

**Does alexithymia mediate the association between
borderline personality pathology and non-suicidal self-
injury?**

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Abstract

Introduction: Borderline personality disorder (BPD) is a mental disorder defined by an ongoing pattern of instability in mood; affect regulation, impulse control and problems with interpersonal relationships and self-image. One of the most characteristic behaviours in BPD is non-suicidal self-injury (NSSI). An underlying determinant, contributing to NSSI in patients with BPD is alexithymia, reflecting difficulty in identifying feelings (DIF), difficulty describing feelings (DDF) and externally orientated thinking (EOT). Thus, the aim of the presented study was investigating if the alexithymia components DIF, DDF and EOT mediate the association between BPD traits and NSSI urge.

Methods: The prevailing research features a cross-sectional online-survey design, with 185 participants. The constructs were explored by means of the TAS-20, investigating the alexithymia scores, the ABUSI, investigating NSSI urge and the PID-5-BF investigating BPD traits. A mediation analysis testing whether DIF DDF and EOT mediate the association between BPD traits and NSSI urge was conducted.

Results: Statistical significant indirect effects were found for the mediators DIF and DDF. For EOT, no significant mediation effect was found.

Conclusion: These results confirm that DDF and DIF can explain the association between BPD traits and NSSI urge. In a parallel mediation model, only EOT cannot explain this association. Thus, further research and treatment for BPD and NSSI should target problems in the identification and verbalization of emotions.

Contents

Introduction.....	4
Borderline personality disorder and non-suicidal self-injury.....	4
Measurement of BPD.....	5
Association with Alexithymia.....	5
Earlier literature on Associations between NSSI, BPD and Alexithymia.....	6
Research Questions and Hypotheses.....	7
Methods.....	8
Design.....	8
Participants.....	8
Materials.....	9
<i>The Toronto Alexithymia Scale-20 (TAS-20)</i>	9
<i>Alexian Brothers Urge to Self-Injure Scale (ABUSI)</i>	9
<i>Personality Inventory for DSM-5—Brief Form (PID-5-BF)</i>	10
Procedure.....	11
Data Analysis.....	12
Results.....	13
Descriptive Statistics.....	13
Correlation Analysis.....	14
<i>Correlations of alexithymia dimensions and BPD traits</i>	14
<i>Correlations of alexithymia dimensions and NSSI urge</i>	15
<i>Correlations of alexithymia dimensions DDF, DIF and EOT</i>	15
Main Analyses.....	16
<i>DIF</i>	16
<i>DDF</i>	17
<i>DIF and DDF (Affect awareness)</i>	18
<i>EOT</i>	19
Discussion.....	20
Limitations.....	22
Strong Points.....	23
Conclusions and Recommendations.....	23
Conclusion.....	24
Reference List.....	25
Appendix.....	29
Questionnaire.....	29

Introduction

Borderline personality disorder (BPD) is a mental disorder defined by an on-going pattern of instability in mood, affect regulation, impulse control and problems with interpersonal relationships and self-image (Loas, Speranza, Pham-Scottez, Perez-Diaz & Corcos, 2012).

Borderline personality disorder and non-suicidal self-injury

BPD affects about 1–2% of the general population, with a higher prevalence in adolescents. Moreover, up to 10% of psychiatric outpatients, and 20% of inpatients suffer from this disorder. BPD is associated with self-harming behaviour that can have permanent physiological impairments such as potentially life-threatening injuries of the organs and the skin (Loas et al., 2012). Additionally, 41–83% of patients show symptoms of major depression (Lieb, Zanarini, Schmahl, Linehan & Bohus, 2004). Besides a physical burden due self-injury and psychological strain, the disorder also entails a high mortality rate due to suicide, ranging up to 10% (Lieb et al., 2004). Due to those impairments and potential consequences, BPD is considered a public health problem (Loas et al., 2012).

Self-injury is one of the most characteristic behaviours in BPD. About 70% of all patients account for a history of non-suicidal self-injury (NSSI). In the Diagnostic and Statistical Manual of Mental Disorders (2013), this type of self-injury is characterized as “the repetitive, deliberate, direct and socially unacceptable destruction or alteration of one’s own body tissue without the intend to die.” (p.803). Prevalent methods of NSSI in borderline personality disorder are cutting, scratching, hitting oneself, burning and head banging. A majority of 90% of self-harming BPD patients uses more than one method of NSSI (Lieb et al., 2004). Non-suicidal self-injury can have severe health consequences and the affected patients exhibit a higher risk for suicidal behaviours. NSSI can be described as a dysfunctional emotion-regulation strategy for emotional relief and as a means to communicate with others and influence them (Lieb et al., 2004).

Another essential feature of BPD is a pervasive pattern of instability in emotions and the presence of impulsivity in behaviour (Lieb et al., 2004). People living with this personality disorder typically experience mood swings and display ambivalence about their self-images and their role in the world. As a result from these mind-sets, interests and values can change quickly. Moreover, patients tend to have rather extreme viewpoints and show dichotomous thinking patterns (Veen & Arntz, 2000). As a consequence of the behavioural and physical saliences, BPD patients usually show lower rates of education completion and occupation completion (Arntz & ten Haaf, 2012). The disorder also influences patients’

interpersonal relationships because their perceptions of others can change quickly. This often leads to intense and unstable relationships with people in their environment and might often swing from extremely close relationships, known as idealization, to extreme dislike or anger, known as devaluation (Lieb et al., 2004). Those impairments can profoundly decrease patients' quality of life (Arntz & ten Haaf, 2012). Therefore, an investigation of different determinants of borderline to provide a better understanding of the disorder is of importance to help patients to increase their quality of life by tailored methods.

Measurement of BPD

BPD is usually diagnosed applying a categorical approach by using the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5). To identify the disorder, a person needs to fulfil five of the nine criteria, included in a symptom list (Lieb et al., 2004). However, applying the categorical approach for personality disorders leads to shortcomings and the diagnostic agreement is usually low. Symptoms and traits of personality disorders are diverse and show a high comorbidity with other personality disorders. Additionally, most personality disorders do not exhibit stable symptoms over time (Trull & Durrett, 2005). Dimensional models for personality disorders could enhance the diagnosis by approaching those problems. These models classify personality disorders qualitatively and continuously. In dimensional models, personality disorders are conceptualized as maladjusted levels of normal personality traits (Trull & Durrett, 2005). By using dimensional models to investigate personality disorder, it can become easier to recognize BPD in its development, which can lead to more effective treatment from the beginning on (Trull & Durrett, 2005). Thus, this study will use a dimensional measurement to investigate the variables.

Association with Alexithymia

A more elaborate understanding of the underlying determinants, contributing to NSSI in patients with borderline personality disorder, is an important step to develop tailored treatments for those patients. Therefore, this study is further elaborating on one of these determinants, namely alexithymia. According to Sleuwaegen, Houben, Claes, Berens, & Sabbe, the alexithymia rate in BPD patients ranges between 65 to 80% (Sleuwaegen, Houben, Claes, Berens, & Sabbe, 2017). Nemiah defined Alexithymia as a phenomenon characterized by inadequate emotional awareness, especially by the difficulty to identify and describe feelings (Nemiah, 1988). Moreover, people with alexithymia usually report not to have fantasies, in the way other people do. The condition is present in close to 10% of the general population in European countries and 30% in clinical samples as reported by Franz et. al., Mattila et. al., and Parker et.al (Keefer, Taylor, Parker & Bagby, 2019). The inability to

identify different emotions is considered an essential component of affect dysregulation in BPD.

In 1999, Bagby, Parker & Taylor developed a model of alexithymia, deriving from Nemiah's pioneer research on alexithymia (Bagby, Parker, & Taylor, 1994). This so-called Toronto model characterizes four interrelated components of alexithymia: difficulty identifying feelings in the self (DIF); difficulty describing feelings (DDF); externally orientated thinking (EOT) style and difficulty fantasising (DFAN). Externally oriented thinking style entails an individual's concentration on details of the external situation rather than on their internal state and difficulty fantasising (DFAN) is characterized by a deficiency of daydreams and fantasies. Moreover, the model describes that DIF and DDF elements are associated with an affect awareness component, while the EOT and DFAN elements are linked to an operative thinking component (see Fig. 1) (Preece, Becerra, Allan, Robinson, & Dandy, 2017).

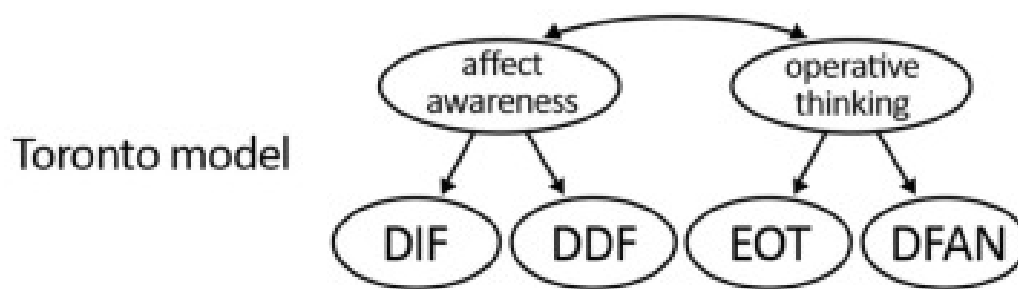


Figure 1 Visual representation of the Toronto model of alexithymia. Double arrows indicate that the constructs are represented as positively correlated. DIF = difficulty identifying feelings, DDF = difficulty describing feelings, EOT = externally orientated thinking, DFAN = difficulty fantasising

In addition to the model, the Toronto research group developed the TAS-20, a measure for alexithymia. The TAS-20 is a self-report questionnaire including items measuring DIF, DDF and EOT. The item DFAN was not included due to a lack of theoretical relevancy and the influence of social desirability, which was seen as the pitfall. The definition based on the Toronto model is nowadays universally used in literature (Preece et al., 2017).

Earlier literature on Associations between NSSI, BPD and Alexithymia

To further elaborate on the association, the different factors of alexithymia, described in the Toronto model and their influence on the association between BPD and NSSI can play an important role. Sleuwaegen et al. (2017) conducted a study on the relationship between non-suicidal self-injury and alexithymia in a BPD patient group. Their results suggested that NSSI in BPD patients is associated with alexithymia. Particularly, the element difficulties

describing feelings (DDF) of the Toronto scale was highly associated with NSSI in a group of BPD patients showing NSSI (Sleuwaegen et al., 2017). Moreover, in a study of Wolff, Stiglmayr, Bretz, Lammers & Auckenthaler, comparing BPD patients to healthy control participants in their difficulties in identification of their emotions and its association with affect dysregulation, it was found that BPD patients showed more difficulties in identifying their emotions than the control group (Wolff, Stiglmayr, Bretz, Lammers & Auckenthaler, 2007).

Alexithymia has already been identified in various populations, including psychiatric patients, BPD patients and healthy individuals. In the meta-analysis of Derks, Westerhof & Bohlmeijer, a moderate positive correlation between BPD and alexithymia has been identified. The researchers found strong correlations between BPD and the factors DIF and DDF (Derks, Westerhof & Bohlmeijer, 2017). Similarly, a study on emotional intelligence in BPD patients by Webb & McMurran found that a difficulty in identifying and communicating emotions decreases patients' capacity for emotional regulation. Moreover, there is evidence of DDF and DIF, being associated with NSSI. Cerutti, Zuffianò & Spensieri found statistically significant positive relations of 0.212 for DDF and 0.261 for DIF between difficulties in describing identifying and feelings and NSSI in a non-clinical sample of adolescents (Cerutti, Zuffianò & Spensieri, 2018).

The EOT component of alexithymia has not shown significant correlations with BPD or NSSI in the presented studies. Regarding BPD patients' high comorbidity with depression, a mediating effect of EOT is unlikely due to the high internal focus in depression (Ingram & Smith, 1984).

There are several existing studies on correlations between the components of the Toronto model with BPD and NSSI. To elaborate on the direct correlations between the alexithymia components and BPD and NSSI, in this study, Spearman correlations will be conducted. Notably, no studies did investigate the effect of the alexithymia concepts on NSSI in BPD. This seems particularly important, since DDF and DIF are also prevalent in the BPD and NSSI patient groups and could explain the association. Thus, it is necessary to investigate the possibility of DDF, DIF on NSSI in BPD. In this study, the association between BPD and NSSI and the alexithymia components DDF, DIF and EOT is measured by three different mediation models. Based on results from earlier literature, correlations between the variables are presumed. Mediation analysis was chosen, because the mediators DDF, DIF are presumed to be a causal result of the predictor variable and a causal antecedent of the outcome, which would not be the case for e.g. moderation analysis.

Research Questions and Hypotheses

Research question: Is the association between borderline personality traits and the urge for non-suicidal self-injury mediated by alexithymia?

Hypothesis 1: The element difficulty describing feelings (DDF) of alexithymia **mediates** the association between borderline personality disorder (BPD) traits and the urge for non-suicidal self-injury (NSSI).

Hypothesis 2: The element difficulty identifying feelings in the self (DIF) of alexithymia **mediates** the association between borderline personality disorder (BPD) traits and the urge for non-suicidal self-injury (NSSI).

Hypothesis 3: The element externally orientated thinking (EOT) of alexithymia **does not mediate** the association between borderline personality disorder (BPD) traits and the urge for non-suicidal self-injury (NSSI).

Methods

Design

This research features a cross-sectional online-survey design. The study is part of a bigger project on the association between alexithymia and coping behaviours and the questionnaires, therefore, included in a bigger test battery consisting of 9 different subsets. In this study, it is tested whether the three factors of alexithymia difficulty describing feelings (DDF), difficulty identifying feelings in the self (DIF) and externally orientated thinking (EOT) are mediators in the association between borderline personality disorder (BPD) traits and the urge for non-suicidal self-injury (NSSI).

Participants

Initially, 138 participants took part in the study, from which 106 were included in the data analysis because some individuals did not complete the full survey or took less than 15 minutes for the survey. In the studied sample, 38 (35.8 %) were male and 68 (64.2 %) female. The mean age of the participants was 22.3 years (SD = 5.42) with a minimum of 18 and a maximum of 55 years. 77.4% of the participants were German, 10.4% Dutch and 12.3% of other nationalities. All participants took part in the study voluntarily. The Ethics committee of the University of Twente approved the research, and all participants gave written informed

consent in accordance with the guidelines of the committee.

The participants were recruited via convenience sampling with SONA systems and by sending personally addressed invitations to participate via the personal messaging services of Whatsapp and Facebook. Via SONA psychology and communication science students from the University of Twente were targeted. The persons who were addressed via Whatsapp and Facebook were all part of the private social network of (at least) one of the researchers involved in this collaborative survey study. SONA is an online platform for Psychology and Communication Science students of the University of Twente to take part in studies in order to collect a specific amount of points, required for their graduation. For the participants using SONA the reward was 0.75 p. The time span of the data collection was about four weeks (16th April- 20th May 2019).

Materials

Three self-report questionnaires were used: the Toronto Alexithymia Scale-20 (TAS-20), the Alexian Brothers Urge to Self-Injure Scale (ABUSI) and the Personality Inventory for DSM-5—Brief Form (PID-5-BF). Below, these will be described in more detail.

The Toronto Alexithymia Scale-20 (TAS-20)

The TAS-20 is a 20-item, self-report questionnaire assessing factors of alexithymia (Bagby et al., 1994). The participants were asked to rate 20 items on the extent on how much they disagree or agree with the declaration on a five point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree) of which some were scored in reversed key. The TAS-20 has a range of total scores from 20 to 100, with higher scores reflecting stronger indication for alexithymia. Scores below 52 points suggest no alexithymia while scores of 52 to 60 give indication for the possibility of alexithymia. Scores higher than 60 are indicative of alexithymia (Eiden, 1998). The questionnaire is based on the Toronto model of alexithymia, including 4 factors of alexithymia (Preece et al., 2017). Three of the four factors, namely, difficulty identifying feelings, difficulty describing feelings and externally oriented thinking are included in the measure. The factor DDF includes five items and its scores range from 5-25. DIF is investigated by seven items and the scores therefore range from 7- 35. The subscale EOT is comprised of eight different items and the score on this scale ranges from 8-40.

The TAS-20 demonstrates a good internal consistency (Cronbach's alpha $r = .81$) and was also proved as reliable in a test-retest format ($r = .77$) (Eiden, 1998). Moreover, research using the TAS-20 showed adequate levels of discriminant, convergent and concurrent validity (Sleuwaegen et al., 2017).

Alexian Brothers Urge to Self-Injure Scale (ABUSI)

The Alexian Brothers Urge to Self-Injure Scale (ABUSI) assesses participants' urge to self-injure. The questionnaire intends to estimate the severity of a cognitive and emotional state in which an individual is motivated or driven to engage in self-injuring behaviour (Washburn, Juzwin, Styer & Aldridge, 2010). The ABUSI assesses frequency, intensity, and duration of the urge for self-injury. Moreover, the difficulty of resisting the urge or desire to engage in self-injury in the prior week is taken into account. The five Items are rated on a 7-point Likert-type scale including different options for each question with 1 indicating no urge to self-injure to 7 indicating a strong urge or frequency. The measure has a range of total scores from 7 to 35, with higher scores reflecting more intense urges to self-injure. The ABUSI demonstrated excellent internal consistency (Cronbach's $\alpha = 0.92-0.96$), a high test-retest reliability (0.84) and adequate incremental validity. Thus, the ABUSI is considered a promising tool for both clinical assessment and research (Washburn, et al., 2010).

Personality Inventory for DSM-5—Brief Form (PID-5-BF)

The questionnaire is a 25-item self-report inventory, developed to measure a dimensional pathology model of personality disorders, based on the Criterion B of the DSM-5 Section III. It is the brief form of the PID-5. In this section of the DSM, alternative models for assessing personality disorders are introduced. The PID-5-BF was developed to investigate personality disorders in a dimensional way by assessing the presence of individual, PD-specific traits in adults of the age 18 and older (Fossati, Somma, Borroni, Markon, & Krueger, 2017). The questionnaire includes 5 personality domains: Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism, each containing different trait facets. To identify BPD traits, the following facets are required to be present in an individual: instability of self-image, personal goals, interpersonal relationships and affects, impulsivity, risk-taking and/ or hostility. These traits are present in the personality domains: Negative Affect, Antagonism and Disinhibition (American Psychiatric Association, 2013). The DSM-5 suggests to use these three facets for studying BPD dimensionally. These three personality domains were used to identify in the present study. In their research on the utility of the PID-5 Calvo et al., only found higher values for the domains Negative Affectivity and Disinhibition and for the facets emotional lability, impulsivity and [lack of] restricted affectivity. However, the lack of the Antagonism domain can be attributed to associations between the variables of the PID-5 and consequently collinearity in their study. Moreover, they were using the test to differentiate BPD from other personality disorders and not from healthy personalities. Therefore, the approach suggested in DSM-5 is going to be used in this research.

Each Item is rated on a 4-point Likert-type scale ranging from 0 (very false or often false) to 3 (very true or often true). Negative Affectivity and Antagonism were assessed by five items and Disinhibition by four items. The domains were calculated by averaging items (Krueger, Derringer, Markon, Watson, & Skodol, 2013). The BPD variable including Negative Affectivity, Disinhibition and Antagonism has a range of total scores from 0 to 42, with higher scores indicating higher BPD trait indication. The trait domains Negative Affectivity and Antagonism range in score from 0 to 15, and Disinhibition from 0 to 12 with higher scores indicating greater dysfunction in the specific personality trait domain (Krueger et al., 2013). Cronbach's alpha values for the PID-5-BF total score was .83 (mean interitem $r = .16$) and the reliability of the measure can therefore be interpreted as good (Fossati, et al., 2017).

Procedure

In order to gather data for this study, an online survey was constructed with Qualtrics, a website for questionnaire construction (see: <https://www.qualtrics.com>) and the link to the questionnaire was uploaded on SONA, as a Facebook post and spread via Whatsapp. The 20-item Toronto Alexithymia scale was used to assess the participants' alexithymia scores. The Alexian Brothers Urge to Self-Injure Scale (ABUSI) assessed participants' urge to self-injure and the Personality Inventory for DSM-5—Brief Form (PID-5-BF) assessed the participants' tendencies for Borderline Personality traits. The questionnaires are presented here in the order of being administered in the online questionnaire.

Subjects, who decided to participate in the study, were asked to use the aforementioned link. The online survey began with an information screen, giving the participants all the needed information about the content of the study. In addition, they gave informed consent in accordance with the guidelines of the ethics committee by agreeing to take part in the study. After the general information about the study, the participants filled in demographic data about themselves. Subjects were informed that in the first part of the questionnaire (TAS-20), they were presented with a number of statements to rate indicating their degree of agreement or disagreement.

Thereupon, participants were shown the instructions for the ABUSI, to choose the most appropriate statement for every question.

The last questionnaire of the battery was the Personality Inventory for DSM-5—Brief Form. The participants were asked to answer each statement below by indicating their degree of agreement or disagreement with the statement.

After the participants completed the entire questionnaire, they were presented with a 'Thank you for participating' message on the screen, together with the email addresses of the

researches in the situation that question arose afterwards. On average, it took the participants between 20 and 30 minutes to complete the questionnaire. The study was part of a bigger project and the whole survey therefore included 6 other questionnaires that will not be included in the prevailing study and will not be discussed in detail.

Data Analysis

The data gathered in this study was analysed using SPSS 24.0 and the add-on PROCESS v3.2 (developed by Andrew Hayes). For the project, an overview about the participants' demographics was computed in SPSS. Descriptive statistics, mean, standard deviation, skewness and kurtosis of the alexithymia-scores, the personality disorder score, the BPD score and the score for NSSI urge were calculated. Respondents who took less than 15 minutes to complete the survey were excluded.

To compare direct associations between the constructs in the studied sample with associations in previously studied groups, spearman correlation analyses between the different alexithymia dimensions BPD traits and NSSI urge were conducted. In total, eight correlations, including each alexithymia dimension and the total alexithymia score with BPD and the alexithymia dimension and the total alexithymia score with NSSI urges were computed. Moreover, the three Alexithymia components DDF, DIF and EOT were correlated with each other, using spearman correlations. The spearman correlation analysis was chosen because the spearman correlation coefficient not based on raw data, but on the ranked values for each variable and can therefore handle non- normal distributions.

Mediation analyses to investigate, whether there was a significant mediation effect on the association between BPD traits and the urge for NSSI, are conducted in SPSS with the add-on PROCESS. The add-on contains the syntax for performing several types of mediation and moderation analyses, which are listed as 'models' (Hayes, 2013). Via the add-on, one can add the chosen predictor and outcome variables and the mediator variables via a click-and-add menu to then perform the chosen analysis. The mediation analysis was conducted using model 4. An indirect effect of BPD traits on NSSI urge via one of the mediators means that this specific mediating variable can explain the effect. The PID-5-BF score indicating the BPD traits was entered as the predictor variable and the ABUSI score indicating NSSI urge, was entered as outcome variable. The three alexithymia components, DDF, DIF and EOT, deriving from the TAS-20 were entered as potential mediators in three separate analyses. A fourth mediation analysis, investigating the effects of DDF and DIF simultaneously on the association between BPD and NSSI was conducted. For the mediation analyses, Bootstrapping was used to solve the problem of a non-normal distribution.

To identify the indirect effect, a null hypothesis (H_0) is going to be tested. In this study, the null hypothesis means that X, M and Y are linearly uncorrelated. It is tested, estimating Y from X, X from M and M from Y. If X, M and Y are uncorrelated, X has no weight in the derivation of the estimate of M and M has no weight in the derivation of the estimate of Y. In other words, if the confidence interval does not contain 0, the null hypothesis fails; meaning the indirect effect is significant and parts of X on Y can be explained by X on M on Y. If the confidence interval does contain 0, the null hypothesis is confirmed and the indirect effect is not significant (Hayes, 2013). According to this analysis, it can be determined whether a hypothesis can be confirmed.

Results

Descriptive Statistics

Initially, 138 participants took part in the study, from which 106 were included in the data analysis because some individuals did not complete the full survey. To get a better overview about the sample mean, standard deviation, skewness and kurtosis are provided. On the PID-5-BF, respondents mean score was 49.69, which is less than one standard deviation (10.02) below the cut-off score 52 for possible alexithymia. On the BPD variable of the PID-5-BF, the dimensional measure of the BPD traits, respondents' mean score was 30.32 (SD= 6.21). The respondents' mean score on the ABUSI, indicating the NSSI urge was 7.16. The sample showed a mean total alexithymia score of 47.46. On DIF, the respondents' mean score was 17.56, on EOT 16.70 and the dimension DDF 16.70. Not all factors are comprised by the same number of items, so the means cannot be compared directly. All variables show a positive skewness, meaning that the data is skewed right, and that most frequent scores are clustered at the lower end and the tail points towards the higher scores. The scores for the PD traits, BPD traits, NSSI urge and Alexithymia show a distribution with a positive kurtosis, meaning that the distribution is heavy tailed and pointy. The distribution for these values can be described as leptokurtic. For the alexithymia components DDF, DIF and EOT, the distributions show a negative kurtosis with thin tails, flatter than a normal distribution. The distribution for these variables is platykurtic.

The skewness of the NSSI urge variable shows a value of 3.6. If the skewness is greater than 1.0 (or less than -1.0), the skewness is substantial, and the distribution is considered asymmetrical. This is the case for the NSSI urge variable. Additionally, the NSSI urge variable shows a kurtosis value of 14.70. The values for asymmetry and kurtosis between

-2 and +2 are considered acceptable in order to prove normal univariate distribution. The value for NSSI urge, therefore, indicates a non-normal distribution. Thus, the distribution for NSSI urge is considered asymmetrical and not normally distributed. Further, this means that this variable cannot be used for parametric testing. For this study, non-parametric testing (spearman correlation) and bootstrapping are used to investigate the variables.

Table 1

Descriptive statistics of the studied variables

	Minimum	Maximum	Mean (M)	Std. Deviation	Skewness	Kurtosis
PD traits	28.00	86.00	49.69	10.02	0.35	0.07
BPD traits	16.00	53.00	30.32	6.21	0.33	0.67
NSSI urge	5.00	34.00	7.16	5.03	3.60	14.70
Alexithymia	27.00	82.00	47.46	10.55	0.62	0.77
DDF	5.00	25.00	13.21	4.55	0.16	- 0.61
EOT	9.00	28.00	16.70	4.02	0.41	-0.06
DIF	8.00	33.00	17.56	5.32	0.32	-0.32
Total N	106					

Note: PD traits= personality disorder traits, BPD traits: Borderline Personality disorder traits, NSSI urge: urge for non-suicidal self-injury, DIF = difficulty identifying feelings, DDF = difficulty describing feelings, EOT = externally orientated thinking

Correlation Analysis

To compare direct associations between the constructs in the studied sample with associations in previously studied groups, correlation analyses between the different alexithymia dimensions BPD traits and NSSI urge were conducted. In total, eight correlations, including each alexithymia dimension and the total alexithymia score with BPD and the alexithymia dimension and the total alexithymia score with NSSI urge were computed, of which seven were significant.

Correlations of alexithymia dimensions and BPD traits

As shown in table 2, the Spearman's rho test showed strong statistically significant correlations between BPD traits and the alexithymia total score ($r = .374$; $p = .000$), BPD traits and DIF ($r = .385$; $p = .000$) and BPD traits and DDF ($r = .297$; $p = .002$). The test showed a statistically significant correlation between BPD traits and EOT ($r = .194$; $p = .047$) at the 0.05 level.

Table 2*Spearman correlations: BPD traits with alexithymia dimensions*

	Spearman Correlation	Significance (2 -tailed)
Alexithymia (total score)	.374**	.000
DIF	.385**	.000
DDF	.297**	.002
EOT	.194*	.047

Note: DIF = difficulty identifying feelings, DDF = difficulty describing feelings, EOT = externally orientated thinking; *correlation significant at the 0.05 level (2-tailed); **: correlation significant at the 0.01 level (2-tailed)

Correlations of alexithymia dimensions and NSSI urge

As shown in table 3, the Spearman's rho test showed statistically significant correlations between NSSI urge and the alexithymia total score ($r = .302$; $p = .002$), NSSI urge and DIF ($r = .441$; $p = .000$) NSSI urge and DDF ($r = .268$; $p = .005$). The test did not show a statistically significant correlation between NSSI urge and EOT ($r = -.077$; $p = .423$).

Table 3*Spearman correlations: NSSI urge with alexithymia dimensions*

	Spearman Correlation	Significance (2 -tailed)
Alexithymia (total score)	.302**	.002
DIF	.441**	.000
DDF	.268**	.005
EOT	-.079	.423

Note: *: correlation significant at the 0.05 level (2-tailed); **: correlation significant at the 0.01 level (2-tailed); DIF = difficulty identifying feelings, DDF = difficulty describing feelings, EOT = externally orientated thinking;

Correlations of alexithymia dimensions DDF, DIF and EOT

As shown in table 4, the Spearman's rho test showed statistically significant correlations between DIF and DDF ($r = .519$; $p = .000$), and DDF and EOT ($r = .315$; $p = .001$) The test did not show a statistically significant correlation for DIF and EOT ($r = .038$; $p = .699$).

Table 4

Spearman correlations: Alexithymia dimensions DDF, DIF and EOT

	DIF	DDF	EOT
DIF			
Coefficient b	1.000	.519**	.038
Sig. (2-tailed)	.	.000	.699
DDF			
Coefficient b	.519**	1.000	.315**
Sig. (2-tailed)	.000	.	.001
EOT			
Coefficient b	.038	.315**	1.000
Sig. (2-tailed)	.699	.001	.

Note: *: correlation significant at the 0.05 level (2-tailed); **: correlation significant at the 0.01 level (2-tailed);
DIF = difficulty identifying feelings, DDF = difficulty describing feelings, EOT = externally orientated thinking;

Main Analyses

To elaborate on the initial hypotheses, three mediation analyses between NSSI urge and BPD traits with the three factors of alexithymia DDF, DIF and EOT as mediators were conducted.

DIF

There is a statistically significant positive indirect effect of BPD traits on NSSI urge through DIF (Figure 2), which shows a regression coefficient of .1580 CI [0.0563, 0.2974]. The effect is considered a complete mediation effect, as the direct effect of BPD traits on NSSI urge is no longer significant. The indirect effect is positive, since both coefficients for the a and b paths are positive. This positive effect indicates that participants showing more BPD traits are estimated to also have stronger urges for NSSI, as a result of the relationship, of BPD traits on the DIF score and consequently of the effect of the DIF score on the NSSI urges. Thus, the association between BPD traits and NSSI urge can be explained through DIF. The hypothesis "The element difficulty identifying feelings in the self (DIF) of alexithymia mediates the association between borderline personality disorder (BPD) traits and the urge for non-suicidal self-injury (NSSI)." can be confirmed. Furthermore, it can be said, that the association between X and Y is explained by the indirect effect of X via M on Y.

Figure 2

Mediation Model DIF

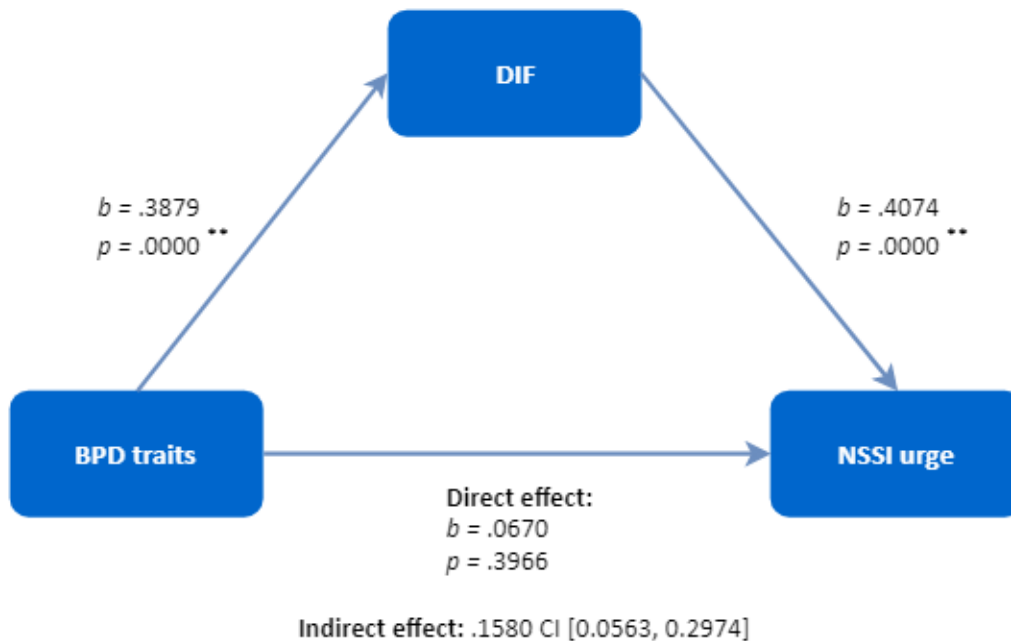


Figure 2 Mediation model being tested (on basis of Hayes, 2013). Predictor variable= BPD traits, Outcome variable NSSI urge, Mediator variable= DIF. Note: *: correlation significant at the 0.05 level (2-tailed); **: correlation significant at the 0.01 level (2-tailed);

DDF

There is a statistically significant positive indirect effect of BPD traits on NSSI urge through the mediator DDF (Figure 3), which shows a regression coefficient of .1066 CI [0.0159, 0.2365]. The effect is considered a complete mediation effect, as the direct effect of BPD traits on NSSI urge is no longer significant. The effect is considered a complete mediation effect, as the direct effect of BPD traits on NSSI urge is no longer significant. The indirect effect is positive, since both coefficients for the a and b paths are positive. This positive effect indicates that participants showing more BPD traits are estimated to also have stronger urges for NSSI, as a result of the effect of BPD traits on the DDF score and consequently of the effect of the DDF score on the NSSI urges. Thus, the association between BPD traits and NSSI urge can be explained through DDF. Thus, the hypothesis "The element difficulty describing feelings (DDF) of alexithymia mediates the association between the urge for non-suicidal self-injury (NSSI) and borderline personality disorder traits (BPD) traits." can be confirmed. Furthermore, it can be said, that the association between X and Y is explained by the indirect effect of X via M on Y.

Figure 3

Mediation Model DDF

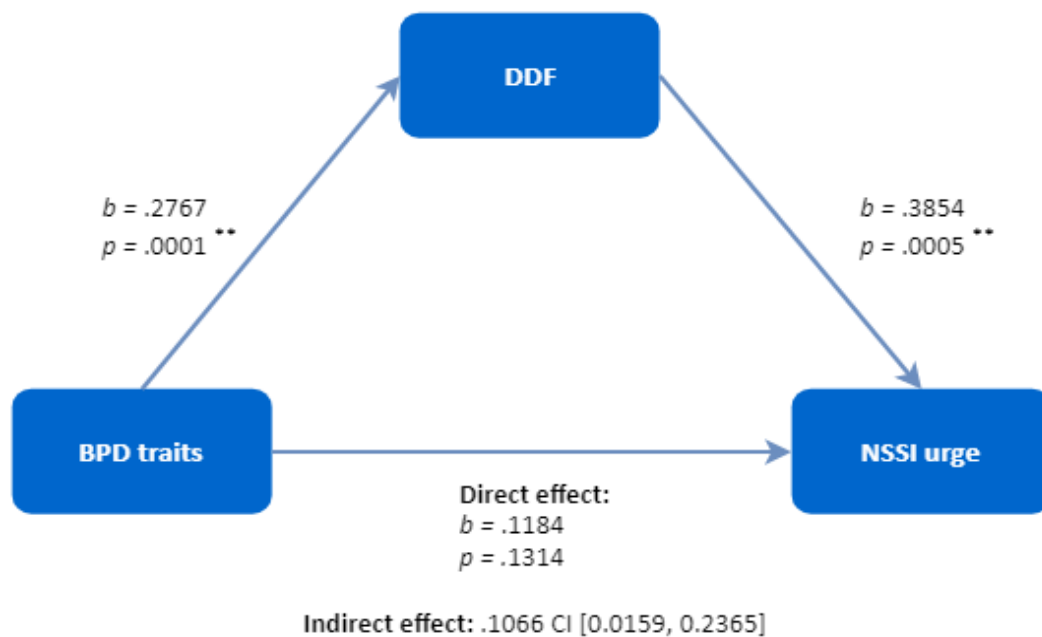


Figure 3 Mediation model being tested (on basis of Hayes, 2013). Predictor variable= BPD traits, Outcome variable NSSI urge, Mediator variable= DDF. Note: *: correlation significant at the 0.05 level (2-tailed); **: correlation significant at the 0.01 level (2-tailed);

DIF and DDF (Affect awareness)

When adding DIF and DDF as mediators simultaneously, there is a statistically significant positive indirect effect of BPD traits on NSSI urge through the mediator DIF, which shows a regression coefficient of .1232 [0.0483; 0.2259]. The indirect effect is positive, since both coefficients for the a and b paths are positive (Figure 4). In this mediation model, there is no statistically significant positive indirect effect of BPD traits on NSSI urge through the mediator DDF, which shows a regression coefficient of .0622 and a confidence interval of [-0.0110; 0.1668]. These associations indicate, that if DIF and DDF are both present in a participant, only DIF explains the association between BPD traits and NSSI urge.

Figure 4

Mediation Model DDF and DIF

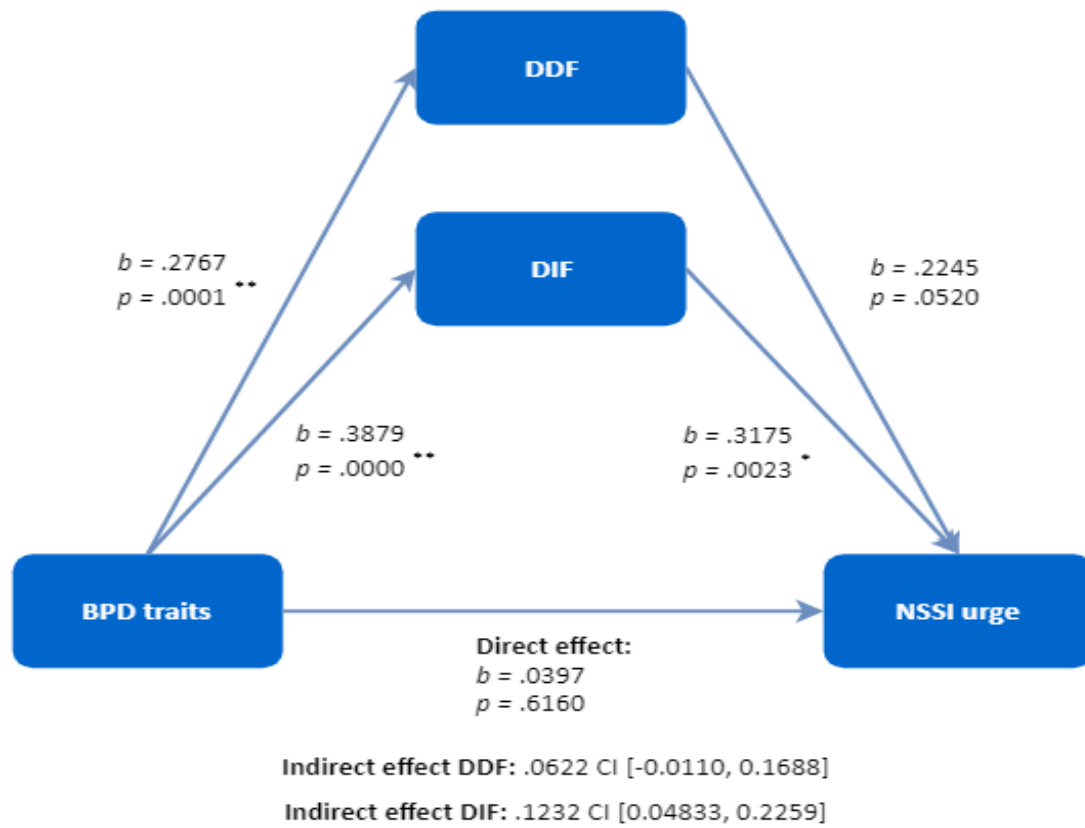


Figure 4 Mediation model being tested (on basis of Hayes, 2013). Predictor variable= BPD traits, Outcome variable NSSI urge, Mediator variables= DDF and DIF. Note: *: correlation significant at the 0.05 level (2-tailed); **: correlation significant at the 0.01 level (2-tailed);

EOT

There is no statistically significant indirect effect of NSSI urge on BPD traits through the mediator EOT (Figure 5), $b = .0119$ CI [-0.0419, 0.0925]. Thus, the association between BPD traits and NSSI urge cannot be explained through EOT. Thus, the hypothesis "The element externally orientated thinking (EOT) of alexithymia does not mediate the association between the urge for non-suicidal self-injury (NSSI) and borderline personality disorder (BPD) traits." can be confirmed.

Figure 5

Mediation Model EOT

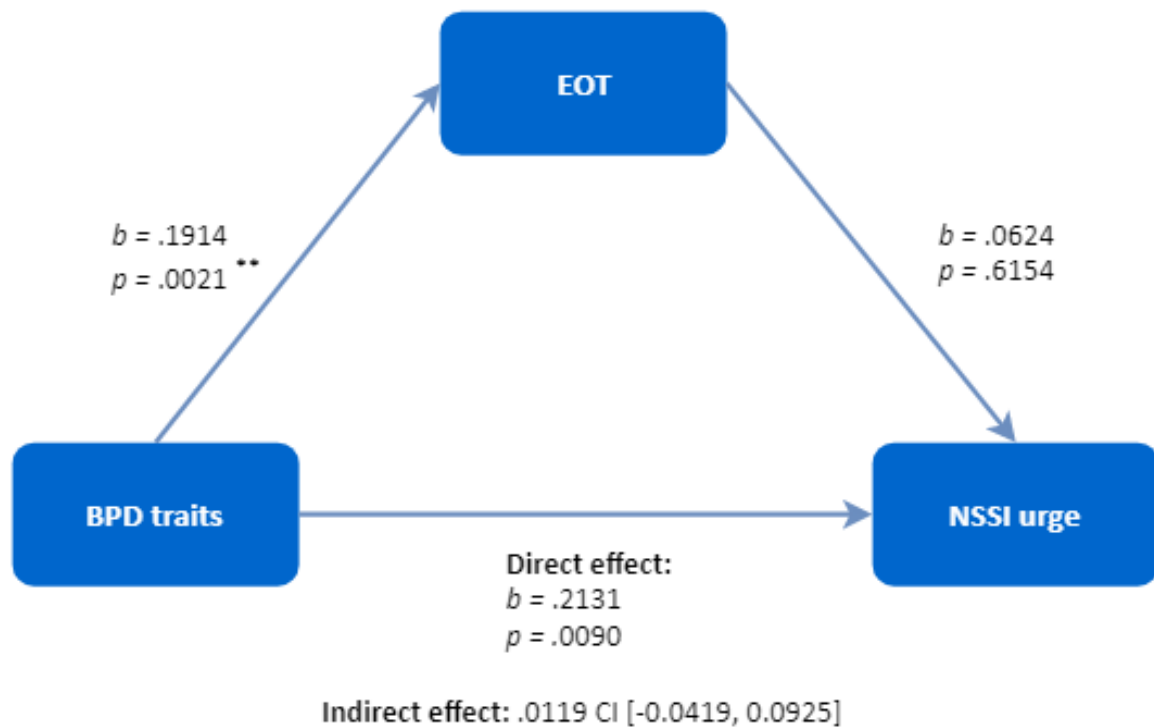


Figure 5 Mediation model being tested (on basis of Hayes, 2013). Predictor variable= BPD traits, Outcome variable NSSI urge, Mediator variable= EOT. Note: *: correlation significant at the 0.05 level (2-tailed); **: correlation significant at the 0.01 level (2-tailed);

Discussion

The main goal of this study was to investigate the mediation effect of the DDF, DIF and EOT alexithymia components, in the association between BPD traits and NSSI urge. This was investigated in a community sample of 106 participants. Statistically significant positive mediation effects on NSSI urge in BPD traits have been found for the components difficulty in describing feelings (DDF) and difficulty identifying feelings (DIF). Regarding externally oriented thinking (EOT), the study did not find a significant effect on the association between NSSI urge and BPD traits.

Based on earlier research about the association between BPD, NSSI and alexithymia, suggesting, that DDF is correlated with both BPD and NSSI (Sleuwaegen et al., 2017; Derks et al., 2017), it was hypothesized, that DDF would mediate the association between NSSI urge and BPD traits. A significant indirect positive effect has been found for DDF as an individual

mediator on NSSI urge in BPD traits. The hypothesis can be confirmed. Thus, for this sample, difficulties in verbally expressing feelings and finding words can explain the association between NSSI urges in BPD traits. Looking at the population level, these findings imply that participants, scoring relatively high on all BPD, NSSI and DDF three concepts, show NSSI urges due to higher DDF scores. Participants, scoring relatively high on these three variables, might have NSSI urges due to difficulties in describing their emotions. The second hypothesis considered that DIF mediates the association between NSSI urge and BPD traits as an individual mediator. A significant indirect positive effect has been found for DIF as a mediator on NSSI urge in BPD traits. The second hypothesis can therefore be confirmed. Accordingly, difficulties in identification and distinguishing of emotions explain the association between NSSI urge and BPD traits in the sample. These findings imply that participants, scoring relatively BPD traits, NSSI urges and DIF, show NSSI urges due to higher DIF scores. Participants, scoring relatively high on those three variables, might have NSSI urges due to difficulties in identifying their emotions. This finding is in line with outcome of a study by Wolff et.al. (2007), suggesting that the inability to identify different emotions is considered as an essential component of affect dysregulation in BPD. The outcome of the mediation analysis in the prevailing study investigates this association between BPD traits and DDF further by classifying DDF as a mediator in the association between BPD traits and NNSI. In order to compare the current sample with samples of other studies, directly, in the prevailing study, a spearman correlation analysis between variables was conducted. BPD traits and DDF (difficulties identifying feelings) showed a significant positive correlation ($r = .297$; $p = .002$). These findings can directly be compared to Wolff et. al.'s outcomes. Their results support their hypothesis; 'the lower the level of emotion identification, the higher the level of aversive inner tension in the BPD patient group' ($r = -.314$, $p < .05$) (Wolff et. al., 2007). This correlation can also be seen in the sample of this study.

After having investigated DIF and DDF as mediators individually and discovering significant positive associations, it was also investigated if DIF and DDF would also mediate the association between BPD traits and NSSI urge in a parallel mediation model. This model was chosen, because it could provide practitioners with valuable information for practical situations with BPD patients, showing both alexithymia components, DIF and DDF. In individuals with alexithymia, DDF and DIF are mostly present at the same time and cannot be isolated from each other. In real life scenarios, both constructs influence the association at the same time. The parallel mediation model including DDF and DIF showed a statistically significant positive indirect effect of BPD traits on NSSI urge through the mediator DIF ($b = .$

1232; CI [0.0483; 0.2259]). However, in this mediation model, there is no statistically significant positive indirect effect of BPD traits on NSSI urge through the mediator DDF ($b = 0.0622$; CI [-0.0110; 0.1668]). These associations indicate, that if DIF and DDF are both present in a participant, only DIF explains the association between BPD traits and NSSI urge. The insignificant mediation effect through DDF in this model could be caused by high correlation between DDF and DIF ($r = .519$; $p = .000$). Looking at the population level, this means that NSSI urges in participants showing both, DDF and DIF in BPD, can be explained only by DIF. Only their difficulty identifying feelings in themselves leads to higher NSSI urges when also showing BPD traits.

Thirdly, it was hypothesized, that EOT would not mediate the association between NSSI urge and BPD traits. The current study did not find a statistically significant indirect effect of NSSI urge on BPD traits through the mediator. Thus, the third hypothesis can be confirmed. This finding suggests that externally oriented thinking, meaning concentrating on the details of the external situation rather than on internal states, is not considered a mediator for NSSI urge in BPD traits and can therefore not explain the association in the present sample. This is in line with earlier literature on the associations of the alexithymia components and BPD and NSSI. These findings are in line with outcomes of existing studies showing that DDF and DIF of alexithymia are correlated with BPD and NSSI, while EOT is not. An example for one of those studies is Webb & McMurrans' research on emotional intelligence in BPD patients. The results indicated that difficulty in identifying and communicating emotions decreases patients' capacity for emotional regulation while externally oriented thinking does not have an influence on the emotional regulation (Webb & McMurrans, 2008). In their study on alexithymia in adolescents, Modestin, Furrer & Malti suggested, that BPD indicates a higher probability for alexithymia (Modestin, Furrer & Malti, 2004). The current study investigated this association from a new angle. Moreover, the results of the prevailing study are in line with the findings of other research on alexithymia and NSSI such as Norman & Borrill's literature review and Cerutti, Zuffianò & Spensieri's study. Norman & Borrill's literature review indicated, that poor emotional cognition and expression is associated with the vulnerability to self-harm (Norman & Borrill, 2015). Additionally, Cerutti et al. found significant positive relations between difficulties in describing and identifying feelings and NSSI in a non-clinical sample of adolescents (Cerutti et al., 2018). In the current research, the outcomes of these studies are put in relation. Evaluating the results of existing research gives the impression that elaborating on the connections is essential for the understanding of NSSI in BPD. Combining the previously mentioned results

with the association between BPD and alexithymia, observed by Derks et al., a mediation analysis seemed reasonable (Derks et al., 2017). Based on results from earlier literature, correlations between the variables are presumed. Mediation analysis was chosen, because the mediators DDF, DIF are presumed to be a causal result of the predictor variable and a causal antecedent of the outcome, which would not be the case for e.g. moderation analysis.

The results of the prevailing research indicated the DDF and DIF mediate NSSI urge in BPD traits in the sample used. For the component EOT, no mediating effect for the association was found. This implies that participants, who score relatively high in all three concepts, might show NSSI urges due to higher DDF and DIF scores. Participants scoring relatively high on the three variables might have NSSI urges due to difficulties in describing and identifying their emotions. This study was the first to test mediation of DDF, DIF and EOT in the context of BPD traits and NSSI urge. Therefore, these results are a new addition to the literature.

Limitations

There are some imitating factors in this study that need to be taken into account. In the prevailing study, a cross-sectional survey was used to gather data from the participants. This design implies that it is not possible to draw conclusions about causal directions of the relations investigated. For further studies, an alternative approach, allowing conclusions about causality could be used.

Another limitation concerns the language of the questionnaire. In the study, the questionnaire was solely provided in English. However, 77.4% of the respondents indicated they were German, 10.4% were Dutch and 12.3% were of other nationalities. Thus, the majority of the respondents do not speak English as their first language. Therefore, it might have been hard for some respondents to understand everything correctly and the results might be biased due to misunderstandings. In further research, translated versions of the questionnaire in participants' first language could be used to prevent this bias.

Additionally, the age and group and educational level in the sample are not representative for the general population. The majority of the participants in the sample were students. However, only 4% of people living in the Netherlands are registered at a University or a similar institution. Moreover, this group largely consists of persons who are 16 to 27 years of age. (CBS, 2019) Therefore, the results can mainly be referred to this specific group that receives a higher education than the average population and are not generalizable for the total population.

Strong Points

The study also exhibited several strong points that need to be emphasized. In the prevailing study, an adequate sample size was investigated. 106 participants participated in the study. The margin of error is directly connected to the sample size and decreases with increasing sample size. Therefore, a relatively big sample size is of advantage.

Moreover, the questionnaire was constructed out of existing questionnaires, developed by valued researchers and already tested several times. Therefore, the questionnaire has acceptable psychometric properties like validity and reliability.

Conclusions and Recommendations

The findings of this study provide the basis for a more elaborate understanding of alexithymia in BPD. It is suggested, that DDF and DIF might lead to NSSI in BPD. The results highlight the importance of approaching alexithymia and related emotional impairments in BPD patients. To further elaborate on the association found in this research, more studies in the area should be conducted. Using interviews and quantitative approach could expand the understanding gained and add participants' personal insights. In this study, a sample of healthy individuals was investigated. Additionally, a similar design to the current study, using a BPD population would possibly allow conclusions about a clinical context and would provide practitioners with valuable information. Moreover, a comparative study with a control group could add valuable insights and directly comparable relationships.

Especially, targeting the identification and verbal expression of emotions in treatment seems to be of importance. Relating back to the problems, elaborated on in the introduction, treatment for BPD is often unsuccessful (Lieb et. al., 2004). This study might provide the basis for improving tailored treatment options for BPD patients with alexithymia. Focusing therapy on the difficulties of individuals to identify and describe their feelings could possibly help to achieve better treatment outcomes. The results of this study highlight the importance of focusing on emotion regulation by improving alexithymia in BPD and especially to identify and express feeling more adaptively. Several treatment options such as Dialectic Behaviour Therapy (DBT), metallization-based therapy (MBT) and transference-focused psychotherapy (TFP) already target the improvement of emotion regulation (Sleuwaegen et al., 2017). However, they are barely used in BPD patients. The first step in DBT is increasing emotional regulation skills by learning to observe and describe one's own emotions and react to them in a constructive way, instead of engaging in NSSI. Also, alexithymic patients have shown to benefit from psychotherapeutic treatment and were able to improve their emotional processing. Accordingly, emotion regulation skill training can help to identify and verbalize emotions and can be valuable in treating NSSI in BPD patients (Sleuwaegen et al., 2017).

Psychotherapy is most frequently used to treat BPD (Zanarini, 2009). Combining MBT or TFP with more traditional forms of psychotherapy, could possibly help BPD patients with alexithymia more effectively.

Conclusion

In conclusion, the findings of this research confirm that the difficulty to identify and verbalize emotions, deriving from alexithymia, are related to a higher urge for NSSI in people exhibiting BPD traits. Externally oriented thinking does not result in a higher NSSI urge in this context. Thus, further research and treatment for BPD and NSSI should target problems in the identification and verbalization of emotions.

Reference List

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). Arlington, VA: Author.

Arntz, A., & ten Haaf, J. (2012). Social cognition in borderline personality disorder: Evidence for dichotomous thinking but no evidence for less complex attributions. *Behaviour Research and Therapy*, 11(50), 707-718. doi: [10.1016/j.brat.2012.07.002](https://doi.org/10.1016/j.brat.2012.07.002)

Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia scale-I. Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research*, 38(1), 23-32. doi: [10.1016/0022-3999\(94\)90005-1](https://doi.org/10.1016/0022-3999(94)90005-1)

Calvo, N., Valero, S., Sáez-Francàs, N., Gutiérrez, F., Casas, M., & Ferrer, M. (2016). Borderline personality disorder and personality inventory for DSM-5 (PID-5): dimensional personality assessment with DSM-5. *Comprehensive psychiatry*, 70, 105-111. doi: [10.1016/j.comppsy.2016.07.002](https://doi.org/10.1016/j.comppsy.2016.07.002)

Cerutti, R., Zuffianò, A., & Spensieri, V. (2018). The role of difficulty in identifying and describing feelings in non-suicidal self-injury behavior (nssi): associations with perceived attachment quality, stressful life events, and suicidal ideation. *Frontiers in psychology*, 9, 318. doi: [10.3389/fpsyg.2018.00318](https://doi.org/10.3389/fpsyg.2018.00318)

CBS - Regionale kerncijfers Nederland. (n.d.). Retrieved June 14, 2019, from <http://statline.cbs.nl/StatWeb/publication/?VW=T&DM=SLNL&PA=70072ned&D1=0-118&D2=0%2C12&D3=14-15&HD=100914-1525&HDR=T&STB=G1%2CG2>

Derks, Y. P., Westerhof, G. J., & Bohlmeijer, E. T. (2017). A meta-analysis on the association between emotional awareness and borderline personality pathology. *Journal of personality disorders*, 31(3), 362-384. doi: [10.1521/pedi_2016_30_257](https://doi.org/10.1521/pedi_2016_30_257)

Eiden, T. C. (1998). *Twenty item Toronto alexithymia scale: Construct validity in a college student population* (Doctoral dissertation, Oklahoma State University). Retrieved from shareok. (<https://shareok.org/bitstream/handle/11244/33514/Thesis-1998D-E34t.pdf?>

sequence=1)

Fiedler, K., Schott, M., & Meiser, T. (2011). What mediation analysis can (not) do. *Journal of Experimental Social Psychology*, 47(6), 1231-1236. doi: [10.1016/j.jesp.2011.05.007](https://doi.org/10.1016/j.jesp.2011.05.007)

Fossati, A., Somma, A., Borroni, S., Markon, K. E., & Krueger, R. F. (2017). The Personality Inventory for DSM-5 Brief Form: Evidence for Reliability and Construct Validity in a Sample of Community-Dwelling Italian Adolescents. *Assessment*, 24(5), 615–631. doi: [10.1177/1073191115621793](https://doi.org/10.1177/1073191115621793)

Hayes, A. F. (2013). Introduction to Mediation, Moderation and Conditional Process Analysis. *Journal of Chemical Information and Modeling* (Vol. 53, p. 527-528). doi: [10.1017/CBO9781107415324.004](https://doi.org/10.1017/CBO9781107415324.004)

Ingram, R. E., & Smith, T. W. (1984). Depression and internal versus external focus of attention. *Cognitive Therapy and Research*, 8(2), 139-151.

Keefer, K. V., Taylor, G. J., Parker, J. D. A., & Bagby, R. M. (2019). Taxometric Analysis of the Toronto Structured Interview for Alexithymia: Further Evidence That Alexithymia Is a Dimensional Construct. *Assessment*, 26(3), 364–374. doi: [10.1177/1073191117698220](https://doi.org/10.1177/1073191117698220)

Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2013). The personality inventory for DSM-5—brief form (PID-5-BF)—adult. *American Psychiatric Association: Author*.

Lieb, K., Zanarini, M. C., Schmahl, C., Linehan, M. M., & Bohus, M. (2004). Borderline personality disorder. *The Lancet*, 364(9432), 453-461. doi: [10.1016/S0140-6736\(04\)16770-6](https://doi.org/10.1016/S0140-6736(04)16770-6)

Loas, G., Speranza, M., Pham-Scottez, A., Perez-Diaz, F., & Corcos, M. (2012). Alexithymia in adolescents with borderline personality disorder. *Journal of psychosomatic research*, 72(2), 147-152. doi: [10.1016/j.jpsychores.2011.11.006](https://doi.org/10.1016/j.jpsychores.2011.11.006)

McDonald, J. D. (2008). Measuring personality constructs: The advantages and disadvantages of self-reports, informant reports and behavioural assessments. *Enquire*, 1(1), 1-19.

Modestin, J., Furrer, R., & Malti, T. (2004). Study on alexithymia in adult non-patients. *Journal of psychosomatic research*, 56(6), 707-709. doi: [10.1016/S0022-3999\(03\)00125-9](https://doi.org/10.1016/S0022-3999(03)00125-9)

Nemiah, J. C. (1988). The psychodynamic view of anxiety: an historical perspective. *Handbook of Anxiety*, 1, 277-305.

Norman, H., & Borrill, J. (2015). The relationship between self-harm and alexithymia. *Scandinavian journal of psychology*, 56(4), 405-419. doi: [10.1111/sjop.12217](https://doi.org/10.1111/sjop.12217)

Preece, D., Becerra, R., Allan, A., Robinson, K., & Dandy, J. (2017). Establishing the theoretical components of alexithymia via factor analysis: Introduction and validation of the attention-appraisal model of alexithymia. *Personality and Individual Differences*, 119, 341-352. doi: [10.1016/j.paid.2017.08.003](https://doi.org/10.1016/j.paid.2017.08.003)

Sleuwaegen, E., Houben, M., Claes, L., Berens, A., & Sabbe, B. (2017). The relationship between non-suicidal self-injury and alexithymia in borderline personality disorder: "Actions instead of words". *Comprehensive psychiatry*, 77, 80-88. doi: [10.1016/j.comppsy.2017.06.006](https://doi.org/10.1016/j.comppsy.2017.06.006)

Trull, T. J., & Durrett, C. A. (2005). Categorical and dimensional models of personality disorder. *Annual Review of Clinical Psychology*, 1, 355-380. doi: [10.1146/annurev.clinpsy.1.102803.144009](https://doi.org/10.1146/annurev.clinpsy.1.102803.144009)

Veen, G., & Arntz, A. (2000). Multidimensional dichotomous thinking characterizes borderline personality disorder. *Cognitive Therapy and Research*, 24(1), 23-45.

doi: [10.1023/A:1005498824175](https://doi.org/10.1023/A:1005498824175)

Washburn, J. J., Juzwin, K. R., Styer, D. M., & Aldridge, D. (2010). Measuring the urge to self-injure: Preliminary data from a clinical sample. *Psychiatry Research*, 178(3), 540-544. doi: [10.1016/j.psychres.2010.05.018](https://doi.org/10.1016/j.psychres.2010.05.018)

Webb, D., & McMurran, M. (2008). Emotional intelligence, alexithymia and borderline personality disorder traits in young adults. *Personality and Mental Health*, 2(4), 265-273. doi: [10.1002/pmh.48](https://doi.org/10.1002/pmh.48)

Wolff, S., Stiglmayr, C., Bretz, H. J., Lammers, C. H., & Auckenthaler, A. (2007). Emotion identification and tension in female patients with borderline personality disorder. *British Journal of Clinical Psychology*, 46(3), 347-360. doi: [10.1348/014466507X173736](https://doi.org/10.1348/014466507X173736)

Zanarini, M. C. (2009). Psychotherapy of borderline personality disorder. *Acta Psychiatrica Scandinavica*, 120(5), 373-377. doi: [10.1111/j.1600-0447.2009.01448.x](https://doi.org/10.1111/j.1600-0447.2009.01448.x)

Appendix

Questionnaire

Q1 Dear Participant, You are about to participate in a research study about alexithymia. 'Alexithymia' can be defined as the way a person is or is not able to perceive and express his or her emotions or points of view. In this study, the relationship between alexithymia and other topics will be investigated, such as humour style, urges to self-harm and adaptive and maladaptive coping behaviours. The study is conducted by the psychology students ... from the University of Twente in order to complete their bachelor theses. You are asked to fill out a set of nine questionnaires. This will take approximately 30 minutes of your time. There is no wrong or right answer to any of the questions since all are a reflection of your perception. As the questions will inquire on your personality and behaviour, these questions can come across as confronting or sensitive for some people, although this is generally not to be expected for most.

If you do not wish to participate in this research you can close the survey at any time. If you want to stop participating during this survey close the survey on whatever page you reached. Data entered up on that point will be recorded and will be used for analysis. If problems of any sort occur, please contact the researchers via e-mail (see listed below).

Before continuing, please read the following statement and indicate whether you agree to take part in the study:

'I hereby declare that I have been informed in a manner which is clear to me about the nature and method of the research as described in the aforementioned introduction of the research. I agree with my own free will to participate in this research. I am aware of my right to retract this consent without the need to give any reason and I have been informed that I may withdraw from the study at any time. All information about me, that could lead to the identification of my identity in a direct or indirect way (including your IP-address) will be anonymized. If I request further information about the research, now or in the future, I may contact the researchers.'

Thank you for participating in our study!

- ☐ I agree to take part in the study. (3)

Q53 Note: If you have any complaints about this research, please direct them to the researchers or the secretary of the Ethics Committee of the Faculty of Behavioural Sciences at the University of Twente, Drs. L. Kamphuis-Blikman P.O. Box 217, 7500 AE Enschede (NL), telephone: +31 (0)53 489 3399; email: l.j.m.blikman@utwente.nl).

End of Block: Alexithymia

Start of Block: Demographics



Q40 What is your age?

Q41 What is your gender?

- ☐ Male (1)
- ☐ Female (2)
- ☐ Other (4)

Q54 What is your nationality?

- ☐ Dutch (1)
- ☐ German (2)
- ☐ Other, namely (3) _____

End of Block: Demographics

Start of Block: TAS-20 Part 1

Q37 Please answer each statement below by indicating your degree of agreement or disagreement with that statement. There are no right or wrong answers. There are five possible responses to each statement ranging from 'Strongly Agree' To 'Strongly Disagree'.

Please scroll down and press the arrow pointing to the right to proceed with the survey. The test will continue on the following page.

	Strongly Disagree (1)	Somewhat Disagree (2)	Neither Agree nor Disagree (3)	Somewhat Agree (4)	Strongly Agree (5)

I am often confused about what emotion I am feeling. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's difficult for me to find the right words for my feelings. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have physical sensations that even doctors don't understand. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to describe my feelings easily. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer to analyze problems rather than just describe them. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am upset, I don't know if I am sad frightened or angry. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am often puzzled by sensations in my body. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer to just let things happen rather than to understand why they turned out that way. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have feelings that I can't quite identify. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being in touch with emotions is essential. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: TAS-20 Part 1

Start of Block: TAS Part 2

Q38 Please answer each statement below by indicating your degree of agreement or disagreement with that statement. The test will continue on the following page.

	Strongly Disagree (1)	Somewhat Disagree (2)	Neither Agree nor Disagree (3)	Somewhat Agree (4)	Strongly Agree (5)
I find it hard to describe how I feel about people. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People tell me to describe my feelings more. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't know what's going on inside me. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often don't know why I am angry. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer talking with people about their daily activities rather than their feelings. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I prefer to watch "light" entertainment shows rather than psychological dramas. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is difficult for me to reveal my innermost feelings, even to close friends. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can feel close to someone, even in moments of silence. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find examination of my feelings useful in solving personal problems. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Looking for hidden meanings in movies or plays distracts from their enjoyment. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: TAS Part 2

Start of Block: Block 13

Start of Block: ABUSI

Q48 The questions below apply to the **last week**. Please select the most appropriate statement. The test will continue on the following page.

Q43

How often have you thought about injuring yourself or about how you want to injure yourself?

- ☐ Never, 0 times in the last week (1)
- ☐ Rarely 1-2 times in the last week (2)
- ☐ Occasionally, 3 – 4 times in the last week (3)
- ☐ Sometimes, 5 – 10 times in the last week, or 1 -2 times a day (4)
- ☐ Often, 11 – 20 times in the last week, or 2 – 3 times a day (5)
- ☐ Most of the time, 20 – 40 times in the last week, or 3 – 6 times a day (6)
- ☐ Nearly all of the time, more that 40 times in the last week, or more than 6 times a day (7)

Q44

At the most severe point, how strong was your urge to self-injure in the last week?

- ☐ None at all. (1)
- ☐ Slight, that is, a very mild urge. (2)
- ☐ Mild Urge. (3)
- ☐ Moderate Urge. (4)
- ☐ Strong Urge, but easily controlled. (5)

- Strong Urge, but difficult to control. (6)
- Strong Urge and would have self-injured if able to. (7)

Q45

How much time have you spent thinking about injuring yourself or about how you want to injure yourself?

- None (1)
- Less than 20 min. (2)
- 21-45 min. (3)
- 46-90 min. (4)
- 90 min to 3 hrs. (5)
- 3-6 hrs. (6)
- More than 6 hrs. (7)

Q46 How difficult was it to resist injuring yourself in the last week?

- Not difficult at all (1)
- Very mildly difficult (2)
- Mildly difficult (3)
- Moderately difficult (4)
- Very difficult (5)
- Extremely difficult (6)
- Was not able to resist. (7)

Q47 Keeping in mind your responses to the previous questions, please rate your overall average urge or desire to injure yourself in the last week.

- Never thought about it and never had the urge to self-injure. (1)
- Rarely thought about it and rarely had the urge to self-injure. (2)
- Occasionally thought about it and occasionally had the urge to self-injure. (3)
- Sometimes thought about it and sometimes had the urge to self-injure. (4)
- Often thought about it and often had the urge to self-injure. (5)
- Thought about self-injury most of the time and had the urge to do it most of the time. (6)
- Thought about self-injury nearly all the time and had the urge to do it nearly all the time. (7)

End of Block: ABUSI

Start of Block: PID- 5- BF

Q20 We are interested in how you would describe yourself. Please answer each statement below by indicating your degree of agreement or disagreement with that statement. There are no right or wrong answers. There are four possible responses to each statement ranging from 'Very False or Often False' to 'Very True or Often True'. The test will continue on the following page.

	Very False or Often False (1)	Sometimes or Somewhat False (2)	Sometimes or Somewhat True (3)	Very True or Often True (4)
People would describe me as reckless. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like I act totally on impulse. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Even though I know better, I can't stop making rash decisions. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often feel like nothing I do really matters. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Others see me as irresponsible. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm not good at planning ahead. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My thoughts often don't make sense to others. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry about almost everything. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get emotional easily, often for very little reason. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I fear being alone in life more than anything else. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: PID- 5- BF

Start of Block: PID- 5- BF

Q21 We are interested in how you would describe yourself. Please answer each statement below by indicating your degree of agreement or disagreement with that statement. There are no right or wrong answers. There are four possible responses to each statement ranging from 'Very False or Often False' to 'Very True or Often True'. The test will continue on the following page.

	Very False or Often False (1)	Sometimes or Somewhat False (2)	Sometimes or Somewhat True (3)	Very True or Often True (4)
I get stuck on one way of doing things, even when it's clear it won't work. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have seen things that weren't really there. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I steer clear of romantic relationships. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm not interested in making friends. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get irritated easily by all sorts of things. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't like to get too close to people. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's no big deal if I hurt other peoples' feelings. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I rarely get enthusiastic about anything. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I crave attention. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often have to deal with people who are less important than me. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: PID- 5- BF

Start of Block: PID- 5- BF

Q22 We are interested in how you would describe yourself. Please answer each statement below by indicating your degree of agreement or disagreement with that statement. There are no right or wrong answers. There are four possible responses to each statement ranging from 'Very False or Often False' to 'Very true of Often True'. The test will end after clicking the arrow pointed to the right.

	Very False or Often False (1)	Sometimes or Somewhat Fales (2)	Sometimes or Somewhat true (3)	Very True or Often True (4)
I often have thoughts that make sense to me but that other people say are strange. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use people to get what I want. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often "zone out" and then suddenly come to and realize that a lot of time has passed. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Things around me often feel unreal, or more real than usual. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy for me to take advantage of others. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: PID- 5- BF