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Features of borderline personality and related psychopathologies as a contemporaneously and temporally connected network

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temporally connected network

by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

In contrast with the latent variable models, network psychometricians have proposed that symptoms co-occur not because of an underlying common cause but because of direct dynamic associations among symptoms. This empirical study aims to elucidate how features of with borderline personality disorder, depression, and anxiety interact with one another and form a network. Specifically, I aimed to identify a potential causal structure among the features of BPD, depression, and anxiety while identifying the most influential features. Participants were 37 undergraduate students between the ages of 18 and 26 recruited from University of South Florida SONA pool. Following baseline assessment, participants were prompted to answer a Qualtrics-based survey of current symptoms of BPD, depression and anxiety twice each day for 40 days. Multi-level time-series network analysis identified a potentially causal structure that may explain how BPD features interact among themselves and with features of other disorders and behave as a network. In the network of BPD features alone, interpersonal difficulties predicted dissociation which then predicted affective fluctuation within-person over time, with dissociation exerting the strongest influence on the network. When depression and anxiety features were included to form transdiagnostic networks, several cross-disorder connections were found highlighting potential pathways to comorbidity. Overall, future -related negative thoughts and feelings, and dissociation were identified as the most influential features across the networks and might be promising targets of intervention.

INTRODUCTION

Borderline personality disorder (BPD) is a serious mental health illness marked by affective instability, identity disturbance, chaotic interpersonal relationships, and self-destructive behaviors (American Psychiatric Association, 2013). It is a major public health concern as it is associated with high distress, functional impairments, high comorbidity, and utilization of mental health resources (van Asselt, Dirksen, Arntz, & Severens, 2007; Wagner et al., 2014; Wunsch, Kliem, & Kröger, 2014; Zanarini, Frankenburg, Hennen, & Silk, 2004). Importantly, BPD is associated with a range of impulsive, maladaptive behaviors such as alcohol and substance use, suicide and non-suicidal self-injury, which results in regular utilization of emergency room services by individuals with BPD (Pascual et al., 2007), warranting further research to understand the unfolding of BPD symptoms over time.

However, studying the etiology, presentation, and prognosis of BPD is complicated by the heterogeneity in its presentation and high comorbidity with other disorders. Given its elusive nature, recent empirical and theoretical studies have called the idea of BPD as an independent disorder into question (Brune, 2016). In line with this, BPD seems to be a complex system with causal connections among its symptoms (Peters et al., 2016; Koller et al., 2002; Wedig et al., 2012). While most of the existing research has been done treating BPD as a distinct disorder, attention is now being paid to its individual features and the potentially causal structure that might underlie BPD. This shift to studying BPD at the level of its potentially constituent features

and the short-term temporal associations among them seems to be a promising step towards understanding its complex nature. A prominent theoretical approach that elucidates the complexity in psychological disorders by focusing on their *constituents* and the underlying complex causal structure is the network perspective.

The Network Theory of Psychopathology

Current conceptualizations of psychopathology view symptoms as independent manifestations of latent constructs. While the disease model is useful for explaining medical diagnoses, it might be overly simplistic approach to understand the elusive nature of psychological constructs. Network psychometricians have challenged the ontological status of latent variables, and proposed an alternative model that views symptoms as active constituents of a disorder rather than manifestations of underlying latent constructs (Borsboom, Mellenbergh, & Van Heerden, 2003).

According to the network paradigm, symptoms cluster together not because of an underlying common cause, but because of causal connections among themselves. Therefore, symptoms constitute disorders rather than being caused by them (Borsboom & Cramer, 2013). When applied to psychopathology data, network analysis yields a graph where nodes reflect symptoms or features of a disorder and edges reflect connections between them. With intensive longitudinal data, networks reveal temporal and instantaneous directed relationships between features and identify those with the strongest influence on the network.

Applying the network perspective to BPD features would allow us to study BPD as a system of potentially causally connected pieces that actively interact over time and maintain the disordered state. Additionally, features associated with disorders that are frequently comorbid

with BPD such as depression and anxiety can be incorporated into the network to investigate the transdiagnostic pathways to comorbidity.

As mentioned above, the network perspective of psychopathology seems particularly relevant for BPD as its nosological status as a discrete disorder has been in question given its high comorbidity and heterogeneity. Hence, studying BPD at the level of individual features as opposed to latent variable level may lead to important insights into its complex nature. Furthermore, applying the network approach to the study of BPD and related psychopathologies serves other several specific advantages. By modeling disorders at the latent variable level, there is an overall neglect of the differential roles of features and their interrelationships. There has been a growing understanding that different personality disorder criteria have differential roles in presentation and progression of a disorder (Cooper, Balsis, & Zimmerman, 2010). Furthermore, there seem to causal processes within BPD that may explain how it maintains itself as a system. A large body of research has demonstrated prospective associations among features associated with BPD which holds in clinical and general populations. For instance, affective stability and impulsivity longitudinally predict non-suicidal self-injury (Peters et al., 2016). Additionally, affective instability and self-esteem instability temporally predict one another within a day (Santangelo et al., 2017). Likewise, aggression and impulsivity prospectively predict suicidal ideation (Koller et al., 2014). In individuals diagnosed with BPD affective instability, dissociative symptoms, and comorbid psychopathology predicted suicidal behavior over 16 years (Wedig et al. 2012). Therefore, moving from studying BPD at the latent construct level to investigating specific symptoms and their differential functioning and potentially causal interrelationships may be a promising tool to understand the underlying complexities that would otherwise be overlooked. Specifically, network analysis with BPD symptoms will identify which

symptoms *cluster* together and show dense connectedness such that an increase in one feature is likely to cause the closely connected feature to also increase as a ripple-effect. Likewise, the relatively isolated features will also be identified. In line with this, network analysis ranks features according to their *centrality* or relative importance in the network. With temporal data, we can identify which symptoms exert the strongest influence on the network and which symptoms receive the most input from other symptoms. Hence, network analysis taps directly into the question of different features carrying different *weight* in a disorder and identifies the most important and influential features. By identifying the most *central* or influential features, we can discover potential targets for intervention.

Another advantage of applying network analysis to BPD is that the it provides a promising tool to study diffuse boundaries and high comorbidity between disorders: some features may trigger those associated with a different disorder (Cramer, Waldorp, Maas, & Borsboom, 2010; Borsboom, Cramer, Schmittmann, Epskamp, & Waldorp, 2011). This is particularly relevant for BPD given its high comorbidity. Over 85% of the people who meet the criteria for BPD, also meet the criteria for an axis I disorder and over 75% meet the criteria for a lifetime Axis-II disorder (Tomko et al., 2014; Zanarini et al., 1998). Likewise, findings from the McLean Study of Adult Development demonstrate that of 290 inpatients diagnosed with BPD, 96% had a co-morbid mood disorder, 89% had some anxiety disorder, 53% had some eating disorder, and 62% had substance use disorder (Zanarini, Frankenburg, Hennen, Reich, & Silk, 2004). This is congruent with the findings from large longitudinal datasets: Collaborative Longitudinal Personality Disorders Study found longitudinal associations of BPD with disorders such as major depressive disorder and PTSD (Shea, Widiger, & Klein, 1992), supporting that BPD has shared dimensions of psychopathology across Axis 1 disorders. Accordingly, a

transdiagnostic approach may give a more comprehensive picture of the potential causal structure underlying BPD features and related disorders. Similar to an underlying causal structure within the symptoms of BPD, there might be causal pathways from BPD features to the features of other frequently comorbid psychopathology. Such cross-disorder association among features may help explain comorbidity. Existing studies have shown associations between features associated with BPD and those with depression and anxiety. For example, impulsivity in BPD patients was associated with anhedonia (Marissen et al., 2012). Similarly, non-suicidal self-injury predicted interpersonal stress and depressive symptoms over time (Burke et al., 2015). Given the high comorbidity in BPD, application of the network perspective offers a straightforward way to study transdiagnostic pathways between symptoms associated with BPD and other disorders. Therefore, utilization of the network model may offer new insight into how BPD symptoms interact to form and maintain a system, and how they interact with symptoms of other disorder and explain comorbidity.

To my knowledge, two studies have applied the network perspective to BPD symptoms. Richetin and colleagues (2017) studied borderline personality symptom network with cross-sectional data in order to identify the most central nodes and found affective instability to be the most central node. On the other hand, Knefel and colleagues (2016) included symptoms of post-traumatic stress disorder and BPD to yield a transdiagnsotic network and understand comorbidity. They found re-experiencing the trauma and dissociation to be the most central. While these studies provide novel insights into feature interrelationships within and across disorders, they are based on cross-sectional, retrospective data. This is a major shortcoming as interrelationships among features occur essentially at the within-person level and cross-sectional, between-subjects models cannot capture such temporal dynamics. Hence, cross-sectional

networks are not useful to identify potential causal pathways, chains or feedback loops. Likewise, in cross-sectional networks high centrality does not have a specified direction. For instance, in Richetin et al. (2017), high centrality for affective instability did not imply that this feature was the most influential. Without temporal information, high centrality could be due to a node receiving input from other nodes rather than influencing them. To establish which nodes exert the strongest influence on other nodes, we need temporal data so that the direction of effects can be ascertained. Thus, the use of intensive longitudinal data are warranted in order to discover the direction of effects and identify the most influential symptoms which could be promising targets of treatment.

Present Study

The purpose of this study was to examine how features associated with BPD and comorbid pathologies such as depression and anxiety form a system or network, while identifying features that are the most central or influential to the network.

After examining the within-person temporal dynamics, I aimed to 1) study what BPD features cluster together temporally and contemporaneously 2) identify what BPD features are the most influential and drive other symptoms 3) elucidate pathways to comorbidity by showing how BPD features interact with and form a network with depression and anxiety symptoms, hence explaining overlap and comorbidity between disorders and 4) identify the most central features in the transdiagnostic network. Hence, for aim 1 and 2, I used multilevel time series network analysis with BPD features only and for aim 3 and 4, I included features associated with depression and anxiety forming a larger cross-disorder network.

This is the first study to my knowledge that investigates symptoms of BPD as they form a dynamic, interactive network. It fills a major gap in existing research by 1) including intensive

longitudinal data in a multi-level framework to reveal directed relationships and a potential

causal structure, and 2) by including features of depression and anxiety to discover the cross-

disorder symptoms pathways that may explain comorbidity.

METHOD

Participants were undergraduate students recruited from the USF SONA pool, and were eligible of they were 18 to 26 years old and owned a smart phone. At baseline, participants completed comprehensive, multi-method, in-person assessment of demographics, personality and psychopathology using standardized self-report measures and structured interviews (see Measures). Participants with current or past psychosis were excluded from the study.

Eligible participants were followed for 40 consecutive days using ecological momentary assessment. They received a *ping* on their smart phone twice each day, with each ping staying active for four hours (morning 8AM-12PM; night 8PM to 12AM). Each ping directed them to a Qualtrics survey, where they provided data pertaining to features of BPD, anxiety and depression *'right now'*. Additionally, they reported on their behaviors *'since the last* prompt' including alcohol and substance use. Participants were compensated with 4 SONA points for completing the baseline assessment, and additional 8 SONA points for completing the longitudinal portion of the study.

Measures

Baseline Assessment

Participants provided demographic information at baseline including age, gender, and ethnicity.

MINI International Neuropsychiatric Interview for DSM 5 (MINI; Sheehan et al., 2016) was administered to assess symptoms of major depression, bipolar disorder, generalized anxiety

disorder, panic disorder, social anxiety disorder, anorexia and bulimia nervosa, post-traumatic stress disorder, alcohol and substance use disorders, anti-social personality disorder, and psychosis. Each interview was conducted and then double coded by trained research assistants.

The BPD module of the Structured Clinical Interview The SCID-II (First, Williams, Benjamin, & Spitzer, 2015) is one of the most popular methods of measuring and diagnosing DSM-IV personality disorders. For BPD, the SID-II has 9 items that are rated from 1 to 3 by the clinician administering the interview, where a score of 1 indicates absence of a symptom, 2 indicates subthreshold presence and 3 indicates above threshold presence. In addition to the BPD module of the clinical interview, a self-report instrument for all DSM V personality disorders was administered. The BPD module of the Structured Clinical Interview for DSM-V Personality Disorders Questionnaire (SCID-5-PDQ; First et al., 2015) is a self-report measure and has True/False questions based on the DSM-5 criteria for personality disorders. In the current sample, SCID-5-PDQ had a Cronbach's alpha of 0.80. Additionally, McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; (Zanarini et al., 2003) was administered. The MSI-BPD is a ten item True/False self-report questionnaire, that has been based upon the Diagnostic Interview for DSM-IV Personality Disorders (DIP-IV). The MSI-BPD has one item per criteria, and a score of 7 or above is meant to indicate individuals at risk for BPD. In a validation study for the MSI-BPD with adolescent inpatients, (Noblin, Venta, & Sharp, 2014) found relatively lower estimates of sensitivity and specificity (see Table), and a cut-off of 5 as opposed to the originally proposed threshold of 7. Although, it was developed as a means of initial screening for BPD, it has been used to assess the severity of BPD symptoms in research and has high convergent validity with structured clinical interviews (Zanarini et al., 2003). In the current sample, MSI-BPD had a Cronbach's alpha of 0.82.

Momentary Assessments

For the intensive longitudinal portion of the study, I used a modified version of Borderline Evaluation of Severity over Time (BEST; Pfohl et al., 2009). The BEST is a self-report instrument which measures BPD symptoms. Items are rated on a Likert type format ranging from 1 to 5. Participants respond according to the extent that each feature has interfered with their life during the past week. The BEST has been demonstrated to have high reliability, validity, and sensitivity to change (Pfohl et al., 2009). For this study, I modified selected BEST items such that the items could be used for EMA assessments primarily by adding the stem '*right now*' and have expanded the response scale to 1-10 for all items. I selected items that tapped into features such as affective instability, interpersonal difficulties, dissociation, chronic emptiness, anger, suicidal and self-harm ideation. Impulsivity was measured behaviorally: participants responded to a questions pertaining to impulsive behaviors engaged in '*since the last prompt*'. Dichotomous responses were summed to yield a score on impulsive behaviors. Additionally, I have added two questions pertaining to alcohol and substance use '*since the last prompt*'. Additionally, I measured current depression and anxiety using a brief set of items particularly developed for momentary studies (Rappaport, *unpublished manuscript*). Participants responded to 1-10 Likert type format where higher scores reflect higher depression and cognitive anxiety. See Appendix A for a complete list of items used in the prompts[1].

Data Analysis

I conducted all analyses in R Version 3.3.3. For network analysis, it is important to limit the number of nodes modelled in order to have more reliability and power. Therefore, I conducted multilevel confirmatory factor analysis with measurements nested within individuals

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[1] Depression and anxiety items have been abbreviated as they are currently in a separate manuscript for publication.

for dimension reduction. I then computed sum scores for items that loaded together and modelled the resulting nodes with multi-level network analysis. For the resulting nodes, person-specific descriptive statistics were calculated. In addition to within person mean and standard deviations for each node, I calculated mean squared successive difference (MSSD; von Newman et al., 1941) to characterize the degree of within-person variability in the sample. MSSD is a measure of instability or within person variance of symptoms which takes temporal dependence into account and hence is a preferred index of instability in time series data (Jahng, Wood, & Trull, 2008). The MSSD is based on the differences between successive measurements and was calculated for each variable separately for each participant.

Network Analysis

Temporal network analysis combines the principles of Granger-causality and graphical modelling. Granger-causality is commonly used to identify *potential* causal pathways between temporally ordered variables. Temporal network analysis is an extension of vector autoregressive modelling in that it describes how values of a variable at time *t* is predicted by a set of variables at time *t-1*. Graphical vector autoregressive models generate networks or graphs for the analyzed time-series. Each network is a visualization based upon regression weights between variables, where each node represents a symptom/variable, and each edge between two nodes represents beta coefficients between them.

Specifically, I used multilevel time-series network analysis, with measurement nested within persons using the package *mlVAR* (Epskamp, 2015). *mlVAR* uses a two-step process: in step 1, temporal and between-subjects networks are estimated, and in step 2, the residuals from step 1 are used to estimate contemporaneous networks. The between-subjects network utilizes each subject's sample mean for each node and uses it in sequential univariate regression

analyses. In this network, each 'edge' or regression weight between two nodes A and B is an average of standardized regression weights from A to B and from B to A, after controlling for all other nodes. Hence, the between-subjects network is undirected. In contrast, the temporal network is a graph of directed, lagged relationships (including autocorrelations) between each node at time t regressed on all others at time t-1. In this step, univariate multilevel regression are computed sequentially for each node given all other nodes at the previous time point as predictors. The temporal network is directed and maps the lagged relationships.

In the second step, the contemporaneous network is estimated. The contemporaneous network is a graph of instantaneous relationships among the variables. The residuals from step 1 are used to sequentially predict the residual of each variable/node from residuals of all other nodes as predictors. These regression analyses are based on measurements taken at the same time point and do not include lagged relationships.

Finally, centrality indices are generated for each network, which identify the most *central* nodes based on their connections to other nodes in the network. In between-subjects and contemporaneous network, the centrality indices are undirected as temporal information is not taken into account. For the temporal network the centrality indices are directed and identify nodes with the highest *out-strength* and *in-strength*. Out-strength pertains to outward paths stemming from a node to other nodes in the network. Hence, it is an indicator of the influence that a certain mode has on other nodes. In-strength refers to the input that a node receives from other nodes. Rather than influencing the network, a node with high in-strength gets influences by other nodes. In and out strength centrality measures are based upon lagged, directed relationships. Hence, centrality indices identify the most influential nodes in a network.

Multi-level network analysis, like other time-series models, assumes stationarity. That is, there should be no linear tend of time in the nodes. A common practice to correct for any non-stationarity is to include time as a node. Time was included as a node in the temporal network analysis in order to remove any trends of time.

Missing data were handled by list-wise deletion. Currently, maximum likelihood method for missing data handling not been implemented in time series network analyses with multiple subjects. Likewise, existing univariate imputation methods for time series data are suited mostly for idiographic time series. Therefore, the default method of list-wise deletion was used.

RESULTS

Sample Size

Fifty-four students consented to participate in the EMA study. Of 54, 17 participants had responded to less than 19 prompts and were excluded from the analyses to prevent biased estimates in network analysis. Of the remaining 37 participants, 2 responded to 19 prompts; 11 responded to between 20 and 50 prompts, and 23 responded to more than 50 prompts.

Participants who responded to less than 19 prompts and hence were excluded from the analyses did not differ significantly from other participants on baseline MSI scores, and baseline psychopathology with the exception of major depression and generalized anxiety disorder. Participants who continued providing data were more likely to be diagnosed with lifetime major depression $t(45) = -2.35$, $p<.05$) and generalized anxiety disorder $t(50) = -2.33$ $p<.05$).

Results of the multilevel CFA identified six participants with no within-person variance on most variables. However, these participants were not excluded from the analyses since *mlVAR* can handle no-variance cases. Hence, the final N was 37.

Participant Characteristics

The mean age of the participants included in the analyses was 23.32 (*SD*=3.15); 78% were female; 62% were Caucasian, 19% Hispanic, 11% Asian, 5% African American, and 3% were other/mixed.

Of the 37 participants, 51% (n=19) scored above the recommended cut-off of 5 on the MSI-BPD and 24% (n=9) scored above the conservative cut-off of 7. On the BPD module of the

SCID questionnaire which has the maximum possible score of 15, the mean in this sample was

3.70 (SD=3.24). Based on the results of the clinical interviews, 3 participants met criteria for

borderline personality disorder, 2 for antisocial personality disorder, 14 for lifetime major

depression (2 current), 10 for current generalized anxiety disorder, 5 for lifetime panic disorder

(4 current), 2 for social anxiety disorder, 2 for past year alcohol use disorder and 4 for past year

substance use disorder, and 2 for current bulimia nervosa.

Construct Validity

Given that the items used in the EMA prompts to measure features associated with BPD were

created for this study, I used baseline scores on the baseline SCID-Questionnaire and MSI-BPD

to establish construct validity. SCID predicted the mean momentary BPD score (b= 1.11, SE=

0.32, p<.01) after controlling for mean momentary depression (b= 0.07, SE=0.11, p=.55) and

anxiety (b=0.33, SE=0.12, p<.05). Likewise, baseline MSI-BPD score predicted mean

momentary BPD score (b=0.94, SE=0.41, p<.05) after accounting for mean momentary

depression (b=0.16, SE=0.12, p=.19) and anxiety (b=0.31, SE=0.14, p<.05).

Multi-level CFA

In order to reduce the number of nodes for network analysis, items tapping into the same

construct were grouped together and confirmed using multilevel CFA. With measurements

nested within individuals, I tested the within-person and between-person factor structure. Most

items loaded as expected both at the between and within level and were sum-scored to form

nodes to be modeled using network analyses.

Among the nodes modelled separately were reassurance-seeking, anhedonia, anger,

feelings of emptiness, dissociation, and affective fluctuation. Understandably, most participants

had zero variance on two variables: "Right now, I want to hurt myself' and "Right now, I wish I

was dead'. These two variables were excluded from further analyses. Likewise, more than half

the participants had no variance on alcohol use and only a few participants reported substance

use (marijuana); these variables were hence removed from the analysis. An impulsivity node was

computed by taking a sum score of the dichotomous scores on items pertaining to impulsive

behaviors engaged in since the last prompt. See Table 1 for the results of the ML-CFA.

The following nodes were included in the network analysis: interpersonal difficulties;

affective fluctuation; anger; tension; future-related negative thoughts and feelings; self-related

negative thoughts and feelings; low mood; feelings of emptiness; dissociation; anhedonia;

alcohol use; and impulsive behaviors. See *Table 2* for means of within person mean and standard

deviations, and the mean MSSD for each node. For detailed distributions of per-person

descriptive statistics, please see Appendix B.

Network Analysis

As a first step, I studied the dynamic network of BPD features alone, identifying the most

central nodes. As a second step, I included features associated with depression and anxiety and

identified the most central features in this larger, transdiagnostic network. At each step, multi-

level time-series network analyses generated between-persons networks, and within-person

contemporaneous and temporal networks.

For each network, only significant edges have been plotted. The green edges indicate

positive relationships while purple indicate negative relationships. The edges have been labelled

with their corresponding regression weights.

In step 1, BPD features form a well-connected between-subjects network (*see Figure 1*).

With the exception of feelings of emptiness, all features were positively connected to at least one

other feature with regression weights over 0.4. In this network, affective fluctuation had the

highest centrality as it was strongly connected to interpersonal difficulties, dissociation and impulsive behaviors. However, since this network does not take temporal information into account, the direction of influence cannot be determined. The within-person contemporaneous network (*see Figure 2a*) shows dense connectivity as each node is significantly connected to at least one other node. Affective fluctuation and dissociation had the highest centrality in this network. The temporal network (*see Figure 3*), which takes lagged information into account, affective fluctuation was identified to have the highest in-strength, indicating that it received most input from other nodes of the network. In contrast, dissociation had the highest out-strength centrality, indicating that it temporally exerted the most influence on other nodes. A chain formed originating from interpersonal difficulties and leading to affective fluctuation via dissociation. Similar to the between-subjects network, emptiness remained unconnected to the rest of the network. Additionally, anger and impulsive behaviors were not temporally connected to any other node.

In step 2, features of depression and anxiety were included. The between-subjects network (*see Figure 4*) shows a number of significant positive and negative connections between nodes. Reassurance-seeking had the highest centrality in this network, followed by inattentiveness. Within-person instantaneous relationships have been displayed by the contemporaneous network (*see Figure 5*) for instantaneous relationships between features of BPD, depression and anxiety. With all nodes positively connected to multiple other nodes, this is a densely connected network. In this network, low mood and future-related negative thoughts/feelings had the highest centrality. The temporal network (*see Figure 6)* maps the lagged relationships between the nodes. In addition to within-disorder temporal connections such as dissociation to affective fluctuation, there are cross-disorder connections including future-

17

related thoughts/feelings to feelings of emptiness, and from anhedonia to feeling tense. In this network, future-related negative thoughts and feelings had the highest out-strength centrality (see Figure 8), meaning that this feature was the most influential in the network. Affective fluctuation and feeling tense had the highest in-strength centrality, implying that these features act as recipients of input from other nodes. Most nodes had a significant positive autoregressive component, indicating stability over time.

Table 1: *Multi-level Confirmatory Factor Analysis*

	Standardized loadings	
	Level 1: *Within-persons*	*Level 2:* *Between-persons*
Tense		
Trouble calming down	0.83***	0.99***
Difficulty relaxing	0.79***	0.99***
Restlessness	0.53***	0.82***
Feeling nervous	0.53***	0.89***
Self-related negative thoughts/feelings		
Feeling down on oneself	0.74***	0.95***
Feeling inferior	0.59***	0.96***
Guilt	0.51***	0.95***
Worthlessness	0.64***	0.97***
Thinking of past failures	0.62***	0.94***
Future-related negative thoughts/feelings		
Dreading future	0.65***	0.90***
Feeling that things will not improve	0.67***	0.93***
Feeling that something bad will happen	0.63***	0.94***
Hopelessness	0.65***	0.93***
Feeling scared	0.48***	0.68**
Worry	0.59***	0.85***
Low mood		
Feeling blue	0.78***	0.93***
Feeling unhappy	0.75***	0.92
Sadness	0.81***	0.99
Interpersonal Difficulties		
Fear of abandonment	0.91***	0.99***
Fear of betrayal	0.67**	0.90**
Effort to avoid abandonment	0.35*	0.87***
Change in feelings about someone	0.35***	0.80***
SI		
Wish to die	0.68***	0.81*
NSSI ideation	0.52	0.78

Note: The analyses were conducted in *lavaan* package in R. MLR was used to correct for non-normality. Model fit was adequate (RMSEA=0.042; CFI = 0.85; TLI= 0.83)

Table 2*: Descriptive Statistics*

Node	Mean of means	Mean of *SD*	Mean *MSSD*
Affective fluctuation	2.46	1.43	2.98
Alcohol use	0.29	0.63	1.31
Angry	1.88	1.31	2.56
Anhedonia	2.24	1.04	1.87
Attentional instability	2.82	1.39	3.80
Emptiness	2.31	1.24	2.63
Future-related negative thoughts/feelings	2.72	0.98	1.24
Impulsive behaviors	0.93	0.83	1.03
Interpersonal difficulties	1.87	1.45	0.60
Low mood	2.59	1.37	2.50
Reassurance seeking	3.56	1.50	3.20
Self-related negative thoughts/feelings	2.57	0.87	1.08
Suicidal and NSSI ideation	1.23	0.32	0.45
Tense	2.87	1.22	1.90
Dissociation	1.88	0.77	1.41

Note: MSSD: Mean of squared successive differences.

The range for all variables is 1-10, with the exception of impulsive behaviors and alcohol use. Alcohol use reflects the number of drinks consumed since the last prompt, and impulsive behaviors are on a 0-6 range, reflecting the number of items pertaining to impulsive behaviors endorsed.
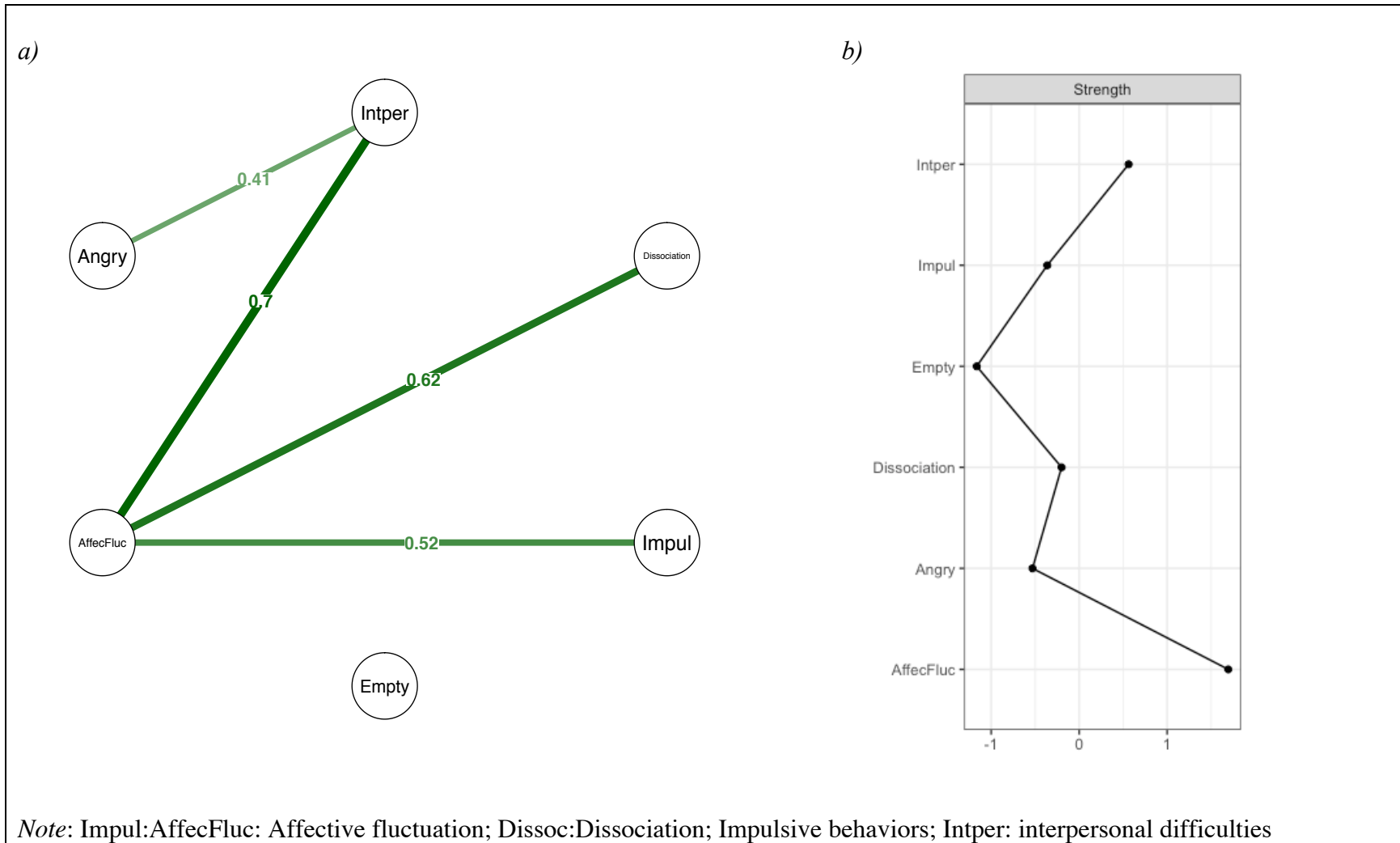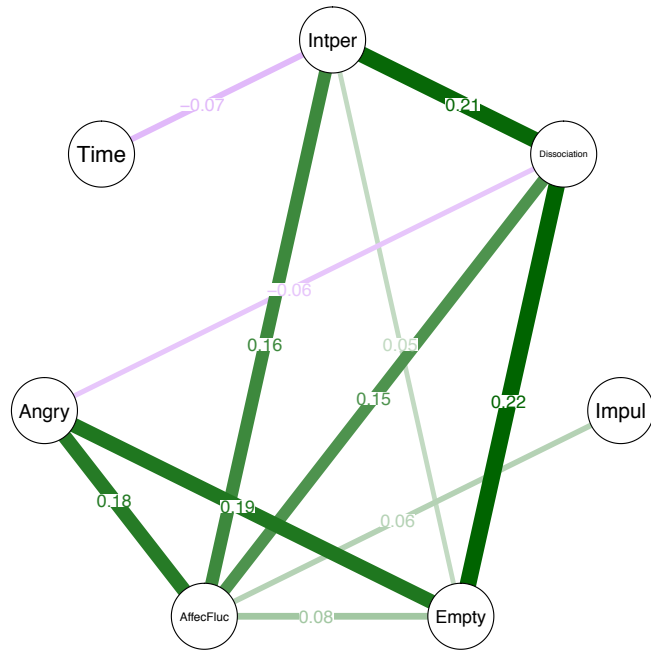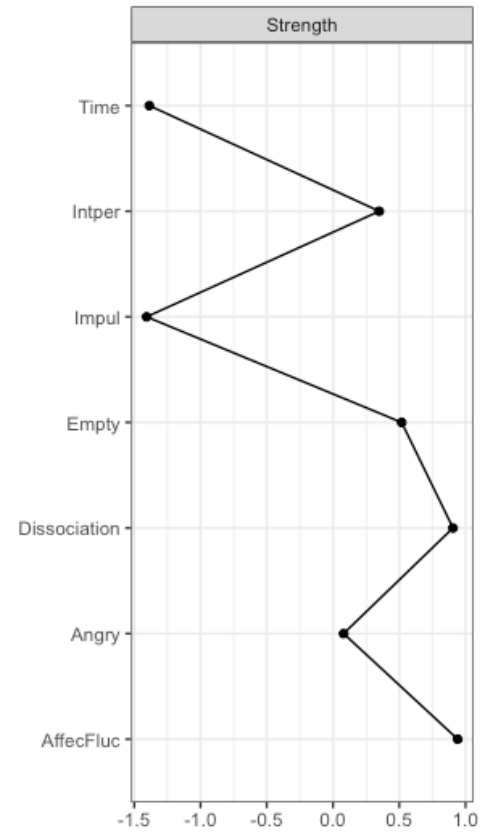
Note: Impul:AffecFluc: Affective fluctuation; Dissoc:Dissociation; Impulsive behaviors; Intper: interpersonal difficulties

Figure 1*: Between-Subjects Network and Node Centrality Plot, BPD Features

Note: Impul: Impulsive behaviors; AffecFluc: Affective fluctuation; Dissoc:Dissociation; Intper: interpersonal difficulties

Figure 2: Contemporaneous Network and Node Centrality Plot, BPD Features

Note: Impul: Impulsive behaviors; AffecFluc: Affective fluctuation; Dissoc:Dissociation; Intper: interpersonal difficulties
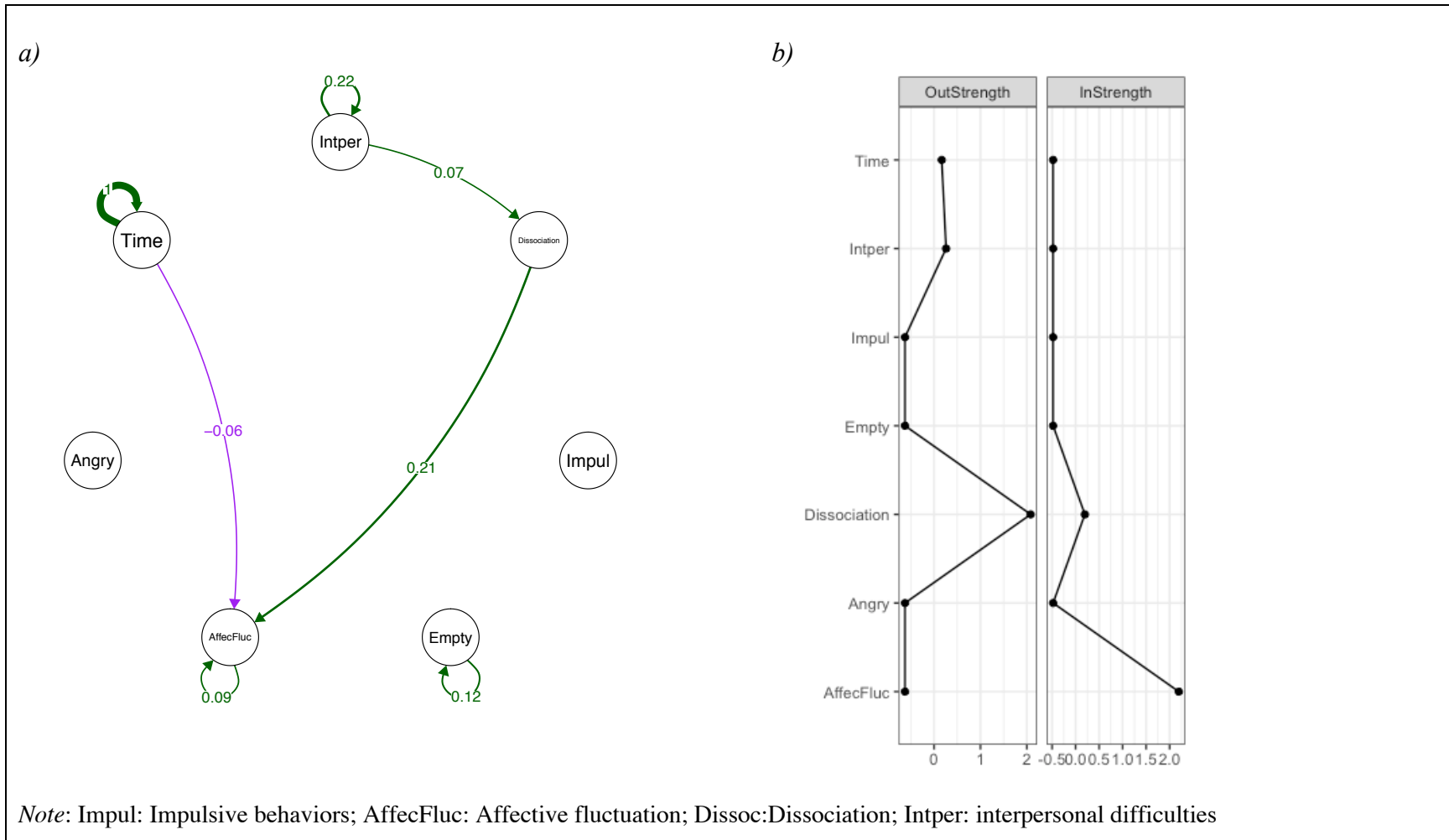
Figure 3*:* Temporal Network and Node Centrality Plot, BPD Features
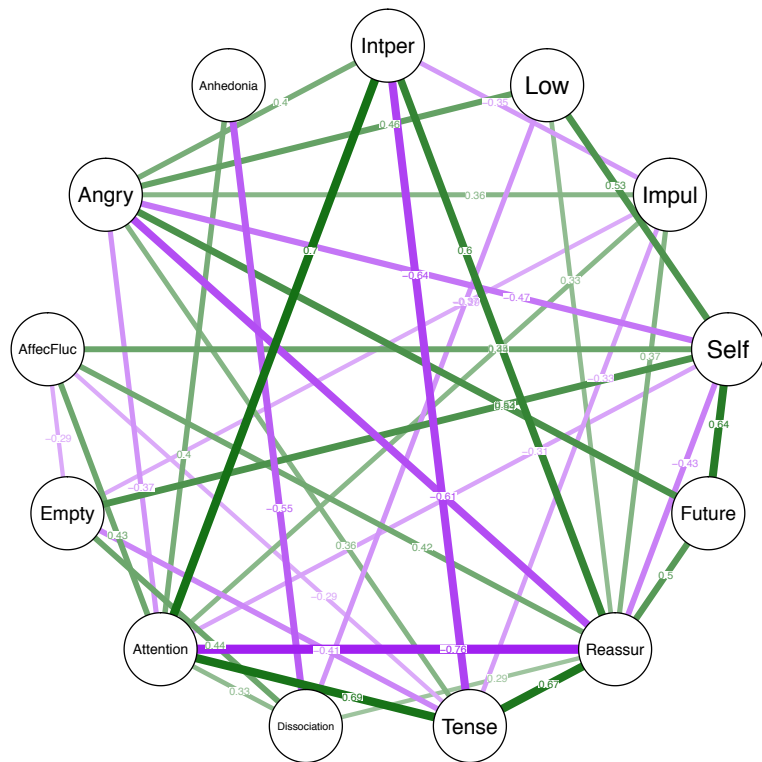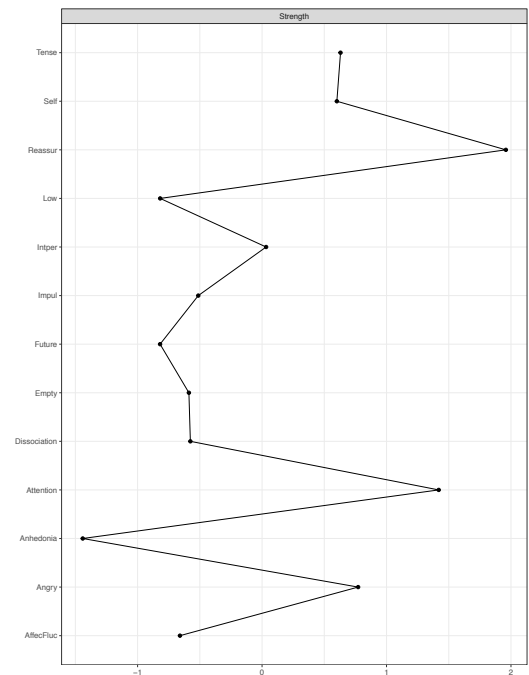
Note: AffecFluc: Affective fluctuation; Dissoc:Dissociation; Impul: Impulsive behaviors; Intper: interpersonal difficulties; Reass:Reassurance-seeking; Future: Future-related negative thoughts and feelings; Low: Low mood; Attention: Attentional instability; Tense:Tension; Self:Self-related negative thoughts and feelings

Figure 4*: Between-subjects Network and Node Centrality Plot With Features Of BPD, Depression And Anxiety

Note: AffecFluc: Affective fluctuation; Dissoc:Dissociation; Impul: Impulsive behaviors; Intper: interpersonal difficulties; Reass:Reassurance-seeking; Future: Future-related negative thoughts and feelings; Low: Low mood; Attention: Attentional instability; Tense:Tension; Self:Self-related negative thoughts and feelings
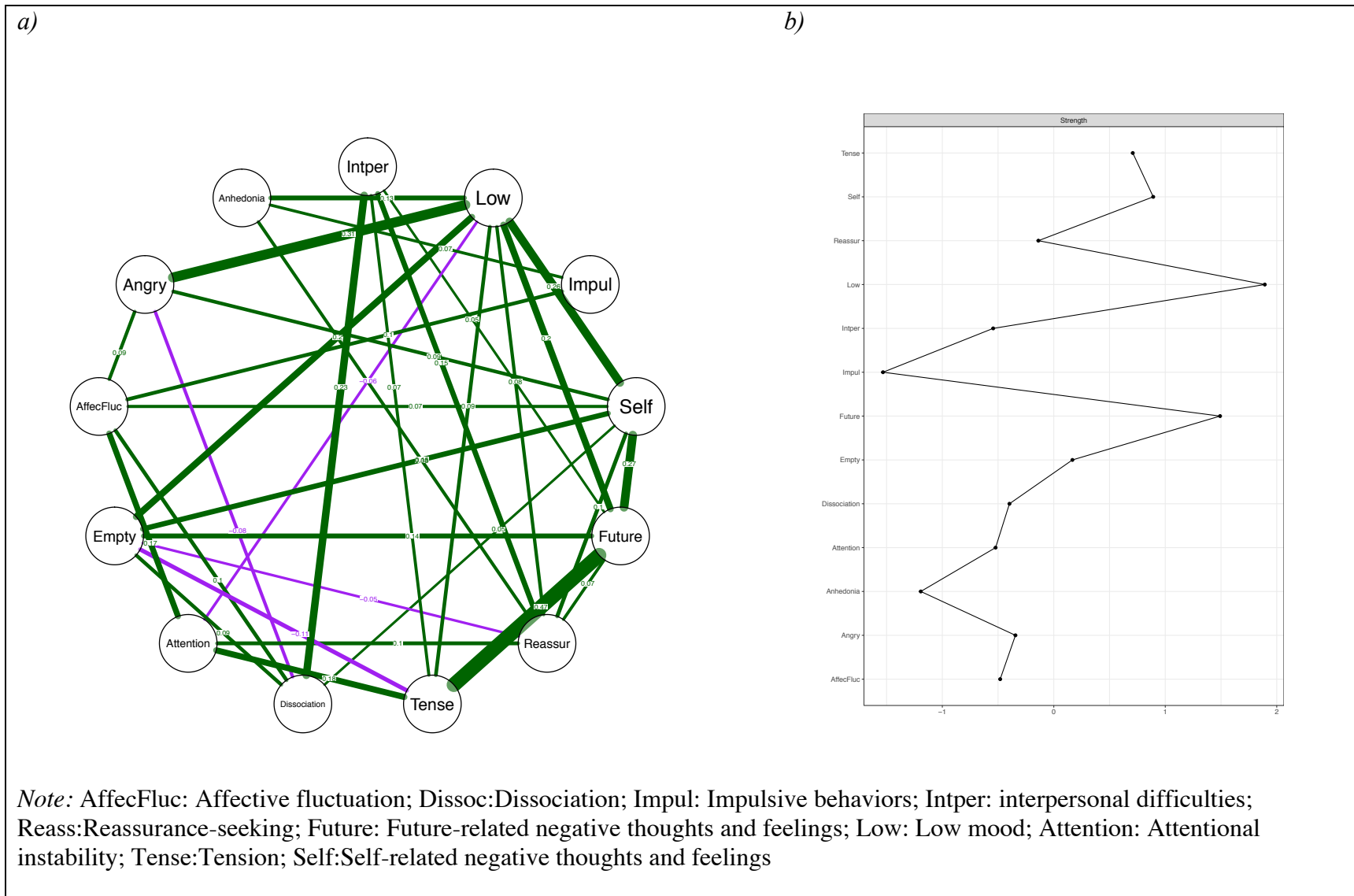
Figure 5*: Contemporaneous Network and Node Centrality Plot With Features Of BPD, Depression And Anxiety

Note: AffecFluc: Affective fluctuation; Dissoc:Dissociation; Impul: Impulsive behaviors; Intper: interpersonal difficulties; Reass:Reassurance-seeking; Future: Future-related negative thoughts and feelings; Low: Low mood; Attention: Attentional instability; Tense:Tension; Self:Self-related negative thoughts and feelings
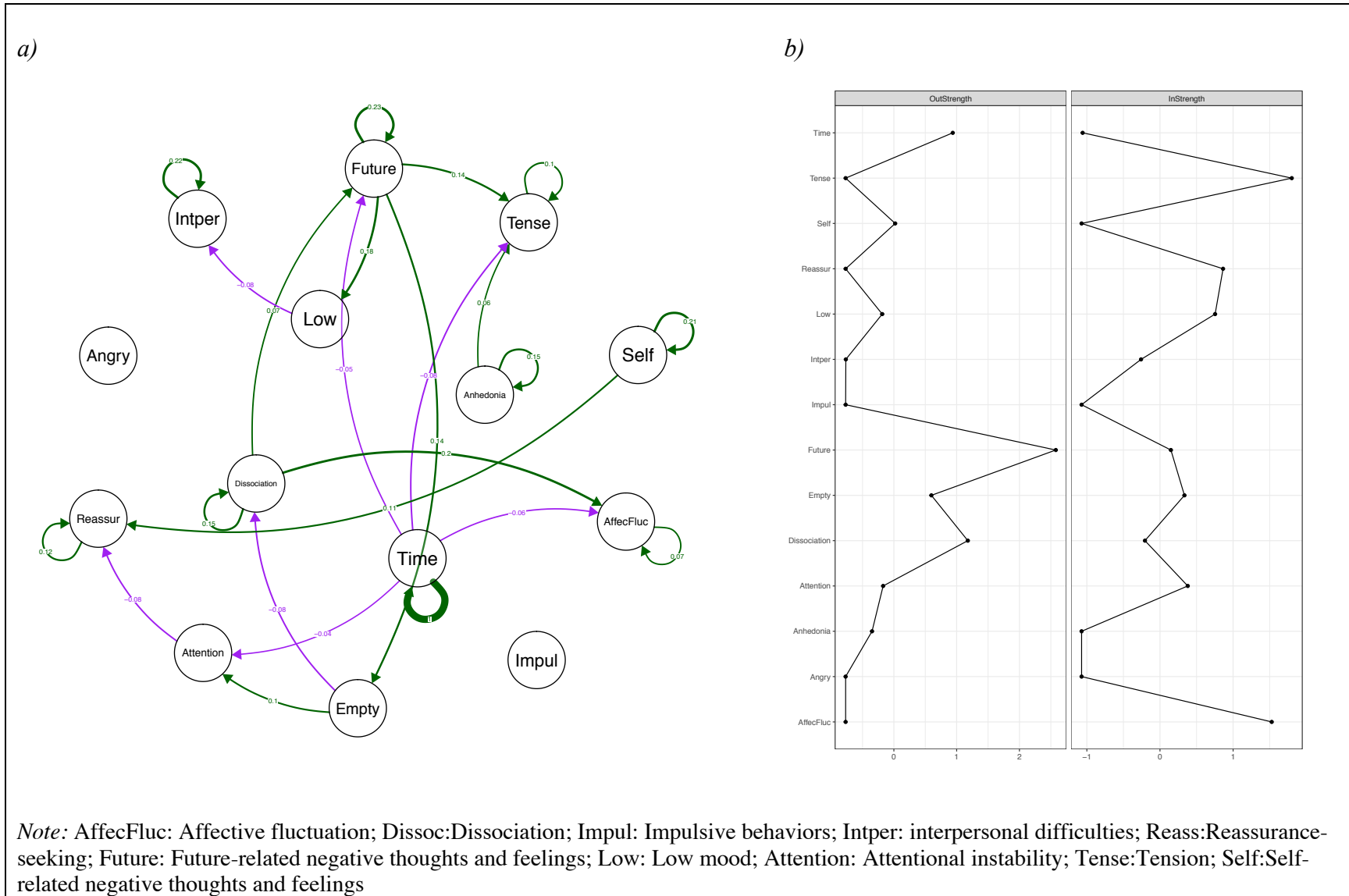
Figure 6*: Temporal Network and Node Centrality Plot with Features Of BPD, Depression and Anxiety

DISCUSSION

The purpose of this study was to discover the temporal dynamics of features associated with borderline personality, depression, and anxiety as they connect with each other and form a network, both instantaneously and over time. Participants showed within-person variability over time as indicated by the MSSD similar to that reported in previous studies on affective dynamics (Bowen et al., 2005).

The between-subjects network with BPD revealed several interesting associations. The high centrality of affective fluctuation in this network is congruent with previous research on cross-sectional, between-subjects networks of BPD in clinical and community samples (Richetin et al., 2017). The centrality of affective fluctuation applied to the within-person level as well, with the directionality of influence clarified by the temporal network showing that it received the most input rather than exerting the highest influence. It is interesting to note that a chain formed originating from interpersonal difficulties, and leading to affective fluctuation via dissociation, making dissociation the node with the highest out-strength or influence. The central position of dissociation is congruent with existing studies that highlight the role of dissociation in predicting other features of BPD (Ozturk & Sar, 2008; Sajadi et al., 2015), including dysregulated emotion (Barnow et al., 2012) in addition to outcomes such as response to treatment (Kleindienst et al., 2011). Given that dissociation had the highest influence in the network, this may be a promising target in treatment, particularly as it temporally predicts affective fluctuation a node that showed

high centrality across networks. Interestingly, while impulsively and anger were connected to other nodes contemporaneously and between-subjects, they remained isolated within person temporally and did not have significant autoregressive components. The lack of significant autoregressive paths could imply that and impulsive behaviors may self-regulate over the course of a day, and hence may not be as stable as other features. Furthermore, the lack of temporal connections of these nodes has important implications. Being relatively isolated, these features might need to be targeted independently in treatment as change in other symptoms might not result in change in these symptoms at least temporally.

To address aim 2, larger transdiagnostic networks were formed by including nodes pertaining to depression and anxiety features. In the between-subjects network reassurance-seeking and attentional instability had the highest centrality and was significantly connected to features of BPD, depression and anxiety. This is consistent with previous research which shows that reassurance-seeking it may reflect a transdiagnostic process (Mason et al., 2016). However, contrary to research that shows reassurance to be specifically related to depression (Joiner & Schmidt, 1998; Joiner et al., 2001), we found it to be more strongly associated with anxiety and BPD symptoms. Similar to reassurance-seeking, attentional instability emerged as a transdiagnostic process with significant positive connections with tension, interpersonal difficulties, affective fluctuations, emptiness, and dissociation.

The within-person contemporaneous network identified low mood followed by future and self- related thoughts and feelings as the most central nodes. The network shows that both low mood and future-related thoughts and feelings were connected to nodes associated with different disorders. The temporal network elucidated directionality of effects and showed that future-related thoughts had the highest out-strength centrality and exerted influence on the network by

temporally predicting low mood and tension. The importance of self and future-related negative thoughts in the networks is congruent with a large body of research demonstrating that worry and negative thinking predicts psychopathology. Both cross-sectional (Hughes, Alloy, & Cogswell, 2008; McEvoy et al., 2013; Mills et al., 2014) and longitudinal studies (Chaplin, Gillham, & Seligman, 2009; Hong, 2007), including experience sampling studies (Dickson, Ciesla, & Reilly, 2012) have demonstrated the predictive role of future related negative thinking on depressed mood and other features of psychopathology. More recently, a Bayesian network study utilizing ecological momentary data demonstrated within-person potentially causal connections among features such as rumination and negative mood within the course of a day (Selby et al., 2020). However, the high centrality of low mood future-related thoughts and low mood are in contrast with one existing temporal network study which utilizes idiographic data on depression and anxiety and showed that low mood and worry were the least influential in idiographic temporal and contemporaneous networks (Fisher et al., 2017).

Additionally, dissociation maintained its high out-strength centrality in the transdiagnostic temporal network, emerged as an influential feature even after accounting for features of depression and anxiety. Furthermore, tension and affective fluctuation had the highest in-strength in this network implying that these are most strongly predicted by other features such as dissociation and anhedonia over time. The in-strength centrality of affective fluctuation across networks is also supported by existing intensive longitudinal research that shows the influence of other features and mechanisms on within-person variability in affect (Vansteelandt et al., 2019).

Overall, the results of temporal networks indicate that BPD features along with those related to depression and anxiety might behave as a network with causal connections among features that unfold within-person over time. Combining the results from all the networks, future

and self-related negative thoughts and feelings and dissociation had a critical position. Particularly, dissociation and future-related negative thoughts emerged as the most influential nodes. These findings have important clinical implications as these nodes could be the potential targets of intervention. One common practice of targeting negative thoughts is cognitive restructuring that aims to alter the content of the thoughts. In contrast to cognitive interventions, acceptance and commitment therapy aims to alter one's relationship with their thoughts: clients defuse from thoughts and experience them as passing and insubstantial (Duff, Larsson & McHugh, 2016). Similarly, mindfulness-based stress reduction (MBSR) builds non-identification with thoughts and has been shown to decrease self-focused processing and increased present-moment awareness, leading to considerable reduction in the symptoms of depression and anxiety (Goldin et al., 2012). In addition to allow distancing from maladaptive thoughts, techniques aiming to increase present-moment awareness also target dissociative symptoms (Zerubavel & Messman-Moore, 2015).

Four limitations need to be taken into account in order to meaningfully interpret the results. First, the data were collected from an undergraduate sample and had floor effects, especially for the more extreme features. Therefore, important variables like suicidal ideation and non-suicidal self-injury had to be removed from the network analysis due to lack of variability. With a more diverse sample in terms of symptom severity, this study would be more powered to detect effects. Second, I used data from a relatively small sample potentially leading to type-II error. A larger sample size in future studies would help increase power. Third, in order to reduce participant burden, I collected data twice each day. Shorter intervals would allow researchers to capture the short-term dynamic associations between symptoms. Second, similar to structural equations models, network models aim to discover potential causal mechanisms

among nodes. However, only Granger causality can be established as the third variable problem cannot be ruled out. Hence, the obtained networks identify only a *potential* causal structure. Finally, while the network models are based on the network theory of psychopathology which proposes that symptoms are constituents of disorders rather than manifestations, this idea cannot be supported or refuted with a successfully running network model on observational data. What this study provides over and above a latent variable model in psychopathology is an insight into the intricate temporal dynamics at the symptoms level such that we can identify culprits at the individual symptom level and identify targets of intervention. It does not, however, prove the idea that the latent variable model is flawed. Since both frameworks model observed covariance, they cannot be compared to support one theory over the other.

The current study has four key strengths. First, while most studies use retrospective recall and cross-sectional associations, I used intensive longitudinal data to capture experiences as they occurred. Second, the interrelationship among symptoms over time is a strictly within-person process. However, the existing studies aiming to understand BPD-related psychopathology at the symptom level has utilized between-person methods such as cross-sectional networks (Richetin et al., 2017; Southward & Cheavens, 2018). With cross-sectional data higher centrality does not necessarily imply that a node is a potential treatment target since the direction of influence is not available. Third, existing network studies are limited to BPD-related features and rarely take features of comorbid disorders into account (Knefe et al., 2016). This study included features associated with depression and anxiety and developed a more comprehensive picture. Four, the study uses a novel, statistically sophisticated method. To our knowledge, this is the first study that looks at temporal network of features related to BPD using multi-level time series data. With machine learning gaining popularity in psychology (Bzdok & Meyer-Lindenberg, 2018), there

has been a growing recognition of the importance data-driven exploratory models allowing the data to discover patterns rather than specifying them apriori (King et al., 2014). Data-driven knowledge relaxes the constraints imposed by apriori hypotheses and lead to recovery of effects that might otherwise be overlooked (Jack, Crivelli, & Wheatley, 2018).

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APPENDIX A: LIST OF ITEMS IN EMA

BPD
Right now, I'm worried that someone might leave me
Right now, I think someone might betray me
Right now, I would do anything to keep somebody from leaving me
Right now, my feelings for someone have changed dramatically
Right now, I wish I was dead
Right now, I want to hurt myself
Right now, I feel angry
Right now, I feel empty
Right now, things around me feel unreal
Right now, my mood is going up and down
Impulsive Behaviors
Since the last prompt, I acted without caring what might happen
Since the last prompt, I said things without thinking
Since the last prompt, I spent more money than I meant to
Since the last prompt, I made an impulsive purchase
Since the last prompt, I drove dangerously
Since the last prompt, I engaged in risky/unprotected sex
Depression
Inferiority
Guilt
Worthlessness
Feeling that things will not improve
Feeling down on oneself
Loss of interest
Rumination over past failures
Hopelessness
Feeling blue
Feeling unhappy
Sadness

Reassurance-seeking
Anxiety
Feeling scared
Worry
Feeling nervous
Restlessness
Fear that something bad will happen
Dreading feature
Trouble calming down
Difficulty relaxing
Instability in attention

APPENDIX B: PERSON-SPECIFIC DESCRIPTIVE STATISTICS

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
1	Affective fluctuation	4.52	1.88	7.00	-0.22	-0.46
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.59	1.34	6.00	2.65	6.56
	Anhedonia	6.44	1.33	9.00	-1.17	4.74
	Attentional instability	5.07	1.78	9.00	0.07	0.33
	Feelings of emptiness	1.44	1.22	6.00	3.07	9.25
	Future-related negative thoughts/feelings	3.68	0.92	4.33	-0.24	-0.17
	Impulsive behaviors	0.83	1.04	3.00	0.92	-0.50
	Interpersonal difficulties	2.44	0.86	4.75	1.68	4.12
	Low mood	4.21	1.79	7.00	0.14	-1.02
	Reassurance-seeking	7.37	1.26	9.00	-2.19	10.28
	Self-related negative thoughts/feelings	2.63	0.77	3.20	0.04	-0.69
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	6.05	1.45	7.50	-0.33	0.54
	Dissociation	1.22	0.72	3.00	2.96	7.39
2	Affective fluctuation	4.85	2.51	9.00	0.20	-1.17
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	6.30	2.18	9.00	-0.89	0.12
	Anhedonia	3.36	2.27	8.00	0.87	-0.39
	Attentional instability	5.93	1.78	9.00	-0.31	0.33
	Feelings of emptiness	4.23	2.69	9.00	0.35	-1.12
	Future-related negative thoughts/feelings	7.29	1.44	8.17	-1.75	3.64
	Impulsive behaviors	0.43	1.03	5.00	2.67	6.85
	Interpersonal difficulties	3.67	2.16	9.00	1.21	0.59

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	6.99	1.47	7.67	-0.51	0.46
	Reassurance-seeking	7.51	2.14	9.00	-1.56	2.20
	Self-related negative thoughts/feelings	6.93	1.58	7.00	-1.17	0.72
	Suicidal/NSSI ideation	1.25	0.71	4.50	3.74	16.61
	Tension	7.49	1.23	7.75	-1.75	5.00
	Dissociation	3.46	2.32	9.00	1.06	0.25
	Affective fluctuation	1.45	1.05	6.00	3.27	12.85
	Alcohol	0.06	0.23	1.00	3.73	12.14
	Angry	2.58	1.63	8.00	1.52	2.97
	Anhedonia	1.04	0.27	2.00	6.87	46.11
	Attentional instability	1.34	0.98	5.00	3.27	10.84
	Feelings of emptiness	2.47	1.51	6.00	0.85	0.18
	Future-related negative thoughts/feelings	2.11	0.78	3.17	0.70	0.16
3	Impulsive behaviors	0.36	0.96	5.00	3.06	9.69
	Interpersonal difficulties	1.22	0.45	2.00	2.41	5.41
	Low mood	2.05	0.86	4.00	1.24	1.57
	Reassurance-seeking	1.02	0.14	1.00	6.87	46.11
	Self-related negative thoughts/feelings	1.34	0.32	1.00	0.71	-0.59
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	2.02	0.71	2.75	0.29	-0.71
	Dissociation	1.23	0.89	6.00	5.32	30.61
	Affective fluctuation	9.89	0.68	5.00	-6.14	37.93
	Alcohol	0.31	0.94	5.00	3.83	15.09
	Angry	2.68	2.64	9.00	1.60	1.56
	Anhedonia	2.07	1.59	9.00	2.31	7.19
	Attentional instability	9.99	0.12	1.00	-8.14	65.08
4	Feelings of emptiness	8.75	2.19	9.00	-1.57	1.34
	Future-related negative thoughts/feelings	5.99	2.23	9.00	0.04	-0.72
	Impulsive behaviors	0.36	0.94	6.00	3.67	16.61
	Interpersonal difficulties	6.65	2.32	7.50	0.07	-1.13

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	5.52	2.16	9.00	-0.10	-0.60
	Reassurance-seeking	9.97	0.24	2.00	-8.14	65.08
	Self-related negative thoughts/feelings	8.76	1.43	5.60	-1.35	1.24
	Suicidal/NSSI ideation	3.48	2.55	9.00	1.24	0.66
	Tension	6.28	2.17	6.75	0.42	-1.07
	Dissociation	9.82	0.89	7.00	-6.43	44.68
5	Affective fluctuation	1.52	1.37	7.00	3.90	15.62
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	2.00	2.37	9.00	2.32	4.09
	Anhedonia	1.04	0.19	1.00	4.63	20.22
	Attentional instability	1.89	1.60	5.00	1.80	1.90
	Feelings of emptiness	1.37	0.74	3.00	2.07	3.86
	Future-related negative thoughts/feelings	2.04	1.24	5.50	1.80	3.64
	Impulsive behaviors	1.89	1.05	3.00	-0.56	-0.95
	Interpersonal difficulties	1.09	0.30	1.50	3.77	14.28
	Low mood	1.90	1.71	5.67	1.99	2.57
	Reassurance-seeking	1.30	1.54	8.00	4.63	20.22
	Self-related negative thoughts/feelings	2.03	1.38	6.80	2.67	8.43
	Suicidal/NSSI ideation	1.02	0.10	0.50	4.63	20.22
	Tension	1.73	1.11	4.50	1.89	3.00
	Dissociation	1.15	0.60	3.00	4.04	15.87
6	Affective fluctuation	4.67	2.20	8.00	-0.07	-1.26
	Alcohol	1.07	2.35	9.00	2.21	3.73
	Angry	2.32	1.91	9.00	2.00	3.52
	Anhedonia	3.40	2.21	9.00	1.04	0.11
	Attentional instability	5.43	2.29	9.00	-0.47	-0.83
	Feelings of emptiness	2.25	2.21	9.00	2.22	3.83
	Future-related negative thoughts/feelings	4.22	2.09	8.50	0.67	-0.27
	Impulsive behaviors	3.44	1.41	7.00	0.26	-0.23
	Interpersonal difficulties	3.02	1.27	5.50	0.43	-0.13

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	4.20	2.04	9.00	0.78	-0.05
	Reassurance-seeking	7.11	2.39	9.00	-0.72	-0.01
	Self-related negative thoughts/feelings	4.53	1.87	8.60	0.42	-0.01
	Suicidal/NSSI ideation	1.07	0.28	1.50	3.64	12.15
	Tension	4.30	1.95	10.67	0.59	-0.54
	Dissociation	3.01	2.45	8.00	0.59	-0.54
7	Affective fluctuation	3.84	1.86	6.00	0.95	-0.51
	Alcohol	0.68	1.57	5.00	2.15	3.11
	Angry	3.00	0.47	2.00	0.00	1.26
	Anhedonia	3.00	0.47	2.00	0.00	1.26
	Attentional instability	4.47	1.31	4.00	0.69	-0.89
	Feelings of emptiness	2.63	0.68	2.00	-1.44	0.58
	Future-related negative thoughts/feelings	3.78	0.82	2.83	0.12	-1.28
	Impulsive behaviors	4.89	0.46	2.00	-0.43	1.06
	Interpersonal difficulties	2.80	0.44	1.75	-0.54	-0.36
	Low mood	3.04	0.54	2.00	0.13	-0.73
	Reassurance-seeking	5.11	1.70	5.00	-0.41	-1.22
	Self-related negative thoughts/feelings	3.08	0.41	1.20	0.16	-1.49
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	4.96	1.16	4.00	-0.22	-0.89
	Dissociation	3.00	0.47	2.00	0.00	1.26
8	Affective fluctuation	1.79	1.94	7.00	2.18	3.09
	Alcohol	0.06	0.25	1.00	3.46	10.12
	Angry	1.32	1.25	6.00	3.80	13.13
	Anhedonia	1.00	0.00	0.00	NA	NA
	Attentional instability	3.16	2.39	8.00	0.51	-1.22
	Feelings of emptiness	1.16	0.84	6.00	5.67	32.75
	Future-related negative thoughts/feelings	2.40	0.59	3.67	0.49	2.69
	Impulsive behaviors	0.30	0.56	2.00	1.69	1.84
	Interpersonal difficulties	1.02	0.17	1.50	8.12	66.20

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	1.40	1.16	5.00	3.07	8.31
	Reassurance-seeking	5.70	2.43	9.00	-0.83	-0.37
	Self-related negative thoughts/feelings	1.06	0.22	1.20	3.96	16.08
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	6.98	1.31	7.00	-0.86	1.57
	Dissociation	4.75	2.04	8.00	-0.20	-0.75
	Affective fluctuation	1.82	1.96	8.00	2.19	3.41
	Alcohol	0.94	1.24	6.00	1.63	2.74
	Angry	1.53	1.72	9.00	3.38	10.88
	Anhedonia	1.00	0.00	0.00	NA	NA
	Attentional instability	4.68	2.72	9.00	-0.28	-1.37
	Feelings of emptiness	1.00	0.00	0.00	NA	NA
	Future-related negative thoughts/feelings	1.59	0.76	2.83	1.26	0.82
9	Impulsive behaviors	0.20	0.55	3.00	2.94	8.92
	Interpersonal difficulties	1.20	0.55	2.50	2.75	6.54
	Low mood	1.45	1.09	6.00	3.00	9.81
	Reassurance-seeking	2.07	1.84	9.00	1.75	2.86
	Self-related negative thoughts/feelings	1.21	0.50	2.40	2.39	5.26
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	4.72	1.79	7.25	0.24	-0.54
	Dissociation	1.01	0.11	1.00	9.06	81.07
	Affective fluctuation	5.81	2.49	9.00	-0.48	-0.75
	Alcohol	0.03	0.25	2.00	7.56	56.09
	Angry	1.97	1.85	7.00	1.97	2.96
	Anhedonia	3.00	1.92	8.00	0.80	0.07
10	Attentional instability	2.86	2.73	9.00	1.09	-0.34
	Feelings of emptiness	3.22	2.54	9.00	0.72	-0.83
	Future-related negative thoughts/feelings	5.46	1.27	5.50	0.09	-0.83
	Impulsive behaviors	1.98	1.35	5.00	0.11	-0.74
	Interpersonal difficulties	3.33	1.45	6.25	0.58	-0.14

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	3.76	2.08	8.33	0.96	0.10
	Reassurance-seeking	5.90	1.94	9.00	-0.18	0.22
	Self-related negative thoughts/feelings	6.30	1.70	6.40	-0.02	-0.99
	Suicidal/NSSI ideation	1.67	0.88	3.50	1.21	0.69
	Tension	2.37	1.33	6.25	1.30	1.69
	Dissociation	1.68	1.34	7.00	2.51	6.96
	Affective fluctuation	1.45	0.82	3.00	1.50	0.92
	Alcohol	2.97	4.84	20.00	1.59	1.86
	Angry	1.23	0.68	3.00	2.78	6.63
	Anhedonia	1.09	0.42	2.00	4.22	16.15
	Attentional instability	1.27	0.66	2.00	2.03	2.42
	Feelings of emptiness	1.02	0.15	1.00	6.19	37.13
	Future-related negative thoughts/feelings	1.11	0.16	0.50	1.08	-0.27
11	Impulsive behaviors	3.05	1.49	6.00	-0.40	-0.65
	Interpersonal difficulties	1.06	0.14	0.50	2.10	3.18
	Low mood	1.23	0.54	2.67	2.67	7.60
	Reassurance-seeking	1.91	1.27	5.00	1.16	0.51
	Self-related negative thoughts/feelings	1.09	0.26	1.40	3.58	13.82
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.15	0.29	1.00	1.54	0.81
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	1.06	0.42	3.00	6.73	44.12
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.31	1.21	6.00	3.73	12.77
	Anhedonia	1.16	0.58	3.00	3.63	12.55
	Attentional instability	1.57	1.43	6.00	2.61	6.17
12	Feelings of emptiness	1.10	0.50	3.00	4.90	23.31
	Future-related negative thoughts/feelings	1.37	0.60	2.83	2.05	4.52
	Impulsive behaviors	0.27	0.60	3.00	2.51	6.93
	Interpersonal difficulties	1.12	0.48	2.50	4.11	16.08

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	1.41	0.97	4.33	2.53	5.89
	Reassurance-seeking	1.84	2.04	9.00	2.40	5.03
	Self-related negative thoughts/feelings	1.27	0.42	1.60	1.59	1.88
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	2.72	1.95	6.75	1.16	0.14
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	1.03	0.24	2.00	7.89	61.09
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.03	0.24	2.00	7.89	61.09
	Anhedonia	1.00	0.00	0.00	NA	NA
	Attentional instability	1.07	0.36	2.00	4.79	22.06
	Feelings of emptiness	1.07	0.61	5.00	7.89	61.09
	Future-related negative thoughts/feelings	1.17	0.49	3.33	4.46	24.06
13	Impulsive behaviors	0.01	0.12	1.00	7.89	61.09
	Interpersonal difficulties	1.01	0.06	0.50	7.89	61.09
	Low mood	1.13	0.77	6.00	6.83	48.26
	Reassurance-seeking	1.09	0.54	4.00	6.27	40.10
	Self-related negative thoughts/feelings	1.19	0.81	6.20	6.24	42.38
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.38	0.83	5.25	3.47	15.67
	Dissociation	1.04	0.36	3.00	7.89	61.09
	Affective fluctuation	2.00	1.98	8.00	1.67	1.55
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.73	1.95	9.00	2.53	5.45
	Anhedonia	1.44	1.32	6.00	2.84	6.91
14	Attentional instability	4.70	3.36	9.00	0.34	-1.19
	Feelings of emptiness	2.00	2.18	9.00	2.00	2.83
	Future-related negative thoughts/feelings	3.15	1.84	7.33	0.85	0.00
	Impulsive behaviors	0.81	0.91	3.00	1.00	0.21
	Interpersonal difficulties	2.04	0.85	6.75	4.70	29.10

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	3.39	2.70	9.00	1.15	0.21
	Reassurance-seeking	2.77	3.16	9.00	1.40	0.31
	Self-related negative thoughts/feelings	2.69	1.72	6.20	0.61	-0.76
	Suicidal/NSSI ideation	1.40	0.78	3.00	1.63	1.24
	Tension	3.56	2.15	8.00	0.64	0.06
	Dissociation	2.45	2.54	9.00	1.54	1.37
15	Affective fluctuation	1.44	1.77	9.00	4.07	15.92
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	2.05	1.82	5.00	1.13	-0.66
	Anhedonia	1.00	0.00	0.00	NA	NA
	Attentional instability	1.37	1.65	9.00	4.19	16.40
	Feelings of emptiness	1.90	1.71	5.00	1.34	-0.17
	Future-related negative thoughts/feelings	1.62	1.12	6.33	2.51	8.87
	Impulsive behaviors	0.58	1.80	7.00	2.89	6.65
	Interpersonal difficulties	1.00	0.00	0.00	NA	NA
	Low mood	2.19	1.84	6.00	1.18	-0.21
	Reassurance-seeking	1.14	0.73	4.00	5.02	23.61
	Self-related negative thoughts/feelings	1.42	0.81	3.40	1.75	2.22
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.63	0.99	3.25	1.12	-0.29
	Dissociation	1.00	0.00	0.00	NA	NA
16	Affective fluctuation	1.46	1.43	7.00	3.27	10.12
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.19	0.55	3.00	3.27	11.56
	Anhedonia	2.47	2.15	7.00	1.07	-0.28
	Attentional instability	2.46	2.17	7.00	1.15	-0.10
	Feelings of emptiness	1.56	1.56	7.00	2.77	6.75
	Future-related negative thoughts/feelings	1.67	1.06	5.00	2.10	4.58
	Impulsive behaviors	0.09	0.34	2.00	4.04	16.75
	Interpersonal difficulties	1.00	0.00	0.00	NA	NA

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	1.60	1.34	7.00	3.02	9.71
	Reassurance-seeking	2.95	2.26	7.00	0.55	-1.16
	Self-related negative thoughts/feelings	1.28	0.62	3.20	2.99	9.54
	Suicidal/NSSI ideation	1.06	0.40	3.00	6.89	47.28
	Tension	2.70	1.64	6.75	0.87	0.24
	Dissociation	2.16	2.26	9.00	1.90	2.65
	Affective fluctuation	6.02	2.01	8.00	-0.21	-0.58
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	3.71	2.22	8.00	0.93	-0.18
	Anhedonia	5.33	2.40	8.00	0.34	-1.06
	Attentional instability	6.75	1.88	7.00	-0.41	-0.85
	Feelings of emptiness	4.92	2.04	8.00	0.42	-0.71
	Future-related negative thoughts/feelings	5.15	1.53	6.00	0.21	-1.05
17	Impulsive behaviors	2.98	1.34	6.00	-0.26	-0.44
	Interpersonal difficulties	3.50	1.08	4.00	0.07	-0.96
	Low mood	3.67	1.61	6.67	0.61	-0.52
	Reassurance-seeking	8.06	1.11	5.00	-0.28	-0.03
	Self-related negative thoughts/feelings	5.34	1.32	5.20	0.11	-0.78
	Suicidal/NSSI ideation	1.34	0.64	2.50	1.99	3.34
	Tension	4.98	1.93	7.75	0.12	-1.00
	Dissociation	5.31	2.22	8.00	-0.12	-1.31
	Affective fluctuation	3.50	2.20	5.00	-0.11	-1.86
	Alcohol	0.44	0.92	3.00	1.64	1.23
	Angry	3.50	2.07	7.00	0.53	-0.64
	Anhedonia	1.28	0.83	3.00	2.45	4.60
18	Attentional instability	3.06	1.98	5.00	0.06	-1.78
	Feelings of emptiness	2.89	2.45	7.00	0.74	-1.06
	Future-related negative thoughts/feelings	2.65	0.96	3.67	0.40	-0.61
	Impulsive behaviors	2.11	1.08	4.00	0.06	-0.79
	Interpersonal difficulties	2.19	1.04	3.75	0.67	-0.34

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	2.69	1.83	6.33	1.33	0.55
	Reassurance-seeking	3.56	2.20	5.00	-0.18	-1.84
	Self-related negative thoughts/feelings	2.21	0.95	3.20	0.47	-0.86
	Suicidal/NSSI ideation	1.03	0.12	0.50	3.56	11.32
	Tension	2.29	1.14	3.50	0.51	-0.92
	Dissociation	1.78	1.26	4.00	1.22	0.13
19	Affective fluctuation	1.35	0.98	5.00	3.25	10.26
	Alcohol	0.02	0.15	1.00	6.09	35.58
	Angry	1.07	0.41	3.00	5.91	35.75
	Anhedonia	1.01	0.11	1.00	8.78	76.07
	Attentional instability	1.00	0.00	0.00	NA	NA
	Feelings of emptiness	1.01	0.11	1.00	8.78	76.07
	Future-related negative thoughts/feelings	1.11	0.38	2.50	4.66	23.09
	Impulsive behaviors	0.23	0.55	2.00	2.27	4.01
	Interpersonal difficulties	1.33	0.52	2.25	1.89	3.25
	Low mood	1.09	0.45	3.00	5.69	32.26
	Reassurance-seeking	1.46	1.14	6.00	2.96	8.58
	Self-related negative thoughts/feelings	1.05	0.19	1.00	4.12	16.93
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.31	0.37	2.25	4.07	17.29
	Dissociation	1.01	0.11	1.00	8.78	76.07
20	Affective fluctuation	1.98	2.56	9.00	2.34	3.83
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.05	0.26	2.00	5.89	36.31
	Anhedonia	1.56	1.81	9.00	3.14	9.00
	Attentional instability	1.40	1.58	9.00	3.92	14.79
	Feelings of emptiness	2.06	2.62	9.00	2.26	3.46
	Future-related negative thoughts/feelings	1.40	0.61	3.83	2.55	10.08
	Impulsive behaviors	0.06	0.24	1.00	3.66	11.51
	Interpersonal difficulties	1.35	1.13	5.75	3.45	11.14

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	1.83	2.07	8.67	2.36	4.22
	Reassurance-seeking	1.75	2.26	9.00	2.81	6.48
	Self-related negative thoughts/feelings	1.13	0.45	2.20	3.38	10.39
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.27	0.07	4.50	3.77	15.50
	Dissociation	1.11	0.58	4.00	5.45	29.61
	Affective fluctuation	1.10	0.62	4.00	6.03	35.14
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.76	2.02	9.00	2.55	5.76
	Anhedonia	2.33	2.45	9.00	1.77	2.30
	Attentional instability	1.60	1.73	9.00	3.32	11.70
	Feelings of emptiness	1.02	0.15	1.00	6.03	35.14
	Future-related negative thoughts/feelings	1.43	0.93	4.83	3.06	10.18
21	Impulsive behaviors	0.45	0.63	2.00	1.02	-0.10
	Interpersonal difficulties	1.02	0.12	0.75	5.28	28.09
	Low mood	1.89	1.74	6.67	1.95	2.71
	Reassurance-seeking	1.36	1.10	6.00	3.68	14.51
	Self-related negative thoughts/feelings	1.41	0.86	4.20	2.66	7.43
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.78	1.62	9.00	3.35	13.31
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	1.00	0.00	0.00	NA	NA
	Alcohol	0.45	1.39	5.00	2.53	4.78
	Angry	1.50	0.89	3.00	1.50	1.03
	Anhedonia	1.00	0.00	0.00	NA	NA
22	Attentional instability	1.00	0.00	0.00	NA	NA
	Feelings of emptiness	1.15	0.49	2.00	2.94	7.68
	Future-related negative thoughts/feelings	1.02	0.07	0.33	3.82	13.29
	Impulsive behaviors	0.50	1.10	3.00	1.69	1.03
	Interpersonal difficulties	1.00	0.00	0.00	NA	NA

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	1.72	0.91	4.00	2.30	5.58
	Reassurance-seeking	1.00	0.00	0.00	NA	NA
	Self-related negative thoughts/feelings	1.02	0.06	0.20	2.47	4.32
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.01	0.06	0.25	3.82	13.29
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	1.60	1.76	6.00	2.57	4.91
	Alcohol	0.11	0.34	1.50	2.83	6.90
	Angry	1.00	0.00	0.00	NA	NA
	Anhedonia	9.13	1.90	7.00	-2.12	3.42
	Attentional instability	5.47	3.60	9.00	-0.10	-1.64
	Feelings of emptiness	7.22	3.02	9.00	-0.58	-1.14
	Future-related negative thoughts/feelings	5.34	1.28	4.67	-0.20	-1.08
23	Impulsive behaviors	0.67	1.07	4.00	1.55	1.37
	Interpersonal difficulties	1.00	0.00	0.00	NA	NA
	Low mood	3.87	2.44	9.00	0.76	-0.36
	Reassurance-seeking	2.07	2.27	9.00	1.98	2.80
	Self-related negative thoughts/feelings	6.82	1.66	7.20	-0.29	-0.71
	Suicidal/NSSI ideation	1.42	1.18	5.50	3.57	12.43
	Tension	2.88	1.81	5.75	0.48	-1.09
	Dissociation	1.02	0.15	1.00	6.27	38.13
	Affective fluctuation	1.09	0.37	2.00	4.09	16.41
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.48	0.64	2.00	0.97	-0.20
	Anhedonia	2.48	0.66	3.00	0.21	-0.27
24	Attentional instability	1.05	0.28	2.00	5.53	31.82
	Feelings of emptiness	1.77	0.51	2.00	-0.31	-0.20
	Future-related negative thoughts/feelings	2.68	0.42	1.67	-0.08	-0.81
	Impulsive behaviors	0.29	0.73	3.00	2.57	5.81
	Interpersonal difficulties	1.28	0.39	1.75	1.44	1.95

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	3.34	0.82	3.33	0.48	-0.47
	Reassurance-seeking	3.73	0.96	5.00	0.99	0.45
	Self-related negative thoughts/feelings	2.71	0.47	2.40	0.79	1.16
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	3.32	0.59	2.75	0.87	0.75
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	1.59	1.50	6.00	2.46	4.75
	Alcohol	2.16	3.42	14.00	1.47	1.08
	Angry	1.62	1.36	6.00	2.30	4.82
	Anhedonia	2.19	1.59	8.00	1.52	2.66
	Attentional instability	1.47	1.38	7.00	3.06	8.83
	Feelings of emptiness	2.29	2.17	7.00	1.36	0.33
	Future-related negative thoughts/feelings	4.12	1.38	6.67	-0.14	-0.30
25	Impulsive behaviors	1.08	1.09	5.00	0.87	0.35
	Interpersonal difficulties	1.27	0.58	2.50	2.20	4.11
	Low mood	2.64	1.50	6.00	0.85	0.17
	Reassurance-seeking	4.89	3.04	9.00	-0.24	-1.62
	Self-related negative thoughts/feelings	2.44	1.43	7.00	1.51	3.07
	Suicidal/NSSI ideation	1.64	0.96	4.50	1.93	4.01
	Tension	1.78	1.07	5.00	1.78	3.24
	Dissociation	1.02	0.21	2.00	9.17	83.07
	Affective fluctuation	2.65	2.43	7.00	1.10	-0.44
	Alcohol	0.08	0.58	4.00	6.50	41.12
	Angry	1.31	0.88	4.00	2.68	6.42
	Anhedonia	1.17	0.52	2.00	2.90	7.01
	Attentional instability	1.44	1.37	6.00	2.92	7.27
26	Feelings of emptiness	1.83	1.55	6.00	1.72	1.96
	Future-related negative thoughts/feelings	2.74	1.36	5.83	1.04	0.81
	Impulsive behaviors	0.27	0.57	2.00	1.93	2.57
	Interpersonal difficulties	1.56	0.82	3.00	1.44	1.00

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	1.50	1.11	4.33	2.29	4.34
	Reassurance-seeking	5.42	2.50	9.00	0.22	-1.14
	Self-related negative thoughts/feelings	1.84	0.96	4.20	1.53	1.91
	Suicidal/NSSI ideation	1.02	0.14	1.00	6.50	41.12
	Tension	2.78	2.08	6.75	1.14	0.03
	Dissociation	1.85	1.24	4.00	1.19	0.26
	Affective fluctuation	1.29	0.90	4.00	3.00	7.91
	Alcohol	0.04	0.25	2.00	6.77	46.89
	Angry	1.13	0.73	5.00	5.81	33.16
	Anhedonia	1.08	0.42	3.00	5.71	33.25
	Attentional instability	1.06	0.34	2.00	5.19	26.12
	Feelings of emptiness	1.03	0.23	2.00	8.49	71.08
	Future-related negative thoughts/feelings	1.06	0.27	2.00	5.65	34.28
27	Impulsive behaviors	0.33	0.68	3.00	2.22	4.78
	Interpersonal difficulties	1.00	0.00	0.00	NA	NA
	Low mood	1.21	0.90	5.67	4.97	24.97
	Reassurance-seeking	1.08	0.39	3.00	6.03	39.93
	Self-related negative thoughts/feelings	1.10	0.35	2.40	4.57	23.83
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.10	0.39	2.25	4.08	16.55
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	1.14	0.48	2.00	3.25	9.27
	Alcohol	0.05	0.23	1.00	3.90	13.46
	Angry	1.51	0.95	5.00	2.82	9.39
	Anhedonia	1.05	0.23	1.00	3.90	13.46
	Attentional instability	1.05	0.29	2.00	5.68	32.64
28	Feelings of emptiness	1.39	0.73	3.00	1.77	2.23
	Future-related negative thoughts/feelings	1.44	0.68	2.67	1.72	2.06
	Impulsive behaviors	0.75	0.89	3.00	0.78	-0.60
	Interpersonal difficulties	1.22	0.59	3.00	3.03	9.24

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	2.61	1.71	6.00	1.29	0.43
	Reassurance-seeking	2.14	1.94	8.00	1.94	3.05
	Self-related negative thoughts/feelings	1.27	0.63	3.40	2.93	9.46
	Suicidal/NSSI ideation	1.03	0.11	0.50	3.90	13.46
	Tension	1.49	0.90	5.00	3.21	11.22
	Dissociation	1.02	0.13	1.00	7.16	50.10
29	Affective fluctuation	2.13	2.42	9.00	1.90	2.15
	Alcohol	0.82	2.13	8.00	2.44	4.52
	Angry	1.73	1.53	7.00	2.49	5.84
	Anhedonia	1.55	1.71	8.00	2.95	7.39
	Attentional instability	1.80	1.90	8.00	2.48	5.18
	Feelings of emptiness	1.48	1.28	6.00	3.10	9.32
	Future-related negative thoughts/feelings	1.69	1.39	6.50	2.45	5.56
	Impulsive behaviors	0.77	1.15	4.00	1.19	0.16
	Interpersonal difficulties	1.24	0.90	5.25	4.64	22.24
	Low mood	2.10	1.76	7.33	2.11	3.97
	Reassurance-seeking	1.97	2.07	7.00	1.98	2.52
	Self-related negative thoughts/feelings	1.43	1.16	5.60	3.32	10.62
	Suicidal/NSSI ideation	1.01	0.06	0.50	8.32	68.08
	Tension	1.75	1.68	7.75	2.64	6.48
	Dissociation	1.39	1.30	6.00	3.42	10.60
30	Affective fluctuation	1.08	0.37	2.00	4.62	20.44
	Alcohol	0.06	0.30	2.00	5.05	26.33
	Angry	1.17	0.52	3.00	3.52	13.53
	Anhedonia	1.02	0.13	1.00	7.63	57.09
	Attentional instability	1.08	0.32	2.00	4.33	19.45
	Feelings of emptiness	1.03	0.18	1.00	5.26	26.10
	Future-related negative thoughts/feelings	1.45	0.61	3.33	2.67	7.63
	Impulsive behaviors	0.09	0.39	2.00	4.12	16.33
	Interpersonal difficulties	1.02	0.10	0.75	6.71	46.08

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	1.08	0.28	2.00	5.20	30.76
	Reassurance-seeking	1.08	0.32	2.00	4.33	19.45
	Self-related negative thoughts/feelings	1.06	0.17	1.00	3.58	13.77
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.38	0.63	7.75	2.46	6.28
	Dissociation	1.02	0.13	1.00	7.63	57.09
31	Affective fluctuation	1.07	0.26	1.00	3.21	8.51
	Alcohol	0.12	0.77	5.00	6.03	35.14
	Angry	1.24	0.88	5.00	4.18	18.37
	Anhedonia	1.00	0.00	0.00	NA	NA
	Attentional instability	1.00	0.00	0.00	NA	NA
	Feelings of emptiness	1.05	0.31	2.00	6.03	35.14
	Future-related negative thoughts/feelings	1.10	0.33	1.67	3.58	12.20
	Impulsive behaviors	0.57	0.99	3.00	1.49	0.82
	Interpersonal difficulties	1.01	0.08	0.50	6.03	35.14
	Low mood	1.46	0.84	3.67	2.50	5.94
	Reassurance-seeking	1.02	0.15	1.00	6.03	35.14
	Self-related negative thoughts/feelings	1.01	0.05	0.20	3.21	8.51
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.18	0.54	3.25	4.56	22.74
	Dissociation	1.00	0.00	0.00	NA	NA
32	Affective fluctuation	1.62	1.47	5.00	2.01	2.35
	Alcohol	0.01	0.07	0.50	6.87	46.11
	Angry	1.51	1.67	9.00	3.57	12.87
	Anhedonia	7.13	2.40	7.00	0.07	-1.56
	Attentional instability	1.32	1.11	6.00	3.63	13.32
	Feelings of emptiness	8.00	2.70	9.00	-1.18	0.34
	Future-related negative thoughts/feelings	5.71	2.28	8.50	-0.26	-1.02
	Impulsive behaviors	0.11	0.32	1.00	2.37	3.70
	Interpersonal difficulties	1.17	0.41	2.00	2.73	7.46

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	6.91	2.11	7.67	-0.27	-0.84
	Reassurance-seeking	9.34	1.14	4.00	-1.36	0.37
	Self-related negative thoughts/feelings	7.55	2.39	9.00	-0.97	0.08
	Suicidal/NSSI ideation	3.04	1.80	5.00	0.24	-1.50
	Tension	4.68	2.53	9.00	0.35	-0.93
	Dissociation	1.04	0.27	2.00	6.87	46.11
	Affective fluctuation	1.11	0.43	2.00	3.78	13.15
	Alcohol	0.13	0.75	5.00	6.01	35.97
	Angry	1.46	1.33	6.00	3.32	10.53
	Anhedonia	1.13	0.88	6.00	6.35	39.13
	Attentional instability	1.00	0.00	0.00	NA	NA
	Feelings of emptiness	1.02	0.15	1.00	6.35	39.13
	Future-related negative thoughts/feelings	1.53	1.09	4.50	2.36	4.73
33	Impulsive behaviors	0.22	0.59	3.00	3.04	9.66
	Interpersonal difficulties	1.13	0.43	2.25	3.53	12.47
	Low mood	1.61	1.08	5.33	2.36	6.30
	Reassurance-seeking	1.57	1.68	9.00	3.56	13.27
	Self-related negative thoughts/feelings	1.20	0.48	2.00	2.40	4.74
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.21	0.59	3.25	3.66	14.22
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	1.44	1.50	8.00	3.76	14.62
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	1.23	1.01	6.00	4.89	24.32
	Anhedonia	1.54	1.54	6.00	2.69	6.05
34	Attentional instability	1.00	0.00	0.00	NA	NA
	Feelings of emptiness	1.00	0.00	0.00	NA	NA
	Future-related negative thoughts/feelings	1.00	0.03	0.17	5.77	32.15
	Impulsive behaviors	0.05	0.22	1.00	3.91	13.67
	Interpersonal difficulties	1.00	0.00	0.00	NA	NA

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	1.30	0.66	3.67	3.70	15.28
	Reassurance-seeking	1.05	0.32	2.00	5.77	32.15
	Self-related negative thoughts/feelings	1.12	0.33	1.40	2.52	5.42
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.19	0.63	3.25	3.78	13.93
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	1.04	0.29	2.00	6.35	39.13
	Alcohol	0.11	0.38	2.00	3.53	12.52
	Angry	1.04	0.29	2.00	6.35	39.13
	Anhedonia	1.00	0.00	0.00	NA	NA
	Attentional instability	1.11	0.53	3.00	4.61	20.46
	Feelings of emptiness	1.00	0.00	0.00	NA	NA
	Future-related negative thoughts/feelings	1.02	0.09	0.50	4.61	20.46
35	Impulsive behaviors	0.02	0.15	1.00	6.35	39.13
	Interpersonal difficulties	1.00	0.00	0.00	NA	NA
	Low mood	1.03	0.14	0.67	4.33	17.14
	Reassurance-seeking	1.37	1.25	6.00	3.20	9.33
	Self-related negative thoughts/feelings	1.01	0.09	0.60	6.35	39.13
	Suicidal/NSSI ideation	1.00	0.00	0.00	NA	NA
	Tension	1.09	0.34	1.75	3.74	13.09
	Dissociation	1.00	0.00	0.00	NA	NA
	Affective fluctuation	5.20	3.35	9.00	-0.09	-1.66
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	2.70	2.54	7.00	1.26	-0.17
	Anhedonia	2.30	2.15	7.00	1.52	0.90
36	Attentional instability	8.10	2.22	9.00	-1.51	2.50
	Feelings of emptiness	2.65	2.11	7.00	1.56	0.97
	Future-related negative thoughts/feelings	3.20	1.64	5.67	0.32	-0.82
	Impulsive behaviors	3.10	1.94	6.00	-0.17	-1.26
	Interpersonal difficulties	3.09	0.93	3.75	0.70	-0.24

Part. No.	Variable	Mean	SD	Range	Skewness	Kurtosis
	Low mood	2.57	1.48	4.67	0.65	-1.03
	Reassurance-seeking	3.70	2.62	7.00	0.24	-1.72
	Self-related negative thoughts/feelings	2.38	1.28	4.40	0.65	-0.74
	Suicidal/NSSI ideation	1.28	0.50	1.50	1.53	0.91
	Tension	3.89	1.74	5.7	0.21	-1.25
	Dissociation	3.40	3.17	8.00	0.79	-1.26
37	Affective fluctuation	3.44	2.33	7.00	0.51	-1.19
	Alcohol	0.00	0.00	0.00	NA	NA
	Angry	3.00	2.54	6.00	0.55	-1.60
	Anhedonia	3.06	1.95	6.00	0.51	-1.22
	Attentional instability	4.56	2.89	9.00	0.35	-1.21
	Feelings of emptiness	2.33	1.61	5.00	0.93	-0.45
	Future-related negative thoughts/feelings	5.06	1.36	4.50	-0.08	-1.41
	Impulsive behaviors	0.17	0.38	1.00	1.64	0.75
	Interpersonal difficulties	7.04	1.36	5.50	0.06	-0.43
	Low mood	4.59	2.04	7.33	0.25	-0.97
	Reassurance-seeking	9.44	1.29	5.00	-2.35	4.94
	Self-related negative thoughts/feelings	3.23	1.97	6.20	0.48	-1.19
	Suicidal/NSSI ideation	1.25	0.46	1.50	1.48	0.83
	Tension	4.04	1.73	6.50	0.87	0.05
	Dissociation	1.72	0.89	2.00	0.52	-1.61

APPENDIX C: INSTITUTIONAL REVIEW BOARD LETTER

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 ● Tampa, FL 33612-4799
(813) 974-5638 ● FAX (813) 974-7091

1/31/2018

Marina Bornovalova, Ph.D.
Psychology
4202 East Fowler Ave, PCD4118G
Tampa, FL 33620

RE: **Full Board Approval for Initial Review**
IRB#:   Pro00032280
Title: Dynamics of Personality and Behavior

Study Approval Period: 11/17/2017 to 11/17/2018

Dear Dr. Bornovalova:

On 11/17/2017, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol Document(s):
EMA Study IRB_Protocol v1 1.13.2018

Consent/Assent Document(s)*:
Baseline consent form V1 1.26.2018.pdf
EMA consent form v1 1.26.2018.pdf
Online consent form for the initial screening V1 1.26.2018**

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved. **online consent forms are unstamped**

Your study qualifies for a waiver of the requirements for the documentation of informed consent as outlined in the federal regulations at 45CFR46.117(c) which states that an IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either: (1) That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the

subject with the research, and the subject's wishes will govern; or (2) That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context. This waiver of documentation of informed consent is granted to allow the study team to obtain online screening consent.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John Schinka, Ph.D., Chairperson
USF Institutional Review Board