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The general factor of personality and humor styles

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ABSTRACT

The present study examined the phenotypic, genetic, and environmental correlations between a general factor of personality (GFP) and four humor styles: affiliative, self-enhancing, aggressive, and self-defeating. Participants were 571 same-sex adult twin pairs. Individuals completed the Humor Styles Questionnaire (HSQ) and a short form of the NEO personality scale (from which the GFP was extracted). The GFP was found to be heritable with an estimated value of .31. At the phenotypic level, the GFP was found to correlate significantly with the HSQ scales; positively with affiliative and self-enhancing, and negatively with aggressive and self-defeating. Three of the four phenotypic correlations were found to be attributable to correlated genetic factors, suggesting that these dimensions of humor styles and the GFP may have a common genetic factor.

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1. Introduction

The purpose of the present study was to examine the relationships at the phenotypic, genetic, and environmental levels that exist between the four dimensions of the Humor Styles Questionnaire (HSQ; Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003) and a general factor of personality (GFP) extracted from a short form version of the NEO (McCrae & Costa, 2004) which measures the big five personality dimensions: openness to experience (or simply openness), conscientiousness, extraversion, agreeableness, and neuroticism. The present study adds to the literature by demonstrating correlations between a GFP and humor styles, an area which has received little previous attention, and by further examining the genetic and/or environmental contribution to these correlations.

1.1. The GFP

The GFP is defined as a single higher-order personality factor and has been found in multiple measures of personality (Musek, 2007; Rushton & Irwing, 2009; Schermer & Vernon, 2010; Veselka, Just, Jang, Johnson, & Vernon, 2012; Veselka, Schermer, Petrides, & Vernon, 2009; Woods & Hardy, 2012). van der Linden, Nijenhuis, and Bakker (2010) published a meta-analysis of GFP research and described high GFP scorers as "open-minded, hard-working, sociable, friendly, and emotionally stable" (p. 316). In terms of loadings, across the studies included in the meta-analysis, conscientiousness was reported to have the highest value, followed by neuroticism, agreeableness, and extraversion, whereas the lowest loading was for openness (van der Linden et al., 2010). Although a GFP has been extracted in many studies with different personality measures, the construct validity of the dimension needs to be further examined, such as how the GFP relates to such other variables, such as vocational performance ratings (Schermer, Carswell, & Jackson, 2012; van der Linden, Bakker, & Serlie, 2011). Criticisms of the GFP have suggested that it may not capture all aspects of personality (Holden & Marjanovic, 2012), and that the GFP could be an artifact of socially desirable response styles. The present study adds to the understanding of this construct by examining how a GFP correlates with humor styles.

1.2. Humor and personality

The HSQ is based on the assumption that humor is not unique to particular personalities, but rather that individuals express humor in their daily lives in ways that reflect their broader personality traits. Some of these ways of expressing humor may be more desirable or beneficial than others. A fairly consistent pattern of relationships has been reported between the four humor styles from the HSQ and personality (Galloway, 2010; Martin et al., 2003; Saroglou & Scariot, 2002; Vernon, Martin, Schermer, & Mackie, 2008; Veselka et al., 2010). Affiliative humor, or the use of humor

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to enhance social relationships, has been found to correlate positively with extraversion and openness. Self-enhancing humor, or the use of humor to alleviate personal stress, has generally been found to be positively associated with extraversion, agreeableness and openness, and negatively with neuroticism. Aggressive humor, or using humor to make fun of others in a disparaging manner, has been found to be positively correlated with extraversion and neuroticism and negatively correlated with agreeableness, conscientiousness, and honesty–humility. Self-defeating humor, or using excessively self-disparaging humor in an attempt to ingratiate oneself with others, has been found to be positively associated with neuroticism and negatively with conscientiousness. In the only previous investigation of humor styles and the GFP, Rushton and colleagues (2009) found that affiliative and self-enhancing humor loaded positively onto a GFP (which also consisted of the Big Five personality dimensions as well as trait emotional intelligence scales), whereas aggressive and self-defeating humor loaded negatively onto this GFP. However, these authors did not examine how the humor scales correlated with the personality-derived GFP separately.

Both personality (see review by Johnson, Vernon, & Feiler, 2008) and humor styles (Vernon, Martin, Schermer, Cherkas, & Spector, 2008; Veselka et al., 2010) have been found to have a heritable component. Vernon et al. (2008) demonstrated that many of the phenotypic correlations found between the humor style scales and the Big Five personality dimensions (such as those described above) were due to common genetic and/or environmental factors. The GFP has also been found to have a heritable component (Veselka et al., 2009), with additive genetic effects accounting for between 46% and 53% in two studies. To build upon these findings, the present study examines the heritability component of a GFP and will examine the genetic and/or environmental influences on any phenotypic (observed) correlations between the GFP and the humor styles.

2. Method

2.1. Participants

Participants were from the longitudinal twin and family study from the Queensland Institute of Medical Research (see Wright & Martin, 2004) and included 571 pairs of same-sex adult twins (235 monozygotic (MZ) female pairs, 101 MZ male pairs, 175 dizygotic (DZ) female pairs, and 60 DZ male pairs) recruited through the National Health and Medical Research Council Australian Twin Registry. The mean age was 35.75 years (*SD* = 2.52, range = 34–46).

2.2. Measures and procedure

Individuals completed a battery of questionnaires as part of a larger study (see description by Baughman et al., 2012). Included in the set of questionnaires was the 60-item version of the NEO Five-Factor Inventory (McCrae & Costa, 2004), measuring the "Big Five" personality factors. Each scale consists of 12 items, was revised to make certain items more comprehensible to younger participants, and is reported to have maintained high internal consistency (reliability) values, ranging from .73 for agreeableness to .84 for neuroticism (McCrae & Costa, 2004). In the present study, the coefficient alpha values were acceptable (greater than .70) for all of the dimensions except for the openness dimension which was found to have a low internal consistency value of .48. Because this scale has been used in other reports from this sample [see for example, Wainwright, Wright, Luciano, Geffen, and Martin (2008)], the decision was made to keep the scale in the present analyses.

Individuals also completed the Humor Styles Questionnaire (HSQ; Martin et al., 2003). The HSQ consists of 32 items and measures four styles of humor: affiliative, self-enhancing, aggressive, and self-defeating. For the present sample, each scale had high reliability values, ranging from .70 for aggressive humor to .86 for affiliative humor (see Baughman et al., 2012).

3. Results and discussion

3.1. Extraction of the GFP and univariate genetic analysis

Individuals within a twin pair were randomly designated as "Twin 1" or "Twin 2" and were analyzed separately (creating two independent groups) for the extraction of the GFP. For each group, the five NEO scale scores were entered into an exploratory factor analysis using principal axis factoring and extracting a single factor; a fairly common method of extracting a GFP from scales (see Schermer et al., 2012). The results from the two groups are presented in Table 1 and demonstrate that the factor loadings are consistent across the two groups, but differ slightly from the meta-analytic results presented by van der Linden et al. (2010). In the present results, neuroticism has the highest loading, followed by extraversion, conscientiousness, agreeableness, and openness. Of particular note is the low loading for the openness score on the GFP analyses. Possibly this result is due in part to the low internal consistency value for openness.

A GFP score was calculated using the factor loadings (as listed in Table 1) as weights and aggregating across the scales, resulting in a GFP score for each individual within the twin pair. The within-twin pair intra-class correlations were then computed for the GFP scores. The MZ correlation was .43 and the DZ correlation was .30. The full ACE model (where A represents additive genetic factors, C represents common environment factors, and E is specific environment) was calculated using Mx (Neale, Boker, Xie, & Maes, 2006) and the heritability estimate was significant at .31 [95% confidence interval (CI) = .04 to .52], the common environment estimate was non-significant at .13 (95% CI = .00 to .36), and the unique environment estimate was significant at .56 (95% CI = .48 to .65). When age and sex were statistically controlled and the analyses conducted with the residuals, the heritability estimate remained significant at .29 (95% CI = .02 to .51), the common environment estimate was non-significant at .15 (95% CI = .00 to .37), and the unique environment estimate was significant at .56 (95% CI = .48 to .65). This finding is similar to the heritability estimates of the GFP found in two studies reported by Veselka et al. (2009).

3.2. Phenotypic, genetic, and environmental correlations between the GFP and the humor scales

The phenotypic (rp) correlations between the GFP and the four humor scales are presented in Table 2 for both the uncorrected and for the sex and age regressed results. Positive correlations were found between the GFP and the two positive humor scales

Table 1
Extraction of the GFP from the NEO for the two twin groups.

	Twin 1	Twin 2
Kaiser–Meyer–Olkin measure of sampling adequacy	.675	.681
Percentage of variance accounted for by a single factor	29.89	30.79
Loading on the GFP		
Neuroticism	−.77	−.79
Extraversion	.72	.72
Openness to experience	−.04	−.04
Agreeableness	.37	.37
Conscientiousness	.50	.51

Table 2
Phenotypic (rp), Genetic (rg), and Environmental (rc and re) correlations between the GFP and the four SHRQ Scales.

SHRQ scale	Uncorrected data	Age and sex corrected (regressed) data
Affiliative	rp = .39*	rp = .39*
	rg = **.26 (.10 to .40)**	rg = **.27 (.11 to .41)**
	rc = –	rc = –
	re = **.43 (.34 to .50)**	re = **.42 (.34 to .50)**
Self-enhancing	rp = .47*	rp = .47*
	rg = **.42 (.26 to .55)**	rg = **.42 (.26 to .55)**
	rc = –	rc = –
	re = **.49 (.42 to .56)**	re = **.49 (.42 to .56)**
Aggressive	rp = −.14*	rp = −.16*
	rg = −.14 (−.28 to .01)	rg = **−.18 (−.02 to −.33)**
	rc = –	rc = –
	re = **−.16 (−.06 to −.25)**	re = **−.14 (−.05 to −.24)**
Self-defeating	rp = −.31*	rp = −.32*
	rg = **−.48 (−.34 to −.60)**	rg = **−.49 (−.36 to −.61)**
	rc = –	rc = –
	re = **−.23 (−.13 to −.32)**	re = **−.23 (−.14 to −.32)**

Values in bold are considered to be significant in that the 95% CI (values within the brackets) do not contain zero.
* $p < .001$; two-tailed.

(affiliative and self-enhancing) and negative correlations were found between the GFP and the two negative humor scales (aggression and self-defeating). With the GFP in the present study being defined primarily as emotional stability (low neuroticism), extraversion, and conscientiousness, the pattern of correlations is similar to that found with the separate Big Five dimensions (Galloway, 2010; Martin et al., 2003; Saroglou & Scariot, 2002; Vernon, Martin, Schermer, & Mackie, 2008; Veselka et al., 2010).

Bivariate genetic analyses were then performed to further examine the covariance between each of the GFP and humor scales. Cholesky or triangular decomposition (see Neale & Cardon, 1992) was applied to the MZ and DZ mean square between- and within-pair covariance matrices to calculate genetic and environmental correlations. For these analyses, one twin's GFP score is correlated with his or her co-twin's score on a humor scale. If these cross-correlations are higher for MZ twins than for DZ twins, this suggests that the phenotypic correlation is due to some common genetic factor(s).

In conducting the bivariate genetic analyses, four models were computed and the fit estimates were then assessed (Neale & Cardon, 1992). Specifically, a full ACE, an AE, a CE, and an E (environmental covariation only) model were computed for each pair of variables. The model with the lowest chi-square per-degree of freedom and lowest AIC was deemed to be the best fitting model. For each of the bivariate genetic models computed, the AE model was found to have the best fit, indicating that these correlations are due to common genetic and unique environmental factors.

Table 2 lists the results of the bivariate genetic analyses for both the uncorrected and for the age and sex corrected results. Correlations with a 95% confidence interval (values within the brackets) that do not include zero are considered to be statistically significant. As reported in Table 2, three of the four genetic correlations were significant for the uncorrected data and all of the genetic correlations were significant for the analyses with the corrected data. In addition, all of the unique environmental correlations were significant (for both the uncorrected and the corrected data).

The results of this study expand on the understanding of the GFP by demonstrating the heritability of the dimension, the relationships between the GFP and humor styles, and further how these correlations are attributable to common genetic and/or environmental factors. The observed correlations between the four humor styles and the GFP provide further support for the view that these styles of humor represent different ways in which humor is used or expressed by individuals having different general personality traits. In this view, humor as a form of cognitive play is not unique to a particular type of personality; rather, the way an individual uses or expresses humor depends on his or her broader personality traits (Martin et al., 2003). Moreover, these findings indicate that the phenotypic correlations observed between humor styles and the GFP are, in part, attributable to the fact that the genes that contribute to individual differences in personality also contribute to individual differences in humor styles. From an evolutionary perspective, this finding suggests that these styles of humor and the higher-order personality dimension assessed by the GFP may have been co-selected. Several recent studies have found that humor styles mediate the associations between broader personality dimensions and various outcomes such as subjective well-being and relationship satisfaction, suggesting that humor may be one of the mechanisms by which personality traits influence social and emotional functioning (e.g., Cann, Norman, Welbourne, & Calhoun, 2008; Jovanovic, 2011). Future research could investigate whether similar mediation effects are also found with humor styles and the GFP.

Although the results add to the understanding of the nature of the GFP, the present study did have different factor loadings than what is typically found when the GFP is extracted from Big-Five personality measures and the openness dimension was found to have a low internal consistency value. Because of these limitations, a replication study may be required. Furthermore, the present study did not have a measure of social desirability responding, so the question of how social desirability may have influenced the correlations between the GFP and humor styles was not addressed and should be examined in future research.

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