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Personality Traits Predict Irrational Beliefs

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Abstract Irrational beliefs are the focus of many psychological theories, since research has shown that holding irrational beliefs often leads to unhealthy emotions, dysfunctional behaviors, and psychological disturbances. The aim of such therapies as rational emotive behavioral therapy and cognitive behavioral therapy is to dispute irrational beliefs to promote more rational ways of thinking; however they do not take into account individual personality differences. The aim of this study was to determine whether personality traits predict rational and irrational beliefs in a mixed student and clinical sample. It was hypothesized that the domains of the five factor model of personality would predict rational beliefs as well as a range of irrational beliefs. Our findings supported the hypothesis, showing distinct associations between personality traits and each specific irrational belief. Neuroticism predicted rational beliefs as well as six out of the seven types of irrational beliefs measured. Additionally, extraversion predicted rationality and self-downing, openness predicted need for comfort and total irrationality, and conscientiousness predicted need for achievement and demand for fairness. Agreeableness did not predict any type of rational or irrational beliefs. Knowledge of these distinct relationships may increase a clinician's ability to conceptualize a therapy case and determine the best approach to treatment.

Keywords Irrational beliefs · Personality · Five-factor model of personality · Psychopathology

Introduction

The nature and function of rational and irrational beliefs and their relationship with emotionality has been speculated about through the ages. Philosophers from as early

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as the fifth century BC, including Socrates, Plato, Aristotle, Cicero, Seneca, and Marcus Aurelius, sought to understand rationality in the human mind and its relationship with positive and negative emotionality (Ellis et al. 2010). In the first century AD, Epictetus noted: “It is not the misfortunes that happen to you that upset you, but your view of them,” anticipating the most basic assumption of modern day psychotherapies (Ellis et al. 2010).

In the current age, irrational beliefs are the focus of many psychological theories, the most well-known being Ellis’s rational emotive behavioral therapy (REBT). According to Ellis (1995), beliefs are irrational when they are unrealistic, illogical, absolutist, and devoutly held when not provable or falsifiable, while rational beliefs are those that are logically self- or socially-helping. One commonly used factor-analytic model of irrational beliefs suggests there are seven dimensions of irrational thinking, including one rationality scale and six irrationality subscales—need for achievement, need for approval, need for comfort, demand for fairness, self-downing, and other downing (Macavei and McMahon 2010). Holding irrational beliefs may lead to unhealthy emotions, dysfunctional behaviors, and psychological disturbances, and the aim of such therapies as REBT and cognitive behavioral therapy (CBT) is to dispute these beliefs to develop more rational ways of thinking (Davies 2008).

Given their role with many types of psychopathology, it is crucial to fully understand irrational beliefs, including their correlates. One key aspect which has thus far gone relatively understudied is the link between personality and irrational beliefs. The objective of the current study was to understand whether personality traits predict rational and irrational beliefs.

With regard to personality, the five factor model (FFM) is a widely accepted taxonomy of personality traits comprised of extraversion, agreeableness, conscientiousness, emotional stability or neuroticism, and openness to experience, collectively referred to as the Big Five (McCrae and Costa 1987, 2008). There is a plethora of research linking personality traits with psychopathology (Farnam et al. 2011; Faustino 2012; Rector et al. 2012; Roose et al. 2012; Rosellini and Brown 2010). For example, high neuroticism has been associated with internalizing disorders, such as bipolar disorder, generalized anxiety disorder, obsessive compulsive disorder, social phobia, and major depressive disorder. Gore and Widiger (2013) recently suggested that the DSM-5 personality disorder traits are maladaptive variants of FFM traits. Additionally, decades of research is available supporting the association between irrational beliefs and psychopathology, including, but not limited to eating disorders, depression, anxiety, personality disorders, and type A behavior (Brown et al. 2010; Mayhew and Edelman 1989; Newmark et al. 1973; Riggs and Han 2009). While research linking both personality and irrationality with psychopathology is available, little research has been done exploring a possible relationship between personality and irrational beliefs.

Interest in possible association between irrational beliefs and personality traits is longstanding, with some publications occurring as early as the 1960s and 1970s (Forman and Forman 1978; Gorman and Simon 1977; Jones 1968). Jones (1968) reported that all irrational beliefs as measured by the Irrational Beliefs Test (IBT; Jones 1968), except for dependency and perfectionism, correlated with scales

on the Sixteen Personality Inventory (16PF; Cattell et al. 1970), specifically, positively with apprehension, tension, and vigilance, and negatively with emotional stability, perfectionism, and social boldness. These 16PF scales can be mapped onto the Big Five. Apprehension, tension, and emotional stability align with the Big Five trait of neuroticism, vigilance maps onto both neuroticism and agreeableness, social boldness maps onto both extraversion and agreeableness, while perfectionism is a facet of conscientiousness (Cattell and Mead 2008). Gorman and Simon (1977) reported similar results where irrational beliefs on the Ideas Inventory (Kassinove et al. 1977) were negatively correlated with the 16PF scales emotional stability and positively correlated with vigilance and tension. They also reported contrasting results with Jones (1968) in that the 16PF scale of apprehension correlated negatively with irrational beliefs as well as positive correlations between irrational beliefs with sensitivity (openness) and self-reliance (extraversion). Using the Adjective Check List (ACL; Gough and Heilbrun 1965) and IBT, Forman and Forman (1978) reported that high scores on the personality traits of originality and intellectence (intelligence), both markers of openness, resulted in lower irrational beliefs.

To our knowledge however, within the past 15 years, there are few studies investigating the relationship between personality traits and irrational beliefs, using direct measures of the Big Five. The findings of these studies are limited in that each investigated the relationship between personality and irrational beliefs secondary to other study aims and reported only correlational results. The available results were also conflicting, likely due to differences in measures of irrational beliefs; specifically, Blau et al. (2006) used a measure of specific irrational belief factors while the other three studies used measures of a broad irrational belief domain. Spörrle et al. (2010) found significant positive correlations between neuroticism and irrational beliefs and significant negative correlations between openness and agreeableness and irrational beliefs in a German sample. Davies (2006) also reported significant positive correlations between neuroticism and irrational beliefs and significant negative correlations between openness and irrational beliefs. However, Davies (2006) reported a significant positive correlation between conscientiousness and irrational beliefs and did not find a relationship between agreeableness and irrational beliefs. Sava (2009) reported that irrationality was associated with low levels of agreeableness and high levels of neuroticism in a sample of Romanian undergraduates. Blau et al. (2006) reported positive correlations between conscientiousness and extraversion with anti-self-downing beliefs, positive correlations between neuroticism with anti-awfulizing, and positive correlations between agreeableness and openness with anti-low frustration tolerance. See Table 1 for a summary of these findings.

Ultimately, research supports associations between psychopathology and both irrational beliefs and personality, in that specific personality traits and irrational beliefs are independently associated with more severe psychopathology. However, little has been done to explore associations between them. As a result, there is need for insight into the unique relationship between these two variables. The aim of this study was to expand upon the current literature using well-known, valid measures of personality domains and irrational beliefs to determine whether personality traits

Table 1 Summary of previous research correlational results between personality traits and irrational beliefs

	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Blau et al. (2006)					
Anti-self-downing	–	+		+	+
Anti-low frustration tolerance	–		+	+	
Anti-awfulizing	+	–			
Davies (2006)	+		–		+
Forman and Forman (1978)			–		
Gorman and Simon (1977)	+	+	+	–	
Jones (1968)	+	–		–	–
Sava (2009)	+			–	
Spörrle et al. (2010)	+		–	–	

+ Indicates a significant positive correlation; – indicates a significant negative correlation

predict rational and irrational beliefs. We also used both clinical and non-clinical samples to assess a wider range of traits. We hypothesized that the domains of the FFM would predict rational beliefs as well as a range of irrational beliefs.

Methods

Participants

Data were collected from 242 participants (81 males, 158 females, 3 did not indicate gender) who ranged in age from 17 to 64 years, with an average of 27.2 years ($SD = 12.5$). The sample included both undergraduate and clinical participants in an attempt to cover the entire range (normal to abnormal) of irrational beliefs, since a restricted range could lead to near-zero correlations. The sample of undergraduates totaled 125 and included 38 males and 87 females, who ranged in age from 17 to 54 years, with an average of 19.1 years ($SD = 3.3$). The sample of clinical participants totaled 117 and included 43 males and 71 females (3 did not indicate gender), who ranged in age from 18 to 64 years, with an average of 36.0 ($SD = 12.9$). Approximately 36.4 % of participants self-reported their race as White, Non-Hispanic, 20.7 % as African American, 15.7 % as Hispanic/Latino, 7.9 % as East Asian, 4.5 % as South Asian, 12.4 % as other, and 2.4 % did not respond.

The clinical sample could be described as mildly to moderately impaired. Of the participants in the clinical sample, 61.1 % were diagnosed with a current axis I disorder. Of those with an axis I disorder, 42.0 % had two or more axis I disorders. Approximately 72 % were diagnosed with a personality disorder. At the time of the study, 43.4 % were currently in outpatient psychiatric treatment, and almost a third (30.1 %) was taking psychiatric medications. Just over one-quarter (25.7 %) had a history of one or more psychiatric hospitalizations. At the time of the assessment,

the average Global Assessment of Functioning (GAF; APA 2000) score for the clinical sample was 66, consistent with mild impairment. However, 39.8 % had GAF scores falling in the “moderate” or “serious” range (i.e., GAF of 60 or below).

The clinical sample was significantly older ($d = 1.79$), and they scored higher on neuroticism ($d = .58$) and openness ($d = .37$) than the undergraduate sample. The clinical sample scored significantly lower on extraversion ($d = -.48$), demand for fairness ($d = -.26$), and need for achievement ($d = -.27$) than the undergraduate sample.

Measures

The 26-item Shortened General Attitudes and Beliefs Scale (SGABS; Linder et al. 1999) is a self-report scale that was used to assess irrational cognitive processes. The scale includes seven subscales, six of which measure irrationality (need for achievement, need for approval, need for comfort, demand for fairness, self-downing, and other downing) and one rationality subscale. Item responses are rated on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). High scores on the irrational subscales indicate irrational thinking, and high scores for the rationality subscale indicate rational thinking.

The 240-item NEO Personality Inventory—Revised (NEO-PI-R; Costa and McCrae 1992) is a self-report measure of the five major domains of the FFM: neuroticism, extraversion, openness, agreeableness, and conscientiousness. Each major domain is comprised of six lower-level facets (Costa and McCrae 1995). Responses are on a five-point Likert scale, ranging from strongly disagree (0) to strongly agree (4). Various descriptions of individuals scoring high on the five broad traits have been offered (Costa and McCrae 1988; Hooten et al. 2005). Those who score high on neuroticism tend to experience greater negative affect, are concerned with the opinion of others, and are defensive, while those who score lower are more emotionally stable. Individuals who score high on extraversion are more sociable, assertive, and active, while those with low scores are more reserved and prefer to be alone. Individuals who score high on openness are more open to new experiences, are intellectually curious, have active imaginations, and are aesthetically sensitive, while those who score low tend to be conventional in behavior and conservative. High scores on agreeableness tend to be associated with sympathy towards others and willingness to help, while low scores tend to indicate egocentricity, competitiveness, and skepticism of others. Individuals who score high on conscientiousness are purposeful and determined and tend to plan and organize before carrying out a task. Individuals with low conscientiousness scores are more lackadaisical in their work, impulsive, and less moralistic (Costa and McCrae 1988; Hooten et al. 2005).

Procedure

The data were collected for a study previously approved by the Institutional Review Board of St. John’s University. Participants provided written informed consent for their involvement. The NEO-PI-R and SBAGS were completed as part of a larger

battery of self-report inventories and clinical interviews. The recruitment of the clinical participants was done through the use of fliers, emails, web postings on Craigslist, letters to clinicians, and a letter to the Albert Ellis Institute. Individuals were invited to participate if they were receiving psychotherapy or outpatient treatment at the time of participation, or had previously been in treatment for psychological distress. Participants were paid \$10 per hour for their participation. The undergraduate sample participated to fulfill a course requirement.

Results

Descriptive statistics for the total sample's NEO and SGABS scores are presented in Table 2. Correlations among the scales for the total sample can be found in Table 3.

Linear regression was used to determine if the Big Five personality traits significantly predicted subscales on the SGABS (see Table 4). We controlled for gender, age, and sample (clinical vs. undergraduate). Personality traits explained a significant amount of the variance in all SGABS scales except other downing ($R^2 = .04$, $F_{(8, 163)} = 1.89$, $p = .07$): rationality ($R^2 = .12$, $F_{(8, 163)} = 3.98$, $p < .01$), self-downing ($R^2 = .14$, $F_{(8, 162)} = 4.34$, $p < .01$), need for achievement ($R^2 = .16$, $F_{(8, 163)} = 5.18$, $p < .01$), need for approval ($R^2 = .09$, $F_{(8, 163)} = 3.19$, $p < .01$), need for comfort ($R^2 = .19$, $F_{(8, 163)} = 6.13$, $p < .01$), demand for fairness ($R^2 = .10$, $F_{(8, 162)} = 3.39$, $p < .01$), and total irrationality ($R^2 = .18$, $F_{(8, 156)} = 5.56$, $p < .01$). Neuroticism significantly predicted all but one subscale on the SGABS: rationality ($\beta = -.24$, $t_{(163)} = -2.55$, $p = .01$), self-downing ($\beta = .27$, $t_{(162)} = 2.92$, $p < .01$), need for achievement ($\beta = .49$, $t_{(163)} = 5.32$, $p < .01$), need for approval ($\beta = .34$, $t_{(163)} = 3.58$, $p < .01$), need for comfort ($\beta = .42$, $t_{(163)} = 4.72$, $p < .01$), demand for fairness ($\beta = .32$, $t_{(162)} = 3.38$, $p < .01$), and total irrationality ($\beta = .49$, $t_{(156)} = 5.28$, $p < .01$). Neuroticism also accounted for

Table 2 Total sample NEO and SGABS subtests (N = 242)

	Mean	SD	Range
NEO neuroticism	2.11	.47	.63–3.58
NEO extraversion	2.26	.43	1.00–3.25
NEO openness	2.48	.39	1.33–3.60
NEO agreeableness	2.42	.39	1.06–3.67
NEO conscientiousness	2.26	.44	1.08–3.46
SGABS rationality	3.95	.58	2.00–5.00
SGABS self downing	1.69	.75	1.00–4.75
SGABS need achievement	3.10	.89	1.00–5.00
SGABS need approval	2.61	.87	1.00–5.00
SGABS need comfort	3.27	.87	1.00–5.00
SGABS demand fairness	3.68	.77	1.25–5.00
SGABS other downing	2.69	.85	1.00–5.00
SGABS total irrationality	2.84	.56	1.13–4.67

Table 3 Correlations between the NEO and SGABS scores

	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Rationality	-.29*	.35*	.18*	.11	.21*
Self-downing	.38*	-.34*	-.10	-.03	-.33*
Need achievement	.25*	.04	-.01	-.07	.01
Need approval	.28*	-.16*	-.08	-.03	-.16*
Need comfort	.33*	-.04	-.17*	-.16*	-.19*
Demand fairness	.12	.14*	-.10	-.11	.11
Other downing	.16*	-.15*	-.13	-.14	-.15*
Total irrationality	.38*	-.13	-.15*	-.14*	-.17*

* $p < .05$

14 % of the variance of need for achievement ($sr^2 = .14$), 14 % of the variance of total irrationality ($sr^2 = .14$), and 11 % of the variance of need for comfort ($sr^2 = .11$). Extraversion significantly predicted rationality ($\beta = .24$, $t_{(163)} = 2.90$, $p < .01$) and self-downing ($\beta = -.20$, $t_{(162)} = -2.33$, $p = .02$), while openness significantly predicted need for comfort ($\beta = -.25$, $t_{(163)} = -3.24$, $p < .01$) and total irrationality ($\beta = -.18$, $t_{(156)} = -2.27$, $p = .03$). Conscientiousness significantly predicted need for achievement ($\beta = .28$, $t_{(163)} = 3.18$, $p < .01$) and demand for fairness ($\beta = .27$, $t_{(162)} = 2.91$, $p < .01$). Agreeableness did not significantly predict rationality or any of the seven irrationality scales. We tested for possible curvilinear relationships, none of which were observed indicating that all relationships are linear.

Discussion

The aim of this study was to determine whether personality traits predict rational and irrational beliefs using a combined clinical and non-clinical sample. Results of our regression analyses supported the hypothesis that the FFM personality traits, as measured by the NEO, significantly predict rational and irrational beliefs. Specifically, high scores on neuroticism were associated with low rationality, high self-downing, high need for achievement, high need for approval, high need for comfort, high demand fairness, and high total irrationality. High extraversion scores were associated with low rationality and high self-downing. Low openness scores were associated with high need for comfort and high total irrationality. High conscientiousness scores were associated with high need for achievement and high demand fairness. Agreeableness did not predict scores on any SGABS scales.

The positive association between irrational beliefs (total irrationality) and neuroticism, and the negative association between irrational beliefs (total irrationality) and agreeableness and conscientiousness replicate prior findings (Davies 2006; Sava 2009; Spörrle et al. 2010). We also replicated Blau et al. (2006) findings of positive associations between the specific irrational belief factor of self-downing and neuroticism, and negative associations between self-downing and extraversion and conscientiousness. However, our finding of a negative association between total

Table 4 Summary statistics for linear regression of NEO traits and SGABS subscales

	R^2	β	t	sr^2
<i>Rationality</i>	.12*			
Gender		-.02	-.30	.00
Age		.10	1.00	.01
Group		-.11	-1.10	.01
Neuroticism		-.24	-2.55*	.03
Extraversion		.25	2.90*	.04
Openness		.10	1.25	.01
Agreeableness		.09	1.21	.01
Conscientiousness		-.03	-.31	.00
<i>Self-downing</i>	.14*			
Gender		.12	1.52	.01
Age		-.18	-1.82	.02
Group		.02	.17	.00
Neuroticism		.27	2.92*	.04
Extraversion		-.20	-2.33*	.03
Openness		-.07	-.92	.00
Agreeableness		.01	.19	.00
Conscientiousness		-.03	-.30	.00
<i>Need for achievement</i>	.16*			
Gender		.04	.59	.00
Age		-.21	-2.14*	.02
Group		.05	.46	.00
Neuroticism		.49	5.32*	.14
Extraversion		.12	1.47	.01
Openness		-.06	-.78	.00
Agreeableness		-.05	-.71	.00
Conscientiousness		.28	3.18*	.05
<i>Need for approval</i>	.09*			
Gender		.02	.26	.00
Age		-.23	-2.29*	.03
Group		.03	.24	.00
Neuroticism		.34	3.58*	.07
Extraversion		-.08	-.96	.01
Openness		-.09	-1.16	.01
Agreeableness		.03	.44	.00
Conscientiousness		.07	.78	.00
<i>Need for comfort</i>	.19*			
Gender		-.10	-1.32	.01
Age		.06	.58	.00
Group		.19	1.87	.02
Neuroticism		.42	4.72*	.11

Table 4 continued

	R^2	β	t	sr^2
Extraversion		.05	.63	.00
Openness		-.25	-3.24*	.05
Agreeableness		-.08	-1.05	.01
Conscientiousness		-.01	-.13	.00
<i>Demand for fairness</i>	.10*			
Gender		-.07	-.93	.00
Age		-.04	-.37	.00
Group		.13	1.23	.01
Neuroticism		.32	3.37*	.06
Extraversion		.09	1.01	.01
Openness		-.14	-1.75	.02
Agreeableness		-.06	-.84	.00
Conscientiousness		.27	2.91*	.05
<i>Other downing</i>	.04			
Gender		-.14	-1.69	.02
Age		.06	.56	.00
Group		.07	-.64	.00
Neuroticism		.13	1.32	.01
Extraversion		-.16	-1.74	.02
Openness		-.08	-.98	.01
Agreeableness		-.11	-1.36	.01
Conscientiousness		.02	.22	.00
<i>Total irrationality</i>	.18*			
Gender		-.04	-.58	.00
Age		-.10	-0.99	.01
Group		.12	1.21	.01
Neuroticism		.49	5.28*	.14
Extraversion		-.04	-.49	.00
Openness		-.18	-2.27*	.03
Agreeableness		-.07	-.99	.01
Conscientiousness		.15	1.69	.01

* $p < .05$

irrationality and conscientiousness was not consistent with positive associations between irrational beliefs and conscientiousness in a non-clinical adult sample reported by Davies (2006). This discrepancy could be due to variations in measures of irrational beliefs. We assessed specific facets of irrational beliefs, which had widely different patterns of association with conscientiousness, ranging from moderate negative correlations (e.g., $r = -.34$ with self-downing) to near zero correlations (e.g., $r = -.03$ with need for achievement) to low positive correlations (e.g., $r = .08$ with demand for fairness). In using a broad measure of irrational beliefs, Davies may have been unable to capture the more complex pattern of associations between conscientiousness and irrational beliefs. Furthermore, we did not observe a negative association between self-downing and agreeableness (Blau et al. 2006).

The current findings show distinct associations between personality traits and specific irrational beliefs. From a theoretical standpoint, it follows that there may be a common underpinning linking personality traits, irrational beliefs, and psychopathology. Dimensional personality traits can provide clinically useful information (for a review, see South et al. 2010; Widiger and Smith 2008). From a practical standpoint, knowledge of these distinct relationships may increase a clinician's ability to conceptualize a therapy case and determine the best approach to treatment. Conrod and colleagues have provided empirical support on the success of personality-targeted interventions in treating such psychopathology as substance and alcohol use and abuse, comorbid anxiety, and depression (Conrod et al. 2006, 2011, 2013; Watt et al. 2008). Conrod focuses her research on identifying the underlying personality traits that related to pathology and the effectiveness of creating interventions based on individual personality profiles rather than on behaviors or beliefs that may be symptoms of these traits (Castellanos-Ryan and Conrod 2011; Conrod et al. 2013). Additionally, Bagby et al. (2008) investigated whether personality traits could predict response to therapy in individuals with major depressive disorder. These authors found that high scores on openness predicted lower depression severity post-treatment with either pharmacotherapy or with CBT. They also reported an interaction between neuroticism scores and treatment type, specifically that high neuroticism scores predicted lower depression severity only for individuals treated with pharmacotherapy and higher depression severity for individuals treated with CBT. These findings suggest that treatment effectiveness may vary based on individual's specific personality traits and lend further support to the importance of addressing personality in therapy. Such an approach may ultimately increase the effectiveness and lasting change of currently used therapies.

Our findings must be viewed in the context of some limitations of this study. Firstly, we relied on self-report measures, which may carry response biases. Secondly, two very distinct groups made up the study sample, undergraduate students and clinical participants. As a result, these findings may be limited in their generalizability to other samples, such as children. Thirdly, the clinical participants were self-selected and there was no way to ensure that they in fact met the inclusion criterion (i.e., currently participating in therapy), or may be inherently different from clinical individuals who would choose not to be involved in a research study, as some prior research suggests (Rosenthal and Rosnow 2009). Finally, we acknowledge that our conclusions are based on the model we tested with personality traits as predictor variables and irrational beliefs as outcome variables. We did not test competing models, nor were we able to establish the validity of the NEO scales in predicting future irrational beliefs.

Ultimately, these findings provide insight into a unique and previously unidentified relationship between irrational beliefs and personality domains. Awareness of this relationship may be an important piece in understanding the complexity of psychological issues and improving treatment approaches. Future research is needed to replicate these findings and to explore the function of personality that leads to irrational beliefs.

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