

# Maladaptive beliefs as mediators of the relationship between personality traits and Borderline Personality Disorder symptoms

## *Crenças desadaptativas como mediadoras da relação entre traços de personalidade e sintomas do Transtorno de Personalidade Borderline*

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### Abstract

The present study analyzes the relationship between maladaptive beliefs, personality traits, and Borderline Personality Disorder symptoms by focusing in the mediating role of beliefs in the prediction between personality and psychiatric disorders. The sample consisted of 823 adults aged between 18 and 39 years ( $M = 24.09$ ,  $SD = 4.71$ ), who answered a questionnaire of symptoms and beliefs for Borderline Personality Disorder and Big Five Personality Inventory. The predictive model that fit better to the data indicates Neuroticism and Conscientiousness as predictors of Borderline Personality Disorder symptoms, mediated by maladaptive belief patterns. In this sense, it is possible to conclude that both personality traits and maladaptive beliefs are important for the understanding of Borderline Personality Disorder. The theoretical implications of this result and the limitations of the study are discussed.

**Keywords:** Borderline Personality Disorder; Cognitive distortion; Personality traits.

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## Resumo

O presente estudo analisou as relações existentes entre crenças desadaptativas, traços de personalidade e sintomas do Transtorno da Personalidade Borderline, com foco no papel mediador das crenças na relação entre personalidade e transtornos de personalidade. Participaram 823 adultos, idades entre 18 e 39 anos ( $M = 24,09$ ;  $DP = 4,71$ ), que responderam a um questionário de sintomas e de crenças para o Transtorno da Personalidade Borderline e ao inventário dos cinco grandes fatores de personalidade. O modelo preditivo que melhor se ajustou aos dados indica Neuroticismo e Conscienciosidade como preditores dos sintomas de Transtorno da Personalidade Borderline, sendo seus efeitos mediados por padrões de crença desadaptativos. Assim, foi possível concluir que tanto os traços de personalidade quanto as crenças desadaptativas são importantes para a compreensão do Transtorno da Personalidade Borderline. As implicações teóricas desse resultado e as limitações do estudo são discutidas.

**Palavras-chave:** *Transtorno da Personalidade Borderline; Distorções cognitivas; Traços de personalidade.*

A growing body of research has found evidence of the association between the personality traits postulated by the Five-Factor Model (FFM) (neuroticism, extraversion, conscientiousness, openness to experience, and agreeableness) and outcomes related to mental health, such as anxiety disorders, depression, obsessive-compulsive disorder, and impulse control disorders such as pathological gambling or compulsive eating (Belcher, Volkow, Moeller, & Ferré, 2014; Maso & Feitosa, 2013; DeYoung, Carey, Krueger, & Ross, 2016; Hwang et al., 2012; Kendler, Myers, & Reichborn-Kjennerud, 2011; Kotov, Gamez, Schmidt, & Watson, 2010; McCrae & Costa, 2006; Sahraian, Ebrahimi, Toubaei, Ahmadzadeh, & Mani, 2016; Wright & Simms, 2014). Moreover, especially after the publication of the Diagnostic and Statistical Manual of Mental Disorders – DSM-5 (American Psychiatric Association [APA], 2014), the understanding that personality disorders could represent extreme quantitative variations of normal personality traits was reinforced (Kendler et al., 2011; Krueger, Hopwood, Wright, & Markon, 2014; Morey, Benson, Busch, & Skodol, 2015; Suzuki, Samuel, Pahlen, & Krueger, 2015). In their maladaptive phenotypic manifestations, personality traits can be operationalized through instruments specifically designed for use in clinical samples, such as the Personality Inventory for the DSM-5 (PID-5). This kind of instrument organize personality from 5 more general dimensions, namely: Antagonism, Negative Affectivity, Psychoticism, Disinhibition, and Detachment (Wright, Pahlen, & Krueger, 2017). Different researchers, using different data analysis techniques (exploratory factorial analysis, structural equation modeling, and Item Response Theory), have documented the overlap between the more general features of the DSM-5 trait model with the features proposed by the FFM (Suzuki et al., 2015; Wright & Simms, 2014). This is equivalent to saying that when inventories that operationalize the two models (maladaptive traits and typical variants) are analyzed together, most of the items that measure the facets of four of the five proposed dimensions (extraversion/detachment, neuroticism/negative affectivity, agreeableness/antagonism, conscientiousness/disinhibition) can be grouped into joint dimensions that would be unidimensional (Suzuki et al., 2015; Suzuki, Griffin, & Samuel, 2017). Complementary to these findings, Wright et al. (2017) present evidence that the five normative and maladaptive traits co-vary not only at the phenotypic but also at the genotypic level, with higher correlations for the more general domains compared to those found for the facets.

Thus, from the theoretical-conceptual point of view, considering the consistent and multiple relationships that personality traits establish with physical and mental health outcomes (Deary, Weiss, & Baty, 2010), personality structure has been viewed as a predisposition factor of protection or risk to health (Brezo, Paris, & Turecki, 2006). This susceptibility provided by the personality structure (more specifically by personality traits) is differential and potential, since the triggering of psychopathologies from such characteristics will depend on specific environmental circumstances (individual or combined), more commonly known as environmental stressors. Environmental stressors could be negative life events, mistreatment, parenting style, quality of

care, abusive relationships, or any macroenvironmental pressure (wars, environmental disasters, economic or political instability) that is punctual but of high impact or chronic (Belsky & Pluess, 2009).

In addition to the presence of high impact environmental stressors as triggers of mental disorders in association with personality, personality traits could also be related to the way the individual interprets the environment and its experiences, that is, the construction of his/her belief system (Shiner & Caspi, 2003). This understanding is supported by the proposal of Robert McCrae and Paul Costa with The Five-Factor Personality Theory, from which they seek to integrate basic tendencies (traits) to other aspects of personality (characteristic adaptations such as schemas, beliefs, self-concept, values, attitudes, and others) in a unified theoretical system to describe the human personality (Mansur-Alves & Saldanha-Silva, 2017). From this proposal, the interaction between traits and the social environment would foster the development of the individual belief system. Beliefs would be representations that individuals have of themselves, their future, the world, and others, which to be stable, adaptive, and relativistic (Beck, 2013). However, individuals with some kind of psychopathology would develop maladaptive beliefs, that is, overly global, supergeneralized, and absolutist cognitive styles (Duarte, Nunes, & Kristensen, 2008). These would be ways of perceiving themselves, the world, and the future in such a manner that reduces the chances of the individual feeling confident, happy, or hopeful about the future. Consequently, this may increase the chances of developing behaviors that confirm his/her negative perceptions of reality (Farnam, Farhang, Bakhshipour, & Niknam, 2011; Faustino, 2015; Roose et al., 2012).

Although the literature relates personality traits and maladaptive beliefs to psychopathologies, few studies attempt to investigate the interactions between personality traits and maladaptive beliefs in negative health outcomes (Sava, 2009). Blau, Fuller, and Vaccaro (2006) examined this relationship in a sample of 194 subjects, among patients and university students, finding positive associations between catastrophizing and neuroticism, and positive correlations between extraversion and conscientiousness and between extraversion and self-acceptance. Davies (2006) also reports positive and moderate correlations between neuroticism and a total score in two inventories that assess the frequency of maladaptive beliefs, in addition to negative correlations between openness and maladaptive beliefs. Similarly, Sava (2009) pointed out that emotional stability (the opposite pole of to the neuroticism dimension) had negative correlations with all maladaptive beliefs, while agreeableness was inversely associated with schemas/beliefs involving abandonment, distrust, and domination. Spörrle, Strobel, and Tumasjan (2010) and Samar, Walton, and McDermut (2013) found significant and positive associations between extraversion and life satisfaction, and negative associations between neuroticism and subjective well-being. The factor irrationality (total amount of maladaptive beliefs) had positive strong correlations with neuroticism, and negative and weak correlations with agreeableness and openness. All of these studies have worked with correlational analyses that, despite allowing a first glimpse of potential associations between variables, do not allow for making causal inferences or testing theoretical assumptions. Notwithstanding, none of the studies seeks to investigate the influence of personality traits and maladaptive beliefs on symptoms of a specific psychological disorder. This type of finding could increase the clinical usefulness of trait approaches by individualizing the diagnosis and the intervention proposals.

Specifically regarding Borderline Personality Disorder (BPD), studies have shown that some dimensions of the FFM appear as predictors of the diagnosis and severity of symptoms (Distel et al., 2009; Kendler et al., 2011). The BPD is marked by intense emotional lability, impairment of self-perception and interpersonal relationships, persistent feelings of emptiness, fear of abandonment, and self-injurious behaviors (APA, 2014). In adults, the occurrence of BPD can be observed in about 2.7% of the population, of which three quarters would correspond to female individuals (Kienast, Stoffers, BERPohl, & Lieb, 2014).

The borderline personality profile is presumably associated with high levels of neuroticism (or negative affectivity, as it is named in the dimensional model proposed in DSM-5), especially with regard to psychosocial

maladjustment, a construct strongly linked to impulsivity (APA, 2014; Berlin, Rolls, & Iversen, 2005; DeYoung et al., 2016). Furthermore, emotional vulnerability and lability, also present in individuals with high neuroticism, is a hallmark characteristic of BPD (Linehan, 2010). In addition to neuroticism, disinhibition and antagonism (which in the FFM may be almost wholly associated, respectively, to the dimensions of conscientiousness and agreeableness) seem to be important in describing personality traits associated with BPD symptoms, since they are associated with impulsivity, risk exposure, and hostility (APA, 2014). With respect to the cognitive profile, people with BPD tend to present central belief patterns that involve unacceptability, vulnerability, and impotence, which together influence behavioral tendencies such as self-exposure to risk and recurrent attempts to avoid real or imagined abandonment (Beck, 2013; Linehan, 2010).

In this sense, the present study verifies the relationship between personality traits, maladaptive beliefs, and BPD symptoms by using a predictive model based on structural equation modeling. It is hypothesized that the personality traits most related to the disorder will be neuroticism, conscientiousness, and agreeableness, in this order of importance. Regarding belief patterns, it is considered that there will be a positive and significant correlation of the typical BPD beliefs with the personality traits mentioned above, as well as with the typical symptoms of the disorder. Finally, in the expected model, personality traits (high neuroticism, low conscientiousness, and low agreeableness) would be direct and indirect predictors of BPD symptoms, with indirect (belief-mediated) effects being higher than direct ones. The latter hypothesis is associated with an attempt to empirically test the above proposal that one of the main ways to understand the development of negative mental health outcomes would be to include personality traits as developmental antecedents of the individual's belief system (whether it be adaptive or not). This system is constructed from the dynamic relationships established between traits and the social environment, which could ultimately predict the appearance of negative outcomes (in our case, BPD symptoms).

## Methods

### Participants

Eight hundred and twenty-three adults aged between 18 and 39 years ( $M = 24.09$ ;  $SD = 4.71$ ) participated in the study. Of these, 75.6% were female. The study included individuals older than 18 years of age, residing in the metropolitan region of Belo Horizonte city, who answered all questionnaires, without self-reported diagnosis of intellectual disability, schizophrenia, and other psychotic disorders. The majority have incomplete higher education (58.9%) or complete higher education (20.7%). Therefore, a nonclinical sample was used.

### Instruments

*Sociodemographic Questionnaire*: questionnaire for surveying the sociodemographic and economic profile of participants, which includes data such as age, gender, marital status, schooling, physical and mental health information, history of chronic diseases, psychiatric and psychological care, and use of medicines;

*Questionnaire to assess Borderline Personality Disorder symptoms*: questionnaire adapted by the authors, based on the DSM-5 Guide for Diagnostic Evaluations (APA, 2014) and on the Diagnostic Interview for Borderline Personality Disorder – Revised Version (DIB-R), (Scheistatsky, 2005): evaluates symptoms associated with affectivity, cognition, impulsivity, and interpersonal relationships. It consists of 34 items, with scores ranging from 0 to 68, using a 3-point Likert-type response format (0 = no/never, 1 = probably/maybe,

and 3 = yes/always). Some examples of items: "In the past two years, have you made desperate efforts to keep someone from abandoning you?"; "Have you often experienced a sense of emptiness?". The internal consistency of the instrument was satisfactory (Cronbach's alpha of 0.89). Regarding validity indexes, an earlier study (Nunes, Rezende, Silva, & Mansur-Alves, 2015) showed that the total score of this questionnaire was positively correlated with impulsivity levels ( $r = 0.48$ ,  $p < 0.001$ ) and with history of childhood traumas (correlations between 0.12 and 0.34,  $p < 0.001$ ), both of which are frequently pointed out as related to the diagnosis of BPD. It should be emphasized that this questionnaire does not attempt to diagnose borderline personality disorder, it only informs about the number of symptoms of the disorder that would be present in the participants.

*Inventário dos Cinco Grandes Fatores de Personalidade* (IGFP-5) (Andrade, 2008): a Brazilian brief self-report version of the Big Five Inventory (BFI), originally constituted by 44 items designed to evaluate personality dimensions based on the Five-Factor Model, using a 5-point Likert scale response format (1 = strongly disagree; 5 = strongly agree). Analyses of psychometric properties revealed an adequate level of validity and precision (Andrade, 2008). The factorial structure found in the present study was the same found in the adaptation study<sup>3</sup>, and internal consistency indexes were satisfactory (ranging from 0.76 to 0.87). As pointed out in the introduction section, several authors have suggested that instruments measuring personality traits in the general population show high overlap with instruments assessing traits in their extreme variants, for at least four of the five traits (Wright et al., 2017). Since the PID-5 instrument, which operates the extreme variants of personality traits (as internationally accepted), did not have a Brazilian-adapted version in the period of data collection, it was decided to use the IGFP-5. This instrument has good psychometric properties and, moreover, it would be possible to investigate nonclinical variants of the traits without losing explanatory power due to the structural overlap of this type of measurement with PID-5.

*Personality Disorder Beliefs Questionnaire* (PDBQ), *items related to Borderline Personality Disorder* (Savoia et al., 2006): self-report inventory based on the cognitive model of personality disorder beliefs, composed of 126 affirmations (14 for each personality disorder) to which the individual must respond on a 5-point Likert scale (0 = I do not believe it; 4 = I totally believe it). In the present study, we used only the 14 items related to the beliefs common to individuals with BPD. It is reported that although these beliefs are characteristic of borderline personality disorder, they can also be found in individuals without any type of diagnosis, since they also represent dimensions and not categories (Hopwood, Schade, Krueger, Wright, & Markon, 2013). The scores on the scale range from 0 to 56, with higher scores being more identified with typical BPD beliefs. An analysis of the psychometric properties of the subscale revealed adequate precision index (Cronbach's alpha = 0.89) and internal structure (single factor explaining 41.16% of the variance).

## Procedures

Participants were subjected to the instruments in the first half of 2015, after approval by the Research Ethics Committee of the Fundação Educacional Lucas Machado (CAAE: 41795014.0.0000.5134). The sample was obtained in a social network - Facebook - during a period of twelve days, by online electronic survey on the SurveyMonkey platform, after the participants had read and accepted the terms of the Free and Informed Consent Form (FICF). The completion of the questionnaire had an average duration of 20 minutes. Statistical analyses were performed using IBM SPSS (International Business Machines Statistical Package for the Social Sciences Inc., Chicago, Illinois, United States) (version 22) and IBM AMOS (International Business Machines Statistical

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<sup>3</sup> Details on this analysis may be obtained by request from the authors.

Package for the Social Sciences Inc. Amos, Chicago, Illinois, United States) (version 22). For bivariate Pearson correlation and linear regression analyses, significant results were considered with  $p < 0.05$ . For the structural models, the fit indices considered adequate were: Goodness of Fit Index (GFI) and Comparative Fit Index (CFI) higher than 0.90, Root-mean-square Error of Approximation (RMSEA) with values lower than 0.08 (acceptable) and 0.05 (desirable). Moreover, Akaike's Information Criterion (AIC) was used to compare non-nested models, with lower values indicating better fit (Chorpita, Brown, & Barlow, 2016; Hooper, Coughlan, & Mullen, 2008; Iacobucci, 2010). The best model was the one that presented the best fit indices and was more parsimonious, after exclusion of nonsignificant variables and control of residual covariance.

## Results

To verify the variables that should be controlled in the study, Pearson correlation analyses were performed. The variable age showed significant correlations with extraversion, agreeableness, conscientiousness, neuroticism, beliefs present in BPD, and BPD symptoms ( $r = 0.07$ ;  $r = 0.07$ ;  $r = 0.15$ ;  $r = -0.07$ ;  $r = -0.17$ ;  $r = -0.23$ , respectively, all with  $p < 0.05$ ). Schooling showed significant correlations with conscientiousness, agreeableness, and BPD symptoms ( $r = 0.12$ ;  $r = 0.07$ ; and  $r = -0.10$ , respectively, with  $p < 0.05$ ), even after controlling the effect of age. For the analysis of the effect of the variable gender, Student's t-tests were performed, and the results showed significant differences and in favor of women for neuroticism and agreeableness [ $t(821) = 6.225$  and  $t(821) = 4.068$ , respectively, with  $p < 0.05$ ], and significant difference and in favor of men for openness [ $t(821) = -3.864$ ;  $p < 0.05$ ]. To ensure that the results of subsequent analyses would not suffer from the effect of the variables reported above, they were included in all models as control variables. Data were analyzed for normality by means of asymmetry and kurtosis measurements, following Kim's (2013) guidelines. The results indicated univariate normality for all the variables used in the study.

The variables of BPD symptoms, BPD beliefs, and personality traits were subjected to Pearson correlation analysis, with control of gender, age, and schooling. The results, presented in Table 1, showed that BPD symptoms correlate significantly with typical BPD beliefs and personality traits, except for extraversion. The correlations between BPD symptoms and neuroticism ( $r = 0.43$ ,  $p < 0.001$ ), conscientiousness ( $r = -0.31$ ,  $p < 0.001$ ), and beliefs ( $r = 0.63$ ,  $p < 0.001$ ) are highlighted. Among the beliefs and personality traits, the main results were moderate correlation with neuroticism and agreeableness ( $r = 0.47$  and  $r = -0.31$ , respectively, with  $p < 0.001$ ).

To verify which variables are most important for the prediction of BPD symptoms, linear regression analyses were performed, in which the frequency of BPD symptoms was included as a dependent variable. Prior to regression analysis, we chose to verify whether there was a nonlinear relationship between the variables (squared, U-shaped, or inverted U-shaped relationship) (Bozionelos N., Bozionelos G., Polychroniou, &

Table 1  
Means, standard deviations, and Pearson correlations, with control of gender, age, and schooling among the observed variables ( $n = 871$ )

	Mean	1	2	3	4	5	6	7
1. N	29.09	<b>5.233</b>						
2. Ex	23.98	-0.094*	<b>6.911</b>					
3. Op	38.10	-0.022	0.192**	<b>6.712</b>				
4. Ag	27.93	-0.361**	0.125**	-0.039	<b>4.051</b>			
5. C	25.77	-0.184**	0.100*	-0.001	0.180**	<b>5.530</b>		
6. Belief	18.01	0.470**	-0.270**	0.062	-0.309**	-0.291**	<b>11.135</b>	
7. Symptom	27.80	0.430**	-0.084	0.212**	-0.292**	-0.315**	0.629**	<b>12.728</b>

Note: \* $p < 0.05$ ; \*\* $p < 0.01$ . Standard deviations are shown in bold in the diagonal elements. N: Neuroticism; Ex: Extraversion; Op: Openness; Ag: Agreeableness; C: Conscientiousness; Belief: Typical BPD beliefs; Symptom: Frequency of BPD symptoms.



Kostopoulos, 2014; Hair, Black, Babin, Anderson, & Tatham, 2009). An analysis of the estimation curve – which compares the percentage of the explained variance of the linear and nonlinear relationship between two variables – pointed to a curvilinear (U-shaped) relationship between BPD symptoms and openness to experience (with an increase of 0.07 in adjusted  $R^2$ ). This means that high levels of BPD symptoms tend to arise associated with extreme levels of openness to experience. Thus, the variable openness to experience was tested in the model along with its quadratic variant.

For stepwise hierarchical linear regression analysis, all the variables that presented a linear correlation with the symptoms were included in the first block, and the polynomial variable (squared openness) and all interactions between the independent variables were included in the second block, following the guidelines of Hair et al. (2009). A collinearity diagnosis was performed with all independent variables aiming to verify whether the correlations between the independent variables could be influencing the least squares estimates. Variance Inflation Factors (VIF) greater than 10 indicate a relevant influence, while values close to 1 are indicative of no relevant collinearity (Hair et al., 2009). The VIFs found were between 1.01 and 1.37, suggesting, therefore, that the results were not influenced by the correlations between the independent variables. The model considered more adequate ( $Z = 137.334, p < 0.05$ ), which explained 50% of the variance, was composed by the variables age [ $t(816) = -4.534; \beta = -0.114$ ], typical beliefs of BPD [ $t(816) = -16.177; \beta = 0.479$ ], neuroticism [ $t(816) = 5.187; \beta = 0.149$ ], agreeableness [ $t(816) = -2.315; \beta = -0.062$ ], conscientiousness [ $t(816) = -5.160; \beta = -0.136$ ], and openness [ $t(816) = 7.499; \beta = 0.187$ ]. According to the model, the most important variable for predicting BPD symptoms is typical beliefs. Hence, the more relevant the typical beliefs, the greater the frequency of symptoms. In terms of personality traits, openness (quadratic) was the one with the highest predictive value, indicating a U-curve, that is, the symptoms appear more frequently in individuals located at the extremes (very high or very low levels of openness). The other results indicate a linear relationship, *i.e.*, the higher the number of BPD symptoms, the higher the level of neuroticism and the lower the levels of conscientiousness and agreeableness (negative betas).

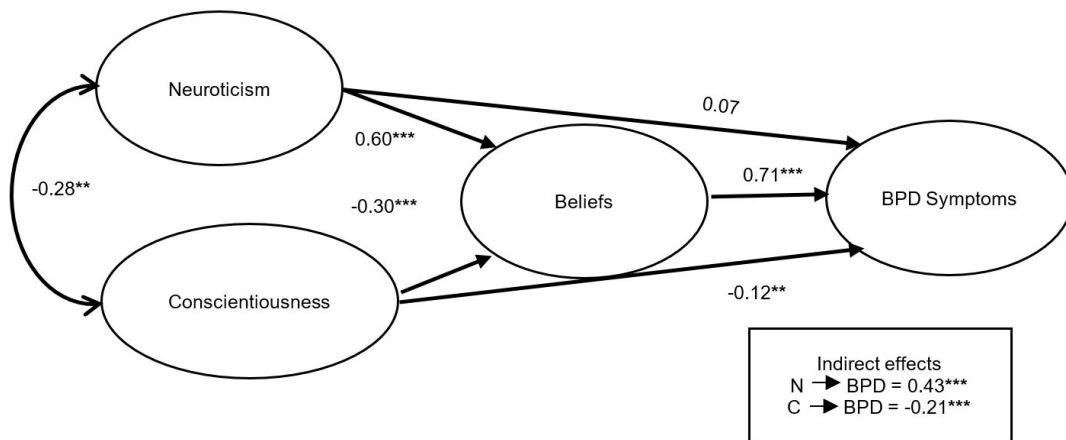
The use of correlation and regression analyses is limited, not allowing for the analysis of more complex relations between the variables (Hair et al., 2009). Thus, it was decided to test structural equation models to verify the initial hypothesis that the relationship between personality traits and BPD symptoms is mediated by maladaptive belief patterns.

The creation of structural models to be tested followed the procedures used by Wei, Mallinckrodt, Russell, and Abraham (2004) to analyze mediation models. Four structural models were tested, all of which contained BPD symptoms as a dependent variable and beliefs as mediator. The independent variables with the lowest total effect on symptoms were withdrawn, one by one, until adequate model fit indices were obtained. The respective fit indices analyzed are shown in Table 2.

Table 2  
Fit indices obtained for each of the mediation models tested

Model	CMIN/DF	CFI	RMSEA	AIC
1	2.45	0.88	0.042	3669.14
2	2.43	0.89	0.042	3507.99
3	2.42	0.90	0.042	2.884.30
4	2.36	0.91	0.041	2.700.47

Note: Independent variables of each model: a) Model 1: Neuroticism, Conscientiousness, Openness, Agreeableness, and Age; Model 2: Neuroticism, Conscientiousness, Openness, and Agreeableness; Model 3: Neuroticism, Conscientiousness, and Openness; Model 4: Neuroticism and Conscientiousness. CFI: Comparative Fit Index; RMSEA: Root Square Error of Approximation; AIC: Akaike Information; CMIN/DF: Criterion Chi-square by degrees of freedom ratio.



**Figure 1.** Mediation Model of beliefs about the relationship between personality and Borderline Personality Disorder (BPD) symptoms.

Model 4, which contained only neuroticism and conscientiousness as independent variables, was the one that achieved the best fit indices (CMIN/DF = 2.36, CFI = 0.91, RMSEA = 0.041) and, therefore, was considered the most adequate for explanation of BPD symptoms. In the model presented in Figure 1, it is noteworthy that the indirect effects of neuroticism and conscientiousness on BPD symptoms are greater than the direct effects, which confirms the hypothesis that there would be a mediating effect of beliefs on the relationship between personality traits and symptoms of the disorder.

## Discussion

This study verifies the association between personality traits, maladaptive beliefs, and borderline personality disorder symptoms. Moreover, we investigate how personality traits and beliefs interact in the prediction of BPD symptoms by testing mediation models through structural equation modeling. By using this type of analysis, we tried to draw cause-effect relationships, albeit by means of a cross-sectional design.

The results suggest that personality traits are associated with the frequency of BPD symptoms, especially the dimensions of neuroticism (high) and conscientiousness (low). Correlation analyses indicated neuroticism, conscientiousness, openness to experience, and agreeableness to be significantly correlated with the number of symptoms. In the literature, the expected profile for BPD involves the traits of neuroticism, conscientiousness, and agreeableness (APA, 2014; Berlin et al., 2005). The dimension of agreeableness, although showing a significant and negative correlation with BPD symptoms, could not explain the symptoms beyond what the other traits explain, different from what was hypothesized. This result may be due to some possibilities. The first one refers to the fact that only one aspect of this dimension is theoretically associated with BPD – the hostility facet –, which may have been underrepresented by the instrument used in the present research. Another possibility, complementary to the first one, refers to the quality of the IGFP-5 items assessing agreeableness. Studies on the psychometric properties of the instrument showed that although it is an instrument with adequate level of validity and precision, the dimension of agreeableness was the one with the lowest item-total correlation indices (0.10 and 0.38) and the lowest number of items representing the factor (only 3 items with factor load within the expected value) (Andrade, 2008). Alternatively, the dimension of neuroticism may be considered sufficient to explain the hostility aspect of BPD. This hypothesis is supported by the fact that the hostility facet, when subjected to factor analysis, tends to present a significant factor load in both agreeableness and neuroticism (DeYoung et al., 2016; Griffin & Samuel, 2014). NEO PI-R, one



of the most used instruments for the evaluation of the five personality factors, has the hostility facet as a component of neuroticism (Hwang et al., 2012). In addition, it is important to emphasize that, as pointed out in the introduction, although there is an overlap between the inventories that operationalize the typical and maladaptive variants of personality traits, the items of the latter appear to contemplate areas of specific losses that are not totally covered by the inventories of typical personality traits (Wright & Simms, 2014). It is suggested, for example, that the emphasis given to the content of inventory items for typical and maladaptive traits covers distinct poles of the trait, highlighting one end of the trait more than the other. Specifically in the case of agreeableness, it is pointed out that the items of typical trait inventories give less emphasis to the aspects that constitute its maladaptive pole, that is, antagonism, and vice versa (Suzuki et al., 2015; Wright & Simms, 2014). For future studies with individuals with BPD symptoms and other personality disorders, it would be important that inventories of typical and maladaptive personality traits be used together and in a complementary way, aiming to represent the construct in its entirety, with items covering equally both poles.

Interestingly, the factor openness, although not appearing in the hypothesized model, showed a positive and significant correlation with BPD symptoms. The relationship between this dimension and psychopathological symptoms appears to be complex and sometimes contradictory (Bozionelos et al., 2014; Carrillo, Rojo, & Avia, 2001; Connelly, Ones, & Chernyshenko, 2014; Davies, 2006). Maladaptive beliefs or suicidal tendencies have been associated with lower levels of openness, since individuals with more psychological distress tend to be less flexible, less able to find alternative solutions to problems (less creative), which increases the possibilities of perceiving the world and experiences in a negative way and presenting ideas of self-extermination (Davies, 2006). On the other hand, in the case of schizotypal personality, for example, symptoms tend to correlate positively with openness (DeYoung, Grazioplene, & Peterson, 2012) due to the facets of fantasy and imagination. In the case of depression, the relationship found by Carrillo et al. (2001) indicates that different facets of this dimension may indicate different directions of the relationship, with the fantasy facet contributing positively to the development of depressive symptoms, while the actions facet contributes negatively. In the present study, regression analysis indicated a quadratic relationship between openness and BPD symptoms (more symptoms in individuals with extreme levels of openness), which may be due to the presence of diverse psychopathological profiles in the case of BPD, with combinations of symptoms that relate differently to the openness trait (APA, 2014; Linehan, 2010). The final structural model did not include openness, which seems to indicate that the relationship found may have been spurious, or it is a relationship direction not yet explored.

The final model found to explain BPD includes as personality traits only high neuroticism and low conscientiousness, and their effects appear to be mediated by maladaptive beliefs. This means that, when the individual is constantly presented with environmental stressor events, a high level of neuroticism and a low level of conscientiousness could increase the chances of developing maladaptive beliefs associated with lack of affection, abandonment, and failure. This would increase the chances of developing characteristic BPD symptoms, considering that in the present study we did not work with clinical samples. This result corroborates the findings of other studies, which separately evaluated the effects of traits or beliefs on BPD symptoms (Blau et al., 2006; Kendler et al., 2011; Krueger et al., 2014; Morey et al., 2015; Sava, 2009; Suzuki et al., 2015). These studies indicate that, in the case of BPD, 1) a high level of neuroticism increases the chances of psychological distress due to the greater tendency to experience negative emotions, low thresholds, and habituation to stress; 2) low conscientiousness reduces organizational capacity, increases impulsivity, and leads to low commitment and low goal directedness, which diminishes the possibilities of adherence to more adaptive life projects and control of maladaptive behaviors. Together, these traits seem to increase the chances of dealing ineffectively with emotions and creating unsatisfactory interpersonal relationships, which could

be related to the development of a mental disorder (DeYoung et al., 2016; Kienast et al., 2014). However, the search for understanding the role of beliefs as mediators of the relationship between symptoms and personality traits is an innovation of the present study. In addition, it is noteworthy that the belief pattern, whose development could be the result of an association between personality traits and a life history marked by stressors (frequent perception of abandonment; psychological, physical, or sexual abuse; lack of validation; and exaggerated criticism by parents/caregivers), would encompass important antecedent conditions to understand the development of borderline personality disorder. This finding agrees with the diathesis-stress model proposed by Linehan (2010). Notwithstanding, an analysis centered on facets rather than on the five more general features would be important in that although different personality disorders may share, for example, high levels of neuroticism (such as borderline and dependent, or even histrionic), these disorders can be differentiated considering trait facets that could appear as maladaptive (Krueger, Derringer, Markon, Watson, & Skodol, 2012). It is emphasized, however, that future studies testing the same hypothesis or similar hypotheses should include instruments that operationalize both the typical and extreme variants of each of the five traits. This would provide a better understanding of the links between the healthy and maladaptive aspects of personality traits and their relationships with other mediating variables, such as maladaptive beliefs, since their overlap is not complete (Wright & Simms, 2014).

The present study has some limitations. Firstly, it is a study conducted through an online questionnaire, which, although contributing with a greater number and diversification of the group of respondents, lacks more detailed studies on the reliability and equivalence of the method compared to traditional ones, with individual pencil-and-paper application. Studies using online instruments have been performed worldwide for more than a decade, and results are found to be equivalent to those achieved by traditional methods, being even more comprehensive and less biased (Gosling & Mason, 2015; Wachelke, Natividade, Andrade, Wolter, & Camargo, 2014). In Brazil, the use of online data collection is recent and requires more scrutiny on the reliability of the results (Wachelke et al., 2014).

Another factor that could be a limitation of the present study is the absence of a clinical sample. The use of a clinical sample would serve as a benchmark and could show whether the differences between groups would occur only at the quantitative level or whether there would be qualitative changes in the way symptoms appear (DeYoung et al., 2016; Kendler et al., 2011; Krueger et al., 2014; Morey et al., 2015).

The relationships between personality traits, life history, and the onset of symptoms of personality disorders are still poorly understood, and are shown to be complex (Distel et al., 2009; McCrae & Costa, 2006; Suzuki et al., 2015). The present study shows an initial model of integration between personality traits and maladaptive beliefs to explain BPD symptoms. In this way, structural modeling was used aiming to capture more complex relationships such as mediation effects. The results lead to theoretical implications on the mechanisms of development and maintenance of personality disorders, especially BPD. Moreover, they also allow for clinical applications, emphasizing the importance of considering personality traits in the promotion of preventive strategies, in the early identification of vulnerabilities, in the elaboration of cognitive conceptualization of the most complete cases, and in intervention protocols that consider individual differences as an important part of treatment adherence and response.

## Contributors

R. SALDANHA-SILVA was responsible for the conception and study design, analysis, interpretation of data and discussion of results, review and approval of the final version of the article. F.L. NUNES and H.A. REZENDE contributed to the conception and study design. M. MANSUR-ALVES contributed to the conception and study design, analysis, interpretation of data and discussion of results, review and approval of the final version of the article.

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