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How Do Emotional Restrictions Affect the Use of Humor? A Behavior Genetic Analysis of Alexithymia and Humor Styles

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This article reports the first behavioral genetic study of relationships between alexithymia and four styles of humor: affiliative, self-enhancing, self-defeating, and aggressive. A total of 509 MZ pairs and 264 DZ pairs of twins completed the Toronto Alexithymia Scale-20 (TAS-20) and the Humor Styles Questionnaire (HSQ). Consistent with our predictions, alexithymia correlated negatively with affiliative and self-enhancing humor and positively with self-defeating and aggressive humor. All but one of the 16 phenotypic correlations that we report are significant at the 0.01 level. Also consistent with our predictions, the phenotypic correlations between alexithymia and humor styles were primarily attributable to correlated genetic factors and to a lesser extent to correlated non-shared environmental factors. Correlated shared environmental factors had no significant effect. Implications and limitations of this study are discussed.

Keywords: alexithymia, humor, behavior genetics, twin study

The construct of alexithymia refers to a notable constraint in the understanding and expression of emotion. Individuals with alexithymia are commonly characterized as having difficulties describing feelings, difficulties identifying feelings, and by an externally oriented thinking (EOT) style (Bagby et al., 1994; Grynberg et al. 2012; Leweke et al., 2012). These restrictions in the ability to both perceive and regulate affect are considered to be a significant vulnerability factor in the development of psychopathological disorders (Leweke et al., 2012). Alexithymic individuals also have difficulty building personal and social relationships with others (Feldmanhall et al., 2013).

The results of several studies have shown significant relationships between alexithymia and the Big 5 (conscientiousness, agreeableness, extraversion, neuroticism, and openness to experience). Higher degrees of alexithymia are associated with high scores on neuroticism and low scores in the areas of openness to experience and extraversion (e.g., Singh et al., 2011; Vernon et al., 2008). Unsurprisingly, alexithymia has also been reported to be negatively correlated with trait emotional intelligence (Baughman et al., 2013).

Humor is understood to be a commonly utilized interpersonal tool in human social interactions that can have several significant benefits. Humor plays a significant role in the formation and maintenance of relationships and is positively correlated with both fondness and intimacy (Treger et al., 2013). Empirical research also suggests that humor can aid in stress relief and to alleviate depressive symptoms, as well as to enhance the use of coping behaviors (Capps, 2006; Kuiper et al., 1993). Overholser's (1992) study of humor as a means of coping with stress found that the use of humor shares a positive relationship with measures of psychological adjustment, suggesting that humor may be an important coping mechanism for individuals' cognitive adjustment.

Conceptually, the notion of a 'sense of humor' is best viewed as a multidimensional construct that comprises a number of loosely connected traits, rather than as a broad personality trait (Martin et al., 2003). Martin and colleagues developed the HSQ (Martin et al., 2003), which taps four

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distinct styles of humor, two of which are believed to be beneficial for well-being (*affiliative* and *self-enhancing*) and two potentially detrimental and mal-adaptive (*self-defeating* and *aggressive*). Affiliative humor is characterized by making humorous comments and telling jokes in order to amuse others, while self-enhancing humor refers to the use of humor to regulate emotions and to cope with stress by maintaining a cheerful outlook on life. Self-defeating humor involves attempts to amuse others by means of excessively self-disparaging comments, while aggressive humor involves demeaning or manipulating others through such things as sarcasm, teasing, or ridicule.

The four humor styles have been the focus of an expanding body of research linking humor to personality models such as the Big 5. Affiliative humor has been found to correlate positively with both extraversion and openness (Vernon et al., 2008). Self-enhancing humor has been found to positively correlate with extraversion, agreeableness, and openness to experience, and to correlate negatively with neuroticism (Vernon et al., 2008).

Aggressive humor has been found to correlate positively with extraversion and neuroticism and negatively with conscientiousness, agreeableness, and honesty-humility (Vernon et al., 2008). Self-defeating humor is also positively correlated with neuroticism and negatively correlated with conscientiousness (Vernon et al., 2008). Interestingly, the two positive humor styles have also been found to be positively correlated with trait emotional intelligence, while the two maladaptive humor styles correlate negatively with trait EI (Vernon et al., 2009). Based on this, we expect that affiliative and self-enhancing humor styles will correlate negatively with alexithymia and that self-defeating and aggressive humor styles will correlate positively with alexithymia. Moreover, based on our and others' previous behavioral genetic studies that have looked at correlations between different personality traits, we expect that any phenotypic correlations that we observe between humor styles and alexithymia will primarily be attributable to correlated genetic factors and secondarily to correlated non-shared environmental factors. We do not expect to find any influence of correlated shared environmental factors.

Method

Participants

Participants consisted of a subset of twins from two existing registries who had participated in previous studies with us and who had consented to be approached for future studies. Sample 1 consisted of 216 pairs of MZ twins (154 female and 62 male pairs) and 45 pairs of DZ twins (24 female and 21 male pairs) ranging in age from 18–74 years and residing in North America. Sample 2 consisted of 293 pairs of MZ twins (263 female and 30 male pairs) and 219 pairs of DZ twins (202 female and 17 male pairs) ranging in age from 18–89 years and residing in the United Kingdom. The sample 1 twins completed the HSQ in 2008 and the TAS-20 in 2011. The sample 2 twins completed the HSQ in 2006 and the TAS-20 in 2012.

Measures

The Humor Styles Questionnaire. The HSQ contains 32 items measuring four styles of humor (affiliative, self-enhancing, aggressive, and self-defeating). Participants rated themselves on the extent to which they agreed or disagreed with each statement regarding each style of humor. Items were scored on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). An example of an item which taps affiliative humor is 'I laugh and joke a lot with my friends'; an example of self-enhancing humor is 'If I am feeling depressed, I can usually cheer myself up with humor'; examples of items which tap the two negative humor styles are 'If I don't like someone, I often use humor or teasing to put them down' (aggressive) and 'I let people laugh at me or make fun at my expense more than I should' (self-defeating). The HSQ has been shown to be reliable, with Cronbach's alphas of 0.80, 0.81, 0.77, and 0.80 for affiliative, self-enhancing, aggressive, and self-defeating humor, respectively (Martin et al., 2003). The reliabilities of these scales in our sample were comparable in magnitude: 0.70 (aggressive), 0.82 (self-enhancing and self-defeating), and 0.86 (affiliative). Intercorrelations between the four scales have been reported to be low, suggesting that each subscale measures a distinct aspect of humor (Martin et al., 2003).

The Toronto Alexithymia Scale-20. The TAS-20 is a 20 item self-report questionnaire. The questionnaire employs a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The scale provides an overall score on alexithymia, as well as scores on three aspects of the trait. These include seven items that measure difficulty in identifying feelings (DIF), five items that measure difficulty describing feelings (DDF), and eight items that measure the extent of externally oriented thinking (EOT). Examples of items for each subscale are: 'I have trouble identifying physical feelings' (DIF), 'I have trouble communicating how I am feeling' (DDF), and 'I prefer not to analyze situations' (EOT). The TAS-20 has shown evidence of both convergent and discriminant validity and good reliability (Bagby et al., 1994). In our sample, the reliabilities of the sacles were 0.59 (EOT), 0.73 (DDF), 0.82 (Total score), and 0.86 (DIF).

Procedure

Twins were contacted by mail, phone, or e-mail and the nature of the questionnaires that they would be completing was described to them. Once the twins agreed to take part they were either sent hard copies of the questionnaires by regular mail or were directed to FluidSurvey where they could complete the questionnaires online. Once participants had finished the study, hard copies were returned

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TABLE 1

Phenotypic (rp), Genetic (rg), and Non-Shared Environmental (re) Correlations Between Humor Styles and Alexithymia

	HSQ scales			
Alexithymia scales	Affiliative	Self-enhancing	Aggressive	Self-defeating
DIF	rp = -0.09*	rp = -0.12*	rp = 0.17*	rp = 0.23*
	rg = -0.06 (-0.21 to 0.09)	**rg = -0.27 (-0.11 to -0.42)**	**rg = 0.30 (0.15 to 0.45)**	**rg = 0.35 (0.19 to 0.51)**
	re = -0.06 (-0.15 to 0.03)	re = -0.01 (-0.10 to 0.08)	re = 0.06 (-0.03 to 0.15)	**re = 0.11 (0.02 to 0.20)**
DDF	rp = -0.24*	rp = -0.14*	rp = 0.07*	rp = 0.15*
	rg = -0.38 (-0.23 to -0.53)	**rg = -0.21 (-0.03 to -0.37)**	rg = 0.12 (-0.06 to 0.29)	**rg = 0.21 (0.03 to 0.39)**
	re = -0.15 (-0.06 to -0.24)	**re = -0.14 (-0.04 to 0.22)**	re = -0.01 (-0.10 to 0.08)	re = 0.04 (-0.05 to 0.13)
EOT	rp = -0.23*	rp = -0.08*	rp = 0.06*	rp = 0.004
	rg = -0.45 (-0.33 to -0.56)	**rg = -0.26 (-0.11 to -0.40)**	rg = 0.07 (-0.08 to 0.21)	rg = 0.01 (-0.14 to 0.16)
	re = -0.10 (-0.01 to -0.19)	re = 0.03 (-0.09 to 0.09)	re = 0.06 (-0.03 to 0.15)	re = 0.02 (-0.06 to 0.11)
Total TAS	rp = -0.24*	rp = -0.15*	rp = 0.14*	rp = 0.18*
	rg = -0.35 (-0.23 to -0.47)	**rg = -0.32 (-0.18 to -0.46)**	**rg = 0.20 (0.06 to 0.34)**	**rg = 0.25 (0.09 to 0.40)**
	re = -0.12 (-0.03 to -0.21)	re = -0.04 (-0.14 to 0.05)	re = 0.05 (-0.04 to 0.14)	re = 0.08 (-0.01 to 0.17)

Note: DIF = difficulty in identifying feelings; DDF = difficulty describing feelings; EOT = externally oriented thinking. *$p < 0.01$, two tailed; Values in bold are significant at the 0.05 level, two tailed.

in self-addressed stamped envelopes that we provided, or were submitted online via FluidSurvey. In each year that the North American and UK twins were contacted they completed either the HSQ or the TAS-20 in addition to other questionnaires not pertinent to the present report. In total, the questionnaires each year took approximately 1 hour to complete, but the TAS-20 and the HSQ each took approximately 15 minutes.

Analyses

Phenotypic correlations between the four humor styles and the four alexithymia scales were computed separately among the sample 1 and sample 2 twins. A comparison of these correlations revealed that they were very similar in both samples and, based on this and on the fact that the largest effect size related to mean differences between the samples on any of the variables showed that less than 2% of the variance was accounted for, we combined the data from both samples for subsequent analyses. Thus, our total sample comprised 509 MZ pairs and 264 DZ pairs.

After correcting for age and sex, bivariate behavioral genetic analyses were conducted using the Mx software package (Neale et al., 1999) to determine the extent to which any phenotypic correlations between alexithymia and humor styles are attributable to common genetic (A) and/or to common non-shared (E) or shared (C) environmental factors. In these analyses, MZ and DZ cross-correlations are computed to estimate the extent to which one twin's score on one variable correlates with their co-twin's score on another variable. We started by running a full A, C, E bivariate model and then ran reduced models (AE, CE, and E only) to see whether any of the effects can be dropped without a significant worsening of fit. The final models, which were all AE models, were then used to compute genetic (rg) and non-shared environmental (re) correlations between the variables.

Results

The phenotypic correlations between the TAS-20 scores and the HSQ scores are shown in Table 1. With one exception, all correlations between the scales were significant at the $p < 0.01$ level and, as we had predicted, those involving the two positive humor styles are all negative and those involving the two maladaptive humor styles are all positive. The only non-significant correlation ($r = 0.004$) is between self-defeating humor and EOT.

Genetic and non-shared environmental correlations are also reported in Table 1. Genetic correlations range from 0.01 to 0.45 in absolute values and all but four are significant at the 0.05 level. Non-shared environmental correlations are both smaller (ranging from 0.01 to 0.15 in absolute values) and only 5 are significant at the 0.05 level. The largest genetic correlations are between affiliative humor and EOT (rg = -0.45) and self-defeating humor and DIF (rg = 0.35); the largest non-shared environmental correlation is only -0.15, between affiliative humor and DDF.

Discussion

The results of this study supported both of our predictions: positive humor styles correlated negatively with alexithymia and maladaptive humor styles correlated positively with alexithymia. Moreover, the significant phenotypic correlations that we found between the variables were largely attributable to correlated genetic factors and to a lesser extent to correlated non-shared environmental factors. No significant correlated shared environmental effects were found.

The majority of the phenotypic correlations that we found between humor styles and alexithymia were small to moderate in magnitude, ranging from 0.004 to 0.24 in absolute value. However, these correlations are almost certainly lower-bound estimates of the true correlation between these variables, given that the measures of humor and of alexithymia were completed as much as 6 years apart. For

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the same reason, the genetic and non-shared environmental correlations that we found are also very likely lower-bound estimates.

One reason for the patterns of correlations that we obtained between humor styles and alexithymia is that both have been reported to correlate with empathy. Empathy includes the ability to identify with and share others' feelings and thoughts (Moriguchi et al., 2007), whereas alexithymia is characterized by a deficit in emotional processing. Affiliative and self-enhancing humor are significantly positively correlated with empathy (Hampes, 2010) and empathy is negatively correlated with alexithymia (Cairncross et al., 2013). Hampes (2010) also reported a negative correlation between aggressive humor and empathy.

Despite its promising results our study is not without limitations. First, in total we had almost twice as many MZ as DZ twins. The effect this may have had on the results is difficult to determine and, moreover, our sample of 264 DZ pairs is still a good size. A more serious limitation is that we had far more female than male twins: 643 pairs of twins in our study were female while only 130 pairs were male. This may limit the generalizability of our results. In addition, it has been reported that women score higher on measures of empathy than do males (Feingold, 1994) and men are almost twice as likely as females to be alexithymic. Males also obtain higher scores than women on all four humor styles, with the largest difference being on aggressive humor (Baughman et al., 2012). Again, it is not immediately clear what effect this may have had on the correlations we obtained but future research employing more equal numbers of males and females is definitely to be encouraged.

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