



Rumination mediates the relationship between personality organization and symptoms of borderline personality disorder and depression

Lilla Nóra Kovács^{a,b}, Ágoston Schmelowszky^b, Attila Galambos^{a,b}, Gyöngyi Kökönyei^{b,c,d,*}

^a Doctoral School of Psychology, ELTE, Eötvös Loránd University, Budapest, Hungary

^b Institute of Psychology, ELTE, Eötvös Loránd University, Budapest, Hungary

^c SE-NAP2 Genetic Brain Imaging Migraine Research Group, Hungarian Academy of Sciences, Semmelweis University, Budapest, Hungary

^d Department of Pharmacodynamics, Faculty of Pharmacy, Semmelweis University, Budapest, Hungary

ARTICLE INFO

Keywords:

Personality organization
Rumination
Borderline personality disorder
Borderline symptoms
Transdiagnostic variables
Identity diffusion
Primitive defense

ABSTRACT

This article presents two studies examining cross-sectional mediational models between self-report assessments of personality organization, rumination, borderline personality disorder symptoms and depressive symptoms. The relationship between rumination and symptoms of borderline personality disorder (BPD) and depression has been demonstrated by numerous empirical studies. In our research we used Kernberg's theoretical frame of personality organization (PO) where normal and pathological personality features are not distinct entities but make a spectrum of increasing severity. In the current study we hypothesized that the relationship between PO and borderline as well as depressive symptoms is mediated by rumination on non-clinical samples. According to our results a less structured personality appears to be associated with more borderline and depressive symptoms, a higher proneness to rumination, and the relationship between PO level and borderline-depressive symptoms is mediated by rumination. These results provide important insights regarding the concomitants of borderline and depressive symptoms, as well as their treatment.

1. Introduction

1.1. Conceptualizations of rumination

Difficulties with emotion regulation are one of the highlighted transdiagnostic risk factors to psychopathology, as they are present in most psychological problems, and besides aggravating behavioral symptoms, make treatment difficult (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Rumination is one such emotion regulation strategy, that is becoming more and more significant in clinical research: it has first been explored regarding depression, but lately has been associated with numerous other psychological problems (e.g. Nolen-Hoeksema & Watkins, 2011). In a review by Smith and Alloy (2009) it has been broadly characterized as an avoidant coping strategy, because it may be a means of escape from undesired affect states, nonetheless it happens to aggravate negative mood. There are several conceptualizations of rumination among which we present the ones applied in this research, along with their corresponding measures.

1.1.1. Depressive rumination – the Response Style Theory

The Response Style Theory defines rumination as the passive

dwelling on the causes, circumstances and consequences of emotionally relevant events that elevates the perceived importance of the stressor, thus aggravates negative mood states (Nolen-Hoeksema, 1991). Empirical results appear to validate this theory regarding the etiology of depression, as it has been shown that rumination on one's own depressed mood leads to elevated depressive symptoms (Brinker & Dozois, 2009; Nolen-Hoeksema, Morrow, & Fredrickson, 1993), and predicts the initiation of depressive episodes (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). These findings appear to pertain not only among mood disorder patients, but also among community samples (Brinker & Dozois, 2009). Studies where current depressed mood was controlled for suggest that rumination is not merely a reaction to, but rather an antecedent of negative affect states (Nolen-Hoeksema & Aldao, 2011). One of the most widely used self-report rumination measures building on the Response Style Theory is the Ruminative Response Scale (RRS, Treynor, Gonzalez, & Nolen-Hoeksema, 2003), that divides rumination into two facets, brooding and reflective pondering, where brooding is the maladaptive, passive dwelling on past negative episodes, while reflective pondering is defined as an attempt to analyze one's own emotions and thoughts in order to facilitate problem solving.

* Corresponding author at: Institute of Psychology, ELTE, Eötvös Loránd University, Budapest, Hungary.

E-mail address: kokonyei.gyongyi@ppk.elte.hu (G. Kökönyei).

1.1.2. Ruminating about unattained goals – the Goal Progress Theory

The Goal Progress Theory (Martin & Tesser, 2006) proposes a broader, multifaceted conceptualization, where ruminative thoughts derive from unattained goals, and thus can arise regarding past, present or future events, and are not necessarily negative in content. However, because of their intrusive and uncontrollable nature, ruminative thoughts interfere with problem solving and tend to elevate negative mood by acting as a constant reminder of unachieved objectives (Martin & Tesser, 1996). Moreover, the discrepancy between the ideal and the actual self deriving from unattained goals may trigger rumination, which appears to mediate the occurrence of depressive and anxious symptoms among university students (Dickson, Moberly, & Huntley, 2019). Smith and Alloy (2009) defined rumination as an avoidant emotion regulation strategy that is triggered by the dissonance between one's actual and ideal state, and the negative affect associated with this notion. This definition aims to bridge the Goal Progress Theory and the Response Style Theory, conceptualizations we adhered to in our studies.

1.1.3. Rumination in BPD – the Emotional Cascade Model

Rumination has also been demonstrated as an important risk factor that may aggravate borderline personality disorder (BPD) symptoms (e.g. Peters, Geiger, Smart, & Baer, 2014; Selby & Joiner, 2009). BPD is a severe mental illness that is estimated to reach up to 6% in the general population, and is characterized by emotional lability, impulsivity, conflicted interpersonal relationships and serious impairments in everyday life, as well as high prevalence of suicidal (10%) and parasuicidal (70%) behavior (Black, Blum, Pfohl, & Hale, 2004; Fertuck, Makhija, & Stanley, 2007; Levy & Johnson, 2016). BPD, together with other personality disorders, is known to demonstrate high comorbidity rates with depression, attenuating remission (American Psychiatric Association, 2013; Smith, Grandin, Alloy, & Abramson, 2006). According to the Emotional Cascade Model, negative events evoke negative emotions that in return trigger a ruminative response, which then intensifies the negative perception of the original stressful situation, leading to even more rumination (Selby & Joiner, 2009). This phenomenon is especially articulated in case of BPD patients who lack constructive emotion regulation strategies (Dixon-Gordon, Peters, Fertuck, & Yen, 2017; Linehan, 1993; Links et al., 2007), resulting in an emotionally escalating vicious circle that is difficult to terminate. According to the model, behavioral symptoms of BPD such as substance use, binge eating or self-harm represent the person's attempt to interrupt the cascade (Baer, Peters, Eisenlohr-Moul, Geiger, & Sauer, 2012). These maladaptive behavioral strategies may bring a short-term ease, however on the long run they tend to generate shame, guilt and self-blame, which may trigger more rumination and another emotional cascade (Selby & Joiner, 2009). Empirical investigations of the Emotional Cascade Model suggest that rumination mediates the relationship between emotion dysregulation and impulsive behavior among BPD patients (Martino et al., 2015) and non-clinical adults (Selby, Anestis & Joiner, 2008).

1.2. Levels of personality organization

Kernberg's model (1984) of personality organization (PO) describes psychopathology in a dimensional way with key domains of personality functioning. Instead of focusing on external symptoms, this model aims to capture the personality structure behind the observed behavior. The normal personality can be described as flexible, while ego function impairments that cause rigidity are considered signs of personality pathology (Lenzenweger, Clarkin, Kernberg, & Foelsch, 2001). In Kernberg's theoretical frame there are three ego functions that primarily define the level of PO: identity diffusion, primitive defense and reality testing. Identity diffusion implicates poorly integrated representations of self and significant others, while primitive defense mechanisms distort the person's interactions and compromise the way of functioning,

among which splitting is the most typical of the borderline personality organization (BPO) level (Lenzenweger et al., 2001). Reality testing describes the person's capacity to differentiate the self and the non-self, the intrapsychic and the external stimuli (Kernberg & Caligor, 2005). At the borderline personality organization (BPO) level, reality testing is intact, however, sometimes restricted or unstable (Oliveira & Bandeira, 2011), whereas the psychotic level of personality organization (PPO) is mainly characterized by an impaired sense of reality (Lenzenweger, McClough, Clarkin, & Kernberg, 2012). BPD, together with the majority of personality disorders, belongs to the BPO level, thus the two concepts demonstrate numerous common features, however, they do not fully overlap: by definition, BPO is a broader concept that mainly focuses on the internal experience, while BPD rather aims to capture external behavior (Hilsenroth, Segal, & Hersen, 2003). This is also reflected by the moderate (but not high) positive correlation between measures of PO level and BPD in clinical samples (e.g. Redondo Rodríguez, Gómez, Montesino, & Muñoz-Rivas, 2019). Accordingly, the lower the personality functioning is, the more behavioral symptoms will appear (Scala et al., 2018). To sum up, chronic ego weakness characterized by primitive defense, a lack of impulse control, emotion dysregulation and identity diffusion are indicators of personality pathology (Kernberg, 1984). These impairments may lead to emotional lability and impulsive behavior, manifested via a broad variety of symptoms observed among patients with personality disorders (Bender & Skodol, 2007; Lenzenweger et al., 2012). The level of PO can be measured by assessing one's ego functions with the help of a clinical interview, STIPO-R (Structured Interview of Personality Organization-Revised; Clarkin, Caligor, Stern, & Kernberg, 2015), or a quantitative questionnaire, the IPO (Inventory of Personality Organization, Kernberg & Clarkin, 1995).

1.3. Rumination as a potential mediator between PO level and symptoms of BPD and depression

It is well-established that lower PO is accompanied by more severe BPD symptoms and depressed mood (e.g. Lenzenweger et al., 2001), both of which have been associated with more rumination (e.g. Martino et al., 2015; Nolen-Hoeksema, 2000). We assumed that impaired personality functioning may provoke ruminative thinking, as patients with personality disorders (i.e. lower PO level) often lack constructive emotion regulation strategies and seek maladaptive ways of avoiding negative emotions (Levy & Johnson, 2016), which may be pursued via rumination (Smith & Alloy, 2009). However, instead of reducing negative affect, rumination appears to increase depressed mood, affective lability and impulsive behavior, i.e. core features of BPD and depression. Thus, we wished to explore whether people with lower PO would be more prone to ruminate, and whether this maladaptive avoidant emotion regulation strategy (Smith & Alloy, 2009) enhances symptom of BPD and negative mood. More specifically, in the current research we hypothesized that rumination would mediate the relationship between personality functioning and symptoms of BPD and depression. Results of longitudinal studies (Lyubomirsky, Layous, Chancellor, & Nelson, 2015) and studies where depression was controlled for (Nolen-Hoeksema & Aldao, 2011) suggest that rumination is rather the antecedent than the symptom of negative affect, and the empirically supported Emotional Cascade Model defines core BPD symptoms such as impulsive behavior as the outcome of ruminative cascades (although clearly, subsequent guilt may also trigger another emotional cascade, resulting in a negative spiral). The order of appearance of these processes may also provide support for the suggested mediation model: rooted in the development of object-relations and early attachment styles, personality structure deficits are theorized to derive from the first years of life (Clarkin, Lenzenweger, Yeomans, Levy, & Kernberg, 2007; Lenzenweger & Clarkin, 2005), meanwhile rumination may first appear at pre-adolescence (Rood, Roelofs, Bögels, Nolen-Hoeksema, & Schouten, 2009). BPD and depressive symptoms can typically be observed during adolescence, however, findings suggest that both

disorders are developmental in nature, and identifying earlier cues would be crucial (Hankin, 2015; Stepp, 2012). Based on these considerations we assumed that rumination may rather be the mediator than the outcome in this model. Rumination is a transdiagnostic risk factor to psychopathology rather than being disorder-specific (Aldao et al., 2010), thus linking it with PO, a conceptualization that spans distinct diagnostic categories and is relevant for psychotherapeutic intervention may yield clinical contribution.

1.4. Considerations for sampling and measurement

BPD patients with severe symptoms are overrepresented in clinical studies compared to BPD patients with milder symptoms, as the former group tends to receive treatment more often and for longer periods (Trull, Ueda, Conforti, & Doan, 1997). Previous studies suggest that undergraduates, although well-functioning in general, typically cover a rather broad range of personality organization (i.e. Ellison & Levy, 2012; Lenzenweger et al., 2001), and that symptoms of BPD, such as anger, emotional lability, impulsive behavior and self-harm are common among university students (Gratz, 2001). Trull (1995) found substantial amount of borderline symptoms among nonclinical young adults, which is conceivable as the prevalence of BPD among the whole population is estimated to reach up to 6% (American Psychiatric Association, 2013), and many affected people refuse to seek help (Bagge et al., 2004). Non-clinical samples may represent a broader range of personality functioning than clinical samples, thus examining our hypotheses among non-clinical young adults might be a more powerful way to look at the full range of the relevant constructs.

As both BPD symptoms and rumination tend to decrease with age (American Psychiatric Association, 2013; Nolen-Hoeksema & Aldao, 2011), young adults may be more prone to experience emotional cascades than the general population, thus we recruited university students for the first study. Due to the challenges of the academic environment, past, present and future events and unattained goals may play a crucial part in evoking rumination among university students (Van Boekel & Martin, 2014), therefore we conceptualized rumination in Study 1 as proposed by the Goal Progress Theory (Martin & Tesser, 2006). In the second study we wished to replicate the findings of our mediation model on a community sample that is more heterogeneous in terms of age and education. Moreover, in Study 2 we hypothesized that the brooding component of rumination may be more strongly associated with impaired personality functioning and symptoms of BPD and depressed mood than reflective pondering.

2. Study 1

2.1. Materials and methods of Study 1

2.1.1. Sample and procedure

The work has been carried out in accordance with the Declaration of Helsinki. After obtaining the ethical consent of the Institutional Review Board, we conducted two self-report studies on non-clinical samples. Informed consent was acquired. Participants who have never been diagnosed by any psychiatric or neurological diseases were included in the study. In the first study, we recruited university students ($n = 179$) currently enrolled in a Masters' Program via course mailing lists who received partial course credit for participating. The sample was predominantly female (84.9%; $n = 152$). The minimum age was 20, the maximum 43 years ($M = 24.35$; $SD = 3.23$).

2.1.2. Measures

Ruminative Thought Style Questionnaire (RTSQ, Brinker & Dozois, 2009) has been constructed based on Martin and Tesser's (1996) conceptualization, which tends to assess rumination as a general, multi-dimensional construct. RTSQ is a self-report survey of 20 items that is aiming to assess rumination globally, without specifying the valence,

content and temporal orientation of ruminative thoughts. It contains items like 'I tend to replay past events as I would have liked them to happen' or 'If I have an important event coming up, I can't stop thinking about it', that participants have to answer on a 7-point Likert-scale, thus its possible score range is from 20 to 140. The total score of RTSQ has shown excellent internal consistency (Cronbach $\alpha = 0.89$ – 0.92) and high test-retest reliability after two weeks ($r = 0.80$, $p < .01$) (Brinker & Dozois, 2009). In the current study we used the total score that has been shown a reliable measure of rumination by psychometric studies (e.g. Brinker & Dozois, 2009; Mihić, Novović, Lazić, Dozois, & Belopavlović, 2019; Walsh, Shou, Han, & Brinker, 2017). This is an important aspect, as the measurement of the mediator is crucial for correct model estimation (Gonzalez & MacKinnon, 2020). The RTSQ also demonstrated excellent reliability in our sample (Cronbach $\alpha = 0.91$).

Borderline Symptom List (BSL-23, Bohus et al., 2009) is the shortened version of BSL-95, a self-report survey that aims to measure BPD symptoms based on the diagnostic criteria of DSM-IV. Participants have to determine on a five-point Likert scale from zero to four whether they experienced symptoms often reported by BPD patients during the previous week, e.g. 'I thought of hurting myself', or 'I suffered from shame'. The mean score is divided by the number of items, so it can be compared to the mean score of the BSL-95, thus the minimum score on the scale is zero, the maximum score is four. Previous research suggests that a mean score above 1.5 reflects sub-clinical BPD symptoms, while a score of two or above indicates the presence of BPD (Meaney, Hasking, & Reupert, 2016). The scale has a one-factor structure that has shown high internal consistency on various samples (Cronbach $\alpha = 0.94$ – 0.97) (Bohus et al., 2009), as well as in the current study (Cronbach $\alpha = 0.92$ – 0.94).

Inventory of Personality Organization (IPO, Kernberg & Clarkin, 1995) is a 57-item questionnaire where each statement is rated on a 5-point Likert-scale from 1 (never true) to 5 (always true). It is based on Kernberg's model that includes both the pathological and non-pathological range of personality functioning, thus it is well applicable in both clinical and sub-clinical populations (Lenzenweger et al., 2001). It contains three primary clinical scales, identity diffusion (ID), primitive defense (PD) and reality testing (RT), corresponding to the personality functions described by Kernberg (1984). The three primary scales are known to be intercorrelated, especially ID and PD, as they both reflect the ego functions characteristic of the BPO level, i.e. of personality disorders (Lenzenweger et al., 2001). Furthermore, the two-factor model where ID and PD load on a single factor appears to represent the latent structure of the IPO better than considering the three subscales separate (Smits, Vermote, Claes, & Vertommen, 2009). This is in line with Kernberg's model (1984), where PD and ID are strongly associated theoretical constructs and both represent the BPO spectrum, while RT characterizes the psychotic level. The following items belong to the PD and ID subscales, respectively: 'I think people are basically either good or bad; there are few who are really in between' or 'My goals keep changing'. The RT scale contains items such as 'I can't tell whether certain physical sensations I'm having are real, or whether I am imagining them'. Since we wished to assess personality structure deficits associated with personality disorder symptoms, and one can expect marginal incidence of psychotic-like symptoms in a non-clinical sample, we only included the PD and ID subscales in our model, combined as a single latent variable. The PD scale contains 16 items, thus its reachable score ranges from 16 to 80, while the ID scale comprises of 21 items, thus its reachable score ranges from 21 to 105. Both subscales have shown excellent psychometric properties in a number of studies (e.g. Lenzenweger et al., 2012; Stern et al., 2010), and they also demonstrated excellent internal consistency in the current sample (Cronbach α of PD = 0.801, Cronbach α of ID = 0.900). To date, cutoff scores associated with the different levels of PO are not available.

The Center for Epidemiologic Studies Depression Scale (CES-D, Radloff, 1977) was constructed in order to assess depressive symptoms

in the general population (Radloff, 1977). It is a short self-report measure made up of 20 items investigating depressed mood during the past week, each of which has to be evaluated on a four-point Likert scale from zero to three, thus the lowest possible score is zero, while the highest possible score is 60. It contains items such as "I felt lonely". Most studies recommend a score of 16 or above as a cutoff indicating clinical depression, however, findings of a recent meta-analysis suggest that the cutoff score of 20 is more adequate in terms of specificity and sensitivity (Vilagut, Forero, Barbaglia, & Alonso, 2016). The Hungarian CES-D demonstrated excellent internal consistency in the current sample (Cronbach α : 0.75–0.89), as well as in a previous study (Cronbach α = 0.82) (Urbán, Szigeti, Kökönyei, & Demetrovics, 2013).

2.1.3. Statistical analysis

Descriptive statistical analyses and reliability testing were performed with IBM SPSS 24 software (2016). Then, we carried out structural equation modelling with MPlus software (Version 8, Muthén & Muthén, 2017) in order to test whether the connection between personality structure deficits, i.e. PO level, and symptoms of BPD and depression is mediated by rumination, as measured by the RTSQ. We performed ML estimation and bootstrapping using 500 bootstrap samples, as it improves accuracy and power without assuming normal distributions (MacKinnon, Lockwood, & Williams, 2004). PO level was used as a single latent variable indexing the two subscales of IPO that are associated with personality disorder symptoms, ID and PD. Gender and age were controlled for in the model, as rumination, BPD and depressive symptoms are more common among women than men, and rumination and BPD symptoms tend to decrease with age (American Psychiatric Association, 2013; Johnson & Whisman, 2013; Nolen-Hoeksema, 2000; Nolen-Hoeksema & Harrell, 2002; Nolen-Hoeksema & Aldao, 2011). We followed the guidelines of Torgrimson and Minson (2005) regarding the use of the terms sex and gender, based on which we chose to apply the term 'gender' in this article. We found high correlation between the BSL-23 and CES-D scores ($r = 0.700, p < .01$), reflecting the high comorbidity rates between the two disorders (Smith et al., 2006), thus we combined the two outcome measures as a single latent variable and tested whether this modification would cause any changes in the model. We calculated the proportion mediated for each mediation by dividing the unstandardized indirect effect by the unstandardized total effect (Cheung, 2009). However, a sample size above 500 is recommended for calculating this ratio (MacKinnon, Warsi, & Dwyer, 1995), thus it should be interpreted carefully.

2.2. Results of Study 1

In the first study we did not find any significant difference between men and women on the mean scores of the assessed measures. The descriptive statistics split by gender and mean differences are available in Table 1.

Non-parametric correlations were performed due to the non-normality of the variables. The descriptive statistics and the correlational matrix of the variables assessed in the first study are shown in Table 2.

Table 1
Gender differences of the assessed variables of Study 1.

Measure	Female M (SD) (<i>n</i> = 152)	Male M (SD) (<i>n</i> = 27)	<i>t</i>	<i>p</i>
IPO primitive defense	29.41 (7.84)	30.70 (8.76)	0.778	.438
IPO identity diffusion	38.43 (12.64)	42.22 (12.08)	1.444	.150
BSL-23	0.70 (0.64)	0.66 (0.56)	0.325	.746
CES-D	18.70 (7.29)	16.59 (4.55)	1.454	.148
RTSQ	78.31 (20.39)	77.22 (19.50)	0.258	.796

Note. *n* = 179. IPO = Inventory of Personality Organization; BSL-23 = Borderline Symptom List; CES-D = The Center for Epidemiologic Studies Depression Scale; RTSQ = Ruminative Thought Questionnaire.

In the first study, our mediation model showed an excellent model fit ($\chi^2 = 8.034, df = 6, RMSEA = 0.044 [0.000–0.113], SRMR = 0.040, CFI = 0.996, TLI = 0.986$). According to the results, lower PO level - i.e. the low integrity of internalized representations of self and others and related emotional experience, as well as the use of immature defense mechanism such as splitting - was directly associated with more BPD symptoms ($\beta = 0.566, p < .001$), more depressive symptoms ($\beta = 0.424, p < .001$), and more rumination ($\beta = 0.556, p < .001$). In addition, rumination was a weak, but significant mediator between PO level and BPD (standardized indirect effect: 0.092, $p = .033$; proportion mediated = 0.14), as well as between PO level and depressive symptoms (standardized indirect effect: 0.108, $p = .049$; proportion mediated = 0.20), providing support for our hypothesis. Age and gender were controlled for in the mediation model. The total explained variance of BPD symptoms were 46.5% ($p < .001$), whereas the total explained variance of depressive symptoms were 33.3% ($p < .001$). The model is shown in Fig. 1.

In order to handle the high correlation between the CES-D and the BSL-23 scores, we combined these two outcome measures as a single latent variable and found that it changed the results marginally. This alternative model can be found as Fig. 1 in the Supplementary material.

2.3. Discussion of Study 1

In this study we examined whether rumination mediated the relationship between personality structure and symptoms of BPD and depression among university students. Although the connection between PO level and symptoms of BPD and depression is well-established, and rumination is known to aggravate depressed mood (e.g. Nolen-Hoeksema, 1991, 2000) and symptoms of BPD (e.g. Peters et al., 2014), the connection between PO level and rumination has not been assessed before. According to the theory of Kernberg (1984), lower level of PO results in emotional instability, that fosters the development of maladaptive behavioral patterns. Linehan (1993) underlines that emotional dysregulation is crucial in BPD, as people with BPD features lack more constructive strategies to alleviate their emotional distress, thus they tend to engage in maladaptive impulsive behavior instead, resulting in a negative spiral. Rumination exacerbates this emotionally unstable pattern, that is often accompanied by depressed mood (Selby & Joiner, 2009). Consistent with these theories, we hypothesized that participants with a less structured personality tend to ruminate more, and report more borderline and depressive symptoms. Furthermore, we assumed that the connection between symptoms and PO level is mediated by rumination. Our results provide support for these hypotheses: PO level was strongly associated with rumination, and we found a weak but significant mediation path between PO level and BPD symptoms, as well as between PO level and depressive symptoms.

In Study 1, we examined the reported associations on a sample of university students, while in Study 2 we wished to replicate our findings on a more heterogeneous community sample. Moreover, in Study 1 we conceptualized rumination as a broad, general thought processing mode unbiased by valence, temporal orientation and content, as we found this conceptualization the most relevant for university students (Van Boekel & Martin, 2014). However, rumination is often conceptualized as a two-faceted construct, comprised of brooding, the maladaptive and often self-blaming repetitive thinking style about past negative experiences, and reflective pondering, defined as an attempt to understand one's own feelings in order to facilitate emotional coping (Treyner et al., 2003). The results of previous studies suggest that brooding may be more strongly associated with emotion dysregulation and negative affect than reflective pondering (Watkins, 2009; Selby, Anestis, Bender, & Joiner, 2008). Thus, in the second study we hypothesized that brooding has a stronger mediating effect between PO level and symptoms of BPD and depression than reflective pondering.

Table 2
Minimum-maximum values, means, standard deviations of the measures assessed in Study 1, and non-parametric correlations of the variables.

Measure	Minimum-maximum values	M (SD)	IPO identity diffusion	BSL-23	CES-D	RTSQ
IPO primitive defense	16–56	29.60 (7.97)	0.781	0.516	0.381	0.440
IPO identity diffusion	21–91	39.01 (12.59)		0.583	0.456	0.550
BSL-23	0.04–3.22	0.69 (0.23)			0.700	0.503
CES-D	25–68	18.39 (6.98)				0.434
RTSQ	23–137	78.15 (20.20)				

Note. $n = 179$. All correlations are significant at $p < .01$. IPO = Inventory of Personality Organization; BSL-23 = Borderline Symptom List; CES-D = The Center for Epidemiologic Studies Depression Scale; RTSQ = Ruminative Thought Style Questionnaire.

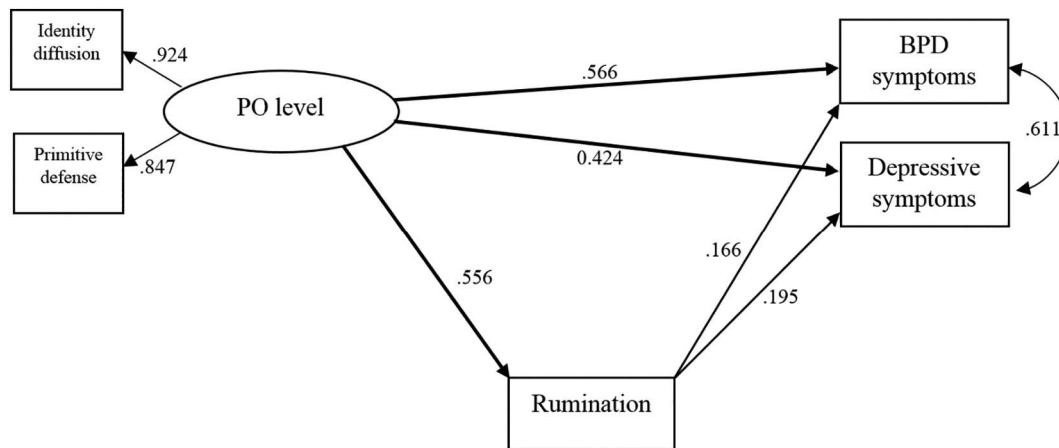


Fig. 1. The mediation model of Study 1 and its standardized path coefficients.

Note: All drawn paths are significant at $p < .001$, except between rumination and depressive symptoms ($p = .038$), and rumination and BPD symptoms ($p = .035$). PO = Personality Organization, BPD = Borderline Personality Disorder. Gender and age were controlled for in the model.

3. Study 2

3.1. Materials and methods of Study 2

3.1.1. Sample and procedure

We recruited our participants ($n = 261$) with convenience sampling method online via social media posts. Informed consent was acquired. Participants who have never been diagnosed by any psychiatric or neurological diseases were included in the study. In terms of highest level of education, 61% of the participants ($n = 159$) had a Bachelor's degree or above, 8.4% ($n = 22$) were university students, 24.5% ($n = 64$) had a high school diploma, 1.5% ($n = 4$) only attended primary school, and 4.6% ($n = 12$) did not answer this question. 67% of the participants ($n = 175$) were women. The minimum age was 18, the maximum 68 years ($M = 37.91$; $SD = 11.51$).

3.1.2. Measures

In the second study, we assessed borderline symptoms with BSL-23, depressive symptoms with CES-D, and PO level with the ID and PD subscales of the IPO questionnaire. These scales are described in details in Study 1.

We measured rumination with the 10-item version of the *Ruminative Response Scale* (RRS, [Treyner et al., 2003](#)) that contains two subscales, brooding and reflective pondering. Items of the RRS are rated on a four-point Likert scale from 1 (never) to 4 (always), thus the possible total score ranges from 10 to 40. Brooding can be characterized as a self-criticizing thinking style that focuses on past negative experiences, containing items such as Think “Why can't I handle things better?” Reflective pondering, on the other hand, is a rather adaptive way of repetitive thinking where one is making an effort to understand their own emotional processes. This subscale contains items like “Go away by yourself and think about why you feel this way”. Both the brooding and reflective pondering subscales of the Hungarian version have shown

good internal consistency in a previous study (Cronbach α : 0.71 and 0.73, respectively) ([Kökönyei et al., 2016](#)), as well as in the current sample (Cronbach α : 0.67 and 0.72, respectively).

3.1.3. Statistical analysis

In Study 2, we assumed that the mediating effect of rumination is stronger in case of brooding than reflective pondering. After performing the descriptive statistical analyses and reliability testing with *IBM SPSS 24 software* (2016), we carried out structural equation modelling with ML estimation and bootstrapping using 500 bootstrap samples with MPlus software (Version 8, [Muthén & Muthén, 2017](#)). PO level was used as a single latent variable indexing ID and PD subscales. Gender and age were controlled for in our model. We calculated the proportion mediated for each mediation by dividing the unstandardized indirect effect by the unstandardized total effect (Cheung, 2009). However, a sample size above 500 is recommended for calculating this ratio (MacKinnon et al., 1995), thus it should be interpreted carefully. The correlation between BSL-23 and CES-D scores was high in this sample ($r = 0.770$, $p < .01$), similarly to Study 1, thus, we combined the two outcome measures as a single latent variable as we did in Study 1, on order to test whether this modification changes the mediation model significantly.

3.2. Results of Study 2

In the second study we did not find any significant difference between men and women on the mean scores of the assessed measures. The descriptive statistics and mean differences split by gender are shown in [Table 3](#).

The descriptive statistics for the total sample and the correlational matrix of the variables assessed in the second study are shown in [Table 4](#). Non-parametric correlations were used due to the non-normality of the variables.

Table 3
Gender differences of the assessed variables in Study 2.

Measure	Female M (SD) (n = 175)	Male M (SD) (n = 86)	t	p
IPO primitive defense	30.50 (8.64)	31.81 (10.06)	1.095	.275
IPO identity diffusion	37.67 (12.12)	36.24 (11.66)	0.877	.381
BSL-23	0.44 (0.46)	0.47 (0.56)	0.457	.648
CES-D	13.56 (10.19)	11.54 (6.89)	1.623	.106
RRS brooding	9.84 (2.50)	9.24 (2.67)	1.774	.077
RRS reflective pondering	10.85 (2.92)	10.55 (3.07)	0.755	.451

Note. $n = 261$. IPO = Inventory of Personality Organization; BSL-23 = Borderline Symptom List; CES-D = The Center for Epidemiologic Studies Depression Scale; RRS = Ruminative Response Scale.

The relative goodness of fit indices showed good model fit for the mediation model of the second study ($\chi^2 = 22.543$, $df = 7$, $RMSEA = 0.092$ [0.051–0.136], $SRMR = 0.059$, $CFI = 0.982$, $TLI = 0.931$). We found strong direct associations between PO level and brooding ($\beta = 0.595$, $p < .001$), BPD symptoms ($\beta = 0.562$, $p < .001$), and depression ($\beta = 0.477$, $p < .001$). Our results showed that brooding mediated the relationship between personality functioning and symptoms of BPD and depression. The mediation paths between PO level, reflective pondering and symptoms of BPD and depression were also significant, but considerably weaker. Standardized indirect effects were 0.134 ($p = .001$) between PO level, brooding and depressive symptoms (proportion mediated = 0.22), and 0.030 ($p = .066$) for PO level, reflective pondering and depressive symptoms (proportion mediated = 0.06). Standardized indirect effects were 0.110 ($p < .000$) between PO level, brooding and BPD symptoms (proportion mediated = 0.17), and 0.052 ($p = .002$) between PO level, reflective pondering and BPD symptoms (proportion mediated = 0.09). These results support our hypotheses that personality functioning and symptoms would be more strongly associated with brooding than with reflective pondering, and that the mediation effect of rumination is stronger in case of brooding than reflective pondering. The total explained variance of depressive symptoms was 47.1% ($p < .001$), the total explained variance of BPD symptoms was 58.9% ($p < .001$). The model is shown in Fig. 2.

In order to address the issue of multicollinearity, i.e. the high correlation between the CES-D and the BSL-23 scores, we combined these two outcome measures as a single latent variable. This alternative model demonstrated minor changes in the obtained results, and is provided as Fig. 2 in the Supplementary material.

3.3. Discussion of Study 2

In Study 2 we examined whether the results of Study 1, i.e. the strong association between personality structure and rumination, the mediating role of rumination between PO level and symptoms of BPD and depression can be replicated on a more heterogeneous non-clinical sample. Furthermore, we explored whether this connection is stronger in case of brooding than reflective pondering. The results of our second

Table 4
Minimum and maximum values, means, standard deviations of the measures assessed in Study 2, and non-parametric correlations of the variables.

Measure	Minimum-maximum values	M (SD)	IPO identity diffusion	BSL-23	CES-D	RRS brooding	RRS reflective pondering
IPO primitive defense	16–80	30.93 (9.13)	0.739	0.537	0.474	0.448	0.215
IPO identity diffusion	21–105	38.16 (12.82)		0.630	0.512	0.489	0.281
BSL-23	0–4	0.45 (0.49)			0.770	0.499	0.450
CES-D	20–65	12.90 (9.28)				0.466	0.275
RRS brooding	5–20	9.64 (2.57)					0.354
RRS reflective pondering	5–20	10.75 (2.97)					–

Note. $n = 261$. All correlations are significant at $p < .01$. IPO = Inventory of Personality Organization; BSL-23 = Borderline Symptom List; CES-D = The Center for Epidemiologic Studies Depression Scale; RRS = Ruminative Response Scale.

study are congruent with the results obtained in Study 1, and indicate that brooding, a less adaptive repetitive thought processing plays a more considerable role in mediating the connection between PO level and borderline as well as depressive symptoms than reflective pondering. Our findings highlight the importance of maladaptive thought processing in the development of borderline-depressive symptoms, and hint at the relevance of extending the exploration of these associations to other emotion regulation strategies.

4. General discussion

Lately, interest has been rising in clinical psychology towards transdiagnostic constructs, i.e. psychological processes that appear to be related to a wide range of diagnostic categories. These constructs can help to explore the underlying factors of observed symptoms, thus may contribute to more accurate diagnoses (Sauer-Zavala et al., 2016). Furthermore, exploring the connection between these transdiagnostic variables may help to reduce the phenomenological heterogeneity within different diagnostic categories, and shift towards a more plausible classification system of mental disorders by bridging disorder-specific features with possible underlying factors (Lenzenweger, Clarkin, Yeomans, Kernberg, & Levy, 2008; Lyubomirsky et al., 2015), which could result in better treatment methods on the long run. This study focuses on such variables, namely rumination, a maladaptive emotion regulation strategy and its relation to key domains of personality functioning, which has not been studied elsewhere.

In the first study we hypothesized that the relationship between PO level and borderline and depressive symptoms is mediated by rumination, while in the second study we also tested whether this association is stronger in case of brooding than reflective pondering, all of which hypotheses gained support. Our results are consistent with previous empirical studies that investigated the relationship between rumination and borderline symptoms among university students (Meaney et al., 2016) and non-clinical adults (Selby, Aenestis & Joiner, 2008), as well as between rumination and depression among young adults (e.g. Slavish & Graham-Engeland, 2015; Topper, Emmelkamp, Watkins, & Ehring, 2017). However, to our knowledge our study is the first to link these associations to the level of personality organization. Our results indicate that a less structured personality, namely the use of primitive defense mechanisms and identity diffusion may be associated with higher proneness to rumination, especially brooding. This implies that the intense unprocessed negative affects and the emotion dysregulation attributed to lower personality organization (Levy et al., 2006) may trigger maladaptive emotion regulation strategies such as rumination (Carpenter & Trull, 2013; Selby, Aenestis, Bender, & Joiner, 2009), that in return may aggravate psychological symptoms.

It is important to note that our models revealed stronger associations between PO level and symptoms of BPD and depression, than between rumination and these symptoms. Although rumination has been identified as a risk factor to depression (e.g. Nolen-Hoeksema, 1991; Smith et al., 2006) and BPD (e.g. Martino et al., 2015; Selby et al., 2009), it is improbable that rumination alone would explain the emergence of borderline or depressive symptoms (i.e. equifinality). At

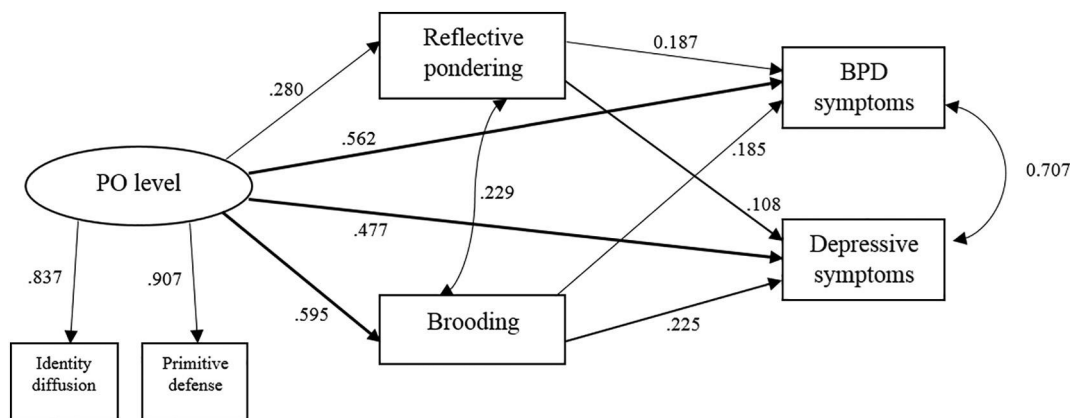


Fig. 2. The mediation model of Study 2 and its standardized path coefficients.

Note: All drawn paths are significant at $p \leq .01$, except between reflective pondering and depressive symptoms ($p = .032$). Gender and age were controlled for in the model. PO = Personality Organization, BPD = Borderline Personality Disorder.

the same time, rumination appears to be a transdiagnostic risk factor to psychopathology (Nolen-Hoeksema & Watkins, 2011), thus it may lead to various other psychological disorders in the presence of other protective and/or risk factors that were not examined here (i.e. multifinality). Therefore, our results indicate that rumination (especially brooding) is one factor that may mediate the relationship between PO level and disorder-specific symptoms, but other determinants should also be considered. This is also reflected in the effect sizes of the mediation paths (i.e. the standardized indirect effect and the proportion mediated), that indicated small to negligible effect sizes. The effects were the lowest in terms of reflective pondering, as hypothesized. However, in order to calculate the proportion mediated, having a sample size above 500 is desirable (MacKinnon et al., 1995), thus it should be interpreted cautiously.

Our results suggest that lower personality organization and the emergence of disorder-specific symptoms can be linked with brooding and reflective pondering on different levels, indicating that specifying the relationship between personality functioning and other subtypes of rumination are worthy of further investigation. Anger and shame are two outstanding negative emotions in BPD, and empirical studies demonstrate that anger rumination triggered by the feeling of shame may substantially contribute to the emergence of BPD symptoms (Peters et al., 2014). Thus we expect robust associations between anger rumination and PO level, a hypothesis that should be tested empirically in future studies. Furthermore, in this research we only addressed the mediating role of rumination, however, a less structured personality can probably be associated with other maladaptive emotion regulation strategies as well, such as expressive suppression (Richmond, Hasking, & Meaney, 2017), thought suppression or experiential avoidance (Carpenter & Trull, 2013). Moreover, in line with the Emotional Cascade Model (Selby et al., 2009), future studies could also address whether low PO level and rumination is associated with important behavioral outcomes of BPD and comorbid depression, e.g. self-injury or substance abuse (Levy & Johnson, 2016).

Our results provide important insights regarding the development of BPD and comorbid depressive symptoms, as they suggest that rumination may mediate the path during which unstable representations of self, others and related affects, the use of immature defense mechanism and compromised social reality testing lead to the manifestation of borderline symptoms and depressed mood. However, one may argue that ruminating about the negative affect states experienced widely in both BPD and depression may be a symptom of, and not a risk factor to these disorders. Our study design does not enable us to determine temporal precedence and infer causal relationships, as cross-sectional data is correlational in its nature. However, the systematic, strictly theorized work of Susan Nolen-Hoeksema involving longitudinal

studies provide support for our model, where rumination is rather the antecedent than the consequence of negative affect (for a review see Lyubomirsky et al., 2015). Concurrently, experiencing negative affective states that are core features of both BPD and depression may also foster maladaptive emotion regulation responses such as rumination, resulting in a vicious circle (e.g. Selby et al., 2009).

Strengths of this research include a transdiagnostic and trans-theoretical approach to conceptualization, the use of two samples to replicate and extend findings, and the study of an important topic, rumination, that is increasingly the target of a range of interventions. However, it has a number of limitations that need to be acknowledged. We recruited non-clinical participants with convenience sampling method, which inevitably leads to selection bias. We only applied self-report measures that may lead to Common Method Variance (CMV). CMV is the bias introduced by the fact that both the predictor and the outcome were estimated by relying solely on the participants' introspection, as one may overestimate or underestimate their own psychological problems, leading to false positive or false negative correlations (Tehseen, Ramayah, & Sajilan, 2017). Furthermore, unlike in previous research, we did not find any significant difference between men and women on the mean scores of the assessed measures in either of the studies, which may be due to the uneven gender distribution of our samples. Both samples are highly educated, and does not represent the general population. Moreover, previous research shows that non-clinical samples mainly cover the neurotic and high-functioning borderline range of PO (Ellison & Levy, 2012; Lenzenweger et al., 2001), whereas a sample of BPD patients would represent the low-functioning borderline and sometimes the psychotic domain (Lenzenweger et al., 2012). It is important to note that in Study 1 only 14 participants (7.8%), in Study 2 only 12 participants (4.6%) had a mean score of 1.5 or above on the BSL-23, indicating that the presence of subclinical BPD symptoms was scarce, especially in the second sample (Meaney et al., 2016). Regarding depressive symptoms, 31.84% of the sample in Study 1 ($n = 57$), whereas 19.54% of the sample in Study 2 ($n = 51$) scored 20 or above on the CES-D, which may indicate that they are at risk for clinical depression (Vilagut et al., 2016). Compared to other studies recruiting university students, depressive symptoms in Study1 were moderately higher (Jiang et al., 2019; Slavish & Graham-Engeland, 2015), whereas the incidence of BPD symptoms was similar (Lu et al., 2018) or lower (Meaney et al., 2016). This conveys that the results of our studies should be replicated either on enriched non-clinical samples overrecruited for these symptoms (especially for BPD features), or on clinical samples in order to cover a broader PO spectrum which would help to understand generalizability.

Furthermore, there are a few methodological considerations regarding our mediation models. We focused on the mediation model

rather than the thorough psychometric evaluation of the applied scales, as drawing firm psychometric conclusions is beyond the scope of this paper, and our sample size would not enable us to do. Thus, we relied on the results of prior research regarding the psychometric evaluation of the applied scales. Another important issue is multicollinearity, however, in our model it was only present among the outcome measures, which is less problematic than at the level of the predictors (Kelava, Moosbrugger, Dimitruk, & Schermelleh-Engel, 2008). In order to justify that, we combined the two outcome measures as a single latent variable, which caused marginal change in the models. These alternative models are available as Supplementary material. BPD features are often comorbid with depression (American Psychiatric Association, 2013), however, most clinical psychologists and psychopathologists consider them two discernible constructs, thus they are typically not merged in either theoretical or clinical discussions. One may argue that merging them would make it difficult to determine whether the effects described in these analyses are rather accounted for depressive symptoms or BPD features. Nonetheless, the fact that merging the two outcomes caused little change demonstrates that the models presented in the Results section are methodologically acceptable, and based on the above mentioned theoretical and clinical considerations, we preferred them against the models with a single latent outcome.

Our results may also raise important questions regarding psychotherapeutic interventions: we assume that treatment modalities that are aiming to contribute to a more integrated personality functioning may also be effective in reducing ruminative thoughts, as higher functioning may be accompanied by less emotion dysregulation (Levy et al., 2006), which may alleviate symptoms. However, before drawing such conclusions, further research is needed to replicate our findings on clinical samples, relying on measures other than self-report (e.g. structured clinical interviews), and ideally within a longitudinal framework to infer causality, for example by testing the level of PO and rumination before and after a certain psychotherapeutic intervention.

5. Conclusions

In line with other studies (e.g. Dickson et al., 2019; Rivière & Douilliez, 2017), our results indicate that rumination is a transdiagnostic mediator that may bridge certain personality features with the occurrence of clinical symptoms. This implies that when low personality functioning is accompanied by rumination, this maladaptive emotion regulation strategy may exacerbate symptoms of BPD and depression. Personality functioning - such as the representations of self and significant others, affective lability, or the use of primitive defense mechanisms - and rumination appear to be clinically relevant regarding the prevention and treatment of BPD and depression, thus they merit further investigation. Therefore, the relationship between personality structure deficits, maladaptive emotion regulation strategies and symptoms of BPD and depression should be explored to better understand their role in the emergence of psychological disorders.

CRedit authorship contribution statement

Lilla Nóra Kovács: Conceptualization, Data curation, Formal analysis, Investigation, Writing - original draft. **Ágoston Schmelowszky:** Conceptualization, Supervision, Writing - review & editing. **Attila Galambos:** Data curation, Investigation, Writing - review & editing. **Gyöngyi Kőkönyei:** Conceptualization, Methodology, Project administration, Supervision, Writing - review & editing.

Declaration of competing interest

This study was supported by the Hungarian National Research, Development and Innovation Office (Grant No. FK128614). The

preparation of this article for Gyöngyi Kőkönyei was supported by the MTA-SE-NAP B Genetic Brain Imaging Migraine Research Group, Hungarian Academy of Sciences, Semmelweis University (Grant No. KTIA_NAP_13-2-2015-0001); Hungarian Brain Research Program (Grant No. 2017-1.2.1-NKP-2017-00002), and by ITM/NKFIH Thematic Excellence Programme, Semmelweis University; by the SE-Neurology FIKP grant of EMMI.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2020.110339>.

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