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Interaction of Diagnostic Criteria in the Narratives of
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Interaction of Diagnostic Criteria in the Narratives of Patients with Borderline Personality Disorder

Szilárd Dávid Kovács[1] [0000-0003-1541-3177], Katherine Mulholland[2] [0000-0002-6106-4310],
Lara Condon[3] [0000-0003-0319-3365], Zsuzsa Koncz[1] [0000-0003-1518-7253],
Szilvia Zörgő[4] [0000-0002-6916-2097]

[1] Semmelweis University, Budapest 1089, Hungary
[2] Clemson University, Clemson SC 29634, USA
[3] University of Pennsylvania, Philadelphia PA 19104, USA
[4] Maastricht University, Maastricht 6200 MD, the Netherlands

kovacs.szilard@phd.semmelweis.hu

Abstract. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders requires the presence of at least five out of nine diagnostic criteria in order to diagnose borderline personality disorder. However, the manifestation, perception, and interaction of the diagnostic criteria differs in patients and with narrative focus. The objective of this study is to describe symptom co-occurrences in persons with borderline personality disorder vis-à-vis the focal points of their narrative. We utilized transcripts of interviews with borderline patients, which were coded by two raters, employing the diagnostic criteria as codes. We examined narratives across patients according to the narrative foci of the discussion (interviewee perceptions of self, others, and how others see them). We employed Epistemic Network Analysis to visualize the interaction of diagnostic criteria. Our study serves as a pilot for further research on mapping manifestations of diagnostic criteria of various mental disorders within patient lived experience. By encouraging future research employing this study design, our pilot aims to contribute to more personalized health care.

Keywords: Borderline Personality Disorder, Epistemic Network Analysis.

1 Introduction

Personality disorders are persistent behaviors or inner experiences, which differ from the norm in an individual's sociocultural surrounding; they develop in puberty or young adulthood, and result in distress or impairment. Borderline Personality Disorder (BPD) is characterized as the widespread occurrence of prominent impulsivity and unstable interpersonal relationships, self-image, and affect. [1] The prevalence of BPD in random samples ranges from 0.5% to 0.7% [2–4], with 75% of the diagnosed patients being female [1]. In primary care samples, prevalence ranges from 4% to 6% [5, 6]. Individuals suffering from BPD may experience difficulties in maintaining relationships, fulfilling their role as a family member, friend, or marital spouse, maintaining financial resources, academic achievement, and career success [7]. Likewise, family members, friends, and colleagues of a person living with BPD are also affected by the disorder, due to their mood shifts, self-damaging or self-destructive behavior, and uncertainty concerning how to relate to the person with BPD after becoming aware of their diagnosis [8].

In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM 5), BPD is diagnosed if at least five of the following nine diagnostic criteria (symptoms) are present: 1) Frantic efforts to avoid real or imagined abandonment, 2) A pattern of unstable and intense interpersonal relationships characterized by alternating between extremes of idealization and devaluation, 3) Identity disturbance, 4) Impulsivity in at least two areas that are potentially self-damaging, 5) Recurrent suicidal behavior, gestures, or threats, or self-mutilating behavior, 6) Affective instability due to a marked reactivity of mood, 7) Chronic feelings of emptiness, 8) Inappropriate, intense anger or difficulty controlling anger, and 9) Transient, stress-related paranoid ideation or severe dissociative symptoms [1]. Diagnosis requires the presence of multiple symptoms manifesting in constellations; thus, viewing symptoms in isolation is suboptimal because it is their interaction that constitutes the disorder. The DSM 5 also describes symptom co-occurrence in BPD patients, for example, efforts to avoid abandonment may co-occur with mood shifts, anger, and dissociative symptoms [1].

Previous studies have examined diagnostic criteria in patient narratives and in self-reported questionnaires. Qualitative studies provide insight into idiosyncratic manifestations of symptoms, as the study of Dammann et al, who conducted interviews with BPD patients regarding self-image, image of others, as well as their emotions and typical episodes [9]. However, the limitation of such studies is their focus on a single diagnostic criterion, identity disturbance in the above-mentioned article. As the diagnosis of BPD requires the presence of at least five diagnostic criteria, one could argue, investigating a single symptom is insufficient in describing the disorder. Furthermore, such idiosyncratic data is difficult to aggregate, and most qualitative studies, although working with small sample sizes, do not attempt to aggregate data systematically. Quantitative studies, generally employing self-reported questionnaires, also tend to scrutinize symptoms in isolation, as Koenigsberg et al measured the dimensions of affective instability in patients with BPD and compared them to patients' with other personality disorders; again, solely investigating the manifestations of a single diagnostic criterion [10].

Research investigating symptom constellations has been conducted with quantitative methods. Klonsky employed structured interviews and a questionnaire on a subsample with a history of self-injury and a nonclinical subsample. The structured interviews measured the frequency of affect states in chronic feelings of emptiness before and after self-injury, while the questionnaire measured the co-occurrence of all nine diagnostic criteria, as well as anxiety, depression, suicidal ideations, and suicide attempts [11]. Albeit the study investigated possible co-occurrences among self-damage and other symptoms, participants were not screened for BPD, hence the results cannot accurately describe BPD patients. The interaction of all nine criteria in BPD patients was measured in Richetin et al's network analysis [12], yet the relationship among variables was computed across cases, yielding results regarding the whole sample, but compromising the ability to draw conclusions for individual patients (cf.: the ergodic fallacy [13]).

In addition to investigating the manifestation of all possible diagnostic criteria on an individual level, a further distinction may be clinically relevant on the level of narrative foci, i.e., whether the patient is describing themselves, others, or how they believe others see them. For example, Dammann et al [9] distinguish such narrative foci as "self-description" and "description of others" in their study . The relevance of this differentiation is that patients' perceptions of others are also valid indicators of how they see

themselves [14], and enable the investigation of transferential displacement, a defense mechanism in which unprocessed affect is projected onto another person or object to reduce associated anxiety [15].

Our first aim was to map the interaction among all diagnostic criteria in the narratives of persons diagnosed with BPD, thus facilitating diagnosis and individualized treatment. Our second aim was to distinguish the interaction of these criteria according to when patients speak about themselves, others, and how they assume others perceive them in order to investigate how code constellations change vis-à-vis these narrative foci. For this purpose, we utilized Epistemic Network Analysis (ENA), which allowed us to quantify and visualize connections among diagnostic criteria. This study aims to serve as a pilot for future studies intending to analyze corpora of patient narratives, especially in the context of practitioner – patient interaction on mental health issues.

2 Methods

All our materials, as well as our final, coded dataset is available in our project repository, available at: https://osf.io/5z624. Narratives were obtained from the YouTube channel Soft White Underbelly[1], containing interviews and portraits of the human condition by photographer, Mark Laita. We selected all interviews available with people living with BPD; two females (Grace and Shawna) and one male (Ernesto). Interviews lasted ca. 30-minutes each and were automatically transcribed by YouTube. Transcripts were scraped manually, placed into a text editor, and cleaned (timestamps and extra line breaks were removed). Transcripts lacked punctuation; to retain heuristics for creating sentences, the same researcher added punctuation marks to all transcripts.

Following an initial discussion on codes and segmentation, all researchers agreed the narratives should be coded on the level of sentences. Thus, text files were processed with the Reproducible Open Coding Kit (ROCK)[2] to create a spreadsheet where each sentence in the transcripts constituted a row. Our spreadsheet also had a column to indicate the case ID for each participant, specified on each row.

Code development was deductive; we adopted the nine diagnostic criteria and their descriptions listed in the DSM 5 [1], and supplemented the definitions with information from other chapters of the manual, such as defining anxiety and dysphoria according to the DSM 5's Glossary of Technical Terms. Our final codebook was reviewed and validated by a clinical psychologist in the team. Two researchers tested the applicability of our final codes on a subset of data (10% of total lines) and reached good percentage agreement (above 95% for each code), but because of the low base-rate of our codes, we decided to compute Cohen's Kappa on the full dataset, not a subset (see below). Table 1 contains our simplified codebook; the complete codebook including examples is accessible through our repository (https://osf.io/audgb).

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[1] https://www.softwhiteunderbelly.com

[2] https://rock.science

Table 1. Simplified codebook.

Code name	Code label	Simplified Definition
Avoiding abandonment	Avoid_aband	Acts to avoid real or perceived abandonment; Fear or anger by threat of abandonment
Unstable relationships	Unstab_relat	Idealizing, making demands, inappropriate intimacy; Expectation of "being there" in return for empathy
Identity disturbance	Id_disturb	Sudden shifts in self-image, goals, values, career plans, sexual identity; Self-perception: "bad", "evil"
Self-damaging	Self-dam	Self-damaging behavior not causing acute physical harm
Self-destructive	Self-destr	Suicidal gestures, threats, attempts, and self-mutilation
Mood reactivity	Mood_react	Episodes of dysphoria, irritability, anxiety, panic, despair
Emptiness	Emptiness	Feeling meaningless or purposeless, chronic visceral feeling in abdomen or chest; Easily bored
Anger	Anger	Intense, inappropriate, uncontrollable anger; Rage
Disconnection from reality	Disconnect	Episode of paranoid ideation or dissociation

Codes were applied by two researchers, both working independently in a spreadsheet that contained our data segmented by sentence and a column for each of our codes. If a code was identified in a given line, it was specified with a 1 in the correlating column; if the code was absent, it was indicated with a 0. When coding for the full dataset was complete, inter-rater reliability (IRR) was computed for the totality of lines. Table 2 shows the number of disagreements and Kappa values for the nine codes and two raters. IRR testing can serve the purpose of splitting data or splitting codes among coders, but in this case, it was employed solely as a measure of consistent application of codes and pinpointing differences in interpretation to be addressed in social moderation.

Table 2. Number of disagreements and Cohen's Kappa values for two raters regarding nine employed codes.

Code	Number of disagreements	Cohen's Kappa
Unstab_relat	5	0.52
Id_disturb	10	0.89
Self-destr	5	0.83
Mood_react	11	0.75
Emptiness	4	0.84
Anger	3	0.89
Disconnect	2	0.50
Avoid_aband	5	0.73
Self-dam	13	0.82

Following IRR testing, the two coders triangulated their work and resolved inconsistencies through social moderation to reach complete agreement. The clinical psychologist in the research team validated the final, coded dataset line-by-line. As a last step in coding, a researcher specified the narrative focus of each line in the final dataset by using a coding scheme of four inductively created categories and specifying these values in a separate column. Table 3 contains the narrative foci coding scheme. These narrative foci served as a higher form of segmentation that provided meaningful context to code co-occurrences [16].

Table 3. Narrative foci coding scheme.

Code name	Code label	Definition
Perceiving others	Others	How interviewee perceives others around them
Others' perception	Them	How interviewee thinks others perceive interviewee
Perceiving self	Self	How interviewee perceives themselves
Miscellaneous	Miscell	Data that cannot be labeled with any other narrative focus

The final dataset was uploaded to the Epistemic Network Analysis web tool[3]. Detailed descriptions of how ENA generates networks can be found elsewhere [17–19], but succinctly: the tabular dataset containing code occurrences and metadata on segmentation and data provider was parsed according to "unit". A unit is the totality of lines associated with a given network in a model. We designated both narrative focus and data provider as our unit in a nested relationship. Code co-occurrence frequencies were computed with a weighted whole conversation stanza window method, which accumulated co-occurrences in the entire conversation in a weighted, as opposed to a binarized manner [20]. ENA aggregated these frequencies per unit to produce cumulative adjacency

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[3] https://www.epistemicnetwork.org

matrices of code co-occurrences, which were represented as vectors in high-dimensional space. Subsequent to normalization (to account for different amounts of narrative contained in the vectors), ENA performed a dimensional reduction procedure (singular value decomposition or SVD) to construct a two-dimensional space. These two dimensions form the axes along which the unit vectors are then projected as points (ENA scores) into the two-dimensional space. The scores each represent a unit's network in which the codes are nodes and the edges signify the relative frequency of co-occurrence between unique pairs of codes. Since the scores and networks are coordinated, the positions of the nodes can be used to interpret the dimensions forming the space and explain the positions of ENA scores. Table 4 contains the parameterization of our ENA model.

Table 4. Epistemic Network Analysis model parameters.

Parameters	Parameter values
Unit	Narrative focus > Case
Conversation	Narrative focus
Stanza window	Weighted Whole Conversation
SVD1	26.4%
SVD2	19.1%

Our model thus contained networks for each of our three interviewees in all four of our narrative foci, twelve in total. For our final analysis, we examined the mean network of our three narrative foci: how the interviewee perceives themselves ("Self"), how they perceive others ("Others"), and how they think others perceive them ("Them"). Analysis was performed by visually inspecting code co-occurrences (the thicker the edge, the higher the co-occurrence frequency) and by using the web tool to perform de- and re-contextualization for each code pair. In the following, diagnostic criteria code labels are indicated in italics, and participant narratives are in quotation marks.

3 Results

3.1 How BPD Patients View Themselves

As the mean network in Figure 1 shows, when speaking about themselves, interviewees exhibited the strongest relationship among six of the nine DSM 5 diagnostic criteria: *avoiding abandonment, emptiness, mood reactivity, self-destructive, identity disturbance,* and *self-damaging.* Each of these six codes are connected to the other five, signifying that the interviewees made connections among these codes when referring to their past and present lived experiences, and shows how the diagnostic criteria interact to impact a patient's sense of self. One interviewee, Ernesto, described how the feeling of *emptiness* presented as intrusive and "[unwanted] thoughts that are coming in, are just constant and consistent that it became, like, unbearable". This ultimately led to his first

suicide attempt at the age of 17, an example of self-destructive behavior. Grace, another interviewee, made connections between *identity disturbance* and *avoiding abandonment* when she described how she is "most afraid of ending up alone, like, in every aspect", because when she loves someone "it's easier for [her] to show [her] bad side". Here, Grace exhibited fears of abandonment because she perceived herself as "having a bad side", a negative self-image.

Disconnection from reality exhibited the weakest relationship with the other eight diagnostic criteria, indicating that included patients with BPD did not emphasize dissociative feelings, such as disconnecting from themselves or reality, regarding their sense of self or how they viewed themselves. One connection between *disconnection from reality* and *anger* was made by Shawna when she described "a really bad argument" with her boyfriend, during which she said she "just black[ed] out".
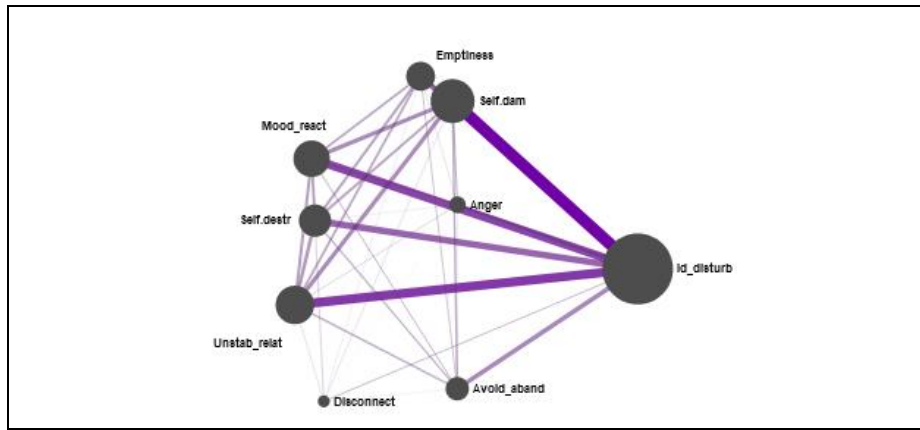

Fig. 1. Mean epistemic network for patients' narratives on themselves, showing the weighted structure of connections among the codes representing the diagnostic criteria of borderline personality disorder. The thickness and saturation of the edges (lines) indicate the relative frequency of co-occurrence between each pair of codes; the size of the nodes (black circles) indicates the relative frequency of each code within that group.

3.2 How BPD Patients Think Others View Them

The mean network for interviewees' perceptions on how others view them, displayed in Figure 2, revealed a strong relationship between *self-damaging* and *identity disturbance*. This may indicate that interviewees thought others see them as unstable due to struggling with negative self-image and exhibiting self-damaging behavior, such as substance abuse or not taking prescribed medications. In her interview, Shawna described how family members and friends encouraged her to take her prescribed medication because "it'll help". However, Shawna avoided taking medications for no explicit reason: "I don't want to. I don't know why", displaying what may be interpreted clinically as self-damaging behavior. Later in the interview, when speaking about her relationship with her boyfriend, Shawna conveys a negative self-image, or *identity*

disturbance, regarding her diagnosis with BPD: "I feel like it slows him down, or it holds him back". Here, Shawna thought her diagnosis of BPD, and ultimately her own person, are negatively impacting her boyfriend. Ernesto also made connections between *self-damaging* and *identity disturbance* when he described how he "feel[s] like a burden to people'', which leads him to "reach out to people" or find himself "in, like, very questionable places [...] drinking during the day, going out". Ernesto thus perceived himself as a burden to the people around him, which led him to partake in self-damaging behavior, such as drinking during the day.

Emptiness was not connected to the other seven diagnostic criteria, indicating that although the interviewees experienced *emptiness* (Fig. 1), they did not think this was evident to others. Similarly to how interviewees view themselves, the code *anger* exhibited the weakest connection in the network visualizing how they think others view them.
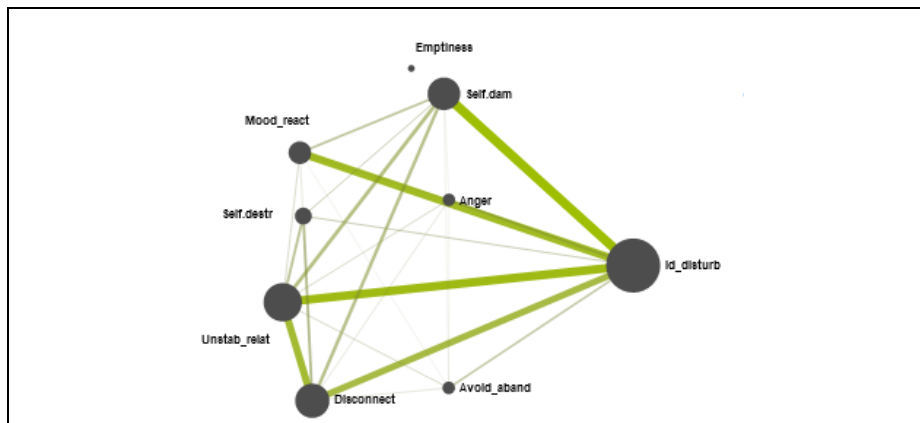

Fig. 2. Mean epistemic network for patients' narratives on how they assume others view them, showing the weighted structure of connections among the codes representing the diagnostic criteria of borderline personality disorder. The thickness and saturation of the edges (lines) indicate the relative frequency of co-occurrence between each pair of codes; the size of the nodes (black circles) indicates the relative frequency of each code within that group.

3.3 How BPD Patients View Others

When interviewees talked about their perceptions of others, displayed in Figure 3, one of the strongest relationships in the mean network was between *unstable relationships* and *anger*. Ernesto connected *anger* and *unstable relationships* when he spoke about his relationship with his family, specifically his mother and brother. Ernesto remembered his brother having "anger issues for sure" and recalled when his brother would assault him: "he would just start, you know, punching me, smacking me, knocking me down, like it was, like, every other day". Ernesto saw his brother as a person who struggles with his anger. When speaking about his relationship with his mother, Ernesto recounted uncertainty, a characteristic of *unstable relationships*: "I would say I'm still

close, it's just, um, I feel like she puts her beliefs before me a lot of the time, you know". Grace connected *unstable relationships* and *identity disturbance* when she spoke about her mother exhibiting similar behavior to herself: "My mom was the same kind of pattern where she would jump from things, she'd jump from partners, she'd jump from jobs". Here, Grace viewed her mother as having unstable relationships because she would experience challenges with commitment. This pattern is characteristic of *identity disturbance*: being unsure of who you are or what you want, exhibiting an unstable sense of self.
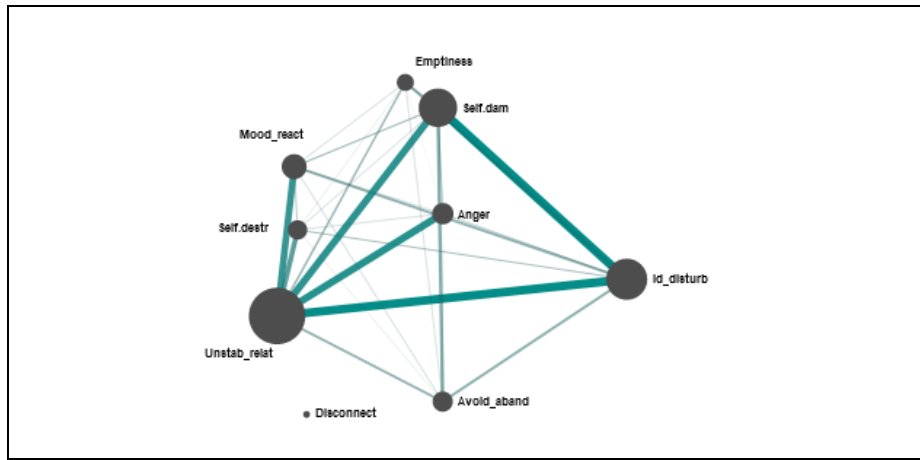

Fig. 3. Mean epistemic network for patients' narratives on others, showing the weighted structure of connections among the codes representing the diagnostic criteria of borderline personality disorder. The thickness and saturation of the edges (lines) indicate the relative frequency of co-occurrence between each pair of codes; the size of the nodes (black circles) indicates the relative frequency of each code within that group.

3.4 Comparing Mean Networks

The ENA projection space was constructed along two dimensions, SVD1 and SVD2, together explaining 45.5% of variance in the data (Table 4). Figure 4 displays the positions of the ENA scores (circles representing a network per narrative focus per person), and mean networks (squares; one for each narrative focus). The dashed lines around the means represent the 95% confidence intervals on the two dimensions. There were no significant differences among the mean networks, but there was a marked disparity between, on the one hand, how participants saw themselves and how they think others see them, and on the other hand, how they saw others.
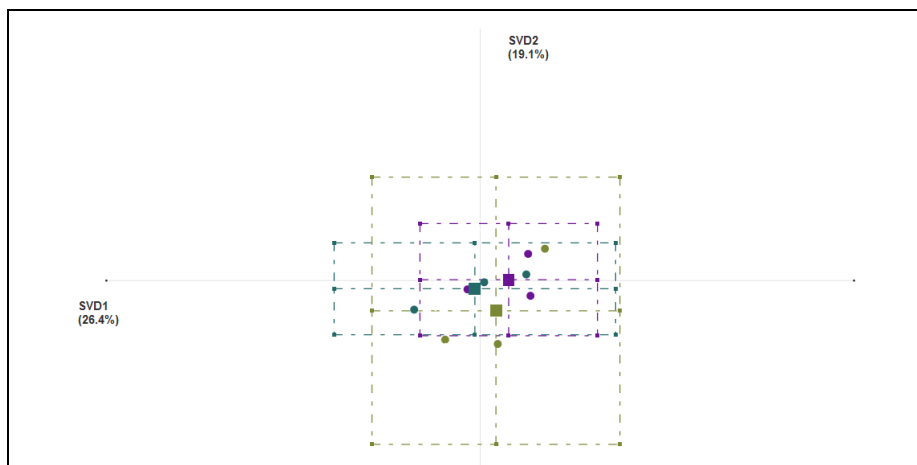
Fig. 4 Epistemic Network Analysis projection space constructed for three individuals living with borderline personality disorder with lines of data grouped according to three narrative foci. The colored circles show the network locations (ENA scores) of the networks generated for each narrative focus per person. The colored squares are the mean network locations (mean ENA scores) of each narrative focus, and the dashed lines around the means represent the 95% confidence intervals on each dimension.

The comparison plots in Figure 5 highlight differences between the Self and Others (left), as well as the Them and Others mean networks (right). Codes *identity disturbance* and *mood reactivity* exhibited a strong connection in patient narratives on how they see themselves (purple) and how they think others perceive them (green), but connoted a weak connection in how they see others (teal). Codes *anger* and *unstable relationships* signified a marked connection in the network visualizing narratives on how they see others, while *anger* was the least connected node in the networks describing how BPD patients see themselves and how others see them.
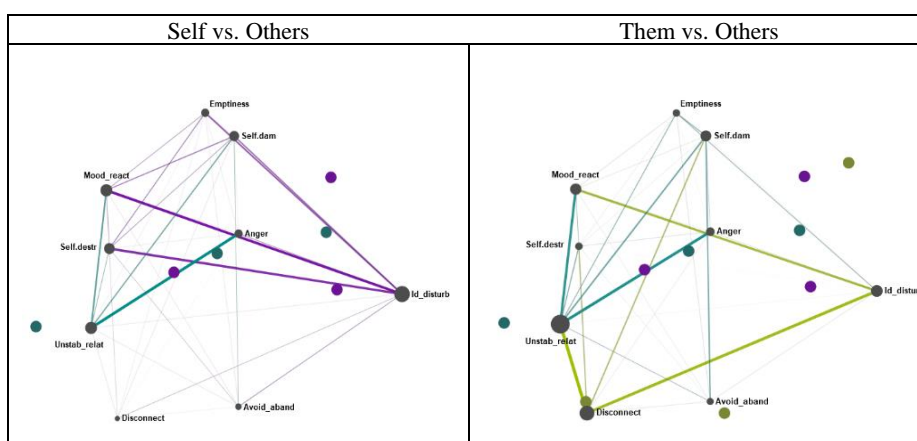
Fig. 5. *Left:* Comparison plot (subtracted graph) of mean epistemic networks highlighting the differences between how individuals living with borderline personality disorder see themselves (purple) versus how they see others (teal), with lines of data grouped according to three narrative foci. *Right:* Comparison plot of mean epistemic networks highlighting the differences between how individuals living with borderline personality disorder think others see them (green) versus how they see others (teal), with lines of data grouped according to three narrative foci. Black circles (nodes) represent our codes; the colored circles show the network locations (ENA scores) of the networks generated for each narrative focus per person.

4 Discussion

Patients diagnosed with BPD experience at least five of the nine diagnostic criteria of the disorder; however, the manifestation and the constellation of these symptoms may differ within patient narratives. Employing ENA, we examined the interaction of diagnostic criteria in the accounts of three persons living with BPD and distinguished narrative foci within their interviews: perception of self, others, and how others view them.

The mean network containing co-occurrences in participant narratives regarding themselves was the most densely connected network of the three narrative foci. Every diagnostic criterion, save *anger* and *disconnection from reality*, exhibited a strong interaction. As all participants were in therapy at the time of their interview, we surmise that dense network connectivity was due to participants having developed a high level of introspection and insight concerning the symptoms of their disorder and were well-versed in expressing themselves. Participation in active therapy may also account for *disconnection from reality* exhibiting only weak connections in the network, as this diagnostic criterion captures paranoid ideation and dissociation, phenomena that tend to decrease in frequency and intensity with ongoing psycho- and pharmacotherapy [21].

The mean network depicting co-occurrences in narratives on how participants think others view them exhibited a marked emphasis on *avoiding abandonment* and *emptiness*. These results may demonstrate that, according to patients, fear of isolation and aligned avoidance behaviors are not as overtly manifest as, for example, unstable identity and self-image. Other studies have shown that patients often feel that the effects of some symptoms of mental disorders are more underestimated by healthcare workers than others [22]. According to the patients included in our study, fear of abandonment connoted a BPD symptom that was de-emphasized by their social environment, compared to their more overt self-harming behavior. Discrepancies such as this one are noteworthy, as covert or unexpressed symptoms that go unnoticed by friends and family, or even by mental health professionals, may be the most dangerous ones [23].

Mean networks of patient narratives on themselves and how participants think others see them exhibited a similar structure of connections. When compared to the mean network depicting co-occurrences in narratives on how these patients view others, a marked distinction was the role of *anger*, especially its association to unstable relationships. According to a study by Dammann et al., BPD patients only saw aggressive tendencies in others, as opposed to observing anger in themselves [9]. Thus, anger signified the most prominent symptom that our participants cope with by transferential

displacement. This aligns with previous studies indicating that anger is one of the most frequently displaced emotions in mental disorders [24].

Our study aimed to present a novel method of modelling the interaction of all nine diagnostic criteria of BPD, while also distinguishing among narrative foci in patient narratives to scrutinize these interactions in processed versus unprocessed affect. Anger represented a diagnostic criterion manifesting as lived experience chiefly through transferential displacement (projection onto others), which may indicate that this affect was least identified with, least integrated into perceptions of self, and therefore, patients exhibit little to no insight concerning their own anger. Dealing with such unprocessed affect for which the patient has not yet assumed ownership may require vastly different therapeutic approaches and strategies compared to their processed affective and behavioral counterparts. Differentiating among narrative foci enables modelling these domains separately, and can guide the clinician in developing a more tailored treatment plan.

5   Limitations

Our study design served as a proof-of-concept only; for this reason a small sample size sufficed, but our sample was not large enough to draw any clinically relevant conclusions, nor can we estimate the transferability of our results. Another limitation of our study concerned the use of categorical values (narrative foci codes) to delimit data segments. Although this technique is a viable option to group lines for code co-occurrence computation [16], there are challenges involved, such as how to address multiple categorical values exhibited in a single line of data (e.g., the sentence contains two narrative foci: Self and Others). Our coding decision was to employ chronological order, that is, apply the narrative foci code that appeared first in the sentence. This coding decision, as any methodological decision, affected our results; for example, if there was a tendency among our participants to emphasize perceptions of others in their sentences before they spoke about themselves, this would entail less lines of data included in the network displaying them describing themselves and false connections in the network displaying them describing others. Further studies based on our general design necessitate a more in-depth qualitative examination of these patterns and perhaps a different solution to this dilemma pertaining to categorical coding. Another limitation of our study is that ENA currently has no hypergraph capabilities, thus models display co-occurrences of unique pairs of codes (as opposed to triads, etc.).

6   Conclusion

The list of diagnostic criteria in the DSM-5 does not shed enough light on the combinatorial possibilities of each diagnostic criterion and their associated features idiosyncratic to a patient. Furthermore, diagnosis of personality disorders has evolved from a solely categorical ("present" or "absent") model to a more complex understanding in which individuals very rarely present with a 'pure' illness, but rather with a mixed personality disorder, comorbid with other disorders (e.g. mood disorders, addiction, etc.). We believe our study design may contribute to mapping case- and narrative focus-level

interactions among diagnostic criteria and across multiple comorbidities, which may have the potential for more tailored and personalized healthcare.

Acknowledgements

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