations between 7-point versions of either scale with the 7- or 3-point version of the second scale.

Method

Participants. Two hundred and ninety nine participants from the psychology subject pool at a large Midwestern university completed an online questionnaire on personality and interests over a period of eight days. Forty-six responders failed at least one of the two quality control questions and were removed from analyses. The final sample comprised 183 Females and 70 Males, with age ranging from 18-25 (M_{age} = 19.70, SD_{age} = 1.40). The racial composition of the sample was 63% White, 24% Asian, 7% Black or African American, and 4% Other. Participants were compensated with course credit for completing the survey.

Measures

Vocational Interests. Vocational interests were measured with 48 activity items from Armstrong, Allison & Rounds' (2008) public domain Brief RIASEC Marker Scales (Set B). Participants rated activities such as "work with juveniles on probation" and "sell newspaper advertisements" on a 5-point scale of "Strongly Dislike" to "Strongly Like". The sum of the RIASEC scales was used to calculate profile elevation. The interest measure was presented in an

order such that it separated the DAM and NOSQ. Armstrong, Allison and Rounds reported reliabilities for each RIASEC scale ranging from .82 to .94. For this study, Cronbach's alpha for the scores on RIASEC scales ranged from .81-.92.

Dispositional Attitudes. Each participant received one of two versions of the DAM (Hepler & Albarracin, 2013). The items remained the same between versions but the response scale was either a 3-point (1 = 'unfavorable', 3 = 'favorable') or 7-point response scale (1 = 'extremely unfavorable', 7 = 'extremely favorable'). The DAM was presented as either the first or last among the measures of interest, attitudes and neutral objects' satisfaction. Cronbach's Alpha was .81 for the three-point DAM and .77 for the 7-point DAM.

Neutral Objects Satisfaction. Each participant received Eschleman & Bowling's (2015) NOSQ on either a 3-point response scale (1 = 'dissatisfied', 2 = 'neutral', 3 = 'satisfied') or a 7-point response scale (1 = 'extremely dissatisfied', 7 = 'extremely satisfied'). The NOSQ was counterbalanced with the DAM to appear as either the first or last in the set of surveys. To increase sample size within subgroups, and since we were interested only in comparing between the 7-point scales and 3-point scales, there were no cases where the 3-point DAM was administered with the 3-point NOSQ. Cronbach's Alpha was .80 for the 3-point NOSQ and .85 for the 7-point NOSQ.

Acquiescence Response Style. Following methods from Baumgartner & Steenkamp (2001), we developed an index of acquiescent responding using a heterogeneous set of random personality questions. Heterogeneous item sets can be created by selecting items with low inter-item correlations drawn from multiple scales irrelevant to the construct of interest (De Beuckelaer, Weijters & Rutten, 2010). 40 items were randomly selected from 463 IPIP scales of 274 different personality constructs (Goldberg, 1999). To examine if our randomly selected

personality items formed a suitable index of acquiescent response style, we performed principal

components analysis which extracted 13 possible components with the first explaining only

11.1% of the total variance. The low proportion of variance explained suggests that the set of

items do not measure a substantively meaningful trait but rather a response style. To more

specifically target acquiescence and not another response style, raw scores on all 40 items were

recoded such that the upper bound responses (4 and 5 on a 5-point scale) were recoded as 1 and 2

respectively, and all other responses were coded as 0. Acquiescence was operationalized as the

mean of the recoded items.

Results and Discussion

Table 5 shows the correlations between the study variables. A principal components

analysis of the RIASEC correlation matrix extracted 3 components with eigenvalues greater than

one, and the first component explained 32.2% of the variance. First component loadings for all

RIASEC scales ranged from .35 to .66. To calculate omega hierarchical, a two-factor solution

did not include the investigative subscale so a three-factor solution was used instead. Omega

hierarchical was .29. These results were slightly smaller compared to Study 1 and Study 2, but

still support the presence of the general factor of interests.

Once again, profile elevation showed a strong significant correlation with a measure of

dispositional attitudes (r = .44 to .54), but not with neutral objects' satisfaction. This effect was

found regardless of the number of response anchors used. Furthermore, profile elevation showed

only a small significant correlation with the dedicated index of acquiescence comprised of

random personality items (r (253) = .12, p = .04). This provides evidence to answer our research

question (RQ$_2$) of whether the GFI is more interpretable as a substantive construct or as a

acquiescence response style. These bivariate correlations clearly suggest that profile elevation is

not simply acquiescence due to the larger correlations between profile elevation and dispositional attitudes than neutral objects satisfaction or acquiescence. For better evidence of the relationships between the three measures, we conducted a series of regressions to estimate incremental variance explained. Since the response scales did not show any marked difference in the relationships between variables, we standardized the DAM and NOSQ scores and used the entire sample (N = 253) for these regressions.

The following models were tested to explore the incremental variance explained by the DAM and NOSQ:

1. Profile elevation = Acquiescence + constant

2. Profile elevation = Acquiescence + 7-point DAM + constant

3. Profile elevation = Acquiescence + 7-point + 7-point NOSQ + constant

In the first model, acquiescence had a standardized beta coefficient of .12 ($t = 1.99$, $p = .04$), but acquiescence no longer was a significant term in the equation upon accounting for the dispositional attitude scores. The standardized beta coefficients for DAM scores was .46 ($t = 8.18$, $p < .01$) versus acquiescence's .10 ($t = 1.77$, $p = .08$) in model 2. This suggests that the small variance accounted for by acquiescence scores in profile elevation is also shared within the dispositional attitude measure. Neutral objects' satisfaction was a non-significant term in model 3. Alternative regression models switching the order in which the predictor variables were introduced found similar results.

When comparing the DAM with NOSQ, our results failed to replicate Eschleman and Bowling (2015) who reported correlations of about .65 between the 7-point DAM and the 7-point NOSQ. In fact, the 7-point versions did not correlate at all whereas the 3-point compared to

the 7-point versions showed a marginally significant correlation. Only the 3-item version of the DAM reflected some similarity with our index of acquiescence.

In summary, regression analysis from this study effectively showed that acquiescence and dispositional attitudes can explain some variation in the general factor of interests. The GFI has more substantial variance that could be valuable in the domain of personality research, while also containing a small amount of acquiescence bias. Thus, forced-choice methods commonly used to remove the general factor in interest research might also be deleting useful information about individual differences. To further seat the general factor of interests within the theoretical space of personality constructs, Study 4 examines possible relationships between the GFI and several specific personality facets and contemporary personality constructs.

STUDY 4

This study complements the previous studies with a convergent-discriminant validity comparison of dispositional attitudes and the GFI on more specific personality facets and constructs in an online sample. Since the previous studies confirmed a similar pattern of correlations with the Big Five personality dimensions for both profile elevation and dispositional attitudes, not all facets of personality were selected in consideration of survey length. The final array of instruments selected comprised measures of grit, subjective vitality, extraversion facets of activity and excitement seeking, openness facet of actions, variety seeking, curiosity, and inquisitiveness. Because studies that include both dispositional attitude measures and interest measures are rare, this study provides novel information regarding the theoretical overlap of these two constructs.

Method

Participants. Two hundred and ninety-nine participants recruited from Amazon's Mechanical Turk completed an online questionnaire on personality and interests. Participants were residents of the United States and comprised 162 Males and 137 Females ($M_{age} = 36.00$, $SD_{age} = 11.69$). The racial composition of the sample was 79% White, 12% Black or African American, and 4% Asian. Participants were compensated with USD 1.50 for completing the survey.

Measures

Vocational Interests. As in Study 1 and 2, the 60-item O*NET Interest Profiler Short-Form (Rounds et al., 2010), was used to assess vocational interests. The sum of the RIASEC

scales was used to calculate profile elevation. For this study, each RIASEC interest scale had an alpha reliability ranging from .85-.90.

Dispositional Attitudes. Hepler & Albarracin's (2013) Dispositional Attitude Measure (DAM) was once again used to assessed dispositional attitudes. Cronbach's Alpha was .75.

NEO Specific Personality Facets. Selected Extraversion and Openness to Experience subscales from Costa & McCrae's (1992) Revised NEO Personality Inventory were used for more fine-grained analysis of the construct overlap between dispositional attitudes and the general factor of interests, which had both shown significant relationships with extraversion and openness in the previous studies. More specifically, the Activity and Excitement-Seeking facet scales for extraversion and the Actions scale for openness were selected in the study. These eight-item measures were scored on a five-point scale of "Strongly Disagree" to "Strongly Agree". According to Costa & McCrae, activity refers to having high energy and vigor (Sample item: "My life is fast paced"). Excitement-seeking refers to the desire for thrills and stimulation (Sample item: "I like to be where the action is"). Actions represent to the willingness to try different activities (Sample item: "I often try new and foreign foods"). For this study, the Activity, Excitement-Seeking and Actions facet scales had a Cronbach's Alpha of .80, .72, and .74 respectively.

International Personality Item Pool. From Goldberg's International Personality Item Pool (IPIP; Goldberg, 1999), we administered scales for Variety Seeking, Curiosity, and Inquisitiveness because the DAM had previously been correlated with those scales in its validation study (Hepler & Albarracin, 2013) but the general interest factor had not. These ten-item scales captured an aspect of openness to experience and had respondents rate their agreement towards descriptive statements such as "Seek adventure" and "Am not all that curious

about the world"(R) on a five-point scale, and had reported Cronbach's Alphas of .90, .86 and .85 respectively.

Subjective Vitality. To better understand how dispositional attitudes and general interests relate to one's energy levels, we included a measure of general energy in Ryan and Frederick's (1997) seven-item Subjective Vitality Scale. Participants were requested to respond on a seven-point scale of "Not at All" to "Very True" on how well descriptors such as "I nearly always feel alert and awake" applied to their life at the present time. For this study, the Subjective Vitality Scale had a reliability of .94.

Grit. Duckworth & Quinn's (2009) Short Grit Scale was included as a measure of trait-level perseverance and passion for long term goals. This eight-item measure requested participants rate statements such as "I am diligent" and "Setbacks don't discourage me" on a five-point scale of "Not at all like me" to "Very much like me". Grit can be divided into consistency of interests and perseverance of effort, which might be informative to differentiate the general factor of interests and dispositional attitudes. The Grit Scale had an alpha reliability of .88 for this study.

Interested Activities & Occupations. Hepler & Albarracin (2014) established a positive .26 correlation between the number of different activities performed by an individual and dispositional attitudes. The general factor of interests had been theorized to be related to interest breadth (Rounds & Tracey, 1993), thus we believed it prudent to explore if the two constructs shared convergent validity in the realm of breadth of interest. To gauge the breadth of participants' interests, we requested that participants list freely the activities and occupations that they would like to pursue in two separate open-ended questions. The number of distinct

activities/hobbies and occupations in each response was then counted by the author according to the number of activity/occupation nouns present in the participant's list.

Results and Discussion

Bivariate correlations between the study variables are presented in Table 6. Study 4 corroborated the correlation found between the DAM and profile elevation in the previous studies (r (297) = .49, $p < .01$). The pattern of significant correlations between the DAM and profile elevation was generally similar. The largest correlations were with subjective vitality (r_{DAM} (297) = .30, $p < .01$; $r_{elevation}$ (297) = .20, $p < .01$) and IPIP inquisitiveness (r_{DAM} (297) = .36, $p < .01$; $r_{elevation}$ (298) = .23, $p < .01$). The magnitude of the correlations was always larger for the DAM than for profile elevation. The DAM and profile elevation differed in their relationship with the action facet (r_{DAM} (297) = .25, $p < .01$; $r_{elevation}$ (298) = .11, $p = .06$) and number of interested activities (r_{DAM} (295) = .16, $p = .007$; $r_{elevation}$ (296) = .06, $p = .324$). These results suggest that although dispositional attitudes are highly correlated with profile elevation, DAM scores are generally superior predictors of personality variables, energy, and persistence. Dispositional attitudes and the profile elevation showed divergence in their relationship with openness to action and the number of interested activities listed by each participant.

The correlation between the DAM and the IPIP subscales of variety seeking, curiosity and inquisitiveness corroborated results from Hepler & Albarracin's (2013) validation study of the instrument. The DAM's significant positive relationships with subjective vitality and number of interested activities is consistent with the attitudes discourse that more positive attitudes predict more action and activity (Glasman & Albarracin, 2006). Even though the DAM is a new measure, its validity seems fairly robust.

Interest profile elevation was significantly related to the number of interested occupations, but not the number of interested activities. This might suggest that RIASEC interest elevation might be more suited for predicting the breadth of vocational interest and less so for breadth of leisure interests. Alternatively, the difference could have been attributable to problems in the open-ended response format. Some participants would list vague interests such as "anything to do with computers" in which the 'counting nouns' procedure would consider that as one activity instead of a wider number of possible activities. Future examinations of interest breadth could utilize a more comprehensive approach (e.g. a 180-item interest inventory) to accurately capture the breadth of participants' leisure and occupational interests. Due to survey length and time considerations, such a measure was not used for this study.

In summary, Study 4 contributed more evidence for convergent validity between dispositional attitudes and the general factor of interests. The consistently larger correlations between dispositional attitudes and other personality constructs compared to the GFI and those same personality constructs suggests that the construct overlap is not large enough to seat the theoretical meaning of the GFI completely within the personality and attitudinal discourse. Some aspects of the GFI are yet to be identified. In the next section, we present a summary of the nomological network of the GFI within the personality discourse. Table 7 presents personality construct correlations with either the GFI or dispositional attitudes. This table acts as a summary of the contributions of the studies in this paper.

GENERAL DISCUSSION

Overall, this research sought to shed light on the general factor of interest (GFI) in two main ways. First, we estimated the size of the general factor within multiple samples and explored its influence on Holland's (1997) RIASEC circumplex. Secondly, we evaluated if dispositional attitudes, neutral objects satisfaction, and acquiescence response style had construct overlap with the GFI. Across four studies in both online and academic samples, we accumulated evidence corroborating previous literature (Prediger, 1982) that found constant general factor across all interest data. Even when using contemporary methods (omega hierarchical) to estimate the saturation of the general factor, our studies found the variance explained by the general factor in interest data to be slightly less than forty percent. Our results suggest that the GFI, though relatively smaller than other general factors such as the general factor of personality or g, still explains a large proportion of interest scale variance. Future studies using vocational interests as a predictor should endeavor to include profile elevation as a possible predictor variable. Only through further study of profile elevation and the general factor will researchers begin to understand more about what the GFI can predict.

Study 2 presented new evidence that the circular structure of interests maintained its shape at different levels of the general factor. This result should embolden interest researchers extrapolating from a limited sample with generally low or generally high profile elevation. Counselors will also be encouraged to know that making predictions about clients using RIASEC high point codes will likely be the same even if the client had a high or low average interest score. Future studies could explore other theoretical models of interest to investigate if different levels of profile elevation influence any structural relationships between interest dimensions.

38

Study 3 provided the strongest evidence for a substantive interpretation of the general factor of interests as a broad attitudinal construct similar but not completely identical to the dispositional attitude. Neither neutral objects' satisfaction nor acquiescence showed moderate correlations with profile elevation, thus ruling out these alternative interpretations of the general factor of interests. Dispositional attitude accounted for more variance in profile elevation scores than an index of acquiescent responding. This implies that profile elevation is a theoretically relevant individual difference variable that should be measured and incorporated into the score report of interest inventories. Consequently, inventories that use forced-choice methodologies may not present the best representation of an individual's interests because the general factor of interests is ipsitized via the forced-choice paradigm. Finally, the general factor of interests should be incorporated into definitions and hierarchical models of interests instead of being dismissed as error. Promoting awareness of the general factor is the best way to ensure its inclusion in future studies about interests.

The four studies in this paper laid the groundwork for understanding the theoretical meaning of the general factor of interests using personality constructs. Future studies would benefit from studying the general factor of interest using a greater variety of interest measures. It would be informative to examine if profile elevation from broader inventories which assess interest in occupations, school subjects, work activities, leisure activities can still show similar correlations with attitudinal and personality constructs. One such inventory worth studying is the Strong Interest Inventory (Donnay et al., 2005). It would be also informative to investigate if there are any similarities between the general factor of interests and the general factor of personality. The growing momentum of general factor research in other disciplines will also open up new opportunities for cross-disciplinary studies of general factors. General factor

research within the field of interests is still in its nascent stage, and we hope that our research can

at the very least stimulate the discussion on the value of general factors within the study of

vocational interest.

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Table 1. Correlations Between Study 1 Variables

		Mean	SD	1	2	3	4	5	6	7	8	9	10
1.	Realistic	2.30	.79	(.89)									
2.	Investigative	3.06	.88	**.44**	(.89)								
3.	Artistic	3.23	.89	**.27**	**.27**	(.88)							
4.	Social	3.58	.74	-.07	.04	**.27**	(.84)						
5.	Enterprising	3.08	.76	**.22**	.08	**.30**	**.30**	(.83)					
6.	Conventional	2.36	.75	**.60**	**.22**	**.13**	-.02	**.42**	(.88)				
7.	Profile Elevation	2.94	.48	**.69**	**.60**	**.65**	**.40**	**.63**	**.63**	(—)			
8.	Dispositional Attitudes	3.58	.77	**.44**	**.37**	**.24**	.01	.15	**.29**	**.43**	(.78)		
9.	Neutral Objects Satisfaction	2.45	.27	-.03	-.03	-.04	**.18**	**.10**	**.10**	.07	**.11**	(.76)	
	Without neutral responses	1.79	.16	-.01	-.05	-.04	**.20**	**.10**	**.09**	.07	**.09**	**.92**	**.20**
10.	Self-Efficacy	32.03	4.84	-.01	.06	-.07	**.11**	**.09**	-.01	.04	.07	**.21**	(.91)

Note. *n* = 489, boldface indicates *p* < .05, scale reliabilities in parentheses. NOSQ coded with and without neutral responses (dissatisfied = 1, satisfied = 2, Neutral responses recoded as missing data)

Table 2. Correlations Between Study 2 Variables

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Interest profile elevation	3.01	.54	(—)													
2. DAM	3.70	.77	**.40**	(.77)												
3. NOSQ	2.30	.33	**.10**	**.20**	(.85)											
4. IPIP: Extraversion	2.61	1.04	**.19**	**.31**	**.31**	(.86)										
5. IPIP: Agreeableness	3.79	.85	**.21**	**.13**	**.27**	**.31**	(.82)									
6. IPIP: Conscientiousness	3.68	.82	-.00	.00	**.25**	**.20**	**.25**	(.73)								
7. IPIP: Neuroticism	2.54	.96	-.03	**-.17**	**-.36**	**-.31**	**-.18**	**-.41**	(.81)							
8. IPIP: Intellect	3.88	.83	**.21**	**.19**	.00	**.26**	**-.34**	.07	**-.11**	(.77)						
9. Realistic	2.77	.85	**.61**	**.33**	-.06	.00	-.03	-.02	**-.04**	**.10**	(.88)					
10. Investigative	3.29	.87	**.59**	**.33**	-.00	**.10**	**.09**	-.05	-.01	**.19**	**.38**	(.89)				
11. Artistic	3.39	.95	**.59**	**.15**	-.03	**.10**	**.22**	-.05	.04	**.32**	**.11**	**.25**	(.89)			
12. Social	2.95	.90	**.66**	**.28**	**.19**	**.28**	**.39**	-.02	-.04	**.13**	**.15**	**.26**	**.43**	(.88)		
13. Enterprising	2.75	.82	**.66**	**.23**	**.22**	**.32**	**.10**	**.10**	**-.11**	.09	**.24**	**.18**	**.25**	**.43**	(.85)	
14. Conventional	2.92	.90	**.56**	**.17**	.05	**-.11**	-.00	.03	.05	-.08	**.39**	**.12**	.05	**.14**	**.36**	(.90)

Note. n = 576, boldface indicates $p < .05$, scale reliabilities in parentheses.

Table 3a. Subgroups Analysis for Study 2

Subset 1 (Profile Elevation Lowest Quartile 1.17-2.70), N = 142

	Mean	SD	Skew	Kurtosis	R	I	A	S	E	C
Realistic	2.13	.73	0.41	-.28	1.00					
Investigative	2.60	.89	0.17	-.72	**.21**	1.00				
Artistic	2.66	.92	0.19	-.67	-.05	.01	1.00			
Social	2.16	.81	0.44	-.50	**-.20**	.01	**.26**	1.00		
Enterprising	2.05	.65	0.43	-.15	-.12	**-.21**	.06	.13	1.00	
Conventional	2.28	.89	0.69	.14	**.23**	-.09	**-.22**	**-.18**	**.17**	1.00

Note. Correlations in bold indicate significance $p < .05$.

Table 3b. Subgroups Analysis for Study 2

Subset 2 (Profile Elevation 2nd Quartile 2.72-3.03), N = 146

	Mean	SD	Skew	Kurtosis	R	I	A	S	E	C
Realistic	2.63	.73	.23	-.49	1.00					
Investigative	3.17	.75	-.15	.10	.04	1.00				
Artistic	3.25	.86	-.06	-.17	**-.39**	**-.19**	1.00			
Social	2.80	.65	-.02	.05	**-.39**	**-.24**	**.17**	1.00		
Enterprising	2.58	.62	.05	.27	**-.21**	**-.22**	**-.26**	-.07	1.00	
Conventional	2.84	.77	.26	-.30	.12	**-.38**	**-.41**	**-.25**	.04	1.00

Note. Correlations in bold indicate significance $p < .05$.

Table 3c. Subgroups Analysis for Study 2

Subset 3 (Profile Elevation 3rd Quartile 3.05-3.36), N = 144

	Mean	SD	Skew	Kurtosis	R	I	A	S	E	C
Realistic	2.88	.66	-.08	-.08	1.00					
Investigative	3.49	.66	-.30	-.11	.05	1.00				
Artistic	3.64	.76	-.39	-.31	**-.48**	-.11	1.00			
Social	3.20	.70	-.35	-.21	**-.37**	**-.28**	.15	1.00		
Enterprising	2.92	.66	-.10	-.38	**-.25**	**-.34**	**-.20**	.07	1.00	
Conventional	3.00	.68	-.01	-.43	**.17**	-.14	**-.49**	**-.41**	-.05	1.00

Note. Correlations in bold indicate significance $p < .05$.

Table 3d. Subgroups Analysis for Study 2

Subset 4 (Profile Elevation Upper Quartile 3.37-4.68), N = 144

	Mean	SD	Skew	Kurtosis	R	I	A	S	E	C
Realistic	0.34	.69	-.37	-.54	1.00					
Investigative	0.39	.61	-.45	.45	.12	1.00				
Artistic	0.40	.67	-.71	.33	-.14	.15	1.00			
Social	0.36	.72	-.33	.09	**-.17**	.05	.09	1.00		
Enterprising	0.34	.65	-.32	.01	-.02	-.15	.00	**.24**	1.00	
Conventional	0.36	.75	-1.12	1.51	.10	**-.26**	-.05	-.14	.13	1.00

Note. Correlations in bold indicate significance $p < .05$.

Table 4. Summary of Randomization Tests of Cone Hypothesis Across Centered Correlation Matrices for Study 2

Sample	Quartile 2	Quartile 3	Quartile 4
Quartile 1 (PE=1.17-2.70; N = 142)			
N Predictions Met	40	38	43
Correspondence Index	-0.01	-0.06	0.06
Quartile 2 (PE=2.72-3.03; N = 146)			
N Predictions Met		42	42
Correspondence Index		0.04	0.04
Quartile 3 (PE=3.05-3.36; N = 144)			45
N Predictions Met			0.11
Correspondence Index			
Quartile 4 (PE=3.37-4.68; N = 144)			
N Predictions Met			
Correspondence Index			

Note. Total number of predictions made = 81.

Table 5. Correlation between Study 3 Variables

	N	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Realistic	253	2.13	.84	(.88)											
2. Investigative	253	3.33	.94	**.28**	(.88)										
3. Artistic	253	3.20	.88	**.23**	**.15**	(.85)									
4. Social	253	3.33	.90	-.01	**.18**	**.28**	(.87)								
5. Enterprising	253	2.82	.77	**.17**	-.06	**.33**	**.16**	(.81)							
6. Conventional	253	2.41	.95	**.41**	.10	.07	-.03	**.40**	(.92)						
7. Profile Elevation	253	2.87	.49	**.61**	**.51**	**.61**	**.48**	**.57**	**.59**	(—)					
8. Acquiescence	253	.61	.18	.01	.11	**.20**	**.16**	-.06	-.01	**.12**	(—)				
9. DAM 3-point	65	1.82	.36	**.50**	**.45**	**.49**	.06	.14	**.33**	**.54**	.24	(.81)			
10. DAM 7-point	188	3.49	.75	**.42**	**.35**	**.20**	.06	.06	**.29**	**.44**	-.00	n/a	(.77)		
11. NOSQ 3-point	64	2.39	.27	.02	.24	.10	**.28**	.05	.05	.23	.10	n/a	**.25**	(.80)	
12 NOSQ 7-point	189	4.82	.63	.04	-.04	-.02	.10	**.15**	**.21**	.13	-.04	.24	.00	n/a	(.85)

Note. Correlations in bold indicate p < .05, scale reliabilities in parentheses. n/a indicates there were no cases where a participant received both the DAM-3point and DAM7-point, or NOSQ 3-point & NOSQ 7-point, or DAM 3-point & NOSQ 3-point.

Table 6. Correlation between Study 4 Variables

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Interest profile elevation	3.04	.53	(—)													
2. DAM	3.74	.75	**.49**	(.75)												
3. Subjective vitality	4.67	1.38	**.20**	**.30**	(.94)											
4. NEO E: Activity	3.00	.68	**.17**	**.25**	**.65**	(.80)										
5. NEO E: Excitement	3.27	.71	**.17**	**.25**	**.29**	**.42**	(.72)									
6. NEO O: Actions	3.05	.60	.11	**.25**	**.29**	**.33**	**.34**	(.74)								
7. GRIT-S	3.44	.77	**.14**	**.18**	**.56**	**.38**	-.05	.09	(.88)							
8. GRIT-Consistency	3.13	.94	.10	**.12**	**.47**	**.28**	**-.13**	.06	**.92**	(.71)						
9. GRIT-Persistence	3.75	.76	**.16**	**.22**	**.56**	**.41**	.06	.11	**.88**	**.63**	(.74)					
10. IPIP Variety Seeking	3.62	.74	**.18**	**.26**	**.40**	**.36**	**.45**	**.75**	**.18**	.09	**.26**	(.90)				
11. IPIP Curiosity	3.77	.69	**.17**	**.27**	**.56**	**.38**	**.17**	**.47**	**.47**	**.40**	**.44**	**.57**	(.86)			
12. IPIP Inquisitiveness	3.76	.71	**.23**	**.36**	**.19**	**.20**	**.22**	**.39**	**.17**	.10	**.22**	**.50**	**.59**	(.85)		
13. Interested Activities	6.32	3.33	.06	**.16**	.07	-.04	-.11	**.22**	**.15**	**.21**	**.39**	**.35**	**.12**	**.15**	(—)	
14. Interested Occupations	5.35	3.57	**.16**	**.16**	.13	-.02	-.03	**.21**	.08	**.21**	**.29**	**.23**	**.49**	.10	.05	(—)

Note. $n = 299$, bold font indicates $p < .05$, scale reliabilities in parentheses.

Table 7. Summary of Correlations of the Dispositional Attitude Measure (DAM) and Profile Elevation with Personality Characteristics

	DAM	Profile Elevation
Openness	**.19**	**.21**
Actions Facet	**.25**	.11
Conscientiousness	.00	-.00
Extraversion	**.31**	**.19**
Activity Facet	**.25**	**.17**
Excitement-Seeking Facet	**.25**	**.17**
Agreeableness	**.13**	**.21**
Neuroticism	**-.17**	-.03
Variety Seeking	**.26**	**.18**
Curiosity	**.27**	**.17**
Inquisitiveness	**.36**	**.23**
Grit	**.18**	**.14**
Subjective Vitality	**.30**	**.20**
Behavioral Activation[*]	**.14**	**.26**
Behavioral Inhibition[*]	**-.29**	.00

Note. Correlations in bold indicate p < .05. Correlations for behavioral activation/inhibition were drawn from Hepler & Albarracin (2013) and unpublished data by fellow graduate student Jonathan Phan.

Figure 1. Structure of RIASEC interests at different levels of the General Factor
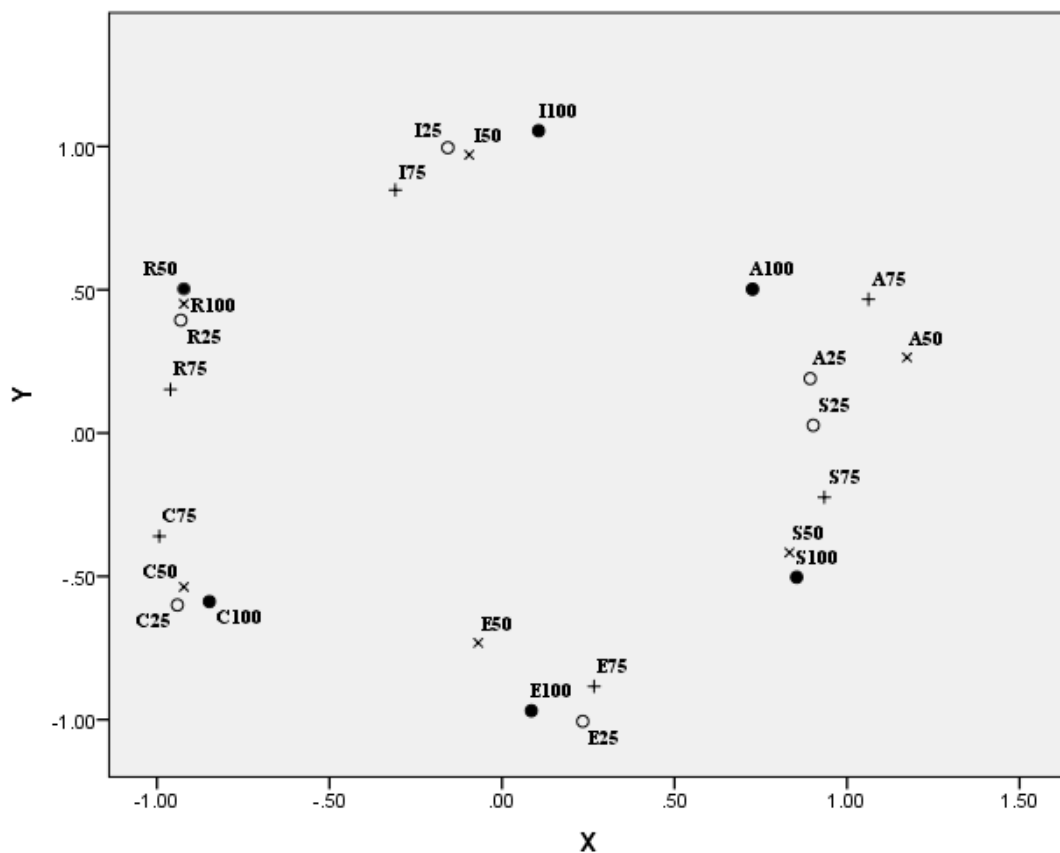
Coordinates		
	X	Y
R25	-0.93	0.39
I25	-0.16	1
A25	0.89	0.19
S25	0.9	0.03
E25	0.23	-1.01
C25	-0.94	-0.6
R50	-0.92	0.45
I50	-0.1	0.97
A50	1.17	0.26
S50	0.83	-0.42
E50	-0.07	-0.73
C50	-0.92	-0.54
R75	-0.96	0.15
I75	-0.31	0.85
A75	1.06	0.47
S75	0.93	-0.22
E75	0.27	-0.88
C75	-0.99	-0.36
R100	-0.92	0.5
I100	0.11	1.06
A100	0.73	0.5
S100	0.85	-0.5
E100	0.09	-0.97
C100	-0.85	-0.59

Note. The numbers next to the scale label indicate the subset of data used (25 = lowest quartile, 50 = 2nd quartile, 75 = 3rd quartile, 100 = upper quartile). Transformations were applied to the coordinates such that identical scales would be in the same quadrant. The shape and distance between points were not affected by these transformations.