Operationalized Psychodynamic Diagnosis -

Using Network Analysis to Explore the Associations between

Psychodynamic Constructs

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Abstract

The Operationalized Psychodynamic Diagnosis (OPD) system has established itself in the psychodynamic field as a supplement to descriptive classification systems for mental disorders. The OPD includes key psychodynamic constructs, namely “interpersonal relations”, “psychodynamic conflicts” and “personality structure”. The examination of the interplay among psychodynamic constructs and their associations with psychopathology holds significant relevance for both clinical and scientific practice, as it advances our understanding of how psychodynamic constructs contribute to the development and maintenance of psychopathological symptoms. For example, this knowledge may serve as a foundation for the refinement of more efficacious therapeutic interventions. A particularly useful method for estimating and visualizing associations between various constructs is network analysis. Estimated networks help to identify constructs that are most relevant to the network and are thought to represent important treatment targets. In this dissertation four empirical studies are included that used network analysis to explore the associations between the psychodynamic constructs in the OPD, their associations with psychopathology and with related constructs.

Study 1 used network analysis in a sample of $N = 341$ seeking for outpatient psychotherapy to explore the associations between psychodynamic constructs and psychopathology. Interpersonal relations, active and passive modes of conflict processing, personality structure, depression, and somatic problems were included as nodes in the network. Results suggest that psychodynamic constructs and psychopathology are distinct. Concerning the conflicts, the active and passive modes were negatively related. Interestingly, the active mode was not associated with psychopathology, whereas the passive mode showed positive associations with both depression and somatic problems. Personality structure emerged as the most important construct in the network, as it was found to be the most inter-connected node overall and emerged as the psychodynamic construct with the strongest associations with

psychopathology. This suggests that personality structure may be an important treatment target in psychotherapy.

Study 2 explored the relationship between psychodynamic conflicts and personality structure in a sample of $N = 220$ outpatients using OPD-2 interview data. Six conflicts and eight structural dimensions were included in the network. Results indicated that conflicts and structural dimensions are best represented as two distinct clusters in the network, supporting the representation of psychodynamic conflicts and personality structure as distinct axes in the OPD. The individuation vs. dependency conflict showed the strongest positive associations with structural dimensions, demonstrating that individuals with this conflict tend to have greater structural impairments.

Study 3 used a sample of $N = 1636$ psychotherapeutic inpatients to explore the similarities and differences of the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS), a measure to assess personality structure according to the OPD, and the Inventory of Personality Organization – 16 item version (IPO-16), which assesses the personality organization according to Kernberg. We used correlation analyses to investigate the relationship at the global and subscale levels. In addition, the dimensionality of the items was explored using exploratory graph analysis. The results indicate that the two questionnaires are highly correlated, but not multicollinear. So, they are assessing a similar but not identical construct. The dimensions identified by the clustering algorithm fairly represented the individual subscales. This suggests that the subscales of both questionnaires tap into different aspects of personality functioning. Thus, both questionnaires contribute to the diagnosis of personality functioning.

Study 4 replicated and extended the findings of Study 1 by unravelling the associations between psychodynamic constructs and psychopathology on a subscale-level in a clinical sample of $N = 2232$ psychotherapy inpatients. Again, psychodynamic constructs and personality functioning were found to form distinct clusters, supporting the assumption of the OPD that

psychodynamic constructs are independent of psychopathology. For most conflicts, the active and passive modes were negatively related. The passive modes were generally more strongly associated with psychopathology than the active modes. Personality structure was again found to play a key role in the network, as the OPD-SQS subscale "self-perception" showed the strongest associations with psychopathology. This emphasizes the need to focus on personality structure and especially on self-perception in psychotherapy.

In addition to summarizing and discussing the main findings of the four studies, this dissertation outlines limitations and directions for future research. Overall, this dissertation increases our understanding of the psychodynamic constructs in the OPD and makes a significant contribution to both clinical and scientific practice.

Zusammenfassung

Die Operationalisierte Psychodynamische Diagnostik (OPD) wurde als psychodynamisches Diagnose- und Therapiemanual entwickelt, um symptombasierte Klassifikationssysteme zu ergänzen. Die darin enthaltenen psychodynamischen Konstrukte sind „Beziehung“, „Konflikt“ und „Struktur“. Das Zusammenspiel dieser Konstrukte und ihre Beziehung zur Psychopathologie ist sowohl für die klinische als auch für die wissenschaftliche Praxis von großem Interesse. Ein besseres Verständnis darüber, wie psychodynamische Konstrukte zur Entwicklung und Aufrechterhaltung psychopathologischer Symptome beitragen, kann unter anderem zur Verbesserung therapeutischer Interventionen beitragen. Eine besonders geeignete Methode zur Berechnung von Zusammenhängen zwischen verschiedenen Konstrukten ist die Netzwerkanalyse. Netzwerke visualisieren die Zusammenhänge und können helfen, Konstrukte zu identifizieren, die für das Netzwerk am relevantesten sind und von welchen man annimmt, dass diese besonders entscheidend für den Therapieerfolg sind. Ziel dieser Dissertation war es, mit Hilfe von Netzwerkanalysen die Zusammenhänge zwischen den psychodynamischen Konstrukten zu untersuchen, aber auch deren Zusammenhänge mit Psychopathologie und anderen relevanten Konstrukten. Insgesamt beinhaltet diese Dissertation vier empirische Studien.

In **Studie 1** wurden die Zusammenhänge zwischen den psychodynamischen Konstrukten der OPD und Psychopathologie mit Hilfe einer Netzwerkanalyse exploriert. Dafür wurde eine Stichprobe von $N = 341$ Personen, die eine ambulante Psychotherapie suchten, verwendet. Folgende Konstrukte wurden in das Netzwerk integriert: interpersonelle Probleme, aktive und passive Modi der Konfliktverarbeitung, Persönlichkeitsstruktur, Depression und somatische Probleme. Die Ergebnisse zeigen, dass psychodynamische Konstrukte getrennt zur Psychopathologie sind. Bezüglich der Konflikte zeigte sich eine negative Verbindung zwischen den aktiven und passiven Modi. Interessanterweise war der aktive Konfliktmodus nicht mit Psychopathologie verbunden, während der passive Modus positive Assoziationen sowohl mit

Depression als auch mit somatischen Problemen zeigte. Die Persönlichkeitsstruktur erwies sich als das wichtigste Konstrukt im Netzwerk. Sie zeigte sowohl die stärksten Verbindungen im Netzwerk insgesamt als auch die stärksten Verbindungen zur Psychopathologie verglichen mit den restlichen psychodynamischen Konstrukten. Dies deutet darauf hin, dass für den Therapieerfolg die Fokussierung der psychischen Struktur von Patient:innen entscheidend sein könnte.

Studie 2 untersuchte die Beziehung zwischen Konflikt und Struktur in einer Stichprobe von $N = 220$ ambulanten Patient:innen anhand von OPD-2 Interviewdaten. Sechs Konflikte und die acht in der OPD-2 definierten Strukturdimensionen wurden in das Netzwerk aufgenommen. Die Ergebnisse zeigten, dass psychodynamische Konflikte und die Persönlichkeitsstruktur am besten als zwei unterschiedliche Cluster im Netzwerk dargestellt werden, was die Annahme von getrennten Achsen in der OPD stützt. Der Individuations- vs. Abhängigkeitskonflikt zeigte die stärksten Verbindungen mit den Strukturdimensionen. Die veranschaulicht, dass Personen mit diesem Konflikt häufig größere strukturelle Beeinträchtigungen haben.

In **Studie 3** wurde eine Stichprobe von $N = 1636$ stationären Psychotherapie-Patient:innen verwendet, um den Zusammenhang zwischen der Kurzform des OPD-Strukturfragebogens (OPD-SFK) und der 16-Item-Version des Inventars zur Persönlichkeitsorganisation (IPO-16), welches die Persönlichkeitsorganisation nach Kernberg erfasst, zu untersuchen. Mit Hilfe von Korrelationsanalysen wurde der Zusammenhang zwischen den Gesamtwerten und den Subskalenwerten der Fragebögen untersucht. Zudem wurde die Dimensionalität der Items mit Hilfe eines Clusteralgorithmus untersucht. Die Ergebnisse zeigen, dass die beiden Fragebögen hoch korreliert, aber nicht multikollinear sind. Demnach erfassen die Fragebögen ein ähnliches, aber nicht identisches Konstrukt. Die mit dem Clusteralgorithmus ermittelten Dimensionen repräsentieren weitestgehend die ursprünglichen Subskalen. Die Ergebnisse deuten darauf hin,

dass die Subskalen der beiden Fragebögen unterschiedliche Aspekte der Persönlichkeits-funktionen erfassen und somit beide zu einer gründlicheren Diagnostik beitragen können.

Studie 4 replizierte und erweiterte die Ergebnisse von Studie 1, indem sie die Zusammenhänge zwischen psychodynamischen Konstrukten und Psychopathologie auf der Subskalenebene in einer klinischen Stichprobe von $N = 2232$ stationären Psychotherapie-Patient:innen untersucht wurden. Insgesamt wurden acht verschiedene interpersonale Beziehungsmuster, die aktiven und passiven Modi von sechs OPD-Konflikten, sowie die Subskalen des OPD-SFK und des IPO-16, sowie verschiedene Psychopathologien in das Netzwerk aufgenommen. Wie in Studie 1 ordneten sich die psychodynamischen Konstrukte und die Psychopathologien in getrennte, aber miteinander verbundene Cluster an. Dies bestätigt die Annahme der OPD, dass psychodynamische Konstrukte als unabhängig von der Psychopathologie zu sehen sind. Bei den meisten Konflikten waren die aktiven und passiven Konfliktmodi negativ korreliert. Die passiven Modi waren in der Regel stärker mit Psychopathologie assoziiert als die aktiven Modi. Erneut spielte die Persönlichkeitsstruktur eine zentrale Rolle im Netzwerk, da die OPD-SFK Subskala „Selbstwahrnehmung“ von allen psychodynamischen Konstrukten die stärksten Zusammenhänge mit der Psychopathologie aufwies. Dies unterstreicht erneut die Notwendigkeit, die psychische Struktur von Patient:innen und insbesondere die Fähigkeit zur Selbstwahrnehmung in der Psychotherapie zu fokussieren.

Neben der Zusammenfassung und Diskussion der wichtigsten Ergebnisse dieser vier Studien werden in der Dissertation auch Limitationen und weitere Forschungsfragen, die sich aus den Studien ergeben, aufgezeigt. Insgesamt erweitert diese Dissertation unser Verständnis der psychodynamischen Konstrukte in der OPD und leistet einen wichtigen Beitrag sowohl für die klinische als auch für die wissenschaftliche Praxis.

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Study 2. Vierl, L., Von Bremen, C., Hagmayer, Y., Benecke, C., & Sell, C. (2023). How are psychodynamic conflicts associated with personality functioning? A network analysis. *Frontiers in Psychology.* 15:1152150. https://doi.org/10.3389/fpsyg.2023.1152150

Study 3. Vierl, L., Hörz-Sagstetter, S., Benecke, C., Spitzer, C., & Juen, F. (2024). All the same? Different measures of personality functioning are similar but distinct. A comparative study from a psychodynamic perspective using exploratory graph analysis. *Journal of personality assessment. 106*(3), 314-327. https://doi.org/10.1080/00223891.2023.2251150

Study 4. Vierl, L., Wülfing, P., Juen F., Hörz-Sagstetter, S., Spitzer, C., & Benecke, C. (2024). Unravelling inter-relations within and between psychodynamic constructs and psychopathology using network analysis. *Personality and mental health.* 1-16. https://doi.org/10.1002/pmh.1628

Abbreviations

AMPD	Alternative Model of Personality Disorders
BSI	Brief Symptom Inventory
C0	Limited perception of conflicts and feelings
C1	Individuation vs. dependency conflict
C2	Submission vs. control conflict
C3	Need for care vs. autarky conflict
C4	Self-worth conflict
C5	Guilt conflict
C6	Oedipal conflict
C7	Identity conflict
CS	Correlation stability
DSM	Diagnostic and Statistical Manual of Mental Disorders
EGA	Exploratory Graph Analysis
GGM	Gaussian graphical model
IIP	Inventory of Interpersonal Problems
IIP-32	Inventory of Interpersonal Problems – 32 item version
ICD	International Classification of Diseases
IPO	Inventory of Personality Organization
IPO-16	Inventory of Personality Organization – 16 item Version
OPD	Operationalized Psychodynamic Diagnosis
OPD-CQ	OPD Conflict Questionnaire
OPD-SQ	OPD Structure Questionnaire
OPD-SQS	OPD Structure Questionnaire – Short Version
PHQ	Patient Health Questionnaire
STIPO	Structured Interview of Personality Organization
a	Active mode of conflict processing
p	Passive mode of conflict processing

1 General Introduction

The Operationalized Psychodynamic Diagnosis (OPD) is a diagnosis manual based on psychodynamic principles that includes key psychodynamic constructs, namely interpersonal relations, psychodynamic conflicts, and personality structure (Arbeitskreis OPD, 2023). These psychodynamic constructs are thought to explain the development and maintenance of mental disorders and are therefore targeted in psychodynamic treatment (e.g., Rudolf, 2010). Understanding of the associations between the psychodynamic constructs and how they relate to other related constructs and to psychopathology is important for both clinical and scientific practice. For example, knowledge about the associations between psychodynamic constructs and psychopathology is needed for case conceptualisation and treatment planning but also to move psychodynamic research forward.

This dissertation aims to explore how the psychodynamic constructs included in the OPD are associated with each other, with related constructs, and with psychopathology. It includes four empirical studies, all of which contribute to a better understanding of the psychodynamic constructs. In this cumulus, first, the theoretical background of the psychodynamic constructs and of network analysis is provided. Then, the methods used in the four studies are described, followed by a presentation of the main results of each study. Finally, a general discussion, clinical implications, limitations with future directions, and a conclusion are presented.

2 Theoretical Background

This chapter outlines the relevant theoretical background of this dissertation. First, the relevant psychodynamic constructs are introduced, followed by a listing of relevant research in the field. Next, network analysis will be introduced. Finally, it will be outlined how network analysis can be used to explore the associations between psychodynamic constructs and psychopathology.

2.1 Psychodynamic constructs

This dissertation focuses primarily on the psychodynamic constructs of the OPD. Besides these constructs, Kernberg's model of personality organization, as well as other contemporary concepts in personality functioning will be introduced.

2.1.1 Operationalized Psychodynamic Diagnosis

The OPD system was developed as a multi-axial diagnostic and classification system based on psychodynamic principles. Originally developed in the 1990s by a group of psychodynamic researchers and clinicians in Germany, Austria, and Switzerland (Arbeitskreis OPD, 1996), the system has gained wide international recognition over the past decades and has been translated into several other languages, including English, Spanish, and Chinese (OPD Task Force, 2008). It was intended to complement descriptive psychiatric diagnosis systems by incorporating psychodynamic constructs that would allow clinicians to hypothesize about the development and maintenance of mental disorders. Furthermore, it aimed to standardize different terminologies by precisely operationalizing psychodynamic constructs. In doing so, the OPD made a significant contribution to (scientific) communication in the psychodynamic community (Schauenburg, 1998). The OPD can be used for the assessment of psychodynamic constructs, for treatment planning and focus determination, and for process evaluation (Cierpka et al., 2007). In German-speaking countries, it has thus become the gold standard of psychodynamic research and practice (Stasch et al., 2014).

In its second version (OPD-2; Arbeitskreis OPD, 2006), the OPD system assesses five axes: (I) experience of illness and prerequisites for treatment, (II) interpersonal relations, (III) psychodynamic conflicts, (IV) personality structure, and (V) mental and psychosomatic disorders according to the Diagnostic and Statistical Manual of Mental Disorders (DSM) or the International Classification of Diseases (ICD). In its most recent third version (OPD-3; Arbeitskreis OPD, 2023), axes I and V have been taken together, so that it only includes four

axes. The axes can be reliably and validly assessed through a psychodynamic interview by trained clinicians (Benecke et al., 2009; Cierpka et al., 2001; Doering et al., 2014; Kaufhold et al., 2017; Lackmann et al., 2023; Schneider et al., 2008; Zimmermann et al., 2012) or through self-rating questionnaires (Benecke et al., 2018; Ehrenthal et al., 2012; Ehrenthal et al., 2015; Zimmermann et al., 2014). The three psychodynamic axes (axes II, III, and IV) are briefly described below.

2.1.1.1 Interpersonal relations. The understanding that repetitive, dysfunctional relation patterns play an important role in the development and maintenance of psychopathology has long been understood and recognized across disciplines (e.g., Benjamin, 1974; Hopwood et al., 2013; Horowitz, 1996; Leary, 1957; Luborsky & Crits-Christoph, 1997). From a psychodynamic perspective, relation patterns emerge when experiences with early significant others (e.g., caregivers) are “transferred” to new relationships (cf. Freud's concept of transference, 1912). These relation patterns are dysfunctional when they become rigid and are reinforced by self-fulfilling vicious cycles. The resulting relationship behavior can be understood as an expression of the interplay between partly unconscious relationship wishes and desires and the associated fears about how the other person might react. In the OPD, both the patient's perspective, as well as the perspective of others (e.g. the diagnostician) are considered. This results in a total of four interpersonal perspectives: (1) how the patient experiences others; (2) how the patient experiences himself/herself; (3) how others experience the patient; and (4) how others experience themselves in relation to the patient. For each perspective, the relationship patterns are selected from 32 interpersonal patterns, which are arranged as a circumplex model with the axes of affiliation (hostility vs. friendliness) and interdependence (control vs. submissiveness). Finally, a hypothesis is formulated to provide an explanation for the maintenance of the dysfunctional relation patterns. Here it is elaborated how the patient, in contradiction to his/her actual self-

experience, repeatedly shapes relationships in such a way that others react to him/her according to his/her expectations (Arbeitskreis OPD, 2023).

The OPD interpersonal relation axis can be assessed in a psychodynamic interview. In contrast to the OPD-2, the axis is rated dimensionally in the OPD-3. In addition, in the OPD-3 a research version was introduced, which enables the scientific evaluation of the interview data and which has been shown to have moderate to good interrater reliability (Lackmann et al., 2023). Regarding questionnaires, Zimmermann et al. (2014) introduced the Maladaptive Interpersonal Patterns Q-Sort, a card-sorting procedure to assess interpersonal behaviors typical of oneself and significant others. However, this procedure is quite complex. In research, the Inventory of Interpersonal Problems (IIP; Horowitz et al., 2000) and its short versions (e.g., IIP-32; Thomas et al., 2011) are more commonly used. However, these questionnaires only assess the patient's perspective on his or her own interpersonal difficulties and therefore do not fully capture the interpersonal relation axis of the OPD.

2.1.1.2 Psychodynamic conflicts. Psychodynamic conflicts are understood as long-lasting, mostly unconscious inner conflicts that manifest themselves in the person’s experiences and behavior across various areas of life, such as the family of origin, relationships, work, social contexts, possessions, body, sexuality, or in the way an individual experiences illness (Arbeitskreis OPD, 2023). A conflict initially arises when contrasting basic motivational needs confront each other within an individual. Its roots often lie in recurring experiences, such as conflictual interactions with or specific demands from caregivers during early childhood. These early behavioral patterns are thought to re-emerge in later life, influencing behavior and perceptions and may lead to psychological distress (Benecke et al., 2018).

The OPD conflict axis describes seven conflicts: individuation vs. dependency (C1), submission vs. control (C2), need for care vs. autarky (C3), self-worth conflict (C4), guilt conflict (C5), oedipal conflict (C6), and identity conflict (C7). In addition, a separate category is

described for a limited perception of conflicts and feelings (C0). A brief description of the conflicts, their underlying motivational themes, and their extreme ways of processing are given in Table 1.

Table 1

Psychodynamic conflicts according to the Operationalized Psychodynamic Diagnosis (OPD)

Conflict	Theme	Passive mode	Active mode
C1: Individuation vs. dependency	Affiliation	Excessive dependency on others, existential fear of being left alone	Excessive need for autonomy and independency
C2: Submission vs. control	Agency	Submitting to others, traditions, or other obligations	Striving for dominance and power to control others
C3: Need for care vs. autarky	Care	Demanding care from others	Not demanding anything from others, taking care of others
C4: Self-worth conflict	Self-worth	Devaluing oneself, sense of shame and feeling worthless	Overvaluing oneself, exaggerated self-confidence
C5: Guilt conflict	Responsibility	Feeling guilty, blaming oneself	Rejecting responsibility, externalizing guilt, blaming others
C6: Oedipal conflict	Sexual roles	Avoiding attention and competition, unremarkable appearance	Seeking admiration and competition, wanting to be noticed, sometimes erotic appearance,
C7: Identity conflict	Identity	Inconsistent identity	Adoption of identity
C0: Impaired perception of conflict and affect	Tendency to not experience conflicts or emotional reactions		

Note. Adapted from "Unravelling inter-relations within and between psychodynamic constructs and psychopathology using network analysis" by L. Vierl, P. Wülfing, F. Juen, S. Hörz-Sagstetter, C. Spitzer, and C. Benecke, 2024, Personality and mental health, p.3.

At best, the individual can deal with both sides of the conflict in a flexible and adaptive way. For example, the individuation vs. dependency conflict is balanced when a person is able to form and maintain close relationships while also feeling autonomous and secure without another person. However, a motivational conflict occurs when the two conflicting needs cannot be integrated, and a person tries to "solve" the problem by taking sides while defending against the other need of the conflict. These extreme ways of dealing with an inner conflict are described in the OPD as passive (p) or active (a) modes of conflict processing. Both processing modes serve to avoid negative affects that are linked to the underlying motivational system and that are often very painful due to personal experiences. The passive modes are generally associated with a more regressive behavior. For example, individuals who passively process the individuation vs. dependency conflict (C1p) tend to show an exaggerated need for closeness, while being alone is experienced as an existential thread. In contrast, patients in the active modes often behave more progressively, while actively defending against the motivational theme. For example, when actively processing the individuation-dependency conflict (C1a), attachment needs are suppressed, and interpersonal closeness is avoided in favor of an exaggerated need for autonomy. Both processing modes come at the cost of leaving the other pole of the motivational theme unsatisfied, thus preventing the conflict from being solved in a balanced way.

The OPD conflict axis can be reliably assessed in a psychodynamic interview (Kaufhold et al., 2017; Lackmann et al., 2023). In addition, the conflicts C1 – C6 can be assessed using the self-rating OPD-conflict questionnaire (OPD-CQ; Benecke et al., 2018).

2.1.1.3 Personality structure. The OPD level of structural integration axis conceptualizes personality structure as the integration of psychological core functions related to oneself and others (referred to as “objects” in psychoanalytic terminology). The OPD-2 outlines four structural domains: perception, regulation, communication, and attachment. Each domain consists of a self-related and an object-related dimension (see Table 2). The OPD-3 has re-

included defense as an additional domain. Each domain is further described by three structural facets that specify structural capacities and functions. The level of structural integration overall and in each domain is rated in seven levels: good, good-moderate, moderate, moderate-low, low, low-disintegrated, and disintegrated (Arbeitskreis OPD, 2023).

The OPD level of structural integration axis can be reliably assessed through a psychodynamic interview (Benecke et al., 2009; Doering et al., 2014; Kaufhold et al., 2017; Lackmann et al., 2023). Regarding self-rating questionnaires, the OPD Structure Questionnaire (OPD-SQ; Ehrenthal et al., 2012) and its short version (OPD-SQS; Ehrenthal et al., 2015) have been introduced.

Table 2

Structural dimensions in the OPD-2

Self	Objects
Self-perception	Object perception
Self-reflection	Self-object differentiation
Affect differentiation	Whole object perception
Identity	Realistic object perception
Self-regulation	Regulation of object relationships
Impulse control	Protecting relationships
Affect tolerance	Balancing of interests
Self-worth regulation	Anticipation
Internal communication	Communication with the external world
Experience of affects	Making contact
Use of fantasies	Affect communication
Bodily self	Empathy
Attachment to internal objects	Attachment to external objects
Internalization	Ability to form attachments
Use of introjects	Accepting help
Variable and triangular attachments	Detaching from relationships

Note: From “How are psychodynamic conflicts associated with personality functioning? A network analysis” by L. Vierl, L. Von Bremen, Y. Hagmayer, C. Benecke, and C. Sell, 2023, Frontiers in Psychology, 14, p.3.

2.1.2 Personality organization according to Kernberg

Another highly influential psychodynamic concept of personality functioning is Kernberg's theoretical model of personality organization (Kernberg, 1967, 1984, 1996). Kernberg places a strong emphasis on an individual's object relations, which refers to the way they perceive and relate to others. Kernberg emphasizes the importance of early experiences in the first years of life in shaping personality. Personality organization can be categorized into four levels: normal, neurotic, borderline, and psychotic. The levels are based on the individual's capacity for identity diffusion, primitive defenses, and reality testing. Briefly, ´identity diffusion` describes the degree of integrated concepts of self and significant others; ´primitive defenses` describes the level of maturity of defense mechanisms; and ´reality testing` represents the ability to distinguish self/intrapsychic from non-self/external. The degree of impairment in these domains is described on a continuum from normal to pathological personality characteristics. Personality organization has important prognostic implications and can be used for treatment planning (Kernberg & Caligor, 2005).

Personality organization can be assessed reliably through the structured interview of personality organization (STIPO; Clarkin et al., 2004; Clarkin et al., 2016; Doering et al., 2013; Stern et al., 2010) or by using the Inventory of Personality Organization (IPO; Lenzenweger et al., 2001) and its short versions (e.g., the 16 item version IPO-16; Zimmermann et al., 2013). Both the STIPO and the self-report questionnaires were found to be largely correlated ($.68 \leq r \leq .81$) with ratings of personality structure according to the OPD (Benecke et al., 2018; Doering et al., 2013; König et al., 2016).

2.1.3 Personality functioning

In the past decade, both personality structure and personality organization have received a great amount of attention also outside of psychodynamic practice and research because of their similarity to the new classification of personality disorders as introduced in the ICD-11 (World

Health Organization, 2019) and in the DSM-5 Alternative Model of Personality Disorders (AMPD; American Psychiatric Association, 2013). In the previous classification systems, personality disorders were conceptualized categorically (e.g., World Health Organization, 1992). However, this model has come under criticism as the disadvantages of this approach have been increasingly highlighted, including the lack of empirical evidence to support the ten distinct personality disorders (O'Connor, 2005) or the categorical system in general (Clark, 2007), the high amount of diagnostic comorbidity (Tyrer et al., 2015), arbitrary thresholds (Clark, 2006), and the clinical importance of subthreshold difficulties (Karukivi et al., 2017). Therefore, in the DSM-5 AMPD and the ICD-11, the conceptualization of personality disorders has shifted to a dimensional approach in which the severity of personality difficulties is rated from absent to severe personality disorder. Inspired by the psychodynamic tradition (Bender et al., 2011; Kernberg, 1984), the severity of personality disorder is assessed by personality functioning, which includes both *intra*personal functioning (identity integration and self-direction) and *inter*personal functioning (empathy and intimacy). In the DSM-5 AMPD, the clinically relevant personality traits are specified in a second module (Krueger et al., 2014), while this is optional in the ICD-11 (World Health Organization, 2019).

Previous research has shown that personality functioning according to the ICD-11 or the DSM-5 AMPD is empirically and conceptually strongly related to both personality structure and personality organization (Blüml & Doering, 2021; Clarkin et al., 2020; Hörz-Sagstetter et al., 2021; Kampe et al., 2018; Sell & Benecke, 2022; Zettl et al., 2019; Zimmermann, Böhnke, et al., 2015; Zimmermann et al., 2012; Zimmermann et al., 2020). The psychodynamic terms can thus be used roughly synonymously with personality functioning (Hörz-Sagstetter et al., 2021). Yet, a key difference between the psychodynamic approaches and the new personality classification systems is their theoretical underpinnings. While the ICD-11 and the DSM-5 AMPD are predominantly descriptive diagnostic systems, the psychodynamic concepts also provide

theoretical frameworks, including clear implications for differential treatment planning and prognosis (Blüml & Doering, 2021). Furthermore, the psychodynamic models are not limited to the conceptualization and understanding of personality disorders but are more broadly applicable to any mental disorder and also to non-clinical individuals.

To simplify the terminology in this dissertation, the term personality functioning is used as a general term in this thesis. Only when discussing the differences between the personality structure according to OPD and Kernberg's model of personality organization, the respective terms are used.

2.2 Literature review

In the following, the empirical literature that has examined the relationships between the psychodynamic constructs of the OPD is summarized, followed by a presentation of studies that have examined the relationships between the psychodynamic constructs and psychopathology.

2.2.1 Associations between psychodynamic constructs

2.2.1.1 Interpersonal problems and psychodynamic conflicts. Henkel et al. (2022) examined the associations of the OPD conflicts with interpersonal problems. The conflicts with the most pronounced interpersonal problems were C2p, C4p, and C5p. Within the conflicts, the processing modes were mostly associated with opposite relational patterns and were broadly consistent with the conflictual theme. For example, patients who scored high on C1a described themselves as cold, vindictive, and socially inhibited, whereas patients with high scores on C1p described themselves as intrusive and self-sacrificing.

2.2.1.2 Interpersonal problems and personality functioning. Spitzer et al. (2004) investigated how the level of structural integration according to the OPD is related to interpersonal problems. Their findings suggest that patients with lower levels of structural integration reported significantly more interpersonal difficulties. In addition, they described themselves as colder and more vindictive.

2.2.1.3 Psychodynamic conflicts and personality functioning. Studies generally indicate that passive modes of conflict processing are more strongly associated with personality functioning than active modes (Benecke et al., 2018; Henkel et al., 2022; Remmers, Wester, et al., 2023). However, the studies found that the active mode of the care vs. autarky conflict (C3a) showed stronger correlations with personality functioning than the passive mode (C3p). The strongest correlations between conflict and personality functioning were found for C4p and C5p (Benecke et al., 2018; Remmers, Wester, et al., 2023). However, when controlling for symptomatology, the strongest partial correlation was found for C1p (Henkel et al., 2022). This is consistent with previous research using OPD interview data, which demonstrated that C1 was significantly more frequently identified as the main conflict in individuals with lower levels of structural integration (Grande et al., 1998; Kaufhold et al., 2017). However, the findings for the other conflicts were somewhat inconsistent. Grande et al. (1998) found that C4 occurred more frequently at a lower structural level, while C2 and C6 were more frequently diagnosed in patients with higher structural levels. Kaufhold et al. (2017), in contrast, found that C3 and C4 were significantly more frequent in patients with higher structural levels, while the remaining conflicts were independent of the structural level. However, due to the small number of patients identified with C6 or C7, no valid statements about these conflicts could be made.

2.2.2 Associations between psychodynamic constructs and psychopathology

The previous literature that empirically examined the associations between the OPD constructs and psychopathology is summarized below.

2.2.2.1 Interpersonal problems and psychopathology. The overall level of interpersonal problems has been found to be associated with a variety of psychiatric disorders, including depression, anxiety, eating disorders (e.g., McEvoy et al., 2013), dependence disorders (Girard et al., 2017), and personality disorders (Dammann et al., 2016; Girard et al., 2017). In addition, a recent meta-analysis revealed that overall interpersonal problems were a small but

robust negative predictor of psychotherapy outcome in the treatment of depression and anxiety (Gómez Penedo & Flückiger, 2023).

2.2.2.2 Psychodynamic conflicts and psychopathology. Empirical research has shown that most OPD conflicts are positively associated with symptom severity, with the strongest associations found for C4p and C5p. In contrast, the respective active modes, C4a and C5a, were found to be negatively associated with symptomatology, suggesting that individuals who tend to overvalue themselves and project guilt onto others do not experience psychic distress (Benecke et al., 2018; Henkel et al., 2022). In general, researchers have documented that the passive modes of conflict processing are more strongly associated with psychopathology than the active modes of conflict processing. However, across studies, the opposite was found for C3, with C3a being more strongly associated with psychopathology than C3p (Benecke et al., 2018; Gisch et al., 2020; Henkel et al., 2022; Remmers, Wester, et al., 2023).

2.2.2.3 Personality functioning and psychopathology. Personality functioning has been shown to be positively correlated with overall symptom severity (Benecke et al., 2018; Ehrenthal et al., 2012; Ehrenthal et al., 2015; Ehrenthal et al., 2023), as well as with the severity of all types of psychopathology, including depression (Dagnino et al., 2020), bipolar disorder (Wagner-Skacel et al., 2020), anxiety (Doering et al., 2018), posttraumatic stress disorder (Baie et al., 2020), eating disorders (Klein et al., 2022; Rohde et al., 2023), somatization (Macina et al., 2021), substance abuse (Rentrop et al., 2014), and personality disorders (Obbarius et al., 2019). The level of structural integration has also been found to mediate between child maltreatment and depression (Dagnino et al., 2020; Freier et al., 2022; Kerber et al., 2023), anxiety (Freier et al., 2022; Kerber et al., 2023), (complex) posttraumatic stress disorder (Kampling et al., 2022), somatization (Kerber et al., 2023; Krakau et al., 2021), and body dysmorphic concerns (Krakau et al., 2021). Furthermore, personality functioning has been found to be associated with treatment outcome. Frank and Huber (2021) demonstrated that an improvement in personality

functioning during inpatient psychodynamic psychotherapy is associated with symptom reduction. In addition, Koelen et al. (2012) found in their systematic review that patients with better personality functioning at baseline responded better to psychotherapy.

2.3 Network analysis

Overall, it can be said that several studies have already examined the relationships between the psychodynamic constructs and their associations with psychopathology. However, to date, no study has examined the associations within and between all OPD constructs and psychopathology at the same time. Because it is difficult to compare the magnitude of correlations across studies, there is so far no empirical evidence as to which of these constructs is most strongly associated with psychopathology. Also, partial correlations have not always been reported in addition to correlations. However, this is recommended because of the significant amount of shared variance that has been reported between the psychodynamic constructs (Henkel et al., 2022; Obbarius et al., 2021; Remmers, Wester, et al., 2023). A statistical method that is particularly well suited to compute and visualize partial correlations between various constructs simultaneously is network analysis (Barabási, 2012).

2.3.1 Psychological networks

In the last decade, network analysis has gained significant attention in the field of psychology, as it provides an alternative conceptualization of psychopathology to the latent variable model (Borsboom, 2017; Borsboom & Cramer, 2013; Bringmann et al., 2022; Cramer et al., 2010; Hofmann et al., 2016; McNally, 2016) and offers a new perspective for understanding comorbidity (Borsboom & Cramer, 2013; Cramer et al., 2010; Jones et al., 2019). Thereby, network models focus on the connections between symptoms instead of the severity of a symptom. In a network plot, (psychological) variables are represented as *nodes* and their relationships are portrayed as *edges*. In most psychological network models, edges represent partial correlations that account for the influence of all other variables in the network.

2.3.2 Network centrality

Nodes differ in the role they play in the network. The importance of each node for a given process and their interconnectivity in the network can be quantified by several descriptive measures of node indices. In psychological networks, the most used indices are strength centrality and expected influence centrality (Bringmann et al., 2019; Epskamp, Borsboom, et al., 2018). Which centrality index to use depends on the research question. *Strength* is the sum of the *absolute* edge weights a given node shares with all other nodes in the network, thus measuring the overall connectedness of a node in the network (Freeman, 1978). *Expected influence* is the sum of the *relative* edge weights (i.e., negative edges are subtracted) that a node shares with other nodes in the network, thus measuring the overall positive connectedness of a node in the network (Robinaugh et al., 2016). Nodes with increased connectedness (i.e., high centrality) are assumed to have greater influence on other nodes due to their extensive connections. The most central nodes are therefore considered potential targets for treatment interventions (Borsboom, 2017; McNally, 2016). This is supported by studies that have found central symptoms to be more predictive of treatment outcome than less interconnected symptoms (e.g., Levinson et al., 2022; Olatunji et al., 2018; Robinaugh et al., 2016). Yet, it is important to note, that there is also contradicting empirical evidence (Rodebaugh et al., 2018) and that some scholars have voiced criticism of centrality and questioned its interpretability (Bringmann et al., 2019; Dablander & Hinne, 2019; Hallquist et al., 2021; Neal et al., 2022).

2.3.3 Bridge nodes

Network analysis also enables the identification of bridge nodes, which are nodes from one community that exhibit strong associations with nodes in another community, thereby connecting these communities (Jones et al., 2019). The definition of communities is left to the researcher, often representing clinical disorders in psychopathology research. Similar to centrality indices, *bridge strength* represents a node's *absolute* connectivity with all nodes from

another community (or communities), while *bridge expected influence* represents a node's *relative* sum of edge weights shared with nodes from another community. Clinically, identifying bridge symptoms offers empirical insights into how a symptom in one community may activate symptoms in another, thereby helping clinicians in understanding comorbidity (Cramer et al., 2010). To treat or prevent comorbidity, clinicians are recommended to target these bridge symptoms in psychotherapy, as they have been shown to prevent the spread of activation across communities (Jones et al., 2019).

2.3.4 Clustering

Network analysis can be used to empirically investigate how the nodes in the network cluster together (Newman & Girvan, 2004). Clustering refers to the tendency of nodes to group together based on their interconnectedness to other nodes in the network (Golino & Epskamp, 2017). An emerging method that determines the clustering of nodes in a network is exploratory graph analysis (EGA).

2.3.5 Network stability and generalizability

Network stability indicates how accurate the estimated parameters (i.e., edge weights, centrality, bridge centrality) are and how likely they are to be replicated in another sample. For the stability of the estimates, a case-dropping bootstrap method is used to test whether the order of the estimates remains the same after re-estimating the network using only a subset of the data. In addition, the accuracy of edge weights can be assessed by estimating bootstrapped confidence intervals (CIs). To avoid over-interpretation of point estimates, bootstrap difference tests are available to determine whether the differences between two estimates is significant (Epskamp, Borsboom, et al., 2018). When strictly adhering to the tutorial for network stability analyses (Epskamp, Borsboom, et al., 2018), Fried et al. (2021) argue that most of the criticism of network analysis (e.g., Forbes et al., 2019, 2021) is unjustified.

2.4 Network analysis and the Operationalized Psychodynamic Diagnosis

Network analysis holds significant promise for increasing our understanding of the psychodynamic constructs of the OPD, by shedding light on the associations among them and their associations with psychopathology. Centrality measures can identify the most interconnected psychodynamic construct(s), serving as a basis for formulating hypotheses regarding potential treatment targets. Identifying bridge nodes that connect psychodynamic constructs to psychopathology enables the identification of the psychodynamic construct most strongly linked to mental illness, which should according to network theory represent valid targets for treatment interventions. Moreover, the use of difference tests allows for the assessment of statistical significance in the difference of the (bridge) centrality values, improving the interpretability of the results. Additionally, cluster analysis is a helpful tool in answering specific research questions. For example, it aids in empirically investigating whether psychodynamic constructs and psychopathology are distinct entities or exhibit substantial overlap. Similarly, it can be used to assess the distinctness of the OPD axes. In summary, employing network analysis on OPD data holds the potential to yield more nuanced insights than traditional methods and previous research. The findings can significantly contribute to case conceptualization, treatment planning, and further research.

3 Aim of the Present Thesis

The present cumulative dissertation aims to use network analysis in order to increase understanding of the psychodynamic constructs as defined in the OPD. Overall, it aims to investigate the associations within these psychodynamic constructs, and between the psychodynamic constructs and psychopathology. Each study has a specific focus and distinct objectives that are outlined alongside the proposed hypotheses in the following.

In **Study 1** (Vierl, Juen, et al., 2023), we employed network analysis to explore the associations between psychodynamic constructs and psychopathology on a global level. To accomplish this, we included interpersonal problems, the combined active and the combined passive modes of conflict processing, personality structure, as well as depression and somatic problems in the network.

Study aims: We aimed to identify the most central node in the network, uncover bridge nodes connecting psychodynamic constructs with psychopathology, and explore how the constructs clustered in the network to determine if psychodynamic constructs and psychopathology were distinct.

Hypotheses: We expected positive associations between psychopathology and all included psychodynamic constructs (Arbeitskreis OPD, 2023). Further we expected stronger associations of the passive than the active modes of conflict processing with psychopathology (Henkel, 2022). We also anticipated the formation of separate but interconnected clusters between psychodynamic constructs and psychopathology. As this study was exploratory, we did not pose specific hypotheses regarding the most central node, nor the bridge nodes.

In **Study 2** (Vierl, Von Bremen, et al., 2023), we employed network analysis to explore the associations between psychodynamic conflicts and personality structure according to the OPD-2 using interview data. To achieve this, we included the conflicts C1 to C6 (see Table 1) and the eight structural dimensions (see Table 2) as nodes in the network.

Study aims: We aimed to investigate the network structure to determine the inter-connections within and between psychodynamic conflicts and structural dimensions. Additionally, we aimed to identify the most central node(s) in the network and detect bridge nodes that indicate the strongest connections between psychodynamic conflicts and personality structure. Lastly, we aimed to identify clusters within the network to determine if conflicts and structure can be seen as independent.

Hypotheses: We expected finding particularly strong associations between C1 and structural dimensions, as previous research suggest a greater prevalence of this conflict at lower levels of structural integration (Kaufhold et al., 2017; Rudolf, 2020). Since psychodynamic conflicts and personality structure represent two axes in the OPD (2023), we expected that the conflicts and structural dimensions would form separate clusters.

In **Study 3** (Vierl, Hörz-Sagstetter, et al., 2024), we examined the similarities and differences of two psychodynamic self-rating questionnaires to assess personality functioning, namely the OPD-SQS and the IPO-16. Knowledge of their associations is important in determining whether there is added value in using both questionnaires in clinical and research settings. If the questionnaires are very similar, either because they are multicollinear or because there is a significant overlap between their individual items, then one questionnaire would be sufficient.

Study aims: We used correlation analyses to investigate the relationship at the global and subscale levels. In addition, we employed network analysis and utilized EGA to examine the dimensionality of the items.

Hypotheses: Based on previous literature (Benecke et al., 2018), we expected a large but non-multicollinear correlation between the global scores. Due to the exploratory nature of this study, we did not hypothesize about the dimensionality of the items.

In **Study 4** (Vierl, Wülfing, et al., 2024), we employed network analysis to uncover the fine-grained associations within and between psychodynamic constructs and psychopathology on a subscale level. We included all interpersonal problems, all active and passive conflict modes, the subscales of personality structure and personality organization, and a variety of psychopathologies in the network. The rationale for this study was to extend and replicate the findings of Study 1.

Study aims: We aimed to examine the network structure to explore the associations between the included constructs, to identify the psychodynamic construct that is most related to other psychodynamic constructs, to detect the bridge nodes between psychodynamic constructs and psychopathology, and to use a cluster algorithm to investigate whether psychodynamic constructs and psychopathology are distinct.

Hypotheses: We expected to find negative associations between active and passive modes of conflict processing across all conflicts. Passive modes of conflict processing were anticipated to show stronger associations with psychopathology compared to the active modes. However, in line with prior studies (Benecke et al., 2018; Henkel et al., 2022; Remmers, Wester, et al., 2023), a reverse effect was predicted for C3, with C3a demonstrating stronger associations with psychopathology compared to C3p. We hypothesized that subscales that assess personality functioning would emerge as the most strongly interconnected psychodynamic constructs in the network and exhibit significantly stronger associations with psychopathology compared to the other included psychodynamic constructs. Lastly, we expected that psychodynamic constructs and psychopathology would form distinct, yet interrelated clusters.

4 Methods

4.1 Participants

The four articles of this dissertation are based on three different samples. The sociodemographic characteristics of all study populations are detailed in Table 3. In all studies, all participants provided written informed consent for the anonymous use of their data for scientific purposes.

Participants in Study 1 were $N = 341$ individuals registering for outpatient psychotherapy at the “Akademie für Psychoanalyse und Psychotherapie, München e.V.” in Munich, Germany, between September 2020 and January 2022. This institute is a certified training center for

Table 3

Sociodemographic characteristics

	Study 1 (*N* = 341)	**Study 2 (*N* = 228)**	**Study 3 (*N* = 1636)**	**Study 4 (*N* = 2232)**
Age	34.56 (12.59) min=18; max=79	37.80 (11.60) min=20; max=71	33.94 (13.29) min=17; max=69	34.25 (13.25) min=17; max=73
Female	239 (70.09%)	132 (57.89%)	1027 (62.78%)	1397 (62.59%)
Educational status				
At school	1 (0.31%)	1 (0.49%)	26 (1.59%)	31 (1.39%)
Without a school-leaving certificate	5 (1.54%)	4 (1.96%)	20 (1.22%)	28 (1.25%)
Less than 12 years	98 (30.15%)	97 (47.56%)	300 (48.90%)	783 (48.97%)
Highschool diploma	84 (25.85%)	64 (31.37%)	466 (28.48%)	624 (27.96%)
University degree	136 (41.85%)	37 (18.14%)	298 (18.2%)	423 (18.95%)
Other	1 (0.31%)	1 (0.49%)	26 (1.59%)	33 (1.48)
Employment				
In training/studying	84 (24.9%)	36 (17.91%)	407 (24.88%)	529 (23.71%)
Employed	196 (57.99%)	97 (48.26%)	562 (34.35%)	784 (35.14%)
Unemployed	26 (7.69%)	39 (19.40%)	327 (14.49%)	444 (19.90%)
Not working	14 (4.14%)	20 (9.95%)	189 (11.55%)	261 (11.70%)
Retired	18 (5.33%)	9 (4.48%)	151 (9.22%)	213 (9.55%)
Relationship status				
Single	157 (46.59%)	70 (34.65%)	766 (46.82%)	1033 (46.47%)
In a relationship	93 (27.60%)	57 (28.21%)	381 (23.29%)	501 (22.54%)
Married	55 (16.32%)	51 (25.25%)	275 (16.81%)	384 (17.27%)
Separated	16 (4.75%)	8 (3.96%)	50 (3.06%)	74 (3.33%)
Divorced	15 (4.45%)	15 (7.43%)	145 (8.86%)	204 (9.18%)
Widowed	1 (0.30%)	1 (0.50%)	19 (1.16%)	27 (1.21%)

psychodynamic and psychoanalytic psychotherapy and provides individual and group therapy for children, adolescents, and adults.

The data in Study 2 was collected as part of intake assessment prior to the experimental manipulation within a RCT study of patients with anxiety and personality disorders (Benecke et al., 2016). Participants were $N = 228$ adults starting outpatient treatment in one of five German clinical outpatient centers (Berlin, Hamburg, Heidelberg, Kassel, Munich) between 2012 and 2017. Use of this data for research purposes was approved by the ethics commission of the University of Kassel (ethics vote of November 2nd, 2011).

Participants for Study 3 and Study 4 were individuals who were hospitalized at the Asklepios Clinic Tiefenbrunn in Germany between June 2016 and March 2020. Upon admission, patients are routinely asked to complete a routine quality assessment consisting of sociodemographic and diagnostic measures. Exclusion criteria included cognitive impairments, severe formal thought disorders and insufficient German language skills. Use of this data for research purposes was approved by the ethics commission of the University Medical Center Rostock (registration number: AZ A 2020-0025). Study 4 included data from all patients ($N = 2232$), whereas Study 3 only included patients who completed the IPO-16 and OPD-SQS without any missing values ($N = 1636$).

4.2 Measures

Studies 1, 3, and 4 relied on self-rating questionnaires. Study 2 used interview data.

4.2.1 Questionnaires

4.2.1.1 Inventory of Interpersonal Problems-32. We utilized the German version of the IIP-32 (Barkham et al., 1996; Thomas et al., 2011) to assess interpersonal problems. The IIP-32 is a self-administered questionnaire consisting of 32 items, each rated on a five-point Likert scale, ranging from 0 (´not at all`) to 4 (´very much`). The following interpersonal problems can be assessed: too domineering, too vindictive, too cold, too socially inhibited, too nonassertive,

too exploitable, too self-sacrificing, and too intrusive. Psychometric assessment of the German version has shown satisfactory to good reliability and validity, with adequate to good subscale reliabilities ($.70 \leq \alpha \leq .86$) (Thomas et al., 2011). The IIP-32 was used in Studies 1 and 4.

4.2.1.2 Operationalized Psychodynamic Diagnosis – Conflict Questionnaire. The OPD-CQ (Benecke et al., 2018) is a 66-item self-report measure to assess six (out of seven) psychodynamic conflicts of the OPD. The identity conflict (C7) has not been included into this questionnaire as it was not possible to develop enough items meeting the expert criteria for this conflict. For all six conflicts both their active and passive modes of processing can be assessed. In addition, the OPD-CQ assesses a defended perception of conflicts and affects (C0). The items are rated on a five-point Likert scale ranging from 0 (´completely false`) to 4 (´completely true`). Good psychometric properties were reported for the total score ($\alpha = .88$) and satisfactory to good for most subscales ($.71 \leq \alpha \leq .89$). However, C0 ($\alpha = .48$), C2a ($\alpha = .68$), and C2p ($\alpha = .55$) showed insufficient internal consistencies (Henkel et al., 2022). Henkel et al. (2022) therefore recommended against the use of C0. The OPD-CQ was used in Studies 1 and 4.

4.2.1.3 Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form. The OPD-SQS (Ehrenthal et al., 2015) is a screening tool for assessing the level of structural integration. It consists of 12 items, each rated on a five-point Likert scale ranging from 0 (´fully disagree`) to 4 (´fully agree`). Three subscales can be derived: self-perception, interpersonal contact, and relationship model. The subscale self-perception focuses on self- and emotion regulation skills, the subscale interpersonal contact assesses interactional skills and aspects of self-uncertainty, and the subscale relationship model captures representations of past relationship experiences and the corresponding expectations to future relationships. Previous literature has demonstrated good psychometric properties, with an internal consistency of $\alpha \geq .88$ for the total score, satisfactory to good reliabilities for the subscales ($.75 \leq \alpha \leq .84$) (Obbarius et

al., 2019), as well as good criterion validity (Ehrenthal et al., 2015; Obbarius et al., 2019). The OPD-SQS was used in Studies 1, 3, and 4.

4.2.1.4 Short form of the Inventory of Personality Organization. The IPO-16 (Zimmermann et al., 2013; Zimmermann, Benecke, et al., 2015) was utilized to assess personality organization according to Kernberg's (1984) model. The IPO-16 consists of 16 items designed to measure identity diffusion, primitive defenses, and reality testing. The items are rated on a five-point Likert scale ranging from 1 (´never true`) to 5 (´always true`). Previous research has shown that the IPO-16 is a reliable tool, with a good internal reliability for the total score (α = .85) and good criterion validity (Zimmermann et al., 2013). The IPO-16 was used in Studies 3 and 4.

4.2.1.5 Patient Health Questionnaire. The German version of the Patient Health Questionnaire (PHQ-D, Löwe et al., 2002), an established self-report screening instrument for common mental disorders, was used to assess the patients' current somatic and depressive symptoms. Somatization was assessed with the PHQ-15 subscale, which assesses the most common somatic symptoms (e.g., abdominal pain, back pain, dizziness). Depressive symptoms were assessed with the PHQ-9 subscale, which assesses the symptoms of major depression disorder according to the diagnostic criteria in DSM-5. Most items in the PHQ-15 were rated on a scale from 0 (´not bothered at all`) to 2 (´bothered a lot`). Items in the PHQ-9 were rated from 0 (´not at all`) to 3 (´nearly every day`). Good reliability and validity values have been reported for both scales, with internal consistencies of α values ranging between .79 and .88 (Gräfe et al., 2004). The PHQ-15 and PHQ-9 were used in Study 1.

4.2.1.6 Brief Symptom Inventory. The German version of the Brief Symptom Inventory (BSI; Derogatis, 1993; Franke, 2000) comprises 53 items that assess clinically relevant psychological symptoms. The items are rated on a five-point Likert scale ranging from 0 (´not at all`) to 4 (´extremely`). Besides to the global severity index, the following nine scales can be

assessed: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The BSI has demonstrated robust psychometric properties, with satisfactory to good internal reliability for the subscales ($.71 \leq \alpha \leq .85$) (Derogatis & Melisaratos, 1983). The BSI was used in Study 4.

4.2.2 Interview data

Study 2 used OPD-2 interview data, assessing psychodynamic conflicts and personality structure. The psychodynamic interviews were administered and rated by OPD licensed and trained clinicians prior to the start of treatment.

For the conflict rating, all seven psychodynamic conflicts outlined in the OPD-2 were rated on a four-point Likert scale ranging from 0 (´absent`) to 3 (´very significant`). In addition, the main conflict and the second most significant conflict were identified. Only for the main conflict, the mode of processing was rated. Adequate inter-rater reliability was demonstrated, with the intraclass correlation coefficient (ICC) ranging from .52 to .64 for most conflicts. Yet, for the identity conflict the ICC was insufficient (Kaufhold et al., 2017).

To evaluate the level of structural integration, the OPD-2 provides a comprehensive operationalized checklist to rate each structural dimension from good (1), good – moderate (1.5), moderate (2), moderate – low (2.5), low (3), low – disintegrated (3.5), and disintegrated (4). Finally, the overall level of structural integration can be determined. Good to very good inter-rater reliability has been demonstrated for the OPD-2 levels of structural integration axis, with Cohen's (1968) kappa ranging from .61 to .82 for the structural dimensions and .83 for the overall level (Benecke et al., 2009).

4.3 Statistical analyses

Analyses of all studies were conducted using *R*Studio (R Core Team, 2023). The *R* packages and versions used in each study can be found in the respective *R* codes, which have been made available online at the Open Science Framework (https://osf.io/3cbnd/).

4.3.1 Missing data

Our approach to dealing with missing data varied across the four studies: In Studies 1 and 2, we first excluded data records with a significant proportion of missing values (10% in Study 1, 33% in Study 2). For the remaining data, we then imputed the missing values by imputing each value ten times using predictive mean matching and retained the mean value of the imputed datasets. In Study 3, we deleted all data records that had missing values on the IPO-16 and OPD-SQS, so that no data imputation was required. In Study 4, we did not impute the missing values, but used all available data to estimate the individual partial correlations using pairwise deletion.

4.3.2 Data transformation

In Study 2, all variables were multiplied by two. This was necessary, because the structural dimensions were measured in 0.5 steps and could therefore not be recognized by the network estimator as ordinal data. In the other studies, no data transformation was needed.

4.3.3 Network analysis

4.3.3.1 Node selection. In Study 1, the global scores of the IIP-32, OPD-SQS, PHQ-15, and PHQ-9, as well as the combined active (CQ-a) and combined passive conflict modes (CQ-p) according to the OPD-CQ were included as nodes into the network. In Study 2, we included the conflicts C1 to C6 and all eight structural dimensions gained from OPD-2 interview data into the network. We removed C7 from the data, as it was only rated significant in one participant. In Study 3, we included all items from the OPD-16 and the IPO-16 as individual nodes into the network. Lastly, in Study 4, we included all eight interpersonal problems according to the IIP-32, all active and passive modes of the conflicts of the OPD-CQ, and all subscales of the OPD-SQS, the IPO-16, and the BSI as nodes into the network.

4.3.3.2 Network estimation. In all studies, we estimated a cross-sectional, regularized Gaussian graphical model (GGM; Epskamp, Waldorp, et al., 2018; Lauritzen, 1996) for continuous data. In a GGM, edges represent partial correlations. To select the model with the

best fit, we followed recommendations for estimating psychological networks (Isvoranu & Epskamp, 2021) and used the Extended Bayesian Information Criterion graphical least absolute shrinkage selection operator (EBICglasso; Epskamp & Fried, 2018) regularization algorithm with the tuning parameter gamma set to 0.5 (Foygel & Drton, 2010). This method reduces the risk of false positive edges by shrinking small edges to zero, thereby resulting in sparser and theoretically more accurate networks (Epskamp, Borsboom, et al., 2018). In all datasets, the variables were skewed, so we used Spearman correlations to obtain more stable network estimates (Epskamp & Fried, 2018).

4.3.3.3 Network visualization. The networks were visualized in the Studies 1, 3, and 4 using a modified version of the Fruchterman-Reingold algorithm (Fruchterman & Reingold, 1991) which places more connected nodes closer to one another. In Study 2, we chose the layout to represent psychodynamic conflicts and structural dimensions as two circles, to improve visual understanding of the associations between them. In Study 4, we used a minimum of .025 to create a more parsimonious network plot. In all other studies no minimum, maximum, or cut value were used. In all network plots, the edges adjust the color saturation and width in relation to the strongest weight of the graph.

4.3.3.4 Centrality indices. To identify nodes that are particularly well connected to other nodes in the network, we calculated centrality indices. We used strength centrality in Study 2 to get information about the overall connectivity. In Study 1, we used expected influence centrality to obtain the positive connectivity. In Study 4, we decided against the use of centrality parameters, since the large correlations within the psychodynamic constructs (e.g., the large correlations within the personality functioning subscales) would have distorted the results. In addition to centrality, in Studies 1 and 4 also predictability was estimated. Predictability is measured as R^2 and quantifies how well a given node can be explained by all remaining nodes (Haslbeck & Fried, 2017; Haslbeck & Waldorp, 2018).

4.3.3.5 Bridge nodes. We additionally identified bridge nodes. In Studies 1 and 4, psychodynamic constructs and psychopathology were defined as the communities. In Study 2, the psychodynamic conflicts and the structural dimensions were defined as the communities. In Study 1, only positive edges emerged between the communities so that we used bridge strength. In Study 2, we used bridge strength to get information about the overall connectivity between psychodynamic conflicts and personality structure. In Study 4, we used bridge expected influence, to identify the psychodynamic construct with the strongest positive connectivity to psychopathology.

4.3.3.6 Difference tests. Difference tests were performed to determine whether the (bridge) centrality of a given node was significantly greater than the (bridge) centrality of the other nodes in the network (Epskamp, Borsboom, et al., 2018). In networks with only few nodes (i.e., Study 1 with 6 nodes and Study 2 with 14 nodes), we interpreted nodes as most central, when they had a greater centrality than at least 50% of the other nodes in the network. Bridge nodes were defined in those networks as the nodes with a higher bridge centrality compared to at least 50% of the other nodes in their community. In Study 4, which included 35 nodes, we required nodes to have a greater (bridge) centrality to at least 85% of the remaining nodes in the overall network for centrality, and within their community for bridge centrality. The edge weight difference test was used in all studies to compare the size of specific pairs of edges.

4.3.3.7 Clustering. In the Studies 1 and 4, we used the spinglass algorithm, a modularity-based community detection algorithm that clusters nodes that are highly connected to nodes within the same community and poorly connected to those in other communities (Traag & Bruggeman, 2009; Yang et al., 2016). In Studies 2 and 3, the Louvain algorithm (Blondel et al., 2008) was used, as it has been proven to be especially effective at detecting clusters that correspond to latent variables (Christensen & Golino, 2021; Golino & Epskamp, 2017).

4.3.3.8 Accuracy and stability of the network estimation. To assess the accuracy and stability of the estimated parameters (edge weights, centrality, bridge centrality, clusters) bootstrap procedures were used. The number of bootstrap samples were in all studies at least 1,000. To assess the stability of all estimates we calculated the correlation stability (CS)-coefficient with the use of case dropping bootstraps. The CS-coefficient indicates the percentage of data that could be removed to maintain a correlation of .70 with the original dataset, with a 95% certainty. CS-coefficients should be above .50 when interpreting a network, while CS-coefficients below .25 indicate unstable networks (Epskamp, Borsboom, et al., 2018). In addition, to estimate the accuracy of edge weights, we calculated the 95% CIs around the original edge value using nonparametric bootstrapping routines. An edge weight is more accurate when it has smaller CIs.

To estimate the stability of the detected clusters, we applied the following methods: In Study 1, we repeated the spinglass algorithm a total of 1,000 times and used the median outcome. In Studies 2, 3, and 4 we used the bootstrap version of EGA (bootEGA) to identify the most common clusters across 1,000 nonparametric bootstrap iterations. In Study 3, we additionally extracted the following information from bootEGA: item stability (i.e., the number of times each item is placed in each dimension), dimension stability (i.e., the number of times the same number of dimensions are replicated), and structural consistency (i.e., the degree of interrelation and homogeneity among items within a dimension). Furthermore, network loadings (i.e., the absolute sum of all edge weights of a given node within each EGA dimension) were calculated, representing the contribution of each item to the coherence of the dimensions.

In Study 4, we additionally conducted robustness analyses by examining alternative network models, including a regularized network with a threshold, and a ggmModSelect network. The resulting edge weights of these networks were then correlated with the ones from the original network.

4.3.4 Additional statistical analysis

In Study 2, we additionally provided the frequencies of the conflicts (overall, the main conflicts, and the second most significant conflict) and the overall level of structural integration. We further compared the prevalence of the conflicts between patients with good/moderate levels of structural integration and those with low/disintegrated levels of structural integration using Fisher's exact test ($\alpha < .05$).

In Study 3, we additionally assessed the correspondence between the global scores and the subscales of the IPO-16 and the OPD-SQS using Pearson correlations. We interpreted them as small, medium, or large based on Cohen's (1988) benchmarks ($r < .30$, $.30 < r < .50$, $r \geq .50$). A correlation $r > .80$ is interpreted as multicollinear (Young, 2018).

5 Results

This chapter summarizes the main results of each of the four studies as part of this dissertation.

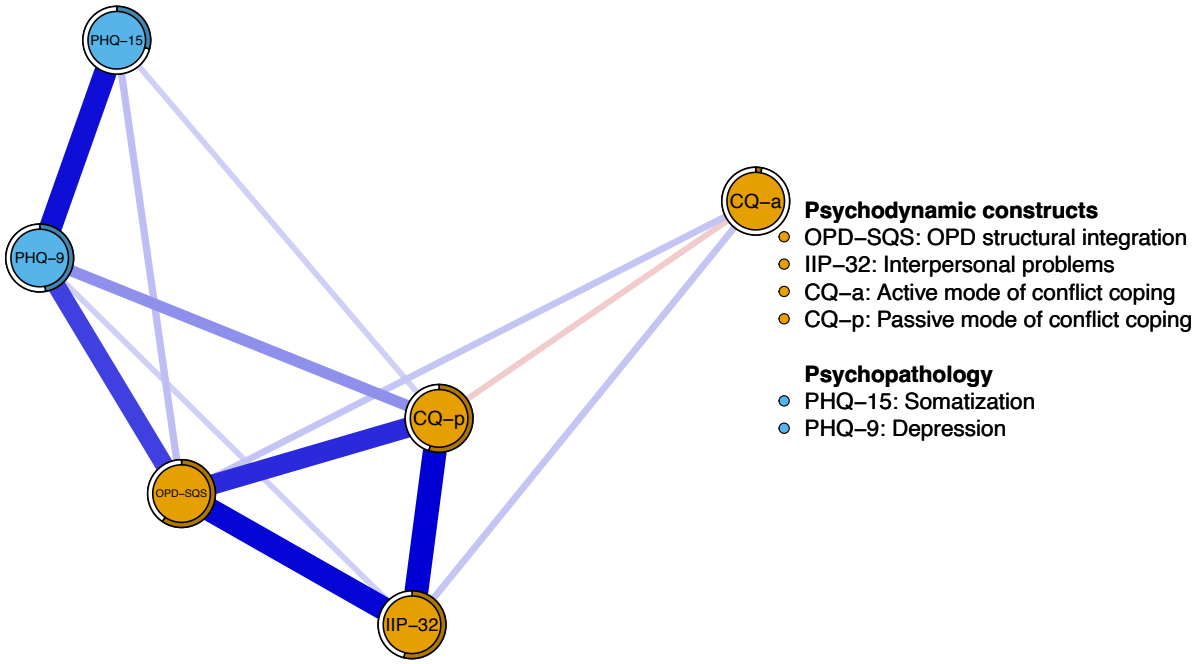
5.1 Study 1: "Exploring the associations between psychodynamic constructs and psychopathology: a network approach"

The resulted network plot of Study 1 is presented in Figure 1. The stability analyses indicated very strong stability (CS-coefficient of expected influence = .75; narrow CI of the edge weights), allowing for reliable interpretations of the estimated parameters. In the network mostly positive edges emerged, except for one negative edge between the active and passive modes of conflict coping. Among the included constructs, personality structure emerged as the most central node. Notably, its expected influence value was significantly greater than all other nodes in the network (see supplementary Figure S5). Further, personality structure was identified as the bridge node with its bridge strength being significantly stronger compared to most other psychodynamic constructs (see supplementary Figure S6).

Interestingly, the active mode of conflict processing showed no associations to psychopathology, while the passive mode was linked to both depression and somatic problems. The cluster algorithm identified three clusters: psychopathology, psychodynamic constructs (i.e., interpersonal problems, personality structure, the passive conflict modes), and the active mode of conflict processing (see supplementary Figure S7).

Figure 1

Network plot of Study 1 (reprinted from Vierl, Juen, et al., 2023, p. 47)



Note. The network model visualizes the relationship between psychopathology (blue circles) and psychodynamic constructs (orange circles). Positive correlations are represented by blue lines, while the red line represents a negative correlation. The thicker the line, the stronger the correlation. The filled part of the circle around each node depicts predictability.

5.2 Study 2: "How are Psychodynamic Conflicts Associated with Personality Functioning? A Network Analysis"

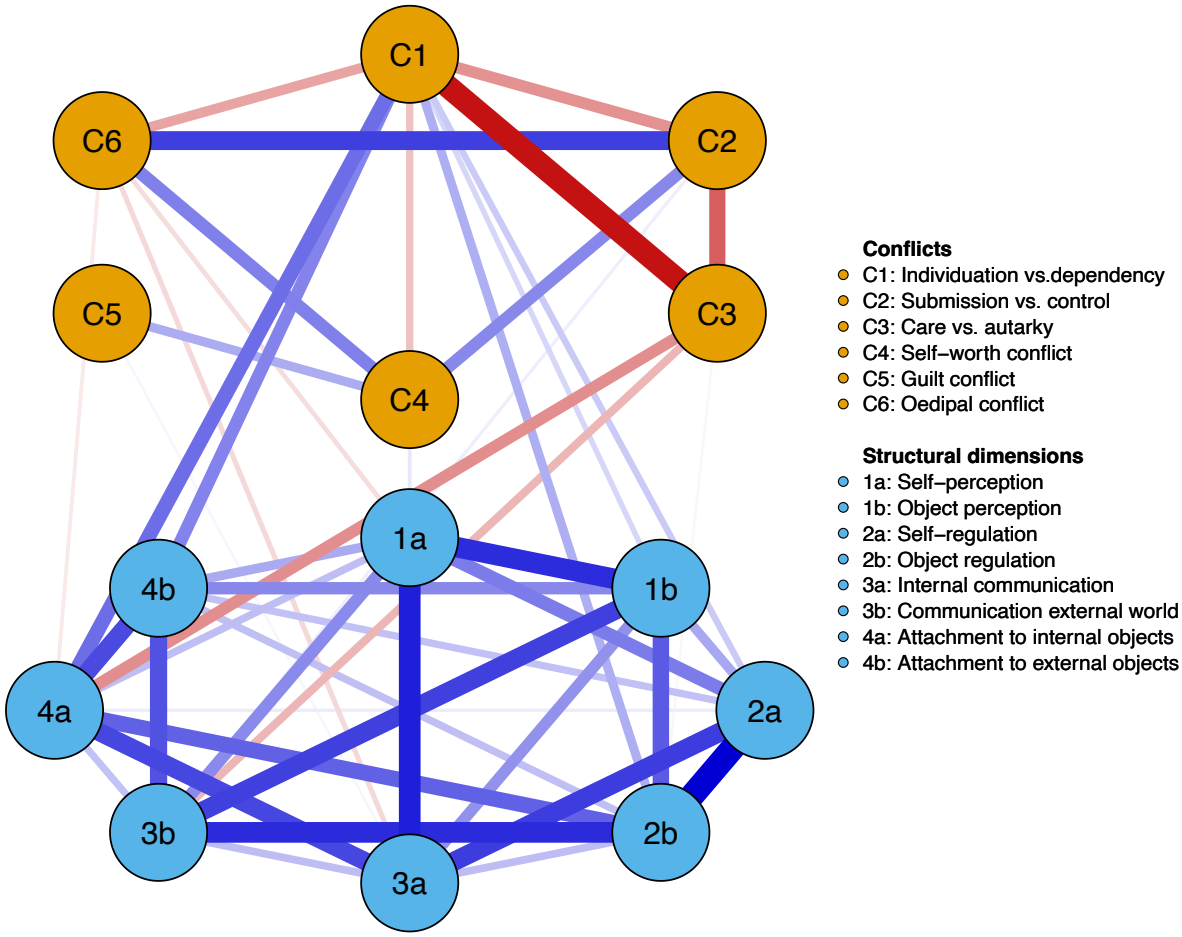
The resulted network plot of Study 2 is presented in Figure 2. The stability analyses indicated very strong stability (CS-coefficients of strength centrality, bridge strength centrality, and edge weights = .6; narrow CIs of the edge weights), allowing for reliable interpretations of the estimated parameters. Regarding the edge weights, only positive edge weights were found within the eight structural dimensions. Within the conflicts, fewer and both positive and negative edge weights were found. Notably, C1 shared exclusively negative edge weights with the other conflicts, suggesting that a profound C1 decreases the likelihood of other psychodynamic conflicts. A particularly strong negative association was found between C1 and C3. No node met the criteria to be identified as the most central node (see supplementary Figure S6). C1 was identified as the conflict that significantly showed the most associations to the structural dimensions (i.e., bridge node; see supplementary Figure S7). In detail, C1 demonstrated positive associations to attachment to both internal and external objects, to self- and object regulation, and to object perception. In contrast, C3 and C6 showed only negative associations to structural dimensions. For the remaining conflicts either no or only marginal edges to structural dimensions emerged. The cluster algorithm revealed that psychodynamic conflicts and structural dimensions formed two separate clusters within the network, supporting the assumption made in the OPD that conflicts and structure are two independent axes.

Besides to the network analyses, we also inspected the associations between all OPD-2 conflicts (including C7) and the overall level of structural integration. We found that C1 was significantly more often rated as the main conflict in individuals with lower levels of structural integration, while C3 was significantly more often rated as the main conflict in individuals with higher levels of structural integration. No significant differences were found for C2 and C4. We found a tendency that C6 was rated more often as the main conflict in individuals with higher

levels of structural integration, yet the findings must be interpreted with great caution, as only seven individuals were rated with C6 as their main conflict. C5 and C7 were only rated in one individual as the main conflict, preventing any statements to be made.

Figure 2

Network plot of Study 2 (reprinted from Vierl, Von Bremen, et al., 2023, p. 8)



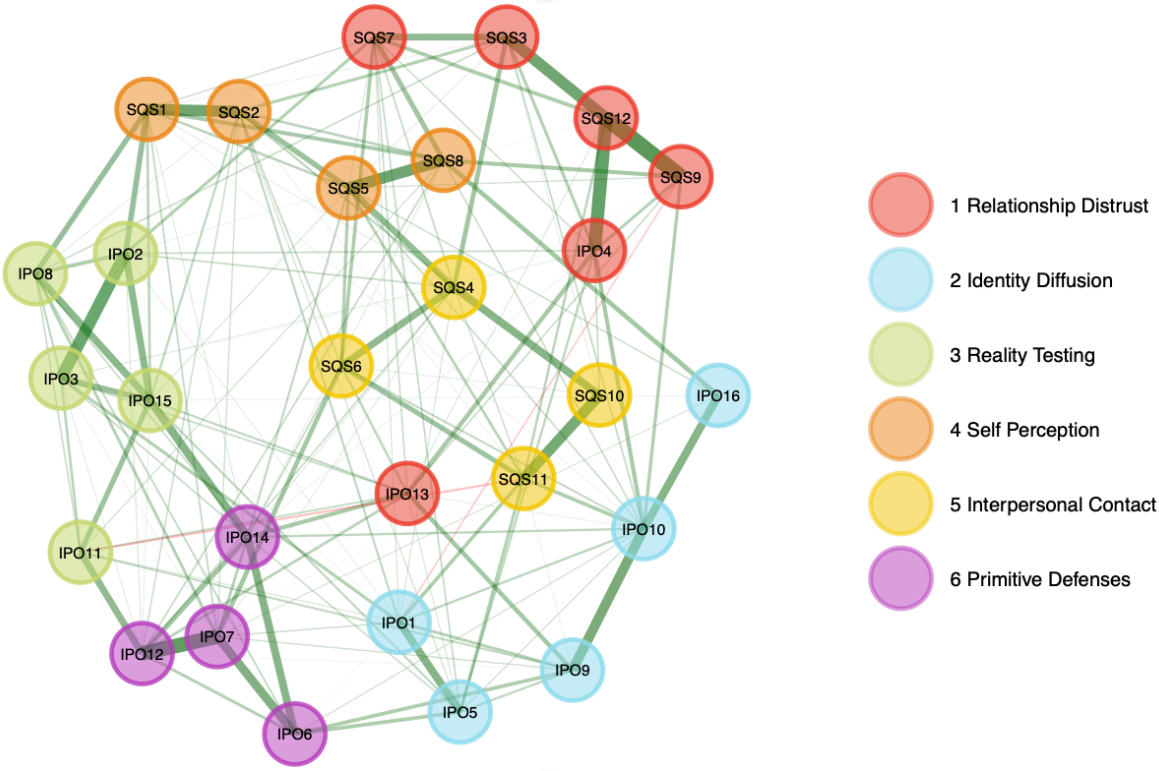
Note. Visualization of the estimated network showing the partial correlations between psychodynamic conflicts (orange circles) and structural dimensions (blue circles). Red edges signify negative associations, blue edges positive ones. The brightness and thickness of the edge displays the strength of the association.

5.3 Study 3: "All the same? Different measures of personality functioning are similar but distinct. A comparative study from a psychodynamic perspective using exploratory graph analysis"

The resulted network plot of Study 3 is presented in Figure 3. The bootEGA stability analyses of the detected dimensions indicated that the dimensions were stable (median = 6, SE = 0.53, 95% CI = [4.96, 7.05]), allowing for reliable interpretation of the dimensions. The results showed a significant and high, but not multicollinear correlation between the global scores of the two questionnaires ($r = .69$, $p < .001$). Moderate to large correlations ($.33 \leq r \leq .61$) were found among the subscales. EGA revealed six dimensions that fairly represented the original subscales: all items of the OPD-SQS subscale relationship model formed a cluster together with the IPO-16 items IPO4 and IPO13 (dimension 1). This dimension was named "relationship distrust", due to the focus of the items on a rather paranoid and distrustful perception of others. All remaining items from the IPO-16 subscales identity diffusion formed a cluster (dimension 2); all items from the IPO-16 subscale reality testing formed a cluster (dimension 3); all items from the OPD-SQS subscale self-perception formed a cluster (dimension 4); all items from the OPD SQS subscale interpersonal contact formed a cluster (dimension 5); and all remaining items from the IPO-16 subscale primitive defenses formed a cluster (dimension 6). The structural consistencies were good to excellent for dimension 2, 3, 4, and 5, but was below the recommended threshold of 0.75 (Golino et al., 2021) for dimension 1 and 6. Regarding item stabilities, most items were stable, except for the item IPO13. Its low item stability results from its multidimensionality, as it showed similar network loadings in the dimensions 1, 2, 3, and 6. After removing this item, the structural consistency of dimension 1 was excellent. Notably, the items of dimension 6 shared in 32.7% of bootstrap iterations a dimension with the items of dimension 3.

Figure 3

Network plot of Study 3 (reprinted from Vierl, Hörz-Sagstetter, et al., 2024, p. 319)



Note. Network plot and dimensionality structure of the items of the Inventory of Personality Organization—16 item version (IPO-16) and the Operationalized Psychodynamic Diagnosis—Structure Questionnaire Short Form (OPD-SQS) using Exploratory Graph Analysis (EGA). Green edges represent positive associations, red edges represent negative associations. Thicker edges represent stronger associations. The colour of the nodes represent the belonging to the detected dimension.

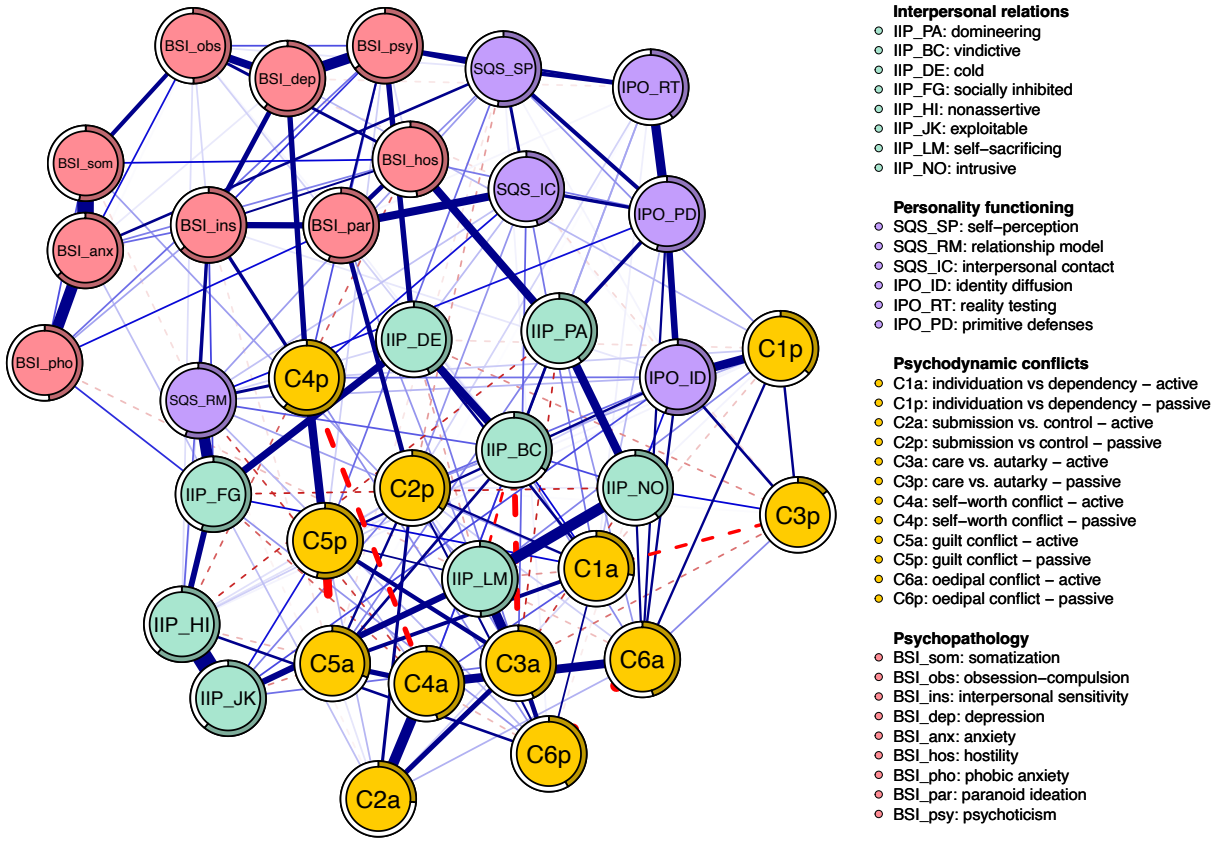
5.4 Study 4: "Uncovering associations between psychodynamic constructs and psychopathology with network analysis"

The resulting network plot of Study 4 is presented in Figure 4. The network stability analyses indicated high stability (edge CS-coefficient = .75, bridge expected influence CS-coefficients = .75; narrow CIs of the edge weights), allowing for reliable interpretations of the

estimated parameters. Robustness analysis indicated a robust network estimation, as it showed very high correlations with other possible network estimations ($r \geq 0.94$). Regarding the edge weights, the active and passive modes of conflict processing were negatively correlated in most conflicts, except for C1, where the conflict modes were not significantly correlated, and C2, where the conflict modes were positively correlated. Passive modes of conflict processing were more strongly associated with psychopathology than active modes, except for C3 and C6. Yet, for those conflicts the difference was not significant (see supplementary Figure S7). The strongest positive associations between conflict modes and psychopathology were found for C4p, C2p, and C1p, while the strongest negative associations were found for C5a, C4a, and C6p. We investigated which of the psychodynamic constructs is most interconnected with other psychodynamic constructs outside their own group (e.g., sum of edge weights C1a shares with interpersonal problems and personality functioning subscales). The IPO-16 subscale identity diffusion emerged as the most interconnected psychodynamic construct. Regarding bridge nodes between psychodynamic constructs and psychopathology, the OPD-SQS subscale self-perception and C4p emerged as the psychodynamic constructs with the strongest associations to psychopathology. Of note, their expected influence values were significantly higher compared to most other psychodynamic constructs (see supplementary Figure S7). Finally, the cluster detection algorithm resulted in separate clusters for psychodynamic constructs and psychopathology (see supplementary Figure S8). In detail, all BSI psychopathologies were found to form a single cluster, while five clusters emerged within the psychodynamic constructs. The psychodynamic constructs were largely arranged according to their axis belonging.

Figure 4

Network plot of Study 4 (reprinted from Vierl, Wülfing et al., 2024, p. 7)



Note. Blue edges represent positive associations, red dashed edges represent negative associations. Thicker edges represent stronger associations. Only edges $\geq |0.025|$ are visualized.

6 General Discussion

This dissertation included four empirical studies that used network analysis to explore how psychodynamic constructs are associated and how they are related to psychopathology. This chapter summarizes and discusses the main findings, outlines clinical implications and implications for the OPD, identifies strengths and limitations, provides an outlook for future directions, and finally draws a conclusion.

6.1 Summary and discussion of findings

In the following, the main findings are summarized and discussed. First, the summary will focus on the associations found within and between psychodynamic constructs, followed by the associations found between psychodynamic constructs and psychopathology.

6.1.1 Associations within psychodynamic constructs

6.1.1.1 Interpersonal problems. As expected, Study 4 found positive associations for interpersonal problems that are close to each other in the circumplex model (e.g., nonassertive and exploitable) and negative associations for opposite relation patterns (e.g., domineering and nonassertive). This replicates the results of the validation study (Thomas et al., 2011).

6.1.1.2 Psychodynamic conflicts. Regarding the associations within the psychodynamic conflicts, Study 1 found a negative partial correlation between the combined active and passive modes. This is reasonable, as the active and passive modes of conflict processing represent contrasting ways of dealing with inner conflicts (Arbeitskreis OPD, 2023). For example, C1 can be resolved by being either highly dependent on others and staying very close to others (C1p), or by seeking excessive independency and keeping other people at a distance (C1a). Study 4 replicated and extended this by finding negative correlations between the active and passive modes of most conflicts, except for C1 and C2. The positive correlation between C2a and C2p has also been reported previously (Henkel et al., 2022). It may be due to the unsatisfactory internal reliabilities of C2a and C2p in the OPD-CQ (Henkel et al., 2022).

The results of Study 4 also show that the modes tend to be positively associated across the conflicts, meaning that active modes are more strongly associated with other active modes, and passive modes are more strongly associated with other passive modes. For example, C4a was strongly associated with C2a, C5a, and C6a, while C4p was strongly associated with C5p and C6p. However, we found a different pattern for C3a, which showed strong associations with C2a, but also with C5p, C6p. It is possible that C3a serves as a compensatory mechanism for

other (often passive) conflicts. By suppressing personal needs and self-sacrificingly caring for others, feelings of guilt or shame can be reduced, while still maintaining control.

Study 2 examined the associations between the conflicts, regardless of the modes. Notably, C1 was exclusively negatively associated with other conflicts, with a particularly strong negative association with C3. This indicates that a pronounced C1 reduces the probability of other conflicts being present, particularly of C3. These findings suggest that other motivational themes, such as agency, care, self-worth, or sexual roles, are only of only secondary importance, as long as the basic needs for secure relationships are not met. The strong negative relationship between C1 and C3 stresses the conceptual difference between the two conflicts. Although the motivational theme of both conflicts is about relationships, they play out on different levels. Individuals with a profound C1 are existentially dependent on a relationship, which reveals fundamental deficits in relationship formation. In contrast, individuals with a C3, are more concerned with the arrangement of the relationship in terms of obtaining something from the other or providing for others (Arbeitskreis OPD, 2023). In other words, to be highly concerned with C3, it is almost a necessity that the relationship formation itself is not the issue.

6.1.1.3 Personality functioning. In Study 2, we examined the inter-relations between the OPD-2 structural dimensions assessed with OPD interview data. We found strong positive associations among the structural dimensions. This fits to previous research which also reported high correlations between the structural dimensions (Doering et al., 2014). These results suggest that personality functioning can be meaningfully computed and interpreted as a total score (i.e., the levels of structural integration). However, for a more comprehensive diagnosis, the individual structural dimensions still provide valuable insights, as Study 2 showed meaningful associations between the structural dimensions and the conflicts.

6.1.2 Associations between psychodynamic constructs

6.1.2.1 Interpersonal problems and psychodynamic conflicts. Study 1 found a strong partial correlation between the IIP-32 global score and the combined passive modes. In contrast, individuals who actively resolve inner conflicts, reported significantly fewer interpersonal problems. It is important to note that patients who predominantly process inner conflicts actively may either not be aware of their own interpersonal problems (cf. active self-worth conflict) or may tend to attribute these problems to others (cf. active guilt conflict). Therefore, external assessments are needed to objectively evaluate this.

In Study 4, the associations between the conflict modes and the interpersonal problems were consistent with the conflictual themes and fairly replicated the results of Henkel et al. (2022). The strongest associations between conflicts and interpersonal problems were found for C1a and being too cold, for C3a with self-sacrificing, for C5a with too vindictive, for C6a with too intrusive, and for C6p with being too nonassertive/submissive. These findings are consistent with the respective conflict themes (Arbeitskreis OPD, 2023). The greatest negative association between interpersonal problems and conflicts was found for C4a. This fits with the fact that narcissistic patients often do not suffer themselves, but their environment (Miller et al., 2007).

6.1.2.2 Interpersonal problems and personality functioning. In both Study 1 and 4, personality functioning and interpersonal problems were positively associated, which is consistent with previous findings (Spitzer et al., 2004). In contrast to Spitzer et al. (2004), however, we found the strongest associations between personality functioning and being too socially inhibited or too domineering. This suggests that individuals with lower levels of structural integration experience in general heightened interpersonal problems, but especially in that they are afraid of degradation or strive for control. One possible explanation for this finding is that individuals with greater structural difficulties tend to resolve conflicts interpersonally, as they may not be able to deal with them intra-psychically (Arbeitskreis OPD, 2023). Additionally,

several structural deficits such as impaired abilities in emotion regulation or self- and object perception may also contribute to the manifestation of interpersonal difficulties.

6.1.2.3 Psychodynamic conflicts and personality functioning. Study 2 focused on the associations between psychodynamic conflicts and structural dimensions according to the OPD-2. Importantly, this study found that the conflicts and structural dimensions are organized into two distinct clusters, supporting the representation of conflict and structure as separate axes in the OPD. Most conflicts showed only a few or, in the case of C4, even no connections to structure, indicating that the conflicts are largely independent of structure. This perspective of conflicts and structure being independent has been reinforced in the OPD-3, where the assessment of all conflicts is mandatory, regardless of the patient's level of structural integration. It should be noted, however, that the expression of a psychodynamic conflict varies according to an individual's level of structural integration, while the motivational theme of the conflict remains the same (Arbeitskreis OPD, 2023).

When examining the frequency of conflicts in relation to the overall level of structural integration, C1 was found to be significantly more frequent in patients with lower levels of structural integration, while C3 was significantly more frequent in patients with better levels of structural integration. For C6, we found a tendency to be more frequent at better levels, while C2 and C4 could not be assigned to a specific structural level. C5 and C7 were too infrequent in the sample to make any valid statement. The finding of C1 is consistent with previous research on the relationship between conflict and structure (Grande et al., 1998; Kaufhold et al., 2017). Furthermore, the tendency for C6 to be diagnosed more frequently in patients with higher structural levels is consistent with the findings of Grande et al. (1998), while the finding that C3 is significantly more frequent in patients with higher structural levels is consistent with Kaufhold et al. (2017). However, the fact that the current study results and the earlier studies have

somewhat different results emphasized the need to reexamine the relationship between conflicts and structure using a large sample and, at best, OPD-3 interview data.

Study 2 expands on these findings by examining not only the relationship between the conflicts and the overall level of structural integration, but also by investigating the associations between the conflicts and the individual structural dimensions. In summary, C1 was found to have the most and strongest associations with structural dimensions, particularly attachment to internal and external objects, self- and object regulation, and object perception. The positive associations suggest a greater likelihood of difficulties in these structural abilities in patients with a profound C1. In contrast, C3 had several negative associations with structural dimensions, including attachment to internal objects, communication with the external world, and object regulation. These results again highlight the differences between C1 and C3: patients with a C1 tend to have greater difficulties in internal object attachment, whereas patients with a C3 tend to have fewer difficulties in this structural facet. The results are also of therapeutic interest, as Rudolf et al. (1996) found that better abilities in the structural dimension of attachment were associated with better outcomes.

Study 1 and Study 4 explored the associations between the conflict modes and personality functioning using self-rating questionnaires. Both studies found that personality functioning was related to psychodynamic conflicts, with significantly stronger associations to the passive modes compared to the active modes. This has also been reported previously (Henkel et al., 2022; Remmers, Wester, et al., 2023). The strongest association between conflicts and personality functioning was found for C1p, which demonstrated a particularly strong partial correlation with identity diffusion. Also, the active mode (C1a) showed strong associations with personality functioning. This replicates the strong correlation between structure and C1 found in Study 2, as well as previous literature using self-rating questionnaires (Henkel et al., 2022; Remmers, Wester, et al., 2023). Other conflicts with strong associations to personality functioning were

C4p, C5p, and C6a. In contrast, C4a and C5a were overall negatively associated to personality functioning. These findings are consistent with previous research (Benecke et al., 2018; Remmers, Wester, et al., 2023). As Remmers, Wester, et al. (2023) pointed out, the results must be interpreted in light of the fact that they are based on self-report questionnaires. People with high self-esteem tend to overestimate their own intra- and interpersonal functioning (Mota et al., 2019), whereas people with low self-esteem or a tendency to blame themselves may underestimate their abilities.

6.1.2.4 Personality structure and personality organization. In Study 3, we explored how the total score, subscales, and items of the OPD-SQS and IPO-16 are related with each other. We found that the total scores were highly correlated, yet the correlation was not suggestive of multicollinearity. Consequently, the two questionnaires do not assess the same construct of personality functioning, but rather assess distinct aspects of it. In examining the dimensionality of the items of both questionnaires, we fairly replicated the original subscales. Only two items of the IPO-16, namely the items IPO4 and IPO13, did not replicate in its original subscale. Therefore, our results indicate that the subscales of the two questionnaires can be reasonable interpreted as distinct facets of personality functioning.

The greatest overlap between subscale items was found for the IPO-16 subscales primitive defenses and reality testing. In almost one-third of the bootstrap iterations the items of both subscales loaded on the same dimension. This is theoretically reasonable because maladaptive defenses interfere with the accurate perception of reality. Nevertheless, it makes sense to use both domains for diagnosis, as reality testing has been postulated as the diagnostic criterion to distinguish borderline personality disorder from psychotic personality organization (Kernberg, 2019). The prevalence of maladaptive defense mechanisms, on the other hand, has been shown to impact treatment response (De Roten et al., 2021).

6.1.3 Associations between psychodynamic constructs and psychopathology

The associations between psychodynamic constructs and psychopathology were examined in Study 1 and Study 4 and are summarized and discussed in the following.

6.1.3.1 Interpersonal problems and psychopathology. Study 1 found the global score of the IIP-32 to be related to depression, but not to somatic problems. However, this was not replicated in Study 4, where somatization was related to interpersonal problems, particularly to being too self-sacrificing. In Study 4, the relationship patterns of being too domineering, too cold, and too socially inhibited were found to be most strongly associated with psychopathology, while patients that described themselves as too exploitable or too intrusive reported only little psychic distress. Surprisingly, our results show no associations between interpersonal problems and anxiety. However, this has been shown in previous studies (Gómez Penedo & Flückiger, 2023; McEvoy et al., 2013).

6.1.3.2 Psychodynamic conflicts and psychopathology. Study 1 found that only the combined passive modes were associated with psychopathology, whereas the combined active modes of conflict processing were not associated with depression or somatic problems. The results are clearly limited by the restriction of psychopathology to depression and somatic problems, but they can be understood in light of the operationalization of the conflict modes in the OPD. Passive modes are seen as regressive ways of resolving inner conflicts. As a result, passive modes often result in negative emotions such as hopelessness, shame, guilt, or envy, which can lead to psychological distress and ultimately psychopathology. On the other hand, active modes represent (pseudo) progressive ways, reflecting independence, dominance, self-sufficiency, exaggerated self-esteem, rejection of responsibility, or being in the center of attention. As long as this can be maintained, often no symptoms develop (Arbeitskreis OPD, 2023).

Study 4 expanded upon these findings by examining the associations between the individual conflict modes and various psychopathologies. Again, for most conflicts the passive mode was more strongly associated with psychopathology than the active mode. C4p showed the strongest associations to psychopathology, with particularly strong associations with depression and interpersonal sensitivity. Active modes, on the other hand, showed only little, in some cases (i.e., C4a, C5a, C6a) even negative associations with psychopathology. These findings are consistent with a recent study of Remmers, Wester, et al. (2023). The authors discussed the negative associations of C4a and C5a with psychopathology as a result of possible self-report biases. However, the results also fit with previous studies that showed that inflated self-esteem in the context of grandiose narcissism is negatively correlated with distress, and was instead correlated with good psychological health and life-satisfaction (Egan et al., 2014; Sedikides et al., 2004). This can be explained by the use of particular defense mechanisms, such as pseudo-altruism, rationalization, anticipation, and dissociation (Kampe et al., 2021).

For C3 and C6, the active mode showed more associations with psychopathology than the passive mode, even though the differences between the active and passive modes were not significant. The reverse finding for C3 has been reported previously (Benecke et al., 2018; Henkel et al., 2022; Remmers, Wester, et al., 2023). While this finding may be due to insufficient internal consistencies of C3a in the OPD-CQ (Gisch et al., 2020), it could also indicate a general reversal of the conflict modes of C3 in the OPD. C3a involves prioritizing others' needs and altruistically caring for others, which can be seen as a passive component of self-withholding. In contrast, C3p entails demanding and self-righteous behavior, aligning with an active approach.

6.1.3.3 Personality functioning and psychopathology. In both Studies 1 and 4, personality functioning was found to play an important role in relation to psychopathology. In Study 1, the OPD-SQS global score was identified as the bridge node, linking psychodynamic

constructs to psychopathology. In Study 4, the OPD-SQS self-perception subscale was identified as the psychodynamic constructs with the most associations to psychopathology. The prominence of structure and its domains in regard to psychopathology is reasonable, given that the level of structural integration has been shown to be strongly related to general psychopathology (Benecke et al., 2018; Crempien et al., 2017; Ehrenthal et al., 2015), as well as to all types of psychopathology (e.g., Dagnino et al., 2020; Doering et al., 2018; Krakau et al., 2021). Obbarius et al. (2021) suggest that this relationship may be because patients with more structural impairments have greater difficulty in managing negative emotions, resulting in the emergence or persistence of symptoms.

Interestingly, the OPD-SQS subscales were more strongly associated with psychopathology than the IPO-16 subscales. The IPO-16 subscale reality testing showed a particularly strong association with psychoticism, which is reasonable, given that elevated impairments in reality testing are an important diagnostic criterion of the psychotic personality organization (Kernberg, 2019). Surprisingly, the subscale identity diffusion was barely associated with psychopathology. This was contrary to our expectations, as previous studies have highlighted the important role of identity diffusion in the severity of both psychiatric symptoms and personality disorders (e.g., Diamond et al., 2023; Ponton Rodriguez et al., 2018; Sekowski et al., 2022; Sollberger et al., 2012). However, in our network identity diffusion showed strong associations to other psychodynamic constructs, particularly to various conflicts. Similarly, primitive defenses had only few associations with psychopathology, but several associations with psychodynamic conflicts and interpersonal problems. It is possible that fewer associations with psychopathology were found because intact defenses are supposed to protect the individual from experiencing aversive affects (Remmers, Bohn, et al., 2023). Overall, our findings may suggest that the IPO-16 may focus more on psychodynamic aspects of personality functioning, while the OPD-SQS may be more symptom-oriented. This fits with the critique of Obbarius et al.

(2019), who are particularly concerned about the strong correlations between self-perception and psychopathology.

6.1.3.4 Psychodynamic constructs and psychopathology. Finally, in Studies 1 and 4, psychodynamic constructs and psychopathology formed distinct but interconnected clusters. This formation of separate clusters of psychopathology and psychodynamic constructs indicates that psychodynamic constructs can be seen as independent of psychopathology (Arbeitskreis OPD, 2023). The fact that the two clusters are interconnected, supports the theoretical assumption that psychodynamic constructs contribute to the development and maintenance of symptomatology. The results therefore demonstrate the usefulness of the OPD as a meaningful and valuable enhancement to symptom-based classification systems like ICD or DSM.

6.2 Clinical implications

The findings of the studies included in this dissertation have significant implications for clinical practice, which are outlined below.

Importantly, personality functioning was found to play a pivotal role in the networks. Specifically, the OPD-SQS global score was identified as the bridge node connecting psychodynamic constructs to psychopathology in Study 1, and the OPD-SQS subscale self-perception was identified as a bridge node in Study 4. According to network theory, targeting bridge nodes has the potential to inactivate symptoms of the other cluster and therefore they are thought to represent important treatment targets (Jones et al., 2019). In terms of our findings, this means that improving personality functioning in psychotherapy, and specifically focusing on self-perception abilities, has the greatest potential to reduce psychological symptoms. In addition, the OPD-SQS global score was also the most central node in the network overall in Study 1, and in Study 4 the personality functioning subscales were strongly related to various psychodynamic conflicts and interpersonal difficulties. Thus, improving personality functioning may not only reduce psychic distress, but may also reduce distress resulting from conflicts or

interpersonal problems. A clinical recommendation from the studies can therefore be to pay more attention to personality functioning in the diagnostic process and to specifically focus on personality functioning in psychotherapy. Our results can be very well linked to psychodynamic therapeutic approaches that generally aim to improve structural abilities, such as transference-focused psychotherapy (Kernberg et al., 2008), mentalization-based psychotherapy (Bateman & Fonagy, 2016), or structure-based psychotherapy (Rudolf, 2020). Psychotherapeutic interventions that specifically relate to self-perception include improving self-reflection by thinking and talking about oneself, developing affect perception and differentiation, as well as focusing on identity by developing a stable image of oneself and others (Ehrenthal & Dinger, 2019).

Our results also highlight the need to consider the other OPD axes. Study 2 demonstrates that structure and conflicts are independent of each other, emphasizing the importance of assessing both axes separately. The strongest association between the conflicts and structure was found for C1. This suggests that when personality functioning is targeted in therapy, the conflict dynamic between individuation and dependency may soften. However, the other conflicts showed only a few associations to the structural dimensions, so they are less likely to be solved solely by targeting personality functioning. This suggests that psychotherapy should focus on both conflict and structure.

In addition, Study 4 shows that it is not only the type of conflict that matters, but also how it is processed. Passive conflict modes show in most conflicts a significantly stronger connection to psychological symptoms than active modes. For example, C4p shows the strongest positive association with psychopathology among all conflict, whereas C4a is negatively associated with psychopathology. Therefore, when treating patients who primarily process conflicts actively, a temporary worsening of the symptoms could be possible. It could also be the case that patients only seek psychotherapeutic help when they have switched from an active processing mode to a

passive mode. For example, a narcissistic patient may seek professional help for severe depressive symptoms after losing self-stabilizing factors, such as loss of job or a relationship. It is important for the therapeutic outcome not to overlook the original active defense formation (e.g., narcissistic grandiosity) (Hörz-Sagstetter & Kampe, 2021).

The importance of personality functioning for treatment outcome also stresses the need for a thorough diagnosis. Self-rating questionnaires have been developed for time-efficient assessment of personality functioning (e.g., Ehrenthal et al., 2015; Zimmermann et al., 2013). In Study 3, we showed that the subscales of the OPD-SQS (which assesses personality structure according to the OPD) and the IPO-16 (which assesses personality organization according to Kernberg) are distinct and tap into different facets of personality functioning. In addition, in Study 4, the subscales were differentially related to psychopathology, psychodynamic conflicts, and interpersonal problems, suggesting that the subscales provide additional clinical information. We therefore recommend, for both clinical and scientific practice, the use of both questionnaires and the interpretation of their subscales, when assessing personality functioning from a psychodynamic perspective. It is important to note, however, that clinical interviews are still required for a thorough diagnosis.

6.3 Implications for the Operationalized Psychodynamic Diagnosis

The results of this dissertations also have implications for the OPD. We were able to prove basic assumptions for which there was previously no empirical evidence. At the same time, we also found inconsistencies that require further investigation and may even require a revision of the OPD or its measures.

First and foremost, our studies highlight that the psychodynamic constructs in the OPD can be seen as independent from psychopathology. Since the psychodynamic constructs were nevertheless associated with psychopathology, the results confirm the OPD as a valuable addition to symptom-oriented classification systems such as the ICD or DSM.

In Study 2, we were able to show with OPD interview data that conflict and structure are best represented as two distinct clusters, supporting the idea of separate axes in the OPD. Also when using self-rating questionnaires (Study 4), almost all conflicts were arranged in one cluster, while most personality functioning subscales clustered in another cluster. This finding is interesting also in regard of C4. This conflict is criticized from time to time, as the topic of self-esteem is also a structural facet, raising the question of whether this conflict can be seen as independent from structure. Our studies show that C4 is clearly independent from structure, as it showed no connection to structural dimensions in Study 2 when using interview data and was clearly assigned to the conflict cluster in both studies.

For some other conflicts, however, it is necessary to critically examine the findings, which may require a revision of the conflict questionnaire, and, if replicated in OPD interview data, may even require a revision of the OPD in general. For C2, the active and passive modes were positively associated with each other in Study 4. However, because active and passive modes are opposing ways of dealing with a motivational theme, a negative association would have been expected. In our study, as well as in previous studies (Benecke et al., 2018; Gisch et al., 2020; Henkel et al., 2022; Remmers, Wester, et al., 2023), these conflict modes showed insufficient internal reliabilities and were found to not fulfil the criteria of one-dimensionality (Gisch et al., 2020). Thus, the conflict modes in the OPD-CQ should be critically reviewed and revised. However, C2 was also found to be the conflict with the lowest interrater reliability in OPD-3 interviews (Lackmann et al., 2023). It could therefore be useful to specify and revise the C2 in future revisions of the OPD.

There were also striking results for C3. The conflict modes tended to be associated with psychopathology in the opposite way to the other conflicts, i.e. the active mode showed stronger correlations compared to the passive mode. Even though this difference was not significant, this finding should be discussed critically, as it has been reported previously by other researchers

(Henkel et al., 2022; Remmers, Wester, et al., 2023). Further, C3a was more strongly associated with other passive modes (especially C4p and C5p). As discussed earlier, the conflict dynamics in C3a could serve to deal with other (passive) conflicts. Nonetheless, a replication of findings based on OPD-3 interview data is needed. A critical revision of the OPD-CQ or, if the finding holds in the OPD-3 interview data, a switch of the modes in the next version of the OPD should be considered.

The identity conflict (C7) was neither included in Study 2, as it was not rated in the included sample, nor was it included in the other studies because it is not part of the OPD-CQ (Benecke et al., 2018). Moreover, the conflict was also hardly rated in other studies (Kaufhold et al., 2017; Pieh et al., 2009; Schneider & Heuft, 2018). Therefore, empirical studies on this conflict are lacking. It should therefore be critically examined whether the identity conflict should still be included in future OPD versions. One may also empirically investigate the clinical relevance of C7 by presenting practicing psychotherapists case reports and ask to what extent the identity conflict contributes to understanding of the patient and helps in treatment planning.

6.4 Strength and limitations

A particular strength of this dissertation is its novel methodology, which, to the best of my knowledge, has not previously been applied to psychodynamic constructs. Although network analysis is not without challenges and controversy (e.g., Bringmann et al., 2019; Forbes et al., 2019), network analysis holds significant promise as a methodological tool to help understand the association between constructs (Borsboom, 2017). As shown in this dissertation, network analysis applied to OPD data can increase our understanding of the respective psychodynamic constructs, which in turn can be used to improve diagnostic accuracy and therapeutic interventions. In addition, the results pinpoint to theoretical inconsistencies, which in turn could lead to future revision of the OPD and its measures.

A notable strength of the included studies is that all analyses were stable and robust, allowing reliable interpretations of the results. Moreover, we used both self-report and interview data, as well as different samples (outpatients, inpatients), which increases the validity and generalizability of our results. In addition, steps have been taken toward transparency and reproducibility by sharing *R* codes, as well as correlation and adjacency matrices that can be used to re-evaluate all analyses. Furthermore, the tutorials and reporting standards for network analyses have been followed (Burger et al., 2020; Epskamp, Borsboom, et al., 2018; Epskamp & Fried, 2018; Isvoranu & Epskamp, 2021).

Despite the strengths of our study, several methodological issues must be mentioned. First, the studies were not pre-registered, and the analyses were mostly exploratory. Second, the cross-sectional nature of all our data significantly limits the interpretability of our findings as it precludes causality. Third, all network models were between-subjects models and therefore the results cannot be applied to individuals (Bringmann, 2021; Fried & Cramer, 2017). Fourth, we used regularized network analysis in all studies. While this is the recommended approach for samples with small to medium sample sizes, as it reduces the risk of false positive edges (Isvoranu & Epskamp, 2021), we may not have always successfully identified all edges in the network. Fifth, we included self-rating questionnaires in the Studies 1, 3, and 4. Because psychodynamic constructs are thought to be unconscious, self-report measures may not adequately capture the constructs. Furthermore, patients with specific conflicts may tend to over- or underreport symptoms, which could have led to stronger or weaker correlations that would be found with interview data. Moreover, the IIP-32 does not fully capture the OPD interpersonal relations axis, which, in addition to one's own (difficult) relationship offer, also includes the subject’s expectation of the other person's reaction as well as their actual reaction. Therefore, our results are limited in regard to this axis. In addition, the OPD-CQ showed insufficient internal consistencies for some scales (Henkel et al., 2022). Regarding, the assessment of

psychopathology it must be mentioned that the factor structure of the BSI, which was used in Study 4, is critically discussed (Serpa et al., 2022). Sixth, in our interview data of Study 2, C5 and C6 were very infrequently rated in the sample so that the results regarding these conflicts must be interpreted with great caution. In addition, C7 was almost absent in the data and was therefore excluded from the study. Because we used OPD-2 interview data, we were not able to include the conflict modes or the interpersonal relations in the network of Study 2.

6.5 Future research directions

Based on the findings of this dissertation and the limitations and challenges outlines above, future research should address the following issues.

First, replication of our findings with OPD-3 interview data is needed to validate our findings. In the research version of the OPD-3 interview data, interpersonal relations are rated dimensionally, and the conflict modes are rated for all conflicts. Consequently, with OPD-3 interview data, one could include all three psychodynamic axes into the network.

Second, because our results can only be interpreted at the between-group level, it is not possible to say to what extent the results can be applied equally to both patients with better and lower levels of structural integration. Due to the risk of Berkson's bias (de Ron et al., 2021), it is not possible to divide the sample by the levels of structural integration and compare the network for patients with better and lower levels of structural integration while still including personality structure in the network. However, one could calculate separate networks for both patients with better and lower levels of structural integration including only the conflicts and compare these two networks using the network comparison test (Van Borkulo et al., 2015).

Third, it would be interesting to compare baseline and discharge networks, to see whether psychodynamic treatment leads to a disruption of the network, such that, for example conflicts are more flexible after treatment (i.e., less negatively connected).

Fourth, as the interpretability of cross-sectional network models is limited, longitudinal networks are warranted. When time-series data are available from a single individual, personalized network models can be calculated. These can be used to understand which psychodynamic constructs maintain psychopathology within an individual and to ultimately allow for personalized clinical recommendations (Bringmann, 2021). When time-series data from multiple individuals (n >1) are available, both between- and within-person temporal relationships can be examined (Epskamp, 2020; Epskamp, Waldorp, et al., 2018). Yet, there are several challenges and issues to consider when applying time-series data collection on psychodynamic constructs. First, it is important to know that even in longitudinal networks the edges do not sufficiently represent causal relationships (Haslbeck & Ryan, 2022), yet they are indicative of potential causal relationships (Epskamp, Van Borkulo, et al., 2018). Second, a high number of time-series data is needed, which is often much higher that what is feasible in practice. While a clear recommendation of time points is so far an unresolved question (Epskamp, Van Borkulo, et al., 2018), a simulation study showed that at least 100 time points are necessary for an eight-node personalized network (Epskamp, Waldorp, et al., 2018). This amount of data is usually gathered by experience sampling methods (ESM) or ecological momentary assessments (EMA), where participants are asked several times a day over several weeks (Myin-Germeys et al., 2009). Yet, there may not be enough fluctuation in psychodynamic variables to measure them using ESM or EMA assessments. For example, psychodynamic conflicts are meant to vary within an individual over time, yet they are not as fluid as for example depressive symptoms. Asking a subject multiple times per day over several weeks about their inner conflicts may not yield any novel information. Further, in EMA/ESM assessments, only a limited number of questions can be asked per measurement occasion due to considerations of participant burden (Eisele, Vachon et al., 2020). In practice, this conflicts with the length of current measures (e.g., the OPD-CQ has 66 items). Consequently, time series data could not be used to replicate our

studies, but could be used, for example, to look at how specific structural abilities, such as emotion regulation, are stable over time and how they are related to daily events. Yet, a longitudinal study design to replicate our studies using longitudinal data can be done using panel data. When using panel data, many people (i.e., at least hundreds to thousands) are measured on few occasions (at least 2 and up to 10 measurements). One may also include variables from the "external field", which are factors that may influence on nodes in the network from outside (for a review see Bringmann et al., 2022). For example, one could include childhood trauma or external stressors such as spousal loss as exogenous variables into the network to see how they affect psychodynamic constructs over time. Yet, a limitation of panel data is that it cannot be used to all longitudinal network models. For example, unlike time-series data, panel data cannot be used to separate within- and between-person effects (Epskamp, 2020).

6.6 Conclusion

The focus of this dissertation was to use network analysis to explore the associations between psychodynamic constructs and their relationships to psychopathology. Overall, four empirical studies were included. Study 1 explored how psychodynamic constructs (i.e., interpersonal problems, active and passive modes of psychodynamic conflicts, personality functioning) are associated with each other, as well as with depression and somatic problems. The focus of Study 2 was to investigate how psychodynamic conflicts and personality functioning are related using OPD-2 interview data. Study 3 examined the extent to which the OPD-SQS and the IPO-16 capture similar or different facets of personality functioning. Lastly, Study 4 extended the findings of Study 1 by unravelling the associations between all psychodynamic constructs of the OPD at the subscale level and their associations with various psychopathologies.

The included studies provided the following main conclusions: First, psychodynamic constructs can be considered independent of psychopathology. Second, psychodynamic conflicts

and personality functioning are best represented as two distinct axes in the OPD. Third, of all psychodynamic conflicts, individuals with a C1 show the greatest impairments in personality functioning. Fourth, passive modes of conflict processing are more strongly associated with psychopathology than active modes. Fifth, personality functioning was found to play a pivotal role in the networks, as it was found to be most interconnected overall and in regard to psychopathology. This highlights the necessity to assess personality functioning as part of the diagnostic process and to focus on it in psychotherapy. Sixth, the subscales of the IPO-16 and the OPD-SQS tap into distinct facets of personality functioning. Both questionnaires therefore provide diagnostic value in addition to clinical interviews. In conclusion, the results of this dissertation have important clinical implications. Future research should include OPD-3 interview data and use longitudinal data designs.

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8 Appendix

The manuscripts of the four studies are presented in the following. For all studies the post-peer-review, pre-copyedited version is presented. The final authenticated versions are available online at the respective journals.

Study 1: Vierl, L., Juen, F., Benecke, C. & Hörz-Sagstetter, S. (2023). Exploring the associations between psychodynamic constructs and psychopathology: a network approach. *Personality and mental health.* 17(1), 40-54. doi:10.1002/pmh.1559

Study 2: Vierl, L., Von Bremen, C., Hagmayer, Y., Benecke, C., & Sell, C. (2023). How are psychodynamic conflicts associated with personality functioning? A network analysis. *Frontiers in Psychology.* 15:1152150. doi:10.3389/fpsyg.2023.1152150

Study 3: Vierl, L., Hörz-Sagstetter, S., Benecke, C., Spitzer, C., & Juen, F. (2024). All the same? Different measures of personality functioning are similar but distinct. A comparative study from a psychodynamic perspective using exploratory graph analysis. *Journal of personality assessment*. *106*(3), 314-327. doi:10.1080/00223891.2023.2251150

Study 4: Vierl, L., Wülfing, P., Juen, F., Hörz-Sagstetter, S., Spitzer, C., & Benecke, C. (2024). Unravelling inter-relations within and between psychodynamic constructs and psychopathology using network analysis. *Personality and mental health.* 1-16. doi:10.1002/pmh.1628

8.1 Study 1

Exploring the associations between psychodynamic constructs and psychopathology: a network approach

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Statement of Ethics

The authors declare that the research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. Written informed consent was obtained from all participants. All data were collected as part of routine diagnostic procedures. All patients consented to the scientific analysis of the data. Participation was voluntary. No identifying information about any participant is included in this article.

Conflict of Interest

The authors have no conflicts of interest to declare.

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Data Availability Statement

The analytic code for all network analyses performed in this study is available along with all network matrices in the Supplementary Materials. These matrices can be used to assess our analyses. The data supporting this study's findings are available from the corresponding author upon reasonable request.

Abstract

Objective: Psychodynamic therapy effectively reduces symptomatology by focusing on underlying (unconscious) processes instead of symptoms. Nevertheless, the exact interrelationship between psychodynamic constructs and psychopathology remains unclear. This study uses network analysis to explore these associations.

Methods: We computed a cross-sectional partial correlation network between psychodynamic constructs (i.e., personality functioning, interpersonal relations, active and passive modes of intrapsychic conflicts according to the Operationalized Psychodynamic Diagnostics (OPD) system) and psychopathology (i.e., depression and somatization) in a naturalistic sample of 341 adults registering for psychodynamic outpatient therapy. We estimated node centrality, node predictability, and bridge symptoms and used community detection analysis. Bootstrap methods were applied to assess network stability.

Results: Psychodynamic constructs and psychopathology resulted in separate but connected clusters. Personality functioning emerged as the most influential node in the network and was bridging the clusters. The network was found to be highly stable, allowing reliable interpretations.

Conclusion: The results offer important insights on how psychodynamic constructs relate to psychopathology, which can be used to inform treatment approaches. The findings suggest that personality functioning may be an important intervention target. However, future research is needed to include a broader range of diagnoses. In addition, longitudinal studies may clarify the direction of causality.

Keywords: network analysis, operationalized psychodynamic diagnostics, psychopathology, personality functioning, structural integration

Introduction

Psychodynamic therapy (PDT) is an umbrella term denoting different psychotherapeutic modalities based on psychoanalytic and psychodynamic principles. While some current methods differ substantially from the original psychoanalytic therapy of Sigmund Freud (e.g., transference-focused psychotherapy (Kernberg et al., 2008)), all methods share the focus on psychological roots of emotional suffering, which are thought to often be unconscious (Boll-Klatt & Kohrs, 2018). According to psychodynamic theory, gaining insight into unconscious or partially unconscious processes underlying the disorder is mutative and ultimately may decrease symptomatology (Benecke, 2014). Overall, PDT has proven effective across various mental disorders (Fonagy, 2015) and different treatment modalities (Abbass et al., 2021; Woll & Schönbrodt, 2020).

The Operationalized Psychodynamic Diagnostics (OPD) system was developed as a multi-axial diagnostic and classification system based on psychodynamic principles (OPD Task Force, 2001, 2008). The second edition (OPD-2) can be used for standardised diagnostics, treatment planning, and process evaluation. It also contributed to (scientific) communication within the field due to its precision in terminology. Five axes can be assessed: (I) experience of illness and prerequisites for treatment; (II) interpersonal relations; (III) intrapsychic conflicts; (IV) personality functioning, i.e. ´structure`; and (V) mental and psychosomatic disorders according to the International Classification of Diseases (11th ed.; ICD-11; World Health Organization, 2019) or the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013). The axes can be reliably rated through a 1-2h psychodynamic interview by trained clinicians (Cierpka et al., 2007; Zimmermann et al., 2010) or through time-economic empirically supported questionnaires (Benecke et al., 2018; Ehrenthal et al., 2012). The three axes most relevant for the psychodynamic approach (axes II, III, and IV)

will be described briefly in the following. A detailed description of the axes can be found in the OPD-2 (OPD Task Force, 2008).

Interpersonal relations are conceptualised as repetitive maladaptive interpersonal behaviour patterns that are thought to play a pivotal role in developing and maintaining mental disorders (Benjamin, 1974; Luborsky & Crits-Christoph, 1997). The axis captures subjective experiences concerning oneself and others and the environmental response. The variety of (dysfunctional) interpersonal behaviour patterns is structured as a circumplex model (i.e., a two-dimensional, circular space), which is defined by two orthogonal, bipolar interpersonal dimensions on the axes affiliation (hostility vs. friendliness) and control (dominance vs. submissiveness) (Benjamin, 1974). In addition, the circumplex space is divided into octants that reflect eight specific interpersonal traits (i.e., domineering, vindictive, cold, socially inhibited, non-assertive, overly accommodating, self-sacrificing, and intrusive).

Intrapsychic conflicts can be understood as common, life-determining motives in crucial life areas (e.g., relationships, the family of origin, profession) and are considered to be central in many mental disorders. The OPD distinguishes seven topics of intrapsychic conflicts (i.e., individuation vs. dependency, submission vs. control, need for care vs. self-sufficiency, conflict of self-value, guilt conflict, oedipal conflict, and identity conflict) and describes a separate category for a limited perception of conflicts and feelings. The predominant way of dealing with the conflict can be rated as active, passive, or a combination of both modes. The two modes (i.e., active and passive) represent the extreme ways of dealing with the unconscious inner conflict while defending against typical aspects of the conflict. Defence is a psychic process that helps a person distance oneself from the full awareness of unpleasant and frightening thoughts, feelings, and behaviours (Freud, 1938). The passive modes are generally associated with a more regressive behaviour. For example, patients in the passive mode tend to show an exaggerated need for closeness or may express wishes concerning security and care. In contrast, patients in

the active modes often behave contrary to their true feelings (i.e., ´reaction formation`). For example, in the active mode of the individuation vs. dependency conflict, attachment needs are suppressed and interpersonal closeness is avoided in favour of an exaggerated need for autonomy (OPD Task Force, 2008).

The OPD *Level of Structural Integration Axis* (OPD-LSIA) is "a measure of individual differences in severity of personality dysfunction" (Zimmermann et al., 2012, p. 1; p. 1). The level of structural integration, synonymous with personality functioning, is operationalized by the OPD by four dimensions with a self-related and an object-related subdomain each (i.e., perception, regulation, communication, and attachment), describing fundamental psychic capacities. The OPD differentiates four levels of structural integration (high, moderate, low integrated, and disintegrated level of structural integration). The level of structural integration of a patient provides crucial information for choosing suitable psychotherapeutic methods (e.g., more supportive for structurally impaired patients vs. more expressive processes for structurally less impaired patients, Rudolf, 2010).

In psychodynamic theory, the above-mentioned constructs are underlying factors for developing and maintaining psychopathology and are, therefore, central in PDT (Ermann, 2020). It has been shown that all constructs are positively associated with general psychopathology (Benecke et al., 2018; Henkel et al., 2022; Zimmermann et al., 2012). Frank and Huber (Frank & Huber, 2021) demonstrated that an improvement in the level of structural integration during inpatient PDT is connected to symptom reduction. Structural integration has also been related to the severity of post-traumatic stress symptomatology (Baie et al., 2020) and has been found to mediate between child maltreatment and psychopathology (Freier et al., 2021; Krakau et al., 2021).

High levels of intrapsychic conflicts have been found to be associated with symptom severity and impairment of life satisfaction (Benecke et al., 2018). These connections become

particularly clear in the passive modes of conflict processing, as those are more often associated with negative affect (Benecke et al., 2018). For example, a high passive mode in the conflict of self-value is associated with low self-esteem and shame, resulting in a high symptom burden. In contrast, a strong active mode in this conflict reflects a narcissistic pattern, with patients being very convinced of themselves. As long as this pattern can be maintained, the person feels confident, and no symptoms are shown; only when the coping mode collapses may severe symptoms develop. Consequently, patients in the active mode show a reduced awareness of their problematic personality traits, resulting in less psychological strain (Henkel et al., 2022).

Finally, the overall level of interpersonal difficulties has been found to be associated with poorer treatment outcomes (Ruiz et al., 2004) and has been shown to be related to symptomatology across different psychiatric disorders (McEvoy et al., 2013). Moreover, greater interpersonal difficulties have been found to be associated with lower levels of self-esteem, psychological distress, and psychological functioning (Lo Coco et al., 2018). Yet, inconsistent findings have been found in the associations between the specific interpersonal traits and treatment outcomes. While some studies have found hostile or dominant interpersonal problems linked with poorer outcomes (Alden & Capreol, 1993; Horowitz et al., 1993), others have found no association of specific interpersonal problems with negative treatment outcomes (Puschner et al., 2005; Ruiz et al., 2004).

Taken together, all of the above-mentioned psychodynamic constructs have been found to be related to psychopathology. Traditional statistic methods, however, cannot assess relations simultaneously. However, understanding the complex associations between psychodynamic constructs and psychopathology is essential to increasing research and treatment progress. One statistical method suited to assess associations simultaneously is network analysis (Borsboom & Cramer, 2013). Network analysis is a fairly new data analysis technique used in psychological research to improve our understanding of complex associations in psychopathology (Borsboom

& Cramer, 2013). The approach captures and visualises the relationships between given constructs in a data-driven manner (Boschloo et al., 2015). All included variables are considered within one statistical model, allowing to calculate correlations between all pairs of variables while partialling out the effect of all other included variables (Borsboom & Cramer, 2013). Each variable is represented by a ´node`, while an ´edge` represents the relationship between two nodes (e.g., partial correlation). If two variables are statistically independent after controlling for all of the other nodes in the network, then no edge will be present between the two nodes (Epskamp & Fried, 2018). Network analysis can identify specific nodes that are most central to the network. Applied to clinical data, these nodes are hypothesised to play a crucial role in maintaining psychopathology, as they are more strongly connected to other nodes in the network than less central nodes (Robinaugh et al., 2016). Theoretically, treatment efficacy may be maximized by interventions targeting central symptoms, as they should deactivate many other symptoms within the network (McNally, 2016). This is supported by studies, finding central symptoms to better predict treatment outcome than peripheral symptoms (e.g., Levinson et al., 2022; Olatunji et al., 2018). Network analysis can also be used to identify which nodes cluster together (Newman & Girvan, 2004) and which nodes link specific clusters (i.e., bridge symptoms) (Jones et al., 2019). Clinically, identifying bridge symptoms offers empirical information about how a symptom of one cluster might activate symptoms of another cluster, thereby helping clinicians to identify targets for interventions that could potentially disrupt the flow between comorbid disorders (Levinson et al., 2018). Viewing the relations between symptoms as paramount in choosing an intervention shifts away from current treatment approaches that rely on distinct disorders (Borsboom & Cramer, 2013). Taken together, the network analysis approach holds significant promise in moving psychopathology research forward, since the results can improve our understanding of psychopathology and treatment approaches (McNally, 2016). Therefore, an increasing amount of studies have used network

models to study associations between symptoms of mental disorders and have used bridge symptoms to understand comorbidity (e.g., Contreras et al., 2019; Monteleone & Cascino, 2021). However, network analysis can not only elucidate interactions on the symptom level but also provides the opportunity to decipher the interrelationships among higher-order constructs, such as subscales or global scores (Hoorelbeke et al., 2016). The decision to estimate the network on an item, subscale, or global score level depends on the research question (De Beurs et al., 2019).

Aim of the Present Study

The network approach could also be used to provide new insights into how psychodynamic constructs relate to psychopathology. Therefore, the present study employed network analysis to explore the associations between psychodynamic constructs and psychopathology. The aims of the study were (i) to evaluate how psychodynamic constructs (i.e., interpersonal relations, active and passive modes of intrapsychic conflicts, and level of structural integration according to the OPD) are associated with psychopathology (i.e., depression and somatization), (ii) to perform network inference parameters to detect the node that is most important within the network, (iii) to use bridge centrality to examine which psychodynamic construct has the strongest connection with psychopathology, and (iv) to detect communities within the network to examine if psychodynamic constructs are conceptually different to psychopathology or whether they build a shared cluster.

We expected psychodynamic constructs and psychopathology to allocate in two distinct clusters with positive interrelations between the clusters based on psychodynamic theory. A great association is expected between depression and somatization because somatic components are common in depressive disorders. Further, according to previous findings, we expected great associations between psychopathology and the level of structural integration and more significant associations between psychopathology and the passive mode of conflict coping than

the active mode. Due to the exploratory character of the present study, no hypotheses were formed regarding the most critical construct in the network and regarding bridge symptoms.

Methods

Participants and procedure

We investigated a sample of treatment-seeking adults who registered for outpatient psychodynamic psychotherapy at the ´Akademie für Psychoanalyse und Psychotherapie München e.V.` in Munich, Germany. The institute offers psychodynamic and psychoanalytic individual and group therapy for children, adolescents, and adult patients and is a training institute for psychodynamic and psychoanalytic treatment. Patients who register for outpatient treatment are invited to a personal interview at the institute, where they receive extensive psychiatric assessments performed by experienced psychiatrists and psychologists. After the interview, the patients receive treatment recommendations and contacts of eligible psychotherapists.

At first contact, all consecutive adult patients who registered between September 2020 and January 2022 (n = 1104) were asked to complete basic documentation for quality assurance, which comprises a battery of sociodemographic and clinical measures. Those who agreed to participate (n = 838, consent rate: 75.9%) were sent a link to an online survey via E-mail. Of those who received the E-mail (n = 812), n = 368 completed the questionnaire battery (response rate: 45.3%). Only adult patients (age $\geq$ 18 years) who completed all questionnaires and had no more than 10% of missing items in each questionnaire were included in the data analysis. In the case of several registrations, only data of the first registration to the outpatient clinic were used, such that no patient was included twice. No other inclusion criteria were set. The final sample of the present study consisted of N = 341 patients (70.7% female; age: M = 34.5, SD = 12.5, range = 18-79). All participants gave written and signed informed consent to scientifically use data in a pseudonymised form.

Measures

Psychopathology

Two subscales of the German version of the Patient Health Questionnaire (PHQ-D, Löwe et al., 2002), an established self-assessment screening instrument for common mental disorders, were used to assess the patients' current depressive and somatic symptoms. The severity of somatization was assessed with the subscale PHQ-15, which assesses the fifteen most common somatic symptoms (e.g., stomach pain, back pain, dizziness) according to the DSM-5. Thirteen items were rated on a scale from 0 (´not bothered at all`) to 2 (´bothered a lot`), and two items were rated on a scale from 0 (´not at all`) to 2 (´nearly every day`). The severity of depressive symptoms was assessed with nine items of the subscale PHQ-9 ranging from 0 (´not at all`) to 3 (´nearly every day`), corresponding to the DSM-5 symptoms for major depressive disorder. Total scores on both instruments are computed as the sum score of the items, thus representing the severity level of the disorders. PHQ-15 total scores can range from 0 to 30, where scores of 5, 10, and 15 represent cut-off points for mild, moderate, and severe somatic symptoms. PHQ-9 total scores can range between 0 and 27. Scores of 5, 10, 15, and 20 represent cut-off points for mild, moderate, moderately severe, and severe depression. Good psychometric properties of both subscales were demonstrated, with high internal reliability values for both scales with Cronbach alpha ranging between .79 and .88 (Gräfe et al., 2004). Further, good levels of validity have been reported, by validating the PHQ-D against the Structured Clinical Interview for DSM-IV (SCID-IV) using clinical and nonclinical German samples (Gräfe et al., 2004). In the current sample, Cronbach alpha for the PHQ-15 was .78 and for the PHQ-9 .85.

Psychodynamic constructs

The short form of the Inventory of Interpersonal Problems (IIP-32; Horowitz et al., 2000; Thomas et al., 2011) was applied to assess interpersonal problems. The IIP-32 is a brief, self-administered questionnaire consisting of 32 items rated on a five-point Likert scale from 0 (´not

at all`) to 4 (´very much`). The items were divided into the first 19 questions beginning with the phrase "It is hard for me to…", and the remaining 13 questions asking about behaviours that "are done too much". The IIP-32 is based on the interpersonal circumplex model (Horowitz, 1996). Each item belongs to one of the octants of the interpersonal circumplex along the dimensions of dominance and affiliation (i.e., domineering, vindictive cold, socially inhibited, non-assertive, overly accommodating, self-sacrificing, and intrusive). The total score has been shown to adequately capture a wide range of interpersonal problems, with higher scores indicating more severe overall interpersonal difficulties. The German version was psychometrically evaluated by Thomas et al. (2011), finding adequate to good subscale reliabilities (αs = .70 - .86) and validity. McDonald's Omega for the IIP-32 total score in our sample was .90.

The OPD Conflict Questionnaire (OPD-CQ; Benecke et al., 2018) is a 66-item self-report measure for active (CQ-a) and passive (CQ-p) modes of coping with six intrapsychic (mostly unconscious) motivational conflicts (i.e., individuation vs. dependency, submission vs. control, need for care vs. self-sufficiency, conflict of self-value, guilt conflict, and oedipal conflict), as well as defended perception of conflicts and affects. Items are rated on a 5-point Likert scale from 0 (´completely false`) to 4 (´completely true`), with higher scores indicating a more significant presence of the conflict. Psychometric properties for most scales were good (McDonald's Omega = .74 - .86), apart from some scales, which showed insufficient internal consistency with McDonald's Omega ranging between .52 - .68 (Benecke et al., 2018; Gisch et al., 2020). In the current sample, McDonald's Omega was good, with .87 for the total scale, .85 for the active mode, and .88 for the passive mode.

Moreover, we used the short version of the OPD Structure Questionnaire (OPD-SQS; Ehrenthal et al., 2015) to assess the self-reported domains of personality structure, according to the conceptualization in the OPD. The OPD-SQS consists of 12 items with three subscales (i.e., self-perception, interpersonal contact and relationship model). The items are rated on a 5-point

Likert scale from 0 (´completely false`) to 4 (´completely true`). Higher scores represent greater structural impairment, that is lower levels of structural integration. The total score ranges from 0 (´highest structural level`) to 48 (´lowest structural level`). The OPD-SQS has shown good psychometric properties, with an internal consistency of Cronbach alpha = .88 (Ehrenthal et al., 2015). In this sample, McDonald's Omega for the total scale was .90.

Statistical Analysis

All statistical procedures were estimated with RStudio version 4.0.3 (R Core Team, 2020). The analytic code is available in the Supplementary Material.

Item selection

Since we were interested in the interrelationships between the broader included constructs, we used the global scores of the questionnaires as nodes. Yet, instead of the OPD-CQ total score, we decided to separately include the active and passive mode due to the described differences concerning psychopathology and other psychodynamic constructs (Benecke et al., 2018; Henkel et al., 2022). Calculating on subscale level would have resulted in too many parameters, which would have threatened both power and stability and, therefore, interpretability of the network structure. For all included variables, a higher value indicates more difficulties.

Missing Data

Missing item-level data ranged between 0% (PHQ-9) and 0.24% (PHQ-15) of the sample and were imputed using multivariate imputation for continuous variables with the use of predictive mean matching as implemented in the *MICE* package (Van Buuren & Groothuis-Oudshoorn, 2011; version 3.13.0). We imputed data 10 times and retained the mean value of the imputed datasets.

Network estimation

We followed the recommendation of Isvoranu and Epskamp (Isvoranu & Epskamp, 2021) for psychological networks with small sample sizes and estimated a regularized partial

correlation network via the Extended Bayesian Information Criterion (EBIC) (Foygel & Drton, 2010) graphical lasso (glasso) (Tibshirani, 1996). Consistent with standard practices, we used a hyperparameter γ of 0.5. This method minimizes false-positive edges by shrinking spurious edges to zero, resulting in a more parsimonious network structure. Since the input data was skewed, we applied a nonparanormal transformation to relax the normality assumption before conducting the networks (Zhao et al., 2012). Pearson correlations provided the input for the network estimation. We computed and visualized the network using the R package *qgraph* (Epskamp et al., 2012; version 1.9)**.** With six included nodes, 15 parameters were estimated. Nodes were placed using a modified version of the Fruchterman-Reingold algorithm (Fruchterman & Reingold, 1991) to place more connected nodes closer to one another (Jones et al., 2018). No specific minimum, maximum, or cut values have been used for network visualization.

Network inference. To identify the most central nodes, we calculated centrality indices using the centrality function in the *qgraph* package (Epskamp et al., 2012; version 1.9). We focus on expected influence (*EI*) in our results, defined as the summed weight of edges that it shares with all other nodes in the network while taking negative associations into account (Robinaugh et al., 2016). We did not focus on other metrics (i.e., betweenness and closeness) because they have been found to be unsuitable and unstable in psychological networks (Bringmann et al., 2019). In addition to the *EI* centrality estimation, we estimated the network's predictability (Haslbeck & Waldorp, 2018), using the centrality function in the *qgraph* package (Epskamp et al., 2012; version 1.9). While network centrality is a relative measure, node predictability is an absolute measure of the interconnectedness of a node. Predictability is defined as the variance of each node explained by all its neighbouring nodes. Therefore, node predictability is of clinical importance since it quantifies how much a node can be predicted by intervening on all other nodes in the network (Haslbeck & Fried, 2017).

Bridge symptoms. Bridge symptoms were estimated to identify the nodes that link the psychodynamic constructs to psychopathology (Jones et al., 2019). Bridge strength (*BS*) was calculated using the bridge function of the R package *networktools* (Jones, 2020; version 1.2.3). The index is defined as the sum of the edge weights connecting a node to the nodes in the other community.

Clustering. We used the spinglass algorithm implemented within the *igraph* package (Csardi & Nepusz, 2006; version 1.2.6) to analyze clusters in the network. The spinglass algorithm is a modularity-based community detection algorithm suitable for uncovering the community structure of relatively small networks that include both positive and negative edges (Traag & Bruggeman, 2009; Yang et al., 2016). Since the spinglass algorithm is not deterministic, we repeated the algorithm 1000 times and used the median outcome.

Accuracy and stability estimation. As recommended in the literature (Borsboom et al., 2018), network stability and the precision of estimated parameters (i.e., edge weights, *EI* and *BS*) were estimated using bootstrapping routines (number of bootstrap samples = 2000) implemented in the R package *bootnet* (Epskamp & Fried, 2020; version 1.4.3). To estimate the accuracy and stability of the edge weights, we calculated the 95% confidence intervals (CIs) around the original edge value. A narrower 95% CI indicates greater edge accuracy. Further, the CI of a present edge is supposed not to cross zero (Epskamp et al., 2018). Moreover, we computed a 'multiverse' plot of the edge weight bootstrap results to demonstrate the stability of the edge weights across bootstrap replications. The plot should show horizontal lines of the same colour to indicate stable estimation of the edge weights (Epskamp, 2020).

To examine the stability of the *EI* centrality order, we calculated the correlation-stability coefficient (CS-coefficient). The CS-coefficient indicates the percentage of the data that could be dropped to retain with 95% certainty a correlation of 0.7 with the original dataset. In order to

interpret a network, CS-coefficients are recommended to be above .50, whereas CS-coefficients below .25 indicate unstable networks (Epskamp et al., 2018).

In addition, we performed difference tests using nonparametric bootstrapping routines to compare centrality estimates (i.e., *EI* and *BS*) and individual edge weights. These difference tests can be used to determine which nodes, bridge symptoms, or edges are significantly different from another. Nodes significantly more central to at least 50% of all other network nodes are interpreted as the most central symptoms. Likewise, the difference test was used to detect the strongest edges and identify bridge symptoms. We interpreted those symptoms as bridge symptoms, with a greater *BS* to at least 50% of the other nodes within the same cluster.

Results

In total, $N = 341$ patients were included in the analyses. Before the nonparanormal transformation, somatization (PHQ-15) scores ranged from 1 to 25, with a mean of 10.2 (SD = 5.0). 13.2% of the patients showed minimal somatic symptoms, 34.9% mild somatic symptoms, 33.1% moderate somatic symptoms, and 18.8% severe somatic symptoms. Depression (PHQ-9) scores ranged from 1 to 27, with a mean of 13.1 ($SD = 5.6$). 4.1% of the patients showed minimal depressive symptoms, 26.4% mild depressive symptoms, 29.9% moderate depressive symptoms, 25.5% moderately severe depressive symptoms, and 14.1% severe depressive symptoms. OPD Structure Questionnaire (OPD-SQS) scores ranged from 0 to 48, with a mean of 22.5 ($SD = 9.9$); Inventory of Interpersonal Problems (IIP-32) scores ranged from 0.0 to 2.8 with a mean of 1.6 ($SD = 0.5$); the passive mode of the OPD Conflict Questionnaire (CQ-p) ranged from 0.1 to 3.3 with a mean of 1.8 ($SD = 0.6$); and the active mode of the OPD Conflict Questionnaire (CQ-a) ranged from 0.1 to 2.5, with a mean of 1.4 ($SD = 0.4$).

Network stability

The network was highly accurate and stable, allowing reliable interpretations (Epskamp et al., 2018). In detail, the results from the edge weight bootstrap show that edges were stable,

with relatively narrow CIs (see Fig. S1). Similarly, the multiverse plot indicates a stable estimation of the edge weights, as it shows similar edge weight values across the bootstrap samples (see Fig. S2). Finally, the case-dropping bootstrap to assess the stability for centrality resulted in a CS-coefficient for the *EI* centrality of 0.75, indicating very high stability (see Fig. S3).

Network estimation

Figure 1 shows the resulting network plot, including psychopathology and psychodynamic constructs. Edges between nodes represent partial correlations controlling for all other items in the network. A correlation and adjacency matrix of the network can be seen in the Supplementary Tables S1and S2, respectively. Of 15 possible edges, eleven were evident in the final graph. Only one negative edge emerged between the active and the passive mode of conflict coping (partial correlation of r = -.07), showing that higher levels on the active mode of conflict coping decreased the probability of coping with inner conflicts in the passive mode and vice versa. The strongest positive associations within the network emerged between the passive mode of conflict coping and interpersonal relations (r = .36), between the level of structural integration and interpersonal relations (r = .36), between depression and somatization (r = .34), between the level of structural integration and the passive mode (r = .30) and between the level of structural integration and depression (r = .27). Of note, in the edge weight difference test these edges were found to be significantly stronger than most other edges in the network, but not significantly different from each other (see Fig. S4).

Additionally, we examined the associations between psychodynamic constructs and psychopathology. The associations were stronger for depression (sum of between-domain edge weights = 0.50) than somatization (sum of between-domain edge weights = 0.16). For both depression and somatization, the associations were strongest with the level of structural integration, followed by the passive mode of conflict coping. Interpersonal relations were only

marginally associated with depression but not associated with somatization. The active mode of conflict coping was not associated with psychopathology.

=== please insert Figure 1 here ===

Network inference

The level of structural integration was identified as the most central node (*EI* = 1.11). According to the centrality difference test, the *EI* centrality of the level of structural integration was significantly higher than the *EI* centrality of all other nodes (see Fig. S5). On the other hand, the lowest node centrality was detected for the active mode of conflict coping (*EI* = 0.10). The raw *EI* centrality values are visualised in Figure 2a and are presented in Supplementary Table S3.

The average node predictability was .41, meaning that over average 41% of the variance of each node was predicted by the other nodes in the network. The level of structural integration had the highest predictability (R^2 = .60) and is, therefore, the construct that is best predicted by (or the best at predicting) all remaining nodes in the network. The node with the lowest predictability was the active mode of conflict coping (R^2 = .03), demonstrating its poor connection to all other included variables. The network plot visualises the predictability scores as pie charts around each node, while the values are reported in Supplementary Table S3.

Bridge analysis

The strongest bridge symptom of the psychodynamic constructs was the level of structural integration (*BS* = .37). At the same time, depression (*BS* = .50) was the strongest bridge symptom from the psychopathology cluster because their bridge strength was found to be significantly greater than the bridge strength of most other nodes within their cluster (see Fig. S6). The raw *BS* values are presented in Supplementary Table S3 and presented in Figure 2b.

=== please insert Figure 2 here ===

Clustering

Three clusters were detected, representing psychopathology, psychodynamic constructs (i.e., interpersonal relations, passive mode of conflict coping, and the level of structural integration), and the active mode of conflict coping. The stability of the clusters was good, with a mean of 2.7 clusters detected in 1000 times. For the sake of clarity and consistency, we present the network figure that shows all psychodynamic constructs belonging to the same group within the paper. However, a visualization of the clusters as they were found in the community detection analysis is presented in Supplementary Figure S7.

Discussion

The present study used a network approach to explore how psychodynamic constructs (i.e., interpersonal relations, active and passive modes of intrapsychic conflict coping, and the level of structural integration assessed by the OPD) and psychopathology (i.e., depression and somatization) are associated in a sample of N = 341 adults seeking psychodynamic outpatient psychotherapy. The network structure resulted in separate, but connected clusters for psychodynamic constructs and psychopathology, bridged by the level of structural integration. The level of structural integration was also the most central (i.e., most influential) node in the network. Within-cluster associations were more substantial compared to between-cluster associations. The great association between depression and somatization is reasonable since there is a basic somatic component in depressive disorders.

The formation of separate clusters aligns with psychodynamic theory, which postulates that psychodynamic constructs and psychopathology are independent, but interconnected domains (OPD Task Force, 2008). Interestingly, the active mode of conflict coping was found to form its own cluster, suggesting its independence from both psychopathology and the other included psychodynamic constructs. This finding is supported by its marginal predictability (R^2 = .03), demonstrating its low interconnectedness within the network. Further, no associations were found between the active mode of conflict coping and psychopathology. In contrast, the passive

mode of conflict coping was associated with both depression and somatic problems. Their operationalization can explain this difference: passive modes are associated with a tendency to experience negative affects (e.g., fear, helplessness, shame, guilt, envy, jealousy), resulting in depression, somatic problems or other mental disorders (OPD Task Force, 2008). In contrast, people who resolve their intrapsychic conflicts in the active mode show only a few symptoms as long as this way of coping works. These people develop symptoms and seek psychotherapeutic help only when their defence breaks down. The fact that a pronounced active mode nevertheless represents a latent vulnerability is indicated by the correlations with the level of structural integration and interpersonal problems. For example, an individual with an active conflict of self-value and pronounced narcissistic traits may be very successful at work, hardly questioning himself and his decisions, showing a controlling and self-absorbed interpersonal style at work and living in a relationship with a younger girlfriend who admires him very much. If this girlfriend decides to end the relationship, the person may experience this as a major insult, gradually weakening his defences, introducing questions of self-doubt, and leading to a severe depression. This might be the first time in his life that he develops symptoms and eventually seeks help. However, since only depression and somatic problems were included within our network, the generalizability of our results is limited to these disorders. Yet, our results are generally supported by recent findings by Henkel et al. (2022), finding more significant correlations between the global severity index (GSI) of the Brief Symptom Inventory (BSI; Derogatis & Spencer, 1982) with the passive modes of conflict coping, compared to the active modes.

The negative association between the active and the passive mode of conflict coping was somewhat expected in this clinical sample, since they describe contrasting ways of solving an inner conflict (e.g., exaggerated autonomy vs. exaggerated need for closeness). It would be interesting to compare this association between patients with different levels of structural

integration to see if the negative relation also holds with patients at higher levels of structural integration. Patients with higher levels of structural integration (i.e., better personality functioning) are meant to have more mature and more flexible ways of dealing with unpleasant experiences, enabling these patients to vary between active and passive modes. Therefore, one would expect the association between the two modes to be less negative (or even positive). On the other hand, patients with lower levels of structural integration show rather rigid defence mechanisms. Thus, their mode of conflict coping is more likely to be either active or passive.

In addition, the two modes of conflict coping also differed in the association with interpersonal difficulties. The relatively small association between the active mode of conflict coping and interpersonal problems may reflect the lack of patients' conscious knowledge regarding their own interpersonal difficulties. Therefore, in addition to self-reports, reports of others may be necessary to get an objective view of their interpersonal difficulties. Future studies may therefore verify our findings using OPD interview data of trained clinicians.

Except for the negative association between the two conflict modes, only positive associations were found within the network. These positive associations are in line with previous studies showing the psychodynamic constructs to be positively correlated with each other and with psychopathology (Benecke et al., 2018; Henkel et al., 2022; Zimmermann et al., 2012). Also, the psychoanalytic theory postulates positive associations between the constructs. According to the theory, intrapsychic conflicts are thought to originate in conflictual interpersonal relationships (Rudolf, 2010). Further, in contrast to the traditional view, where conflicts were understood to be primarily intrapsychic, contemporary concepts stress the interpersonal dimension of inner conflicts. For example, difficulties in the person’s significant relationships (e.g., with attachment figures) early in life may result in a conflict between striving for autonomy and dependency, which can be reflected in difficulties in current relationships (Ermann, 2020). Interpersonal relations are also related to the level of structural integration.

Individuals with lower levels of structural integration tend to have more difficulties in emotion regulation and are prone to carry conflicts out interpersonally instead of processing them mentally (OPD Task Force, 2008). Structural integration has also been found to be related to intrapsychic conflicts, with some conflicts (i.e., individuation vs. dependency) being typically linked to lower levels of structural integration (Grande et al., 1998), as both results from deficits in early childhood development. Other conflicts (e.g., guilt conflict), in contrast, are typically associated with moderate or higher levels of structural integration (Rudolf, 2013).

The study identifies the level of structural integration as operationalized by the OPD to be the most influential construct in the network (i.e., most central and highest predictability) and to link psychodynamic constructs to psychopathology. Yet, since only the global score was included in our network, our findings cannot identify which specific structural functions are most relevant in patients with depression or somatization. However, for clinical case formulations a more detailed understanding of the various aspects of personality functioning is required (Tanzilli et al., 2021).

The OPD defines structural impairment as deficits in developmentally acquired basic and clinically meaningful psychological capacities. For example, lower levels of structural integration manifest themselves in reduced abilities to notice, differentiate, regulate, or express emotions and in greater impulsivity. The concept of structural integration also includes aspects of interpersonal regulation, with lower levels of structural integration being characteristic of maladaptive interpersonal interactions. These symptoms are quite similar to symptoms described in personality disorders. It is, therefore, not surprising that lower levels of structural integration have been found to be associated with higher levels of severity in personality disorders (Doering et al., 2013). Further, it has been found that personality functioning is conceptually and empirically related to the Criterion A of the new DSM-5 Alternative Model of Personality Disorder (AMPD) (Hörz-Sagstetter et al., 2021; Zimmermann et al., 2015), which states that a

personality disorder diagnosis requires an impairment in personality functioning. Criterion B, on the other hand, specifies the specific clinically relevant personality traits (Krueger et al., 2014). A similar proposal has been made for the ICD 11 (Tyrer et al., 2011). Besides, there is strong evidence for a general factor of personality pathology, which may explain the high comorbidity among personality disorder diagnoses (Sharp et al., 2015; Wright et al., 2016).

Structural integration has also been found to be associated with psychopathology, with medium to large correlations (Benecke et al., 2009; Crempien et al., 2017; Ehrenthal et al., 2015; Freier et al., 2021). Obbarius et al. (Obbarius et al., 2021) argue that this relationship may be due to the fact that patients with lower levels of structural integration have more difficulties in dealing with intra- or interpersonal aversive effects, which may result in emerging or persisting symptoms. Similar to our findings, greater correlations between the level of structural integration and depression than somatic problems have been found (Krakau et al., 2021; Obbarius et al., 2021). Further, it has been shown that the level of structural integration is associated with the severity of depressive symptoms (Crempien et al., 2017), mediates between child maltreatment and values of depression (Dagnino et al., 2020; Freier et al., 2021; Krakau et al., 2021), and predicts a more complicated symptom course and a poorer course in patients with depression (Zeeck et al., 2020). A clinical example is an individual with high structural impairments in the areas of self-regulation (e.g., controlling anger and intense affects) and in interaction with significant others (e.g., fear of being rejected by others) may at the same time report severe depressive symptoms. Consequently, the importance of the level of structural integration in the network and its connection to psychopathology, especially to depression, is reasonable. The findings indicate that when the impairment in structural integration decreases, also all other domains, including symptomatology, may be decreased. In other words, increasing personality functioning may result in less psychological strain. The level of structural integration may thus be a potential key target for treatment. However, our results do not give any information on the

causal link. Even though nodes with high centrality are thought to be clinically relevant constructs and viable intervention targets (Levinson et al., 2022; Robinaugh et al., 2016), time-series data are needed to examine the direction of the influence. Suppose it could be established that structural integration has a causal effect on psychopathology: in that case, the findings indicate that patients may benefit from PDT focusing on structural abilities to reduce symptomatic strain. This finding would be in line with studies demonstrating the impact of the level of structural integration on treatment outcome (Koelen et al., 2012). Again, it would be of great interest to compare these results in patients with different levels of structural integration to see if these results hold in both structurally less impaired and more impaired patients. According to psychoanalytic theory, one would expect that inner psychic conflicts would be more salient in patients with higher levels of structural integration.

Strengths and Limitations

A particular strength of the study is its naturalistic sample, with a great range of symptom severity and levels of structural impairment. Symptoms were assessed before the treatment-seeking individuals had their first contact with a psychotherapist. Furthermore, our analyses were stable and robust, allowing reliable interpretation of the results. Most important, this is the first study to investigate the associations between psychodynamic constructs and psychopathology using network analysis.

However, despite the strengths of the study, several methodological issues need to be addressed. First, a significant limitation of the study is the cross-sectional nature of the analysed data, meaning that causality cannot be assumed. However, cross-sectional networks still hold essential insights into the interrelationships between symptoms or constructs, which can be used to generate hypotheses about the causal dynamics (Von Klipstein et al., 2021). Future research, however, should entail longitudinal data to draw causal inferences. Another significant limitation is that our calculations were limited to investigating only depression and somatization as

psychopathology, since no other validated questionnaires to assess mental disorders were included in the routine diagnostics. Future research is essential for expanding our findings by including a greater variety of psychiatric disorders. Similarly, also for the psychodynamic constructs, some differentiated information is missing since only global values were included in the network. This way, our interpretations are limited to the broader constructs. A fine-grained understanding of the interrelationships of, e.g., specific intrapsychic conflicts or specific interpersonal relations patterns with psychopathology is not possible. However, we decided to use global scores in this study (i) to explore the relationships among the broader constructs in order to generate hypotheses regarding how psychodynamic constructs are related to psychopathology, and (ii) to reduce the number of nodes in the network since calculating on subscale or item level would have resulted in too many parameters (concerning our sample size) and, therefore, in an unstable network. Analysing the data on subscale level would be interesting for future research, given the complex relations within the psychodynamic constructs (Cierpka et al., 2007). Further, the included questionnaires had different scoring and scaling properties and differed in their variability, which could have affected the network metrics. The active mode of conflict coping had the lowest variance (*SD* = .39) of all included variables, which may have contributed to its low strength centrality and its marginal statistical relationships to the other included constructs (Fried et al., 2018; Terluin et al., 2016). Moreover, the included constructs are assumed to differ in their time stability, with psychodynamic constructs being more time-stable than psychiatric symptoms (Grande et al., 2000). We also relied solely on self-report questionnaires, which may have resulted in a possible self-report bias. Especially for the assessment of psychodynamic constructs, self-report measures are critical, as they aim to examine (partly) unconscious processes. These are conceptualized to be nondeclarative and cannot be verbalised. Nevertheless, all self-report questionnaires used in this study are psychometrically valid and reliable instruments. However, future research may include OPD

interview data of trained clinicians. Finally, the network model is a between-subject model - no within-subject inferences can be drawn (Fried et al., 2017).

Conclusion

This study explored the link between psychodynamic constructs and psychopathology in a naturalistic sample of N = 341 adults registering for psychodynamic outpatient psychotherapy. The results of this study support the notion that psychodynamic constructs and psychopathology are independent but related domains. A key finding of this explorative study is the crucial role of personality functioning, as assessed by a self-report measure of the level of structural integration as operationalized by the OPD. Structural integration was the most central node within the network and was found to bridge psychodynamic constructs and psychopathology. The active mode of conflict coping was located in the network's periphery and formed its own cluster. It was negatively associated with the passive mode of conflict coping, highlighting the difference between the two ways of dealing with inner psychic conflicts. Future research is needed to replicate the results in a larger sample using subscale levels and a greater variety of psychiatric diseases. Longitudinal studies may clarify causality.

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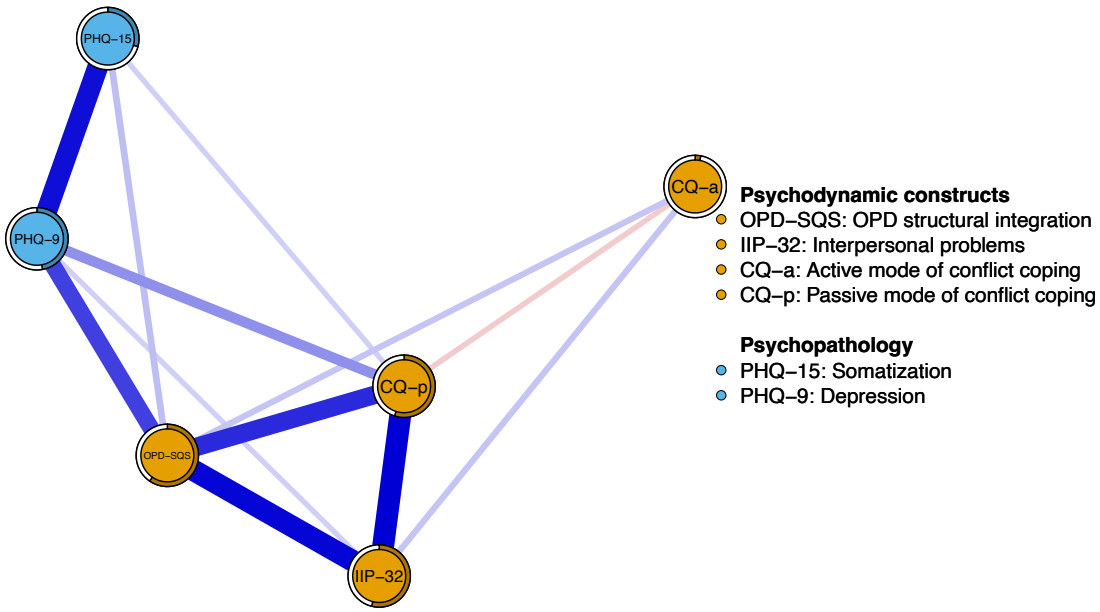
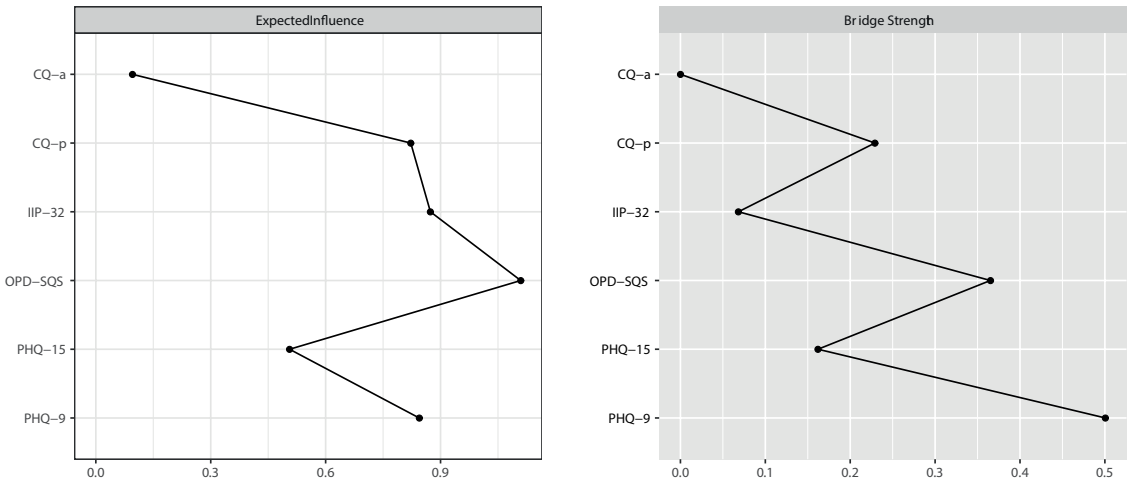
Figure 1



Note. Network model visualizing the partial correlations between psychodynamic constructs (orange) and psychopathology (blue). Blue edges indicate positive; red edges indicate negative relationships. Thicker and more saturated edges represent stronger relationships. The filled part of the circle around each node depicts predictability.

Figure 2



(a) (b)

Note. (a) Expected Influence (EI) and (b) Bridge Strength (BS) of the network.

8.2 Supplementary Materials for Study 1

Exploring the associations between psychodynamic constructs and psychopathology: a network approach

Supplementary Tables

Supplementary Figures

Table S1

Correlation matrices (using Pearson correlations)

	PHQ-15	PHQ-9	OPD-SQS	IIP-32	CQ-a	CQ-p
PHQ-15	1.000	0.542	0.443	0.317	0.043	0.407
PHQ-9	0.542	1.000	0.623	0.520	0.085	0.566
OPD-SQS	0.443	0.623	1.000	0.696	0.164	0.689
IIP-32	0.317	0.520	0.696	1.000	0.162	0.683
CQ-a	0.043	0.085	0.164	0.162	1.000	0.038
CQ-p	0.407	0.566	0.689	0.683	0.038	1.000

Note. PHQ-15 = somatization; PHQ-9 = depression; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; IIP-32 = Inventory of Interpersonal Problems Short Form; CQ-a = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – active mode; CQ-p = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – passive mode.

Table S2

Adjacency matrices

	PHQ-15	PHQ-9	OPD-SQS	IIP-32	CQ-a	CQ-p
PHQ-15	0.000	0.344	0.093	0.000	0.000	0.069
PHQ-9	0.344	0.000	0.272	0.068	0.000	0.160
OPD-SQS	0.093	0.272	0.000	0.357	0.084	0.303
IIP-32	0.000	0.068	0.357	0.000	0.085	0.364
CQ-a	0.000	0.000	0.084	0.085	0.000	-0.073
CQ-p	0.069	0.160	0.303	0.364	-0.073	0.000

Note. PHQ-15 = somatization; PHQ-9 = depression; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; IIP-32 = Inventory of Interpersonal Problems Short Form; CQ-a = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – active mode; CQ-p = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – passive mode.

Table S3

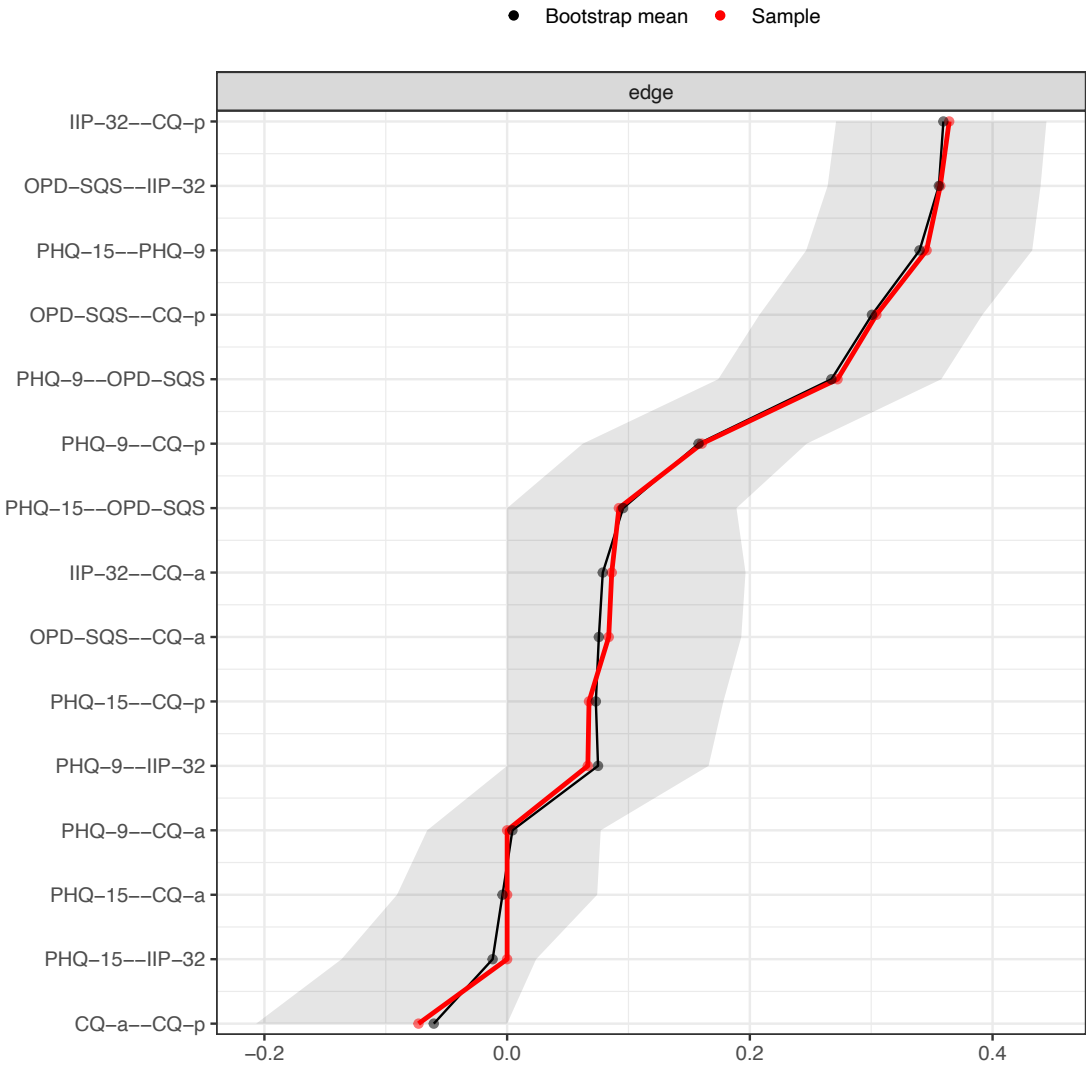
Raw values of expected influence centrality, predictability, and bridge strength parameters

Variable	Expected influence	Predictability (R^2)	Bridge strength
PHQ-15	0.506	0.292	0.162
PHQ-9	0.844	0.472	0.500
OPD-SQS	1.109	0.596	0.365
IIP-32	0.874	0.539	0.068
CQ-a	0.095	0.029	0.000
CQ-p	0.822	0.550	0.229

Note. PHQ-15 = somatization; PHQ-9 = depression; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; IIP-32 = Inventory of Interpersonal Problems Short Form; CQ-a = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – active mode; CQ-p = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – passive mode.

Figure S1

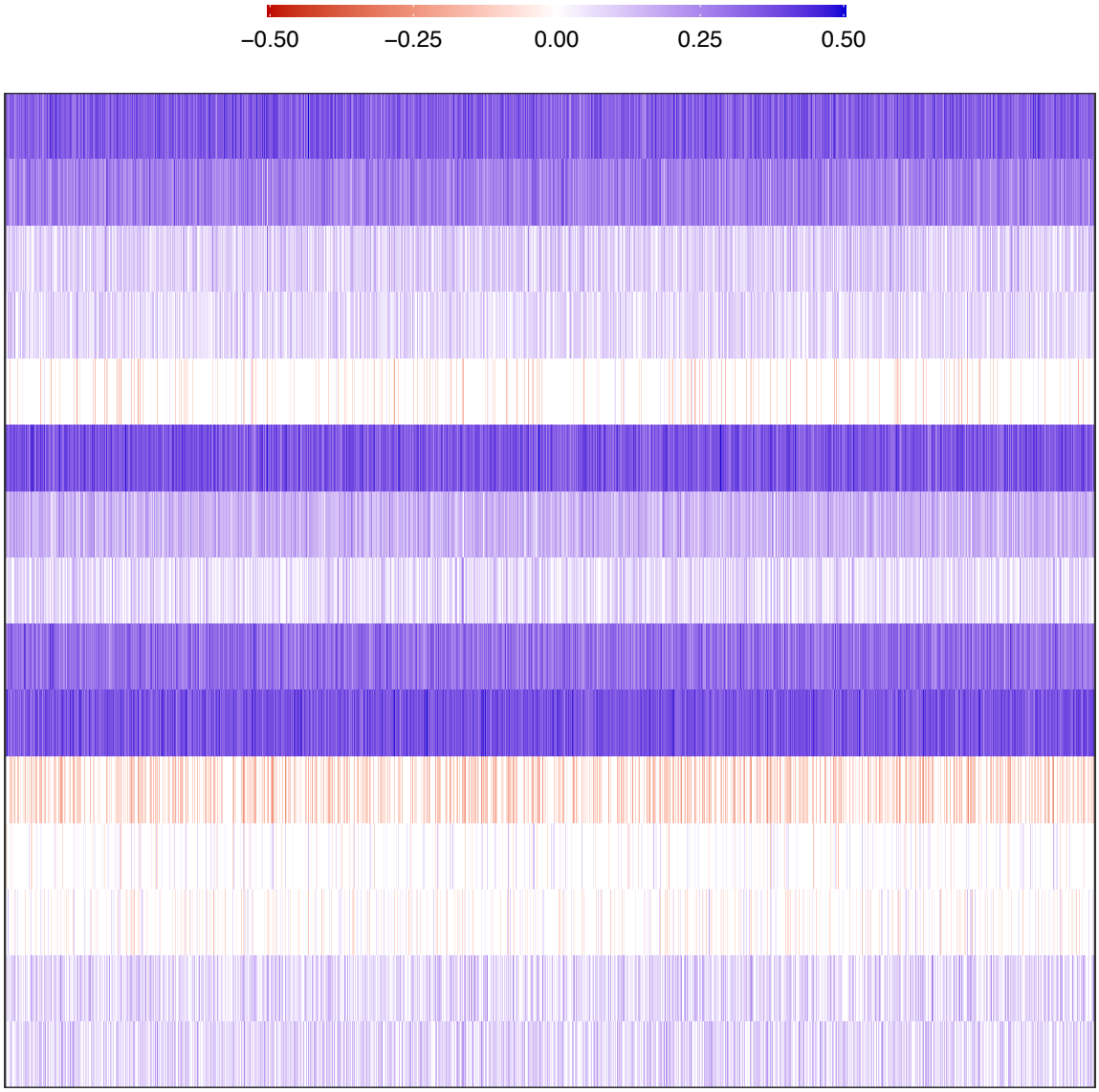
Edge weight bootstrap



Note. Bootstrapped confidence intervals (CIs) of the estimated edge weights in the network across 2000 bootstraps. The red line indicates the original edge weight values, the black line the bootstrap mean edge weight values and the gray-shaded area the bootstrapped 95% CIs of the edge weight values. The sample values lie within the bootstrapped CIs and the bootstrapped CIs are relatively small, thus indicating accurate estimations. PHQ-15 = somatization; PHQ-9 = depression; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; IIP-32 = Inventory of Interpersonal Problems Short Form; CQ-a = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – active mode; CQ-p = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – passive mode.

Figure S2

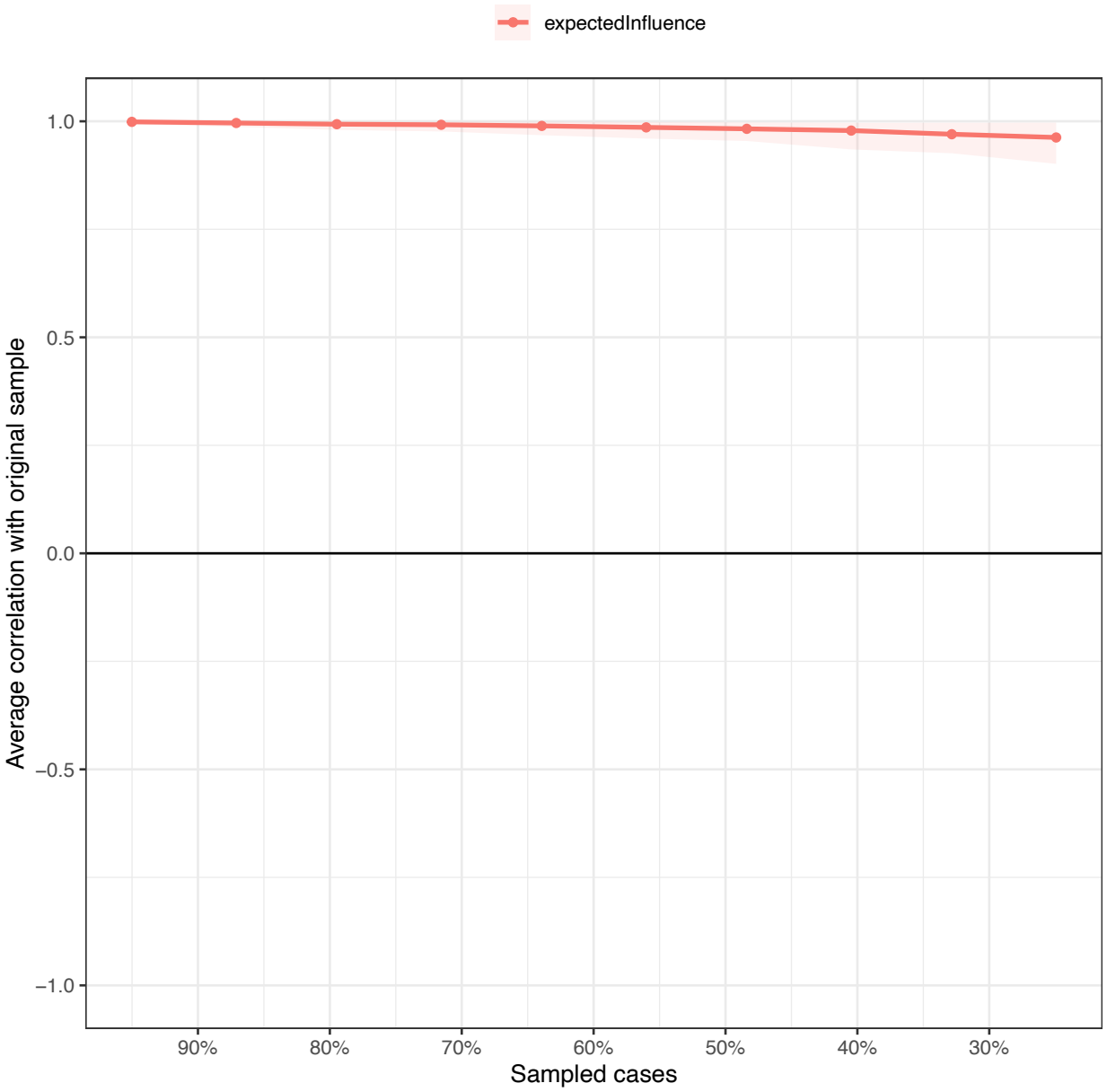
Edge weight multiverse plot



Note. In this multiverse plot of bootstrap edge weight results every row indicates an edge and every column a bootstrap. The colour indicates the strength of the edge in each of the 2000 bootstrap replication. The edge weights in our network are stable, because this figure shows fairly straight horizontal lines of the same colour.

Figure S3

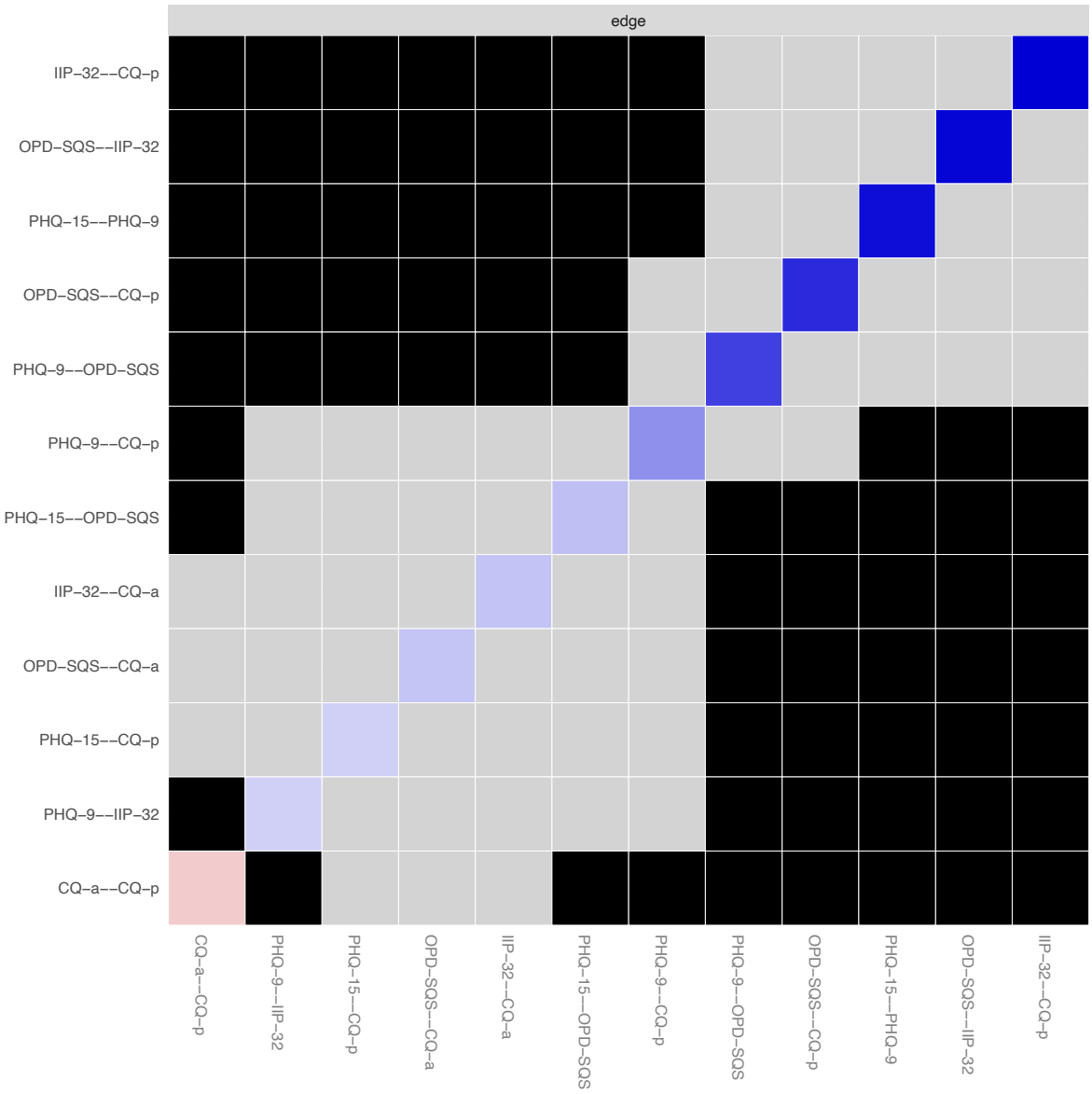
Centrality Stability



Note. The average correlation between the original centrality index and the centrality index after dropping a percentage of subjects at random from the data. The line represents how the expected influence centrality of the nodes changes when dropping different proportions of the data. The straighter the line, the more reliable the centrality. In our network, the plot indicates a very stable and reliable centrality.

Figure S4

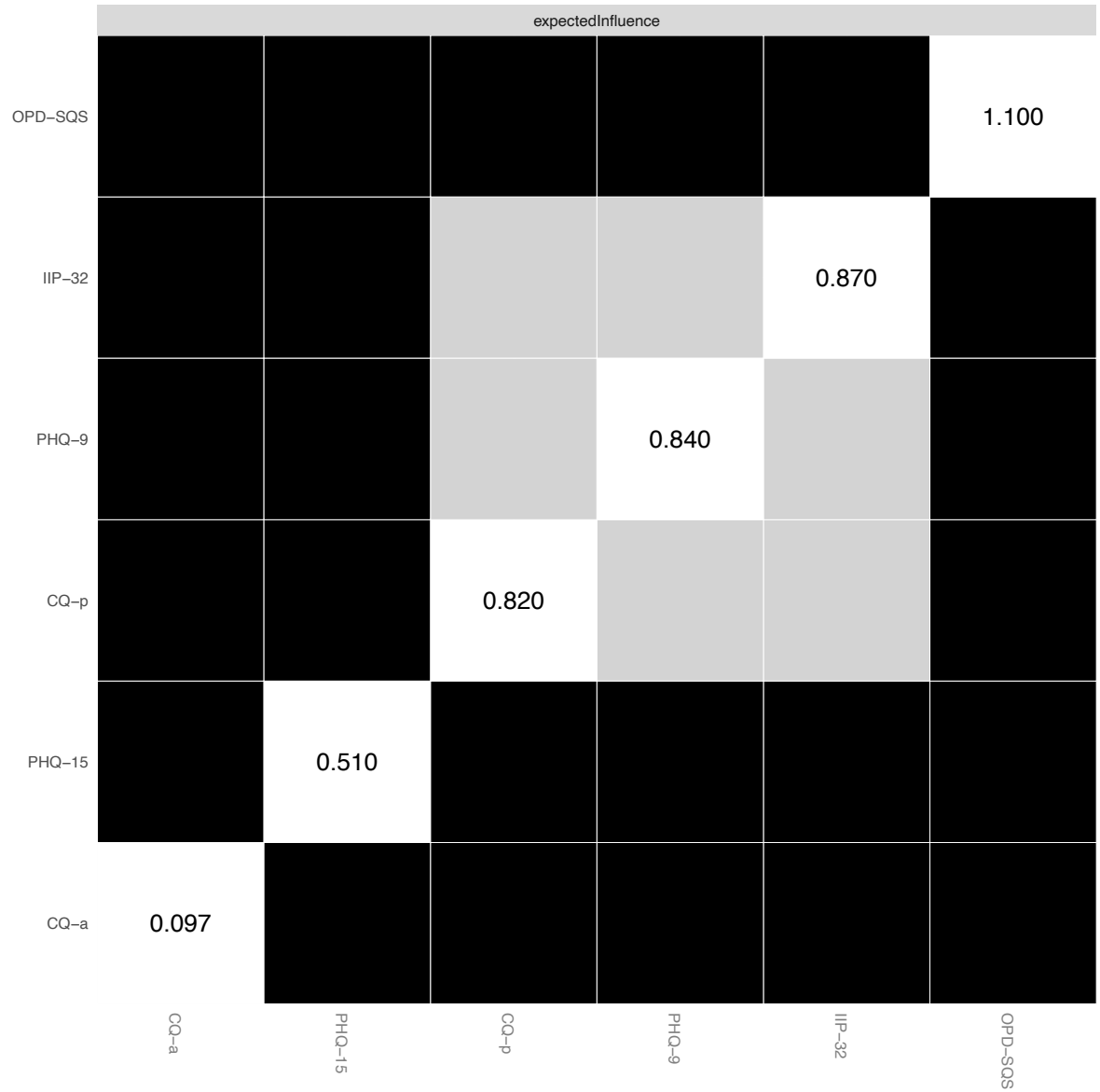
Edge weight difference test



Note. The plot shows the differences between all pairs of edge weights. Each row and column indicate an edge weight. Black boxes represent significant differences between edge weights (α = 0.05), whereas gray boxes indicate non-significant differences. The colour in the diagonal corresponds with the edge colours in the original network figure. PHQ-15 = somatization; PHQ-9 = depression; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; IIP-32 = Inventory of Interpersonal Problems Short Form; CQ-a = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – active mode; CQ-p = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – passive mode.

Figure S5

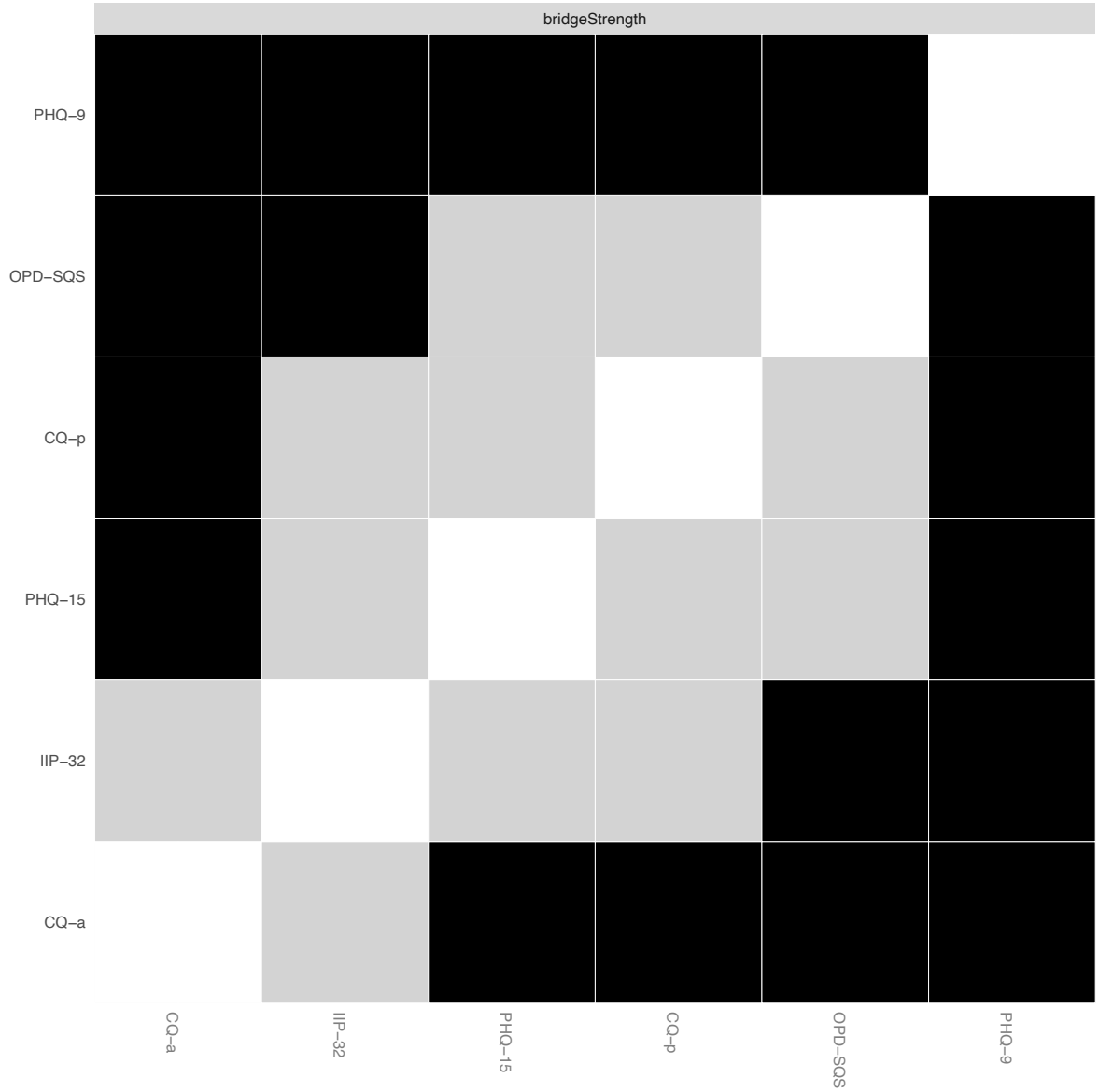
Centrality difference test



Note. Each row and column indicate a node. Black boxes represent nodes that do differ significantly from one-another in their expected influence centrality ($\alpha = 0.05$), gray boxes indicate non-significant differences. The values in the white boxes correspond with the value of the expected influence of the node in the original network figure. PHQ-15 = somatization; PHQ-9 = depression; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; IIP-32 = Inventory of Interpersonal Problems Short Form; CQ-a = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – active mode; CQ-p = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – passive mode.

Figure S6

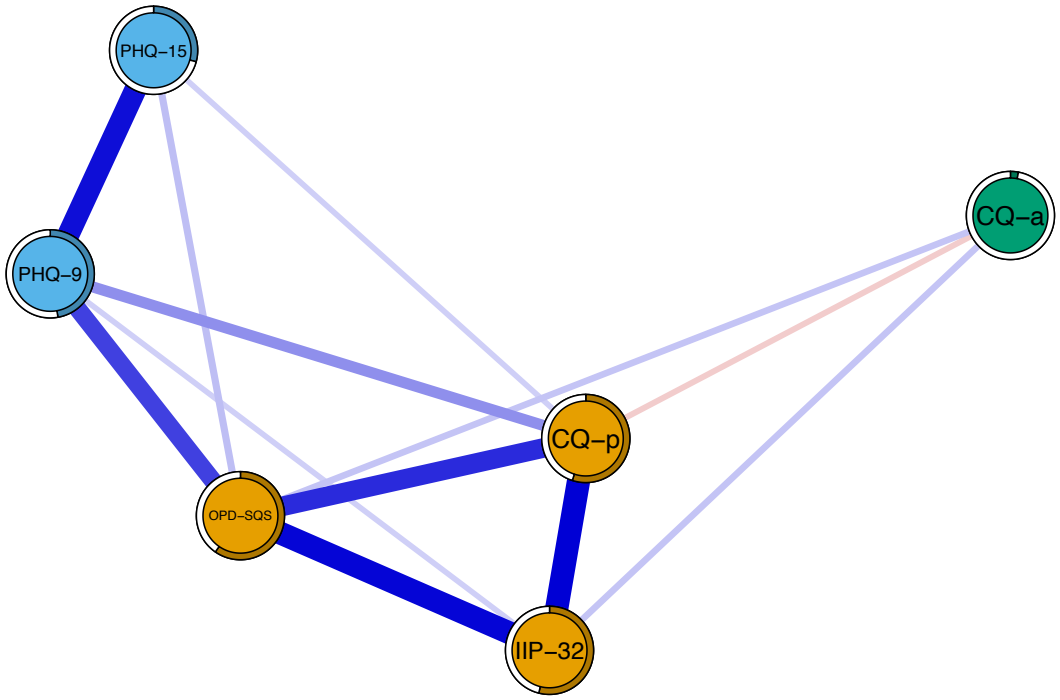
Bridge difference test



Note. Each row and column indicate a node. Black boxes represent nodes that do differ significantly from one-another in their bridge strength (α = 0.05), gray boxes indicate non-significant differences. PHQ-15 = somatization; PHQ-9 = depression; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; IIP-32 = Inventory of Interpersonal Problems Short Form; CQ-a = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – active mode; CQ-p = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – passive mode.

Figure S7

Network plot



Note. Network plot visualising the three clusters as detected in the community detection analysis. Blue edges represent positive associations between two nodes whereas the red edge represents a negative association. The thickness of an edge represents the strength of the association. The colour of each node indicates the cluster to which it belongs: blue = psychopathology, orange = psychodynamic constructs, and green = active mode of conflict coping. PHQ-15 = somatization; PHQ-9 = depression; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; IIP-32 = Inventory of Interpersonal Problems Short Form; CQ-a = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – active mode; CQ-p = Operationalized Psychodynamic Diagnosis – Conflict Questionnaire – passive mode.

8.3 Study 2

"How are Psychodynamic Conflicts Associated with Personality Functioning? A Network Analysis"

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

CVB and LV performed statistical analysis and wrote the first draft of the manuscript. YH supervised the analytical methods. All authors discussed the results. LV, YH, CB, and CS revised the manuscript. All authors contributed to the article and approved the submitted version.

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Data Availability Statement

The analytic code for all analyses performed in this study is available along with the correlation and adjacency matrices online at https://osf.io/pkh9t/. These matrices can be used to assess our analyses. The data supporting this study's findings are available from the corresponding author upon reasonable request.

Supplementary material

The supplementary material for this article can be found online at https://osf.io/pkh9t/.

Abstract

Personality functioning and psychodynamic conflicts are central constructs in psychoanalytic theories of psychopathology as well as in many psychodynamic treatment models. Although there has been a longstanding conceptual discussion on how they relate to each other, empirical evidence on this question is still scarce. In this study, we explore the associations between psychodynamic conflicts and levels of structural integration (which can be used synonymously with personality functioning) by means of a partial correlation network analysis in a sample of *N* = 220 outpatients interviewed and rated according to Operationalized Psychodynamic Diagnosis (OPD-2). We examined network centrality, bridge centrality, clustering, and network stability. The network analysis resulted in separate clusters for levels of structural integration and conflicts, supporting the assumption of distinct psychodynamic constructs. The greatest association between the two clusters was found between the individuation vs. dependency conflict (C1) and the structural capacity to attach to internal objects. In general, C1 showed significantly greater connections with structural dimensions compared to the other five OPD conflicts included. C1 was also more central in the network compared to most other conflicts, whereas the structural dimensions did not differ in centrality. All structural dimensions were found to be strongly interconnected. C1 showed exclusively negative edges to the other conflicts, suggesting that a profound C1 decreases the probability of other psychodynamic conflicts. We discuss clinical as well as conceptual implications of our findings for psychodynamic diagnosis and treatment.

Introduction

The current revisions of the official diagnostic classification systems feature a new approach for the definition and diagnosis of personality disorders (PDs). In both the Alternative Model for Personality Disorders (AMPD) in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) and the PD section in the eleventh edition of the International Classification of Diseases (ICD-11; World Health Organization, 2019) the diagnosis of PDs has shifted towards a dimensional approach. The severity of the PD is now described along a continuum of personality functioning, where impairments in self-functioning and interpersonal functioning on dimensions such as identity, self-direction, empathy, and intimacy are at the core of personality pathology. Maladaptive personality traits can be used to further describe the personality pathology (e.g., negative affectivity, detachment, antagonism, disinhibition, and psychoticism in the AMPD). The result is a hybrid-dimensional-categorical model, where all specific PDs can now be depicted as a combination of a certain impairment in personality functioning and certain maladaptive personality traits.

The revised conception of PDs is inspired by long-established psychoanalytic theories. In particular, the dimensional construct of personality functioning is empirically and conceptually related to contemporary psychodynamic concepts of personality functioning (Blüml & Doering, 2021; Clarkin et al., 2020; Hörz-Sagstetter et al., 2021), such as Kernberg's model of personality organization (Kernberg, 1984, 1996), Fonagy's mentalization-based approach (Fonagy et al., 1993), or the levels of structural Integration ax's of Operationalized Psychodynamic Diagnosis (OPD; OPD Task Force, 2001; 2008, 2023). For more information on the similarities and differences of the psychodynamic theories please see Sell and Benecke (2022). Furthermore, combining a dimensional with a categorical conception of the psyche is also familiar from the psychoanalytic tradition: the OPD, for example, includes both a dimensional conceptualization

of personality functioning and an assessment of psychodynamic conflicts (i.e., conflicting inner motivational themes) that can be used similarly to personality traits to further describe and understand a person. However, compared to the AMPD or ICD-11 the OPD is not limited to the conceptualization of PDs but is in principle applicable to everyone, including individuals without any kind of mental disorder.

Concerning the AMPD, in the last decade there has been an ongoing and controversial debate on the inter-relationship between personality functioning and personality traits. Several studies have shown a substantial cross-sectional and conceptual overlap between the two constructs (e.g., Bach & Hutsebaut, 2018; Hopwood et al., 2018; Widiger & Hines, 2022; Zimmermann et al., 2015). Further, incremental validity of personality functioning compared to personality traits alone has often been found to be low or even absent (for an overview see Zimmermann et al., 2019). Some scholars conclude that the separation of the two constructs is redundant and uneconomic. The scholars therefore question the utility of personality functioning and advocate for its abolishment (e.g., Sleep & Lynam, 2022; Sleep et al., 2019; Widiger & Hines, 2022). Yet, Wright and Ringwald (2022) argue that it is reasonable that both constructs are highly correlated, as they both measure personality dysfunction. Further, a study by Sexton and colleagues (2019) contradicts the statement that personality functioning and traits are redundant concepts, as both were found to interact in a rich and meaningful way. The authors have advised not to collapse the concepts, since both are seen as important for case formulation. Similarly, Kernberg (2016) has warned against a reductionism to personality traits alone. He argues that personality traits are influenced by personality functioning and, thus, that a reductionism would neglect the "complexity of the internal psychological organization of behavior" (Kernberg, 2016, p. 2).

Even though the debate is still going on, it has become clear that understanding the inter-relationship between the different aspects of a hybrid-dimensional-categorical model in

diagnostics is important for the system itself as well as for treatment planning. Zimmermann and colleagues (2015) argue that diagnostic systems should be parsimonious and keep redundancy at a minimum. If two constructs are too similar it would be redundant to use both as they would assess the same phenomenon twice. Also for case formulation and treatment planning it makes a difference if personality functioning and personality traits are considered to be distinct or highly inter-related. Bach and Tracy (2022) stress that from a clinical perspective it is helpful to distinguish personality functioning and personality traits. Clinically, personality functioning can be used for long-term prognosis and optimal treatment intensity, while the personality traits capture several clinically relevant features that can inform the focus and style of the treatment (Bach & Simonsen, 2021).

In the present study we investigate the inter-relationship between personality functioning and psychodynamic conflicts according to the OPD. As mentioned above knowledge of their relationship is not only relevant for (psychodynamic) treatment but is also relevant for the OPD as a diagnostic system. As the OPD has some similarities to the DSM-5 AMPD model, our findings may also contribute to the current debate. We shall commence by introducing the OPD in more detail.

Operationalized Psychodynamic Diagnostics (OPD)

The OPD system was developed as a multiaxial diagnostic and classification system based on psychodynamic principles (OPD Task Force, 2001, 2008, 2023). In its second revision (OPD-2; OPD Task Force, 2008), it encompasses five independent axes: (I) Experience of illness and prerequisites for treatment, (II) interpersonal relations, (III) conflicts, (IV) level of structural integration, and (V) mental and psychosomatic disorders according to the ICD or DSM. The current paper focuses solely on the axes ´conflicts` and ´level of structural integration`.

Psychodynamic conflicts

Psychodynamic conflicts are understood as time-persistent, mostly unconscious inner motivational themes that shape the person's experiences and behavior across several areas of life. A conflict initially arises when contrasting demands or motives confront each other within an individual. Their roots often lie in re-occurring experiences, such as conflictual interactions with or specific demands from significant others during the formative years of childhood. These early behavioral patterns are thought to re-emerge in later life, influencing behavior and perception (Benecke et al., 2018). The OPD-2 conflict axis describes seven intra-psychic conflicts: individuation vs. dependency (C1), submission vs. control (C2), need for care vs. autarky (C3), self-worth conflict (C4), guilt conflict (C5), oedipal conflict (C6), and identity conflict (C7). For each of these conflicts, an active and a passive mode of coping is formulated, which describe contrasting ways of dealing with the respective conflict. A short description of the conflicts is given in Table 1. Previous studies have shown that the conflicts C1 – C4 are very frequent in clinical populations, while the identity conflict (C7) is only sparsely diagnosed (Kaufhold et al., 2017; Pieh et al., 2009; Schneider & Heuft, 2018).

=== insert Table 1 here ===

The level of structural integration

The level of structural integration axis conceptualizes personality functioning as the integration of psychological core functions regarding oneself and in relation to others (i.e., 'objects' in psychoanalytic terminology) (OPD Task Force, 2008). The OPD-2 describes four structural domains (perception, regulation, communication, attachment), each of which consists of a self-related and an object-related dimension. The resulting eight structural dimensions are each assessed by three structural facets (see Table 2).

=== insert Table 2 here ===

Relationship between conflicts and structural integration

In the psychodynamic tradition, unconscious conflicts and the degree of a patient's personality or ego pathology (i.e., structural integration) have commonly been thought of as related (McWilliams, 2011). However, even with the operationalization of levels of structural integration and psychodynamic conflicts through the OPD, there have hitherto only been very few empirical studies on the relationship between them. Rudolf (2004) found the individuation vs. dependency conflict (C1) and the self-worth conflict (C4) to appear mostly at lower levels of structural integration (i.e., individuals with greater impairment in personality functioning), while the oedipal conflict (C6) and the submission vs. control conflict (C2) were more frequent at higher levels. In a study by Kaufhold and colleagues (2017) the individuation vs. dependency conflict (C1) was also significantly more frequent in lower levels of structural integration. Yet, compared to Rudolf (2004) the care vs. autarky conflict (C3) and the self-worth conflict (C4) emerged more frequently at higher levels of structural integration and no significant difference could be found for the submission vs. control conflict (C2). Due to the small sample of patients diagnosed with one of the other conflicts (i.e. C5-C7), Kaufhold and colleagues (2017) could not make any valid statement regarding the prevalence of these conflicts. In addition to these mixed findings, the implications of the studies are somewhat limited as they only show frequencies. A more frequent occurrence of the individuation vs. dependency conflict (C1) at lower levels of structural integration does not mean that this conflict can only occur at lower levels. Nor can the conclusion be drawn that a low level of structural integration is automatically associated with an individuation vs. dependency conflict (C1). More importantly, however, the studies have only assessed how conflicts and the general level of structural integration are related. Yet, a more fine-grained understanding of the relationship between the conflicts and the structural dimensions is needed to improve treatment planning. Further, it is an unanswered conceptual question whether the two axes are distinct or highly inter-related psychodynamic constructs.

Network analysis

A methodological approach with the potential to address these questions empirically is network analysis. Network analysis allows us to compute and visualize associations between several constructs. The unique advantage of this method is that all variables are considered simultaneously within one statistical model, allowing to estimate the relation between any two variables, while controlling for all other variables in the network (Borsboom & Cramer, 2013). In networks, all included variables are represented as *nodes* and their connections (e.g., partial correlations) are referred to as *edges*. In addition to the visualization of the statistical relations, centrality parameters can be used to quantify the inter-connectivity between the nodes and their relative importance within the network structure. The most central nodes are thought to be most influential, as they are highly connected with other nodes in the network (Borsboom, 2017; Borsboom et al., 2011). Moreover, *bridge nodes* can be identified, which are defined as the nodes that link two communities (Jones et al., 2019). Another topic of interest is the clustering (e.g., community detection) of the nodes in a network (Golino & Epskamp, 2017).

To the best of our knowledge, only one study so far has explored the association between OPD-2 constructs with the use of network analysis. Vierl and colleagues (2023) have explored how the OPD-2 constructs (i.e., interpersonal relations, active and passive modes of conflict coping, and level of structural integration) are related with each other and with psychopathology (i.e., depression and somatization). The investigated psychodynamic constructs were assessed by the Inventory of Interpersonal Problems (IIP-32; Thomas et al., 2011), the OPD conflict questionnaire (OPD-CQ; Benecke et al., 2018), and the short version of the OPD structure questionnaire (OPD-SQS; Ehrenthal et al., 2015). Depression and somatization were assessed with the Patient Health Questionnaire (PHQ; Kroenke et al., 2002; Kroenke et al., 2001). Vierl and colleagues (2023) used the global scores of each questionnaire as nodes, except for the OPD-CQ, where the active and passive modes of conflict coping were integrated as separate nodes into the network. They found that psychopathology and psychodynamic constructs formed separate

clusters that were positively interrelated. The level of structural integration was found to play an important role in the network, as it was the most central node in the network and linked psychodynamic constructs to psychopathology. Regarding the associations between structural integration and conflicts, the level of structural integration was highly associated with the passive modes of conflict coping, while only small partial correlations were found with the active modes. This indicates that passive modes of conflict coping may more often be associated with lower levels of structural integration, while active modes may be more equally distributed across different structural levels. However, the authors have only used global scores as variables in the network, so that the association between specific conflicts with specific structural dimensions could not be analyzed. Further, the authors assessed the psychodynamic constructs with self-report questionnaires. Yet, since psychodynamic constructs are conceived as unconscious phenomena, expert interviews and observer ratings are considered the gold standard.

Aim of the present study

The aim of the present study was to explore the associations between psychodynamic conflicts and levels of structural integration according to the OPD-2 with the use of network analysis. The study is meant to overcome the methodological shortcomings in the study by Vierl and colleagues (2023), by using OPD-2 interview data and by including the conflicts and the structural dimensions as separate nodes into the network. The specific objectives of the study were (1) to examine the network structure to explore how conflicts and structural dimensions are inter-connected, (2) to investigate clusters in the network to determine whether the axes are statistically distinct constructs, (3) to identify the most central node(s) in the network and (4) to detect bridge nodes to examine which conflict is most strongly related to structural dimensions and vice versa.

Our objectives therefore were exploratory in nature, which fits well with network analysis which is commonly considered a tool for exploratory analyses. Nevertheless, in accordance with the assumptions made in the OPD, we expected the psychodynamic conflicts and structural dimensions to form distinct but interconnected clusters. Moreover, we expected particularly strong associations between the individuation vs. dependency conflict and structural dimensions, as this conflict has been previously found to be more often rated at lower levels of structural integration (Kaufhold et al., 2017; Rudolf, 2004).

Method

Participants

We investigated a sample of 228 adult outpatients, who were treated between 2012 to 2017 in one of five German clinical centers (Berlin, Hamburg, Heidelberg, Kassel, Munich). The study is a secondary analysis of data from the intake assessment prior to the experimental manipulation within a RCT study of patients with anxiety and personality disorders (Benecke et al., 2016). Use of this data for research purposes was approved by the ethics commission of the University Kassel (ethics vote of November 2nd, 2011). All patients gave their informed consent for the anonymous use of their data for scientific purposes.

Participants had a mean age of 37.8 years (*SD* = 11.6; range = 20 – 71 years) and 64.4 % were female. Most of them (89.5%) had German citizenship. Fifty-three percent reported being married or in a stable relationship, 34.3% reported to not be in a relationship and 11.8% were divorced or widowed. Fifty percent had finished school with a higher education degree, 47.8% had a secondary school certificate and four individuals dropped out of secondary school. Almost half (48.5%) were currently employed, 17.8% were university students or in training, 20.3% were unemployed and 5.9% were retired. According to Structured Clinical Interviews (SCID-I and II; Fydrich et al., 1997; Wittchen et al., 1997), all patients had at least one DMS-IV Axis 1 disorder (*M* = 2.9*, SD* = 1.53*;* range = 1-11). All met criteria for an anxiety disorder, 70.2% for

an affective disorder, and 25.8% for a disorder from the somatoform spectrum. Moreover, 6.2% were diagnosed with a compulsive disorder, 4.9% with an eating disorder and 2.2% with a substance use disorder. In addition, all patients had at least one diagnosis of a PD according to DSM-IV criteria (American Psychiatric Association, 1994). Almost forty percent (38.8%) were diagnosed with an avoidant PD, followed by compulsive PD (25.6%), depressive PD (18.5%), dependent PD (16.3%), Borderline PD (15.4%), and unspecified PD (13.7%). All other PDs were less frequent (< 10%).

Measures

Semi-structured clinical OPD interviews were conducted and rated by OPD licensed and trained clinicians before the beginning of treatment. We used the OPD-2 axes conflicts (axis III) and levels of structural integration (axis IV). As detailed above, the conflict axis captures seven psychodynamic conflicts. All conflicts were rated on a 4-point Likert scale ranging from 0 (“absent“) to 3 („very significant”). Further, the main conflict and the second most significant conflict were identified. Finally, the main conflict was rated as predominantly active, passive or a mixture of both modes. The conflicts were rated for all levels of structural integration, including low and disintegrated levels. At lower levels of structural integration, it is assumed that the conflicts are no longer stable or distinct dysfunctional patterns (i.e., ´neurotic conflict`), but that the conflictual themes can become more diffuse and/or manifest themselves in an extreme way (e.g., existential fear of separation) (OPD Task Force, 2008). Such conflictual expressions were rated as ´conflict schema`. Adequate inter-rater reliability of the OPD-2 has been shown before, with the ICC ranging between .52 and .64 for most conflicts, except for the identity conflict which showed insufficient inter-rater reliability (ICC = .08; Kaufhold et al., 2017). The identity conflict was excluded in this study because it did not occur frequently enough in our sample. To assess the level of structural integration the OPD-2 offers a detailed operationalized checklist to rate the level of each structural dimension on a seven-point Likert-scale ranging from

good (1), good – moderate (1.5), moderate (2), moderate – low (2.5), low (3), low – disintegrated (3.5) and disintegrated (4). Finally, the overall level of structural integration was rated. Adequate to good inter-rater reliability has been found before, with kappa values varying between .61 and .82 for the structural dimensions and .83 for the composite score (Benecke et al., 2009). Internal consistency for the overall level of structural integration has been reported to be $\alpha = .86$ (Zimmermann et al., 2012).

Statistical approach

All statistical analyses were conducted with the statistical software *R*, v. 4.0.3 (R Core Team, 2020). The *R* code to reproduce the network analyses is available online (https://osf.io/pkh9t/) where we also provide the correlation and adjacency matrices to make the analyses reproducible.

Descriptive analysis

We report the descriptive frequencies of the conflicts (i.e., rating of all conflicts, main conflict, second most important conflict), and the overall level of structural integration of the patients. Further, we aimed to determine the prevalence of specific conflicts in accordance to the overall level of structural integration. For this, we divided the group into patients with good and low levels of structural integration. Individuals with good, good – moderate, and moderate levels of structural integration ($n = 153$) were assigned to the first group. The patients with lower levels of structural integration formed the second group ($n = 83$). Group comparisons were calculated with the use of the Fisher's exact test for categorical variables. The level of statistical significance was set as alpha < 0.05.

Network analysis

Variable selection, missing data and data transformation

For the network analysis we used the rating of all conflicts and of the eight structural dimensions. First, we inspected the item informativeness of all included constructs (see

Supplementary Table S1). Importantly, the identity conflict showed an extremely skewed distribution (skewness = 3.42), with the conflict being absent or insignificant for 96.9% of the participants, while it had only been rated significant in one participant (<1%). Therefore, we removed the identity conflict from further analysis. In consequence, 14 variables were included in the network (i.e., six conflicts and eight structural dimensions).

Further, eight patients were excluded from the analysis, because more than a third of their values was missing. For the remaining 220 patients the missing values of the variables ranged between 0% and 15%. We imputed data ten times with the use of predictive mean matching as implemented in the *mice* package v. 3.14.0 (Van Buuren & Groothuis-Oudshoorn, 2011) and retained the mean value of the imputed datasets.

Lastly, the variables of the structural dimensions were measured in 0.5 steps which poses a problem for the network estimator used by *R*, since the variables were not recognized as ordinal. Therefore, all variables that were included in the network analysis were transformed by multiplying them by two, which turned the variables into integers that were correctly recognized by the network estimator.

Network estimation

We estimated a regularized partial correlation network (i.e., Gaussian graphical model; GGM) using the *estimateNetwork* function from the *R* package *qgraph* v. 1.9.2 (Epskamp et al., 2022). The model with the best fit was selected via the Extended Bayesian Information Criterion (EBIC; Foygel & Drton, 2010) and the graphical least absolute shrinkage selection operator (glasso; Tibshirani, 1996), with the tuning parameter set to 0.5. This method is recommended for psychological networks with small sample sizes as it addresses the risk of false positive edges due to multiple testing, by shrinking spurious edges to zero and, therefore, only including edges in the network that likely represent true connections (Isvoranu & Epskamp, 2021). Since the variables were not normally distributed, we used spearman correlations for the network

estimation (Epskamp & Fried, 2018). The network was computed and visualized using *qgraph* (Epskamp et al., 2022). In our network, edges (i.e., the links) between the nodes (i.e., variables) represent partial correlations, which are controlled for the influence of all other nodes in the network (Epskamp & Fried, 2018). Positive edge weights indicate that the connected nodes covary in the same direction (node A increases, node B increases), while negative nodes indicate that they covary inversely (node A increases, node B decreases) (Jones et al., 2019). The chosen layout for the network plot presents the two axes as two circles. This allows for an optical separation of conflicts and structural dimensions and improves a visual understanding of their interconnectedness.

Clustering

To identify clusters in the network we used exploratory graph analysis (EGA; Golino & Epskamp, 2017) using the *EGAnet* package v.1.1.0 (Golino et al., 2022). EGA estimates a network followed by a multi-level modularity optimization algorithm to detect potential clusters. We applied the Louvain algorithm (Blondel et al., 2008), which has been shown to be better performing in continuous data than other algorithms (Christensen et al., 2021). The stability of the clusters was assessed with the use of 1000 nonparametric bootstrap iterations using the *bootEGA* function.

Network inference

To identify the most central nodes we calculated the strength centrality of the nodes using the centrality function in the *qgraph* (Epskamp et al., 2022). Strength centrality is defined as the sum of absolute edge weights that a node shares with all other nodes in the network (McNally, 2016). Thus, nodes with a high strength centrality are highly connected within the network. While other centrality measures exist, we decided to focus on strength centrality, as we wanted to have a measure of overall connectedness of the nodes in the network. As strength centrality may be influenced by differences in item variability (Terluin et al., 2016) we assessed spearman

correlations between the strength centralities and the standard deviations of the items. If the correlation is significant, the nodes' centrality may only be limitedly interpretable.

We additionally identified bridge nodes using the *bridge* function of the *R* package *networktools* v.1.5.0 (Jones, 2022). Bridge nodes are defined as the nodes that are linking two communities (here: psychodynamic conflicts and structural dimensions). We inspected bridge strength centrality, which reflects the sum of all absolute edge weights connecting a node from one community to all nodes from the other community (Jones et al., 2019).

Because both strength and bridge strength centrality are sample dependent, centrality difference tests were conducted via nonparametric bootstrapping (*nboots* = 2500) using the *bootnet* package, v.1.5 (Epskamp et al., 2018). Centrality difference tests identify whether a given node's (bridge) strength centrality is significantly greater than the (bridge) strength centrality of the other nodes within the network. Centrality indices should only be interpreted if there are significant differences between the nodes' centralities (Levinson et al., 2018). We interpret nodes as the most central nodes that are more central than at least 50% of all other nodes in the network. Bridge nodes are required to show a greater bridge strength than at least 50% of the other nodes within the same community. Likewise, edge weight difference tests were conducted.

Network stability

Network stability was assessed by bootstrapping 95% confidence intervals (*CI*) around edge weights (*nboots* = 2500), and with correlation stability (*CS*) coefficients (*nboots* = 2500), which were assessed for strength centrality, bridge strength centrality and edge weights. *CS*-coefficients over 0.5 imply strong stability (Epskamp & Fried, 2018).

Results

Descriptive analysis

The average level of structural integration in the sample was moderate (*M* = 2.18*, SD* = 0.4). Levels of structural integration were distributed as follows: good: *n* = 1 (0.4%), good – moderate: *n* = 17 (7.5%), moderate: *n* = 127 (57.7%), moderate – low: *n* = 52 (22.8%), low: *n* = 22 (1%), low– disintegrated: *n* = 1 (0.4%), disintegrated: *n* = 0 (0.0%). Considering the conflict ratings, the care vs. autarky conflict (C3) dominated in the sample (*M* = 2.14*, SD* = 0.91, range: 0-3), followed by the self-worth conflict (C4; *M* = 1.73, *SD* = 1, range: 0-3), and the individuation vs. dependency conflict (C1; *M* = 1.51, *SD* = 1.15, range: 0-4). In contrast, the identity conflict (C7) was least frequent (*M = 0.15, SD* = 0.46, range: 0-3). The information on the main conflicts and second most significant conflicts was available for n = 197 individuals and is depicted in Table 3. Regarding the relationship between the main conflicts and the overall level of structural integration, the individuation vs. dependency conflict was significantly more often assigned at lower levels of structural integration ($p < .001$), while the need for care vs. autarky conflict dominated at higher levels of structural integration ($p < .001$). There was a tendency for the oedipal conflict to be rated more frequently at higher levels of structural integration ($p = .05$), yet only seven individuals were diagnosed with an oedipal conflict as the main conflicts, preventing meaningful statements. The other conflicts were equally distributed across the levels of structural integration (see Table 4). As expected, at lower levels of structural integration, the conflicts were more often described as conflictual schemas. Specifically, the conflicts were described as schemas in more than two thirds (70.0%) of the patients with a low or low-disintegrated level of structural integration. Descriptive statistics for all structural dimensions and psychodynamic conflicts are displayed in the Supplementary Table S1.

=== insert Table 3 here ===

=== insert Table 4 here ===

Network estimation and stability

The network was found to be accurate and stable (edge CS-coefficient = .60, strength centrality CS-coefficient = .60, bridge strength CS-coefficient = .60), allowing reliable interpretations of the edge weights and the nodes' (bridge) strength centralities (see Supplementary Fig. S1 – S3). Moreover, bootstrapped CI of estimated edge-weights indicate accurate estimations of the edge weights (see Supplementary Fig. S4).

A visualization of the network and a description of the node labels is shown in Figure 1. Of the possible 91 edges 47 edges (51.6%) were evident in the network, with a mean edge weight of 0.038. An inspection of the edges within the network reveals that all eight structural dimensions were densely and positively connected with each other, with mostly no significant differences in their edge weights (see Supplementary Fig. S5). Compared to the densely connected structural dimensions, the conflicts showed fewer and also negative edges. Interestingly, C1 showed exclusively negative associations to the remaining conflicts (except to C5, where no association emerged). C5 was solely associated with C4. Regarding the edges between the conflicts and structural dimensions, C1 was positively connected to several structural dimensions (i.e., 1b, 2a, 2b, 4a, 4b). In contrast, only negative edges emerged for C3 and for C6 with structural dimensions. Finally, only one weak edge emerged each for C2 and C5 with structural dimensions, while no association was found between C4 and any structural dimension. All edge weights can be found in the adjacency matrix in the Online Supplementary (https://osf.io/pkh9t/).

=== insert Figure 1 here ===

Clusters

The EGA community detection resulted in two distinct clusters for psychodynamic conflicts and structural dimensions. The clusters were found to be stable across 1000 bootstrap iterations. For more details, please see the Supplementary Figures S8 – S10.

Network Inference

Strength centrality *(S)* and bridge strength centrality *(BS)* indices are plotted in Fig. 2, while the raw values can be found in the Supplementary Table S2. In our network no node was significantly more central than most (> 50%) other nodes in the network. In detail, strength centrality was high for all structural dimensions ($S \geq 0.84$), with no significant differences between them (see Supplementary Fig. S6). Of the conflict axes, C1 showed the highest strength centrality ($S = 1.01$), which was significantly higher than the strength centrality of most other psychodynamic conflicts (except C2) but did not significantly differ from the strength centrality of any structural dimension (see Supplementary Fig. S6). Strength centrality was not significantly correlated to standard deviations, suggesting that there is no potential relationship of variance to centrality.

Looking at the bridge strength centrality, C1 ($BS = 0.49$) and 4a ($BS = 0.29$) showed the highest BS values. Both are significantly higher than the bridge strength centrality of most other nodes in the network (see Supplementary Fig. S7). The two nodes can therefore be considered the bridge nodes between the two axes in the network. The partial correlation between C1 and 4a was $r_p = 0.15$.

=== insert Figure 2 here ===

Discussion

This study is to our knowledge the first to examine the relationship between the individual psychodynamic conflicts and the separate structural dimensions according to the OPD using network analysis. The objectives of the current study were (1) to explore the general network structure (i.e., the edges) in the network, (2) to examine whether conflicts and structural dimensions form distinct clusters within the network, (3) to identify the most central nodes in the network, and (4) to detect bridge nodes. To address our research objectives, we analyzed OPD-2 interview data of $N = 220$ outpatients.

Overall, our network showed especially strong connections (i.e., edges) within the structural dimensions, while fewer and also negative edges were found within the psychodynamic conflicts. The individuation vs. dependency conflict (C1) showed several connections with structural dimensions, while other conflicts only showed few, or no associations with structural dimensions. Further, the results support the separation of psychodynamic conflicts and structural integration as distinct axes, as in the EGA community detection both were found to form separate clusters. Regarding strength centrality, C1 was found to be more central compared to most other conflicts in the network, while the strength centralities of the structural dimensions did not significantly differ from each other. Yet, no node was significantly more central to at least 50% of all other nodes within the network. Therefore, the statement that a specific node is most influential within the network is not admissible. Lastly, C1 and the capacity to attach to internal objects (4a) were identified as bridge symptoms. In the following, we highlight and discuss our findings in more detail.

Inspecting the network structure, it becomes apparent that the structural dimensions and the psychodynamic conflicts differ in their connectivity. The structural dimensions were strongly interconnected, supporting the idea that a total score of structure (i.e., global level of structural integration) can be meaningfully computed and interpreted when the individual structural dimensions are not of interest. The high connectivity between the dimensions also replicates previous research showing high inter-correlations between all structural dimensions (Doering et al., 2014). Regarding their centrality, we found no significant differences in the strength centrality of any structural dimension, indicating that no one dimension is particularly influential within the network.

In contrast, fewer and some negative connections were found between the conflicts. Remarkably, C1 showed exclusively negative edges to the other psychodynamic conflicts, with a particularly strong negative link to the care vs. autarky conflict (C3). The negative edges can be

understood as follows: a profound C1 decreases the probability of the presence of any other conflict, but especially of C3. The strong negative association between C1 and C3 is particularly notable. This makes sense from our rating experiences with the OPD. Even though the manual does not rule out conceptually that both conflicts could both be very salient in one person, our clinical experience is that they are not. Both conflicts address dependency (or avoidance thereof) in relationships. However, they do so on different levels. C1 is about being dependent *on* a relationship, whereas C3 is about being dependent *within* a relationship. For patients with a strong C1 attachment and relationships (or their avoidance) are of existential importance, while for patients with a strong C3 it is less about the initiation of closeness or the avoidance of intimacy, but about the arrangement of the relationship in the sense of obtaining something from the other or providing for that other (OPD Task Force, 2008). In other words, patients with a strong C1 show more fundamental deficits in relationship formation, resulting in the question whether a close relationship (or lack thereof) can be tolerated at all - which seems to commonly make questions of care and being cared for (C3) of only secondary importance for the person. In order for a person to be very concerned with C3, it seems almost a prerequisite that the relationship as such is not the foremost issue.

This difference between the conflicts C1 and C3 is also highlighted by the associations of the conflicts with the structural ability to attach to inner objects (4a): C1 showed a strong positive link to 4a (i.e., a stronger manifestation of C1 is accompanied by more difficulties on this dimension), while a negative edge was found between 4a and C3 (i.e., a stronger manifestation of C3 is accompanied by fewer difficulties on this dimension). Attachment to internal objects contains the ability to develop and maintain emotional, stable internal images of significant others and to use these internal images for self-regulation. Moreover, it includes the ability to entertain variable and triadic relationships (OPD Task Force, 2008). Consequently, individuals with a strong C3 tend to have better abilities in these areas compared to patients with

a strong C1. The difference found between the two conflicts and their association with attachment also fits with previous studies, were the attachment representation between OPD conflicts were compared (Müller, 1999). While C1 was frequently accompanied by insecure attachment representations, the representations were more secure for patients with a C3. This is also therapeutically of interest, in so far as that better abilities in attachment were associated with more positive outcome (Rudolf et al., 1996).

In the network, C3 also showed a negative association with the dimension ´communication with the external world` (3b), which includes the ability to be in emotional contact with others, to communicate affects, and to be empathic. Again, the negative edge indicates that individuals with a strong C3 tend to have less impairments in this dimension. In contrast, positive associations were found between C1 and the structural dimensions ´attachment to external objects` (4b), ´self-regulation` (2a), ´object regulation` (2b) and ´object perception` (1b). Generally, the great number of positive edges with structural dimensions indicates a higher likelihood of many structural difficulties in patients with a C1. This fits to our findings that the C1 main conflict was significantly more often rated at lower levels of structural integration, while the C3 main conflict was significantly more often associated with better levels. This replicated the findings of Kaufhold and colleagues (2017).. Our findings add to the literature by showing that these relationships result from associations with specific structural dimensions and mostly with the ability to attach to inner and external objects.

The other conflicts showed no or only very small associations with structural dimensions. The absence of an edge is supposed to represent conditional independence between two variables (Borsboom & Cramer, 2013), that is in this case: most conflicts were rather independent of the levels of structural integration, suggesting a distinctiveness of the axes. The separation of conflicts and structure as two distinct axes in the OPD is also supported by the EGA community detection analysis, which found that the psychodynamic conflicts and the structural dimensions

formed two separate clusters in the network. Traditional psychoanalytic systems of nosology have often conflated conflict-based and structural aspects of personality pathology in their diagnostic categories (Christian, 2017). The data from the network analysis, however, supports the underlying assumption of OPD that conflict and structure, albeit interrelated, should be assessed separately. This perspective has been strengthened in the recently published third revision of OPD (OPD-3; OPD Task Force, 2023). In contrast to OPD-2, OPD-3 requires a rating of all conflicts regardless of the patients' level of structural integration. The detailed assessment of psychodynamic conflicts is then not only standard procedure for patients with a good level of structural integration (where the conflicts are referred to as ´conflict tension`) and those with moderate levels of structural integration (´neurotic conflicts`) but also for patients with low levels of structural integration (´conflict schema`). This means that in the OPD-3 even for patients with severe impairments in their personality functioning, the dimension of unconscious motivational forces is addressed and can be taken into account to treatment planning and intervention. One example would be that conflicts could provide a better understanding of individual triggers and stressors that might be involved in the occurrence of destructive or self-destructive behavior. It is important to note here that even though conflicts and structural integration can be thought of as distinct axes, the expression of an unconscious conflict is supposed to differ depending on an individual's level of structural integration. For example, the self-worth conflict shows an accentuated desire for recognition at a good level of structural integration, while a severe narcissistic personality disorder may be thought of at a lower-level expression of the same type of conflict. Yet, the conflictual motivational theme itself remains the same across all structural levels. In the case of C4 (self-worth), this is also reflected in the results of the network analysis: there is no edge between C4 and any structural dimension emerged, suggesting that the conflictual theme itself is independent of the level of structural integration. Also, C2 (submission vs. control) and C5 (guilt) only show a very small positive edge with

structural dimensions each, so that, similarly to C4, the conflicts can be rated across all levels of structural integration. Again, following the assumptions made in the OPD-3, the expression of the conflicts is supposed to differ across the structural levels, yet the conflictual motivational themes should remain the same. The oedipal conflict (C6) shows some (small) negative edges with structural dimensions (i.e., 1a, 3a, 4a). This indicates that the conflict occurs somewhat more often at better structural levels, which corresponds to the findings of Rudolf (2004). However, the small edges also show that the differences in frequency do not seem to be particularly large. The difference between C1 and C3 has already been described above: while C1 shows exclusively positive edges with structural dimensions, C3 shows only negative associations. Consequently, C1 is supposed to appear more frequently at lower levels of structural integration, while C3 is more frequent at better structural levels.

Lastly, C1 and the ability to attach to inner objects (4a) were identified as bridge nodes. From a network perspective targeting bridge nodes through interventions could have especially large impacts, as they may have therapeutic effects in both clusters (McNally, 2016). Our findings suggest that for patients with a strong C1 a conflict-focused treatment may also improve the levels of structural integration. Likewise, by targeting structural impairments the dynamic between individuation and dependency may also soften, particularly when focusing on attachment. For the other psychodynamic conflicts, the network analysis showed low bridge centrality which suggests that a change in conflict pathology is less likely to occur as a by-product of improving structural abilities. This has important clinical implications, including that psychotherapy and treatment planning for patients with lower levels of structural integration will likely also benefit a from a thorough assessment of psychodynamic conflicts.

Strengths, Limitations, and future research

The present study extends current knowledge on hybrid-dimensional-categorical diagnosis by exploring the associations between conflicts and structural dimensions according to the OPD.

A particular strength of this study as opposed to previous work is the usage of OPD-2 interview data. Since psychodynamic constructs are thought to be at least partly unconscious, self-report questionnaires may not be ideal for capturing the constructs properly. Additionally, the interview data enabled us to do a more fine-grained analysis of the levels of structural integration through also considering the individual subscales (structural dimensions) instead of only relying on the total score. This allows to detect association patterns between the conflicts and different aspects of structural integration, which had not been possible in a previous study (Vierl et al., 2023). Despite these strengths, several limitations must be mentioned as well. First, the sample size was rather small. However, the stability parameters found good stability, allowing us to draw reliable interpretations. Moreover, the analyzed data is cross-sectional, which prohibits to draw causal interpretations of the results. For example, the causal relationship between the individuation vs. dependency conflict (C1) and the structural dimension remains unclear. According to psychodynamic theory one would suggest that the fundamental deficits in relationship formation that are shown in patients with a strong C1 are more likely to be the consequence of impaired abilities in e.g., attachment and self/object regulation than vice versa. Intensive longitudinal data that includes how significant impairments in an individual's life affect the network structure would be necessary to draw stronger conclusions. Additionally, the network is based on group-level data and cannot be applied directly to an individual. Individualized networks derived from time-series data would be needed to allow for personalized clinical recommendations (Bringmann, 2021). Moreover, our sample consisted of patients who were all diagnosed with at least one Axis I disorder (with all showing an anxiety disorder) and with at least one PD according to the DSM-IV. Consequently, the sample represents a rather impaired clinical sample. Further, only outpatients were considered. It remains unclear whether the findings can be generalized to other clinical or non-clinical samples. Another limitation concerns the assessment of psychodynamic conflicts: we were not able to take the different modes of conflict coping

(passive vs. active) into account, since in the OPD-2 interview this information is only rated for the main conflict. This limits the conclusions we can draw from the network, as the study by Vierl et al. (2023) highlights the overall importance to differentiate between the modes of conflict coping. Moreover, the guilt conflict and oedipal conflict were less frequent in our sample (see Supplementary Table S1), which could have affected the results. Further, in 70% of all patients with low or low-disintegrated levels of structural integration, the conflicts were described as conflict schema. Due to the small sample, we could not compare the associations between ´neurotic conflicts` and ´conflict schema`. In OPD-3, it is assumed that conflict schemas differ from neurotic conflicts in that the conflictual themes are more diffuse or show themselves in a more extreme way. Therefore, when comparing the networks for patients with neurotic conflicts and conflict schema, it could be that differences in the associations emerge. This could be the focus for future research. Lastly, we did not include the OPD axis concerning interpersonal relations. In the OPD-2 only the three most important relation patterns are rated per individual. While this is useful from a therapeutic point of view, a scientific analysis of the data is difficult because the data are highly incomplete.

Conclusion

In the new conceptualizations of PDs in the DSM-5 AMPD and the PD chapter in the ICD-11 PDs are assessed along a continuum of personality functioning and are further described with the help of personality traits. However, the relationship between personality functioning and personality traits has been controversially debated. An empirically founded understanding of this relationship is relevant for the parsimony of the diagnostic system on the one hand and for how it may inform treatment planning and case conceptualization on the other hand. Variants of these new conceptualizations had already been in clinical use as part of certain psychodynamic systems, such as the OPD. Yet, empirical research on the inter-relationship between psychodynamic constructs has still been missing. Therefore, in the present study we explored the

inter-relationship between structural integration and psychodynamic conflicts according to the OPD. For this, we used OPD-2 interview data of $N = 220$ outpatients and conducted a network analysis. Our results showed that psychodynamic conflicts and the structural dimensions indeed form separate but connected clusters, supporting the conceptualization of conflicts and the level of structural integration as distinct axes in the OPD. The individuation vs. dependency conflict (C1) showed only negative edges with other conflicts, with a particularly strong negative association with the care vs. autarky conflict (C3). Moreover, C1 was strongly related to several structural dimensions, while most other conflicts showed only few or no connections to the structural dimensions. This shows that most psychodynamic conflicts are rather independent of the structural abilities. Thus, the conflicts can theoretically appear at all structural levels, even if they differ in frequency at the overall level of structural integration. At lower levels of structural integration, the conflicts were mostly described as ´conflict schema`. The OPD-3 describes differences in conflict expression for ´neurotic conflicts` and ´conflict schema` while the underlying conflictual theme remains the same. Nonetheless, conflict schemas can contain important diagnostic information. A profound diagnosis of all conflicts is therefore recommended for all patients.

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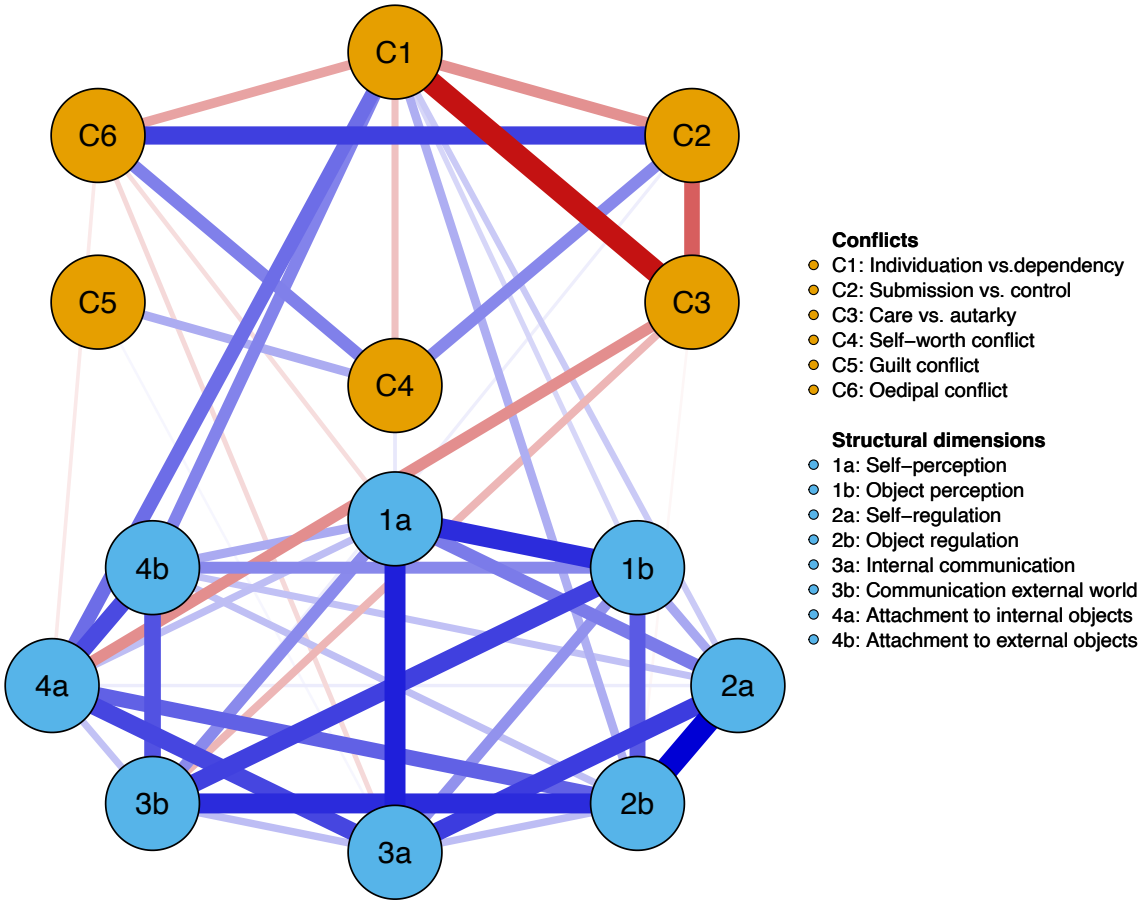
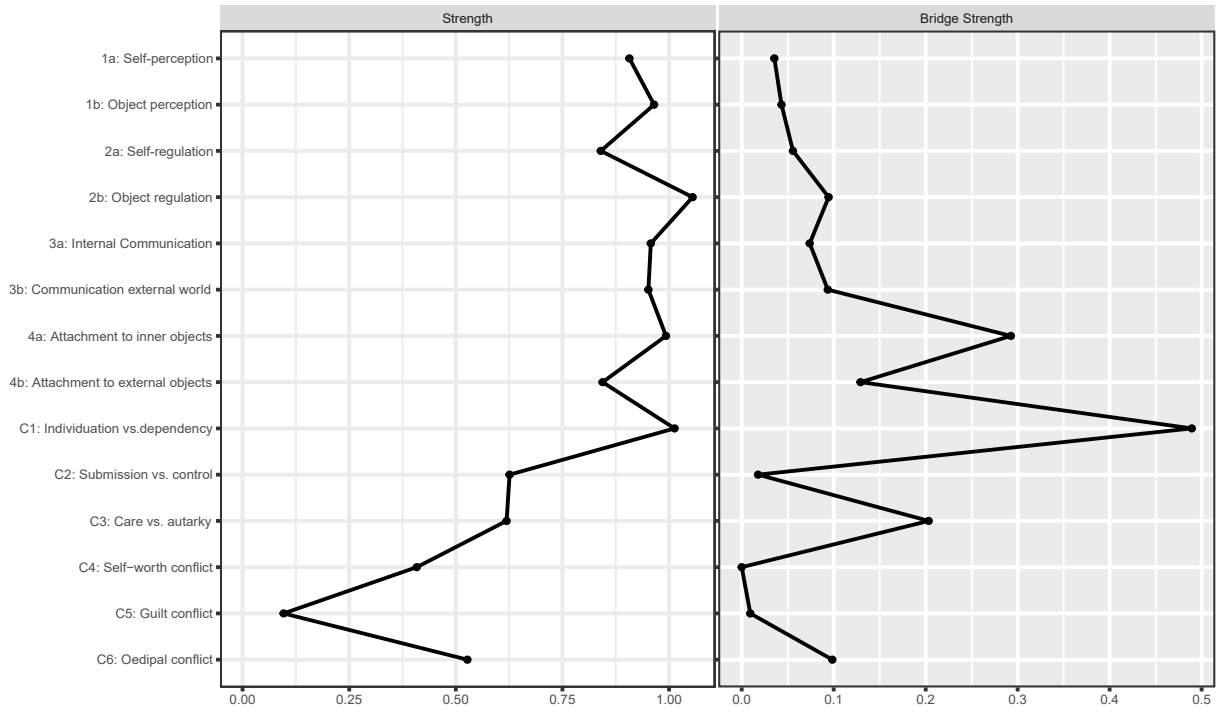
Figures

Figure 1



Note. Visualization of the estimated network showing the partial correlations between psychodynamic conflicts (orange) and structural dimensions (blue). Red edges signify negative associations, blue edges positive ones. The brightness and thickness of the edge displays the strength of the association.

Figure 2



Note. Strength centrality and bridge strength centrality of the nodes in the network.

Tables

Table 1

Conflicts according to the Operationalized Psychodynamic Diagnosis (OPD-2)

Conflict	Passive mode	Active mode
C1: Individuation vs. dependency	Excessive independency with a fear of closeness to others	Existential fear of being left alone, high dependency on others
C2: Submission vs. control	Submitting to others, e.g., tradition or other obligations	Striving for dominance and power to control situations
C3: Care vs. autarky	Attaching to others and demanding care	Not demanding anything from others, deferring own needs

C4: Self-worth conflict	Sense of shame and feeling worthless	Exaggerated self-confidence
C5: Guilt conflict	Feeling guilty, blaming oneself	Externalizing the feeling of guilt, blaming others
C6: Oedipal conflict	Restraint, submission, shyness and unremarkable appearance	Dramatic, sometimes erotic appearance, wanting to be noticed at all costs
C7: Identity conflict	Lack of identity	Exaggerated identity due to insecurity

Table 2

Structural dimensions as defined in the level of structural integration axis in the OPD-2

Self	Objects
Self-perception	**Object perception**
Self-reflection	Self-object differentiation
Affect differentiation	Whole object perception
Identity	Realistic object perception
Self-regulation	**Regulation of object relationships**
Impulse control	Protecting relationships
Affect tolerance	Balancing of interests
Self-worth regulation	Anticipation
Internal communication	**Communication with the external world**
Experience of affects	Making contact
Use of fantasies	Affect communication

Bodily self	Empathy
Attachment to internal objects	**Attachment to external objects**
Internalization	Ability to form attachments
Use of introjects	Accepting help
Variable and triangular attachments	Detaching from relationships

Table 3

Frequencies of the conflicts as main conflict and second most significant conflicts

	Main conflict; N (%)	2nd conflict; N (%)	Total; N (%)
Individuation vs. dependency	53 (26.9%)	18 (9.8%)	71 (18.6%)
Submission vs. control	11 (5.6%)	52 (28.3%)	63 (16.5%)
Care vs. autarky	93 (47.2%)	31 (16.8%)	124 (32.5%)
Self-worth conflict	31 (15.7%)	65 (35.3%)	96 (25.2%)
Guilt conflict	1 (0.5%)	7 (3.8%)	8 (2.1%)
Oedipal conflict	7 (3.6%)	11 (6.0%)	18 (4.7%)
Identity conflict	1 (0.5%)	0 (0%)	1 (0.3%)

Note. The information of the main conflicts was missing for n = 31 and for the second most significant conflict for n = 45.

Table 4

Frequencies of the main conflicts in patients with higher levels and lower levels of personality functioning

	Higher levels (N= 153) *N* (%)	Lower levels (N=83) *N* (%)	*Fisher's Exact Test*
Individuation vs. dependency	21 (13.7%)	31 (37.3%)	*< 0.001*
Submission vs. control	7 (4.6%)	3 (3.6%)	*1.00*
Care vs. autarky	78 (51.0%)	13 (15.7%)	*< 0.001*
Self-worth conflict	19 (12.4%)	9 (10.85%)	*0.83*
Guilt conflict	1 (0.7%)	0	*1.00*
Oedipal conflict	7 (0.5%)	0	*0.05*
Identity conflict	0	1 (1.2%)	*0.35*

Note. Patients with higher levels of structural integration were defined as individuals with good (1) to moderate (2) levels of structural integration. Lower levels were defined as moderate – low integrated (2.5.) to disintegrated (4) levels of structural integration.

8.4 Supplementary Materials for Study 2

How are Psychodynamic Conflicts Associated with Personality Functioning? A Network Analysis

Supplementary Tables and Figures

Table S1

Item characteristics

Construct	Label	M (SD)	Skewness	Kurtosis
Psychodynamic conflicts				
Individuation vs. dependency	C1	1.51 (1.15)	0.06	1.64
Submission vs. control	C2	1.22 (0.95)	0.29	2.40
Care vs. autarky	C3	2.14 (0.91)	-0.71	2.48
Self-worth conflict	C4	1.73 (1.0)	-0.27	2.01
Guilt conflict	C5	0.69 (0.75)	0.98	4.10
Oedipal conflict	C6	0.72 (0.90)	1.02	3.02
Identity conflict	C7	0.15 (0.46)	3.42	15.34
Structural dimensions				
Self-perception	1a	2.06 (0.42)	0.45	3.49
Object perception	1b	2.16 (0.48)	0.07	2.49
Self-regulation	2a	2.22 (0.38)	0.89	3.25
Object regulation	2b	2.17 (0.44)	0.29	2.79
Internal communication	3a	2.17 (0.43)	0.08	3.21
Communication external world	3b	2.04 (0.46)	0.41	2.81
Attachment to inner objects	4a	2.18 (0.40)	0.53	3.65
Attachment to external objects	4b	2.06 (0.38)	0.76	4.90

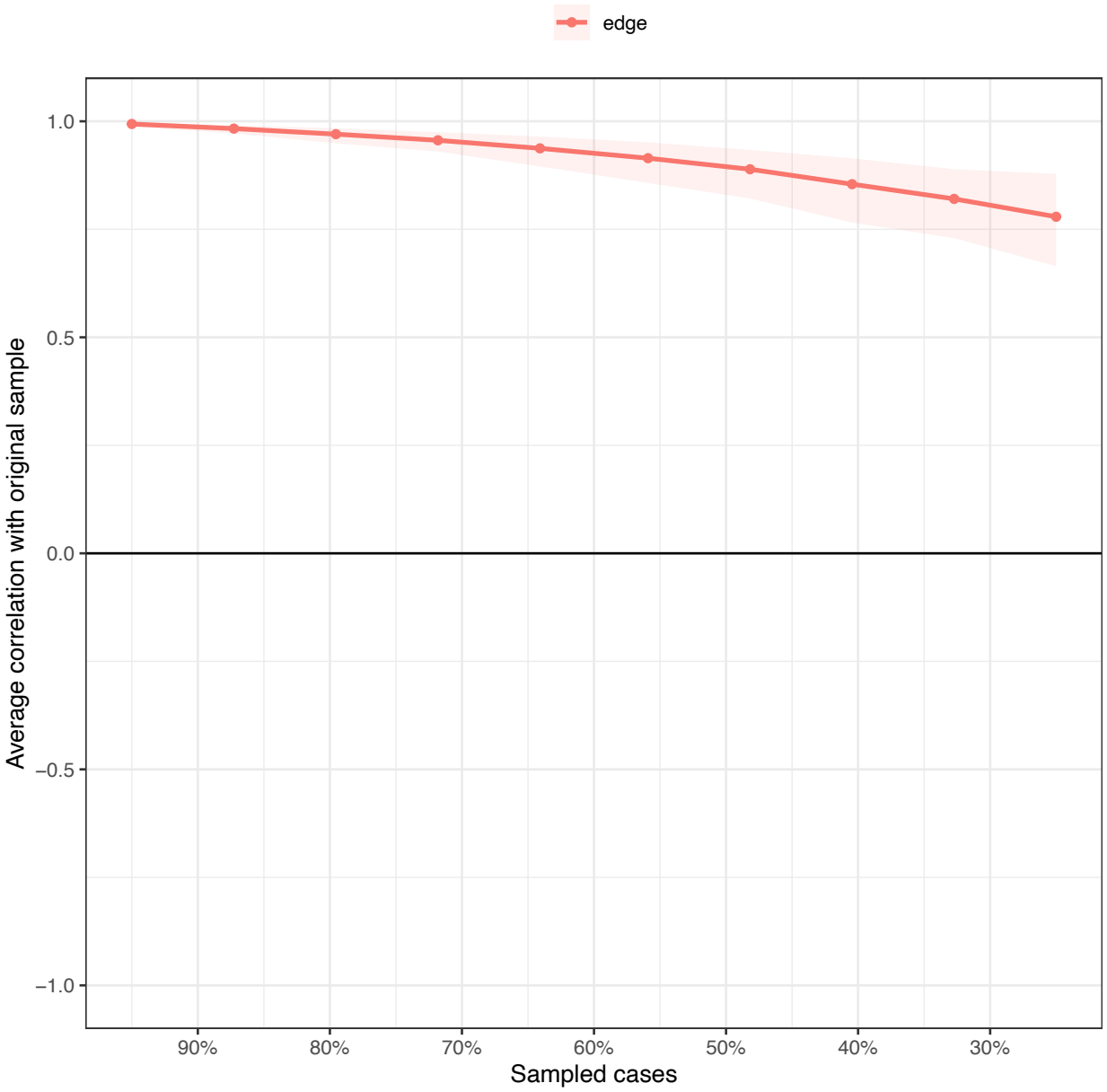
Table S2

Raw values of strength centrality and bridge strength centrality

Construct	Label	Strength centrality	Bridge strength centrality
Psychodynamic conflicts			
Individuation vs. dependency	C1	1.01	0.49
Submission vs. control	C2	0.63	0.02
Care vs. autarky	C3	0.62	0.20
Self-worth conflict	C4	0.41	0.00
Guilt conflict	C5	0.10	0.01
Oedipal conflict	C6	0.53	0.10
Structural dimensions			
Self-perception	1a	0.91	0.04
Object perception	1b	0.96	0.04
Self-regulation	2a	0.84	0.06
Object regulation	2b	1.06	0.09
Internal communication	3a	0.96	0.07
Communication external world	3b	0.95	0.09
Attachment to inner objects	4a	0.99	0.29
Attachment to external objects	4b	0.84	0.13

Figure S1

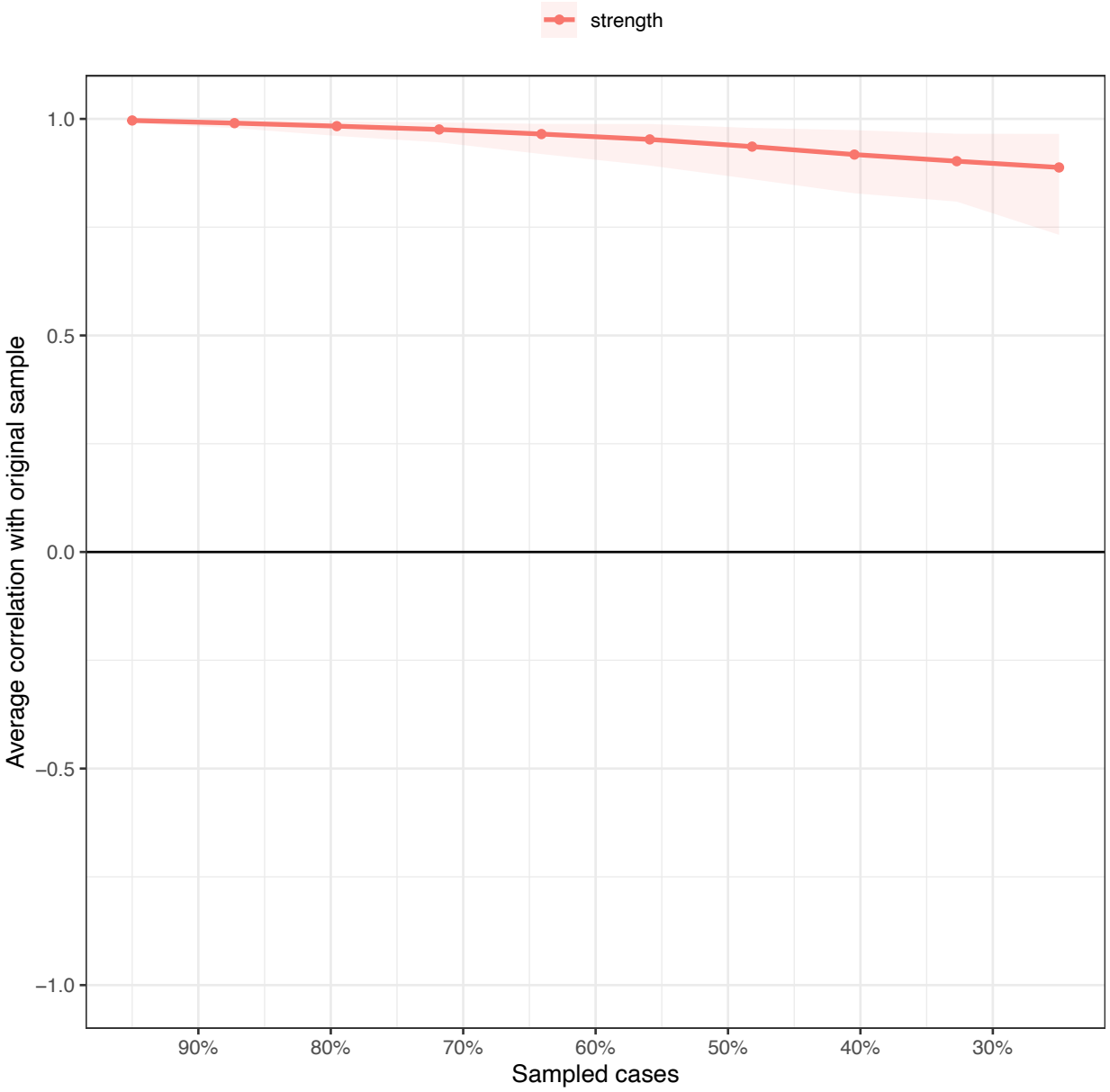
Edge weight correlation stability



Note. The average correlation between the original edge weights and the edge weights after dropping a percentage of subjects at random from the data. The line represents how the edge weights change when dropping different proportions of the data. The straighter the line, the more reliable the edge weights. In our network, the plot and the corresponding edge correlation stability (CS)-coefficient of .595 indicate very stable and reliable edge weights.

Figure S2

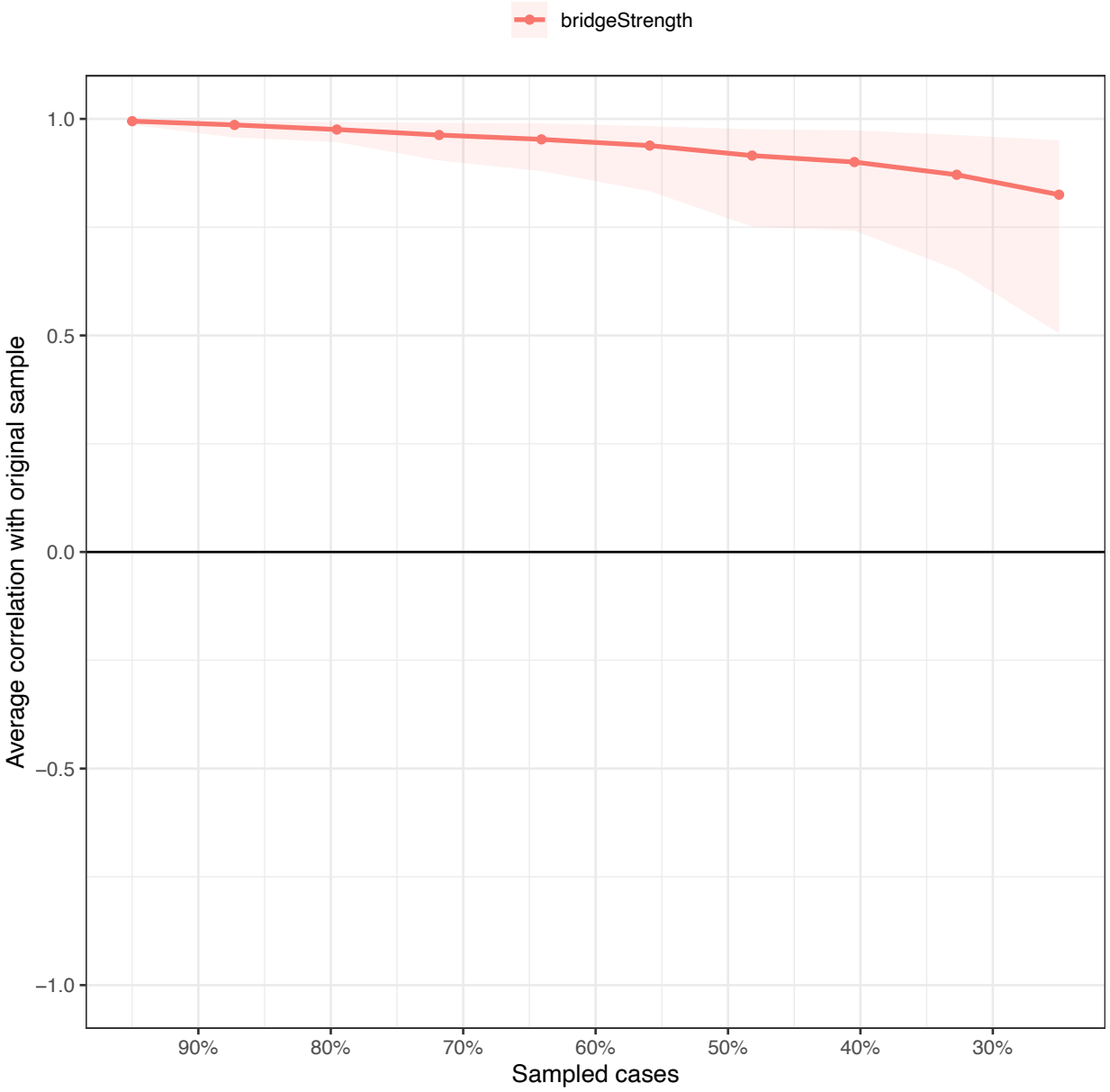
Strength centrality correlation stability



Note. The average correlation between the original strength centrality index and the strength centrality index after dropping a percentage of subjects at random from the data. The line represents how the strength centrality of the nodes changes when dropping different proportions of the data. The straighter the line, the more reliable the centrality. In our network, the plot and the corresponding strength centrality correlation stability (CS)-coefficient of .595 indicate very stable and reliable strength centralities.

Figure S3

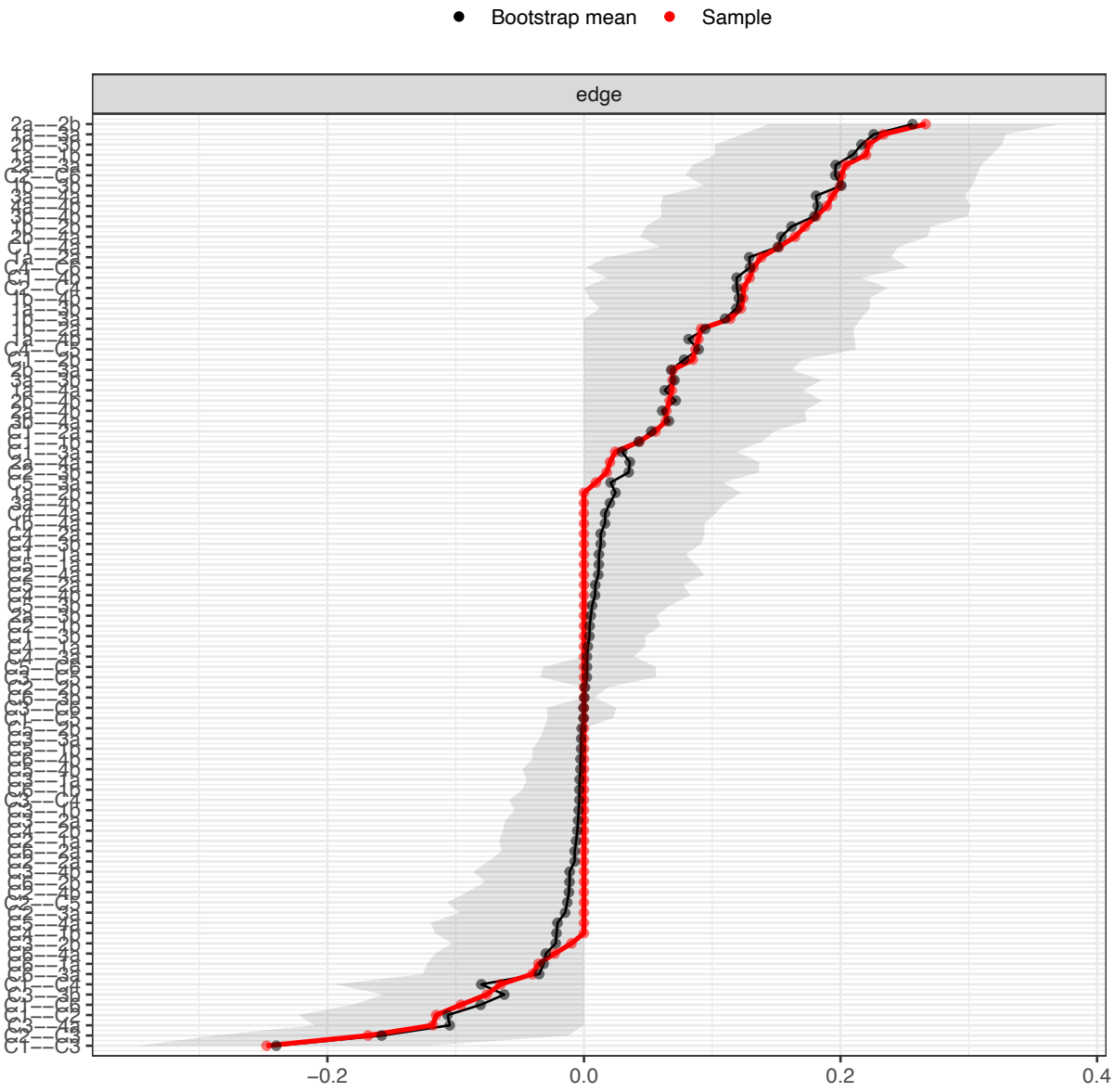
Bridge strength centrality correlation stability



Note. The average correlation between the original bridge strength centrality index and the bridge strength centrality index after dropping a percentage of subjects at random from the data. The line represents how the bridge strength centrality of the nodes changes when dropping different proportions of the data. The straighter the line, the more reliable the centrality. In our network, the plot and the corresponding bridge strength centrality correlation stability (CS)-coefficient of .595 indicate very stable and reliable bridge strength centralities.

Figure S4

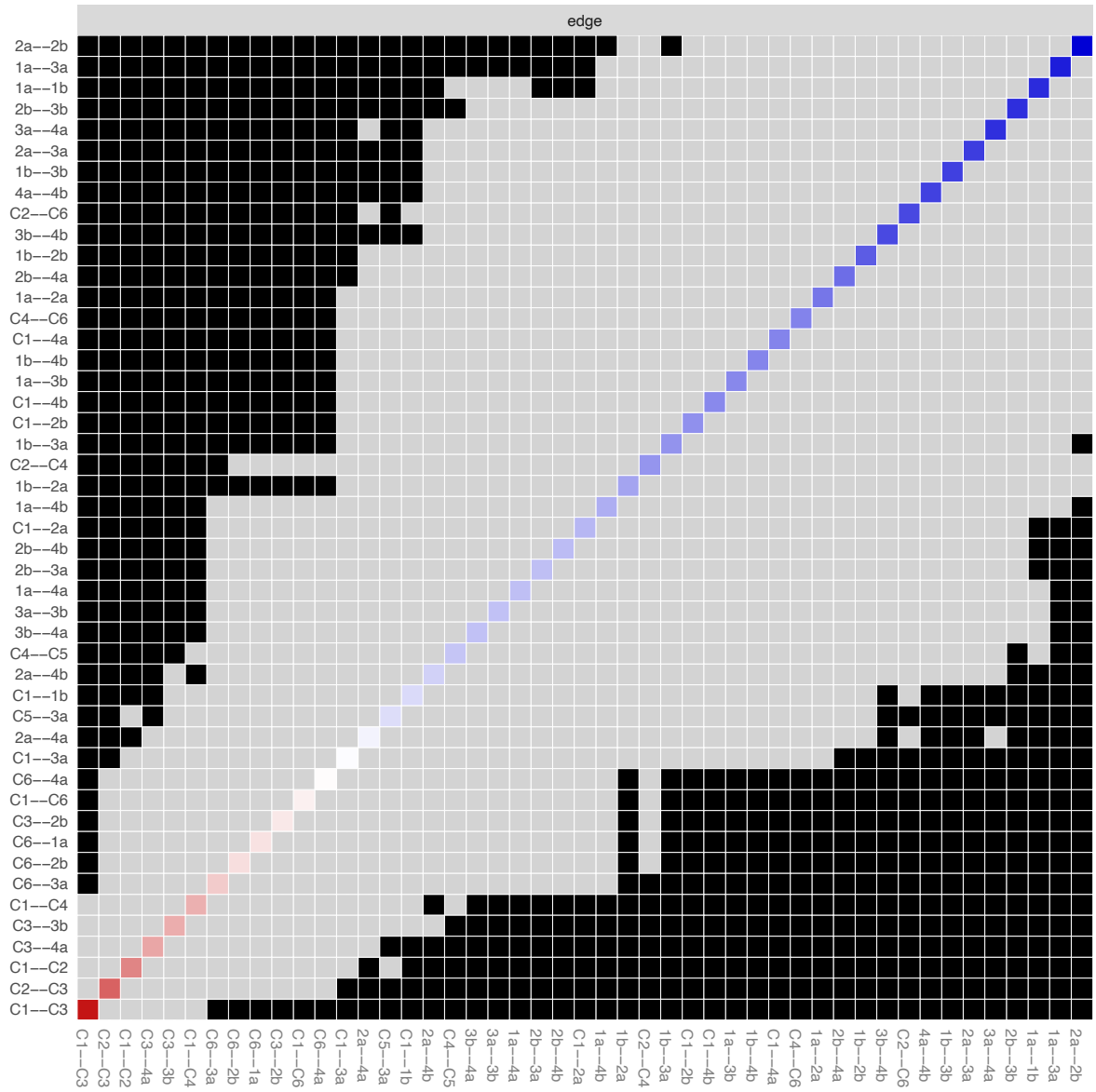
Edge weight bootstrap



Note. Bootstrapped confidence intervals (*CI*s) of the estimated edge weights in the network across n = 2500 bootstraps. The red line indicates the original edge weight values, the black line the bootstrap mean edge weight values and the gray-shaded area the bootstrapped 95% *CI*s of the edge weight values. The sample values lie within the bootstrapped CIs and the bootstrapped mean edge values are relatively close to the edge weights in the original network, thus indicating accurate estimations.

Figure S5

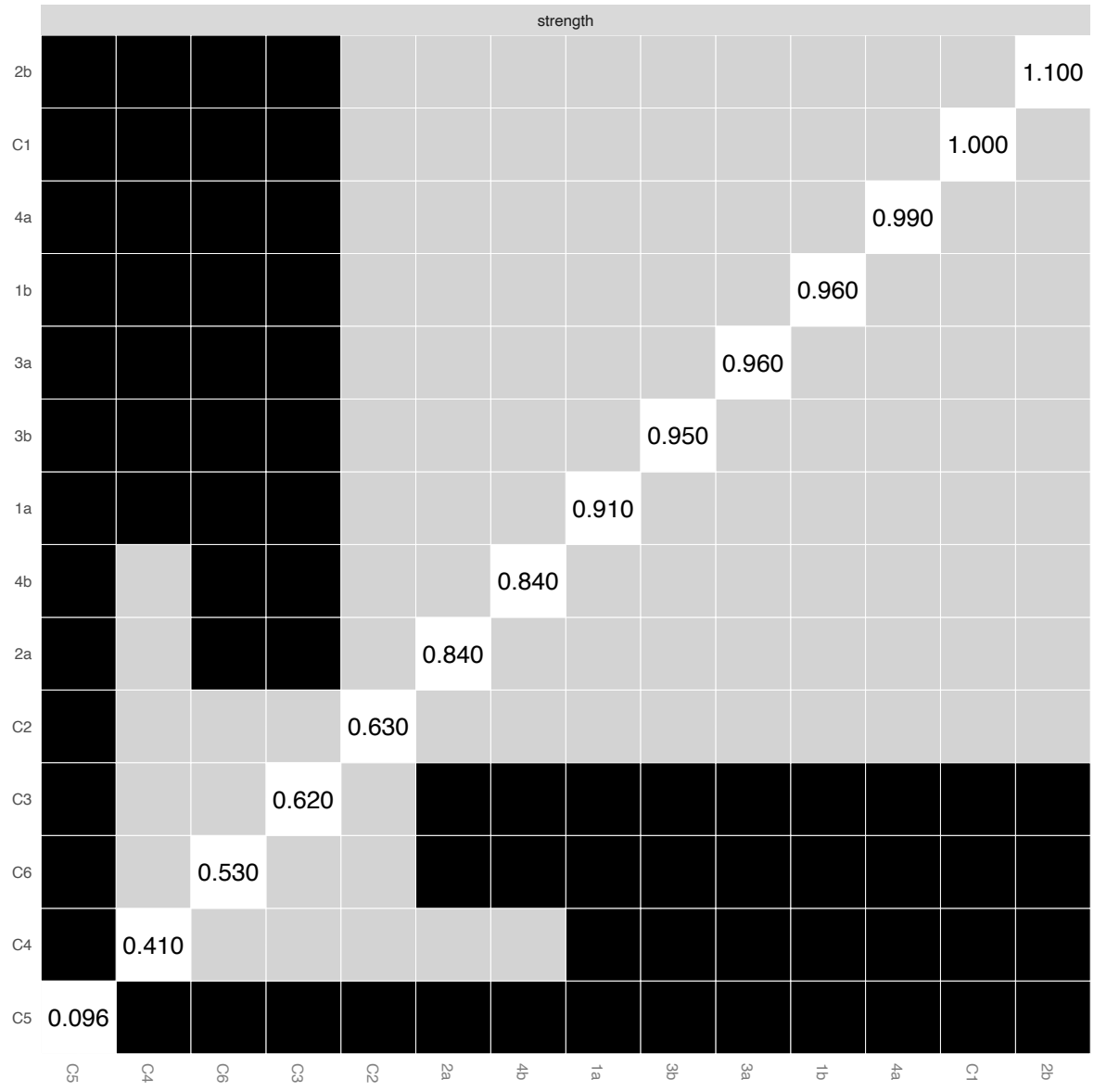
Edge weight difference test



Note. The plot shows the differences between all pairs of edge weights (*nboots* = 2500). Each row and column indicate an edge weight. Black boxes represent significant differences between edge weights (α = 0.05), whereas gray boxes indicate non-significant differences. The color in the diagonal corresponds with the edge colors in the original network figure.

Figure S6

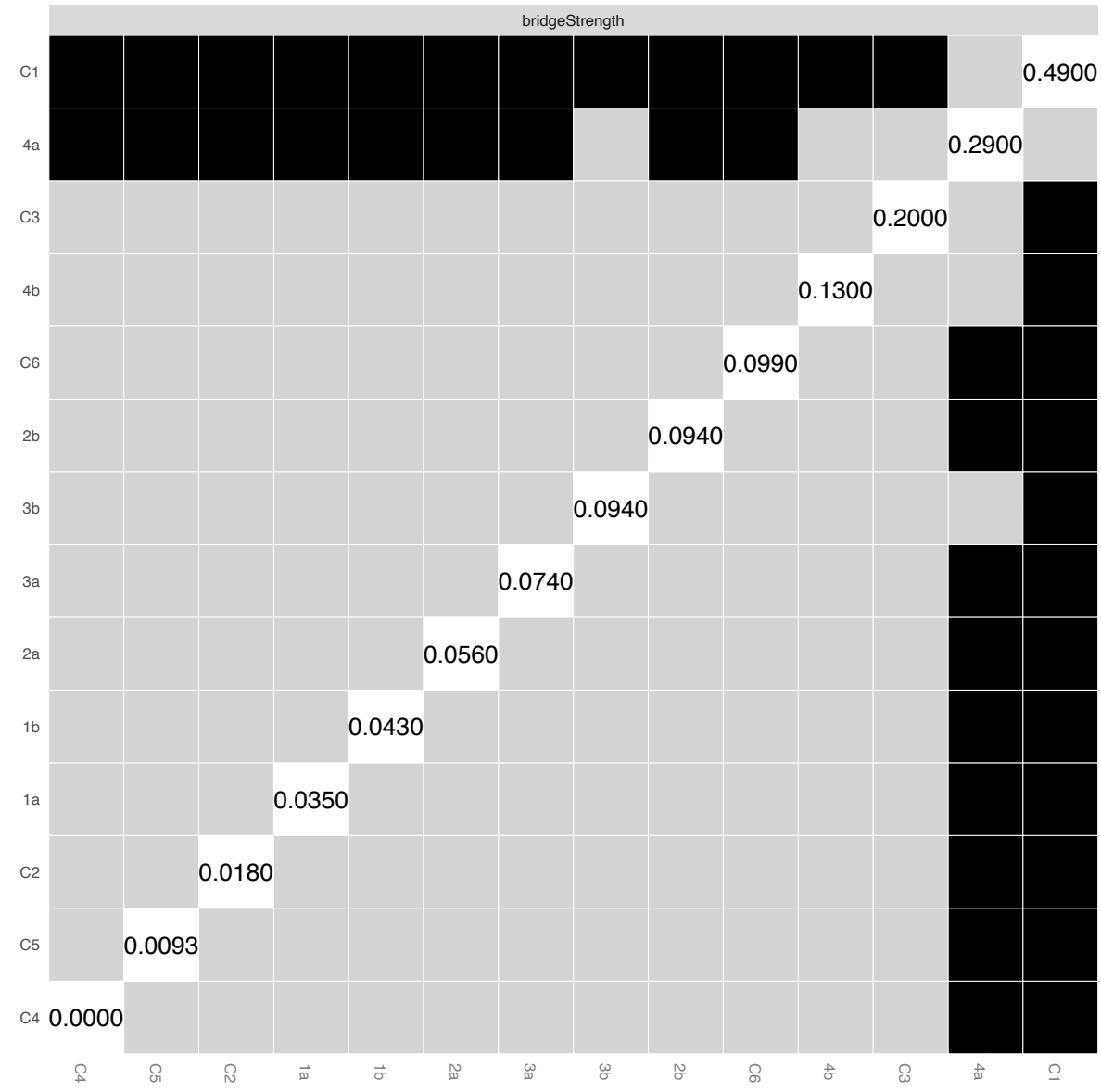
Strength centrality difference test



Note. The plot shows the differences between the strength centrality between all nodes (*nboots* = 2500). Each row and column indicate a node. Black boxes represent nodes that do differ significantly from one-another in their strength centrality (α = 0.05), gray boxes indicate non-significant differences. The values in the white boxes correspond with the value of the node's strength centrality in the original network figure.

Figure S7

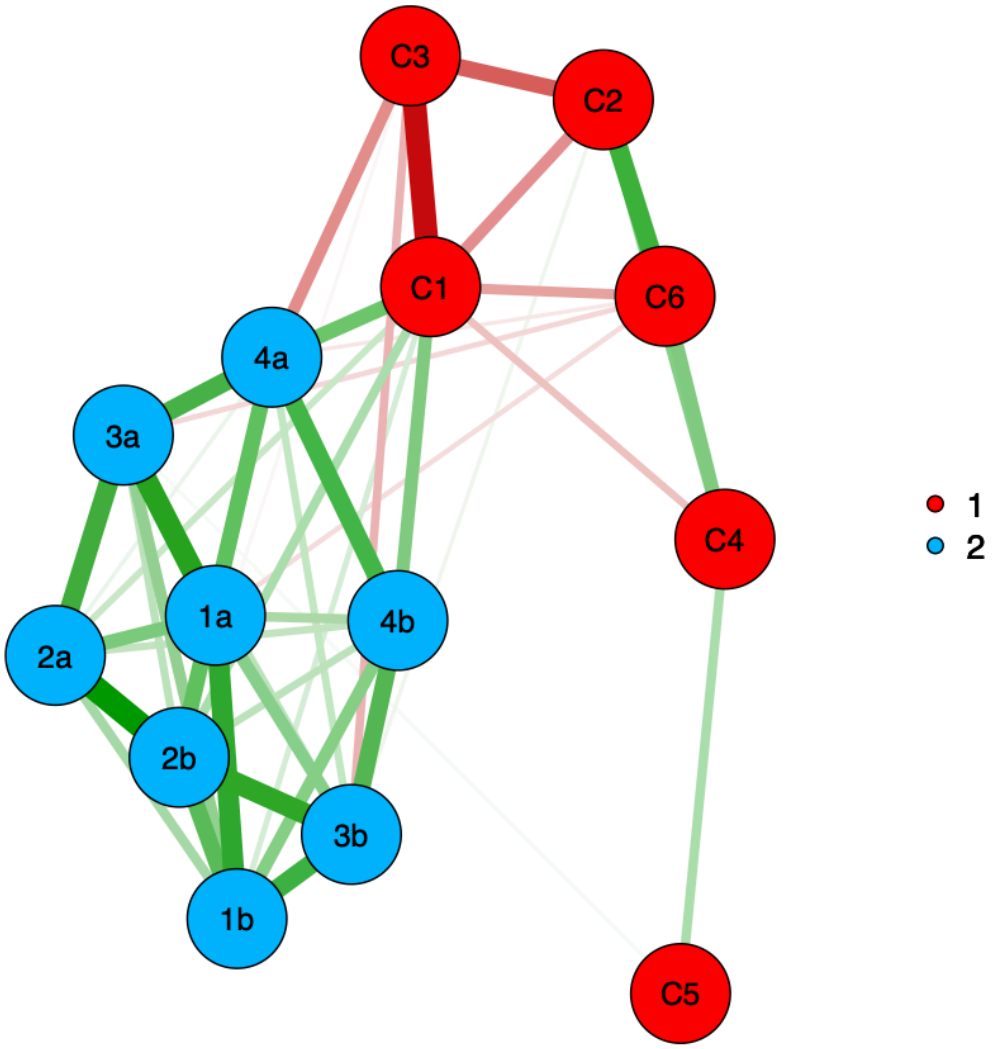
Bridge strength centrality difference test



Note. The plot shows the differences between the bridge strength centrality between all nodes (*nboots* = 2500). Each row and column indicate a node. Black boxes represent nodes that do differ significantly from one-another in their bridge strength centrality ($\alpha = 0.05$), gray boxes indicate non-significant differences. The values in the white boxes correspond with the value of the node's bridge strength in the original network figure.

Figure S8

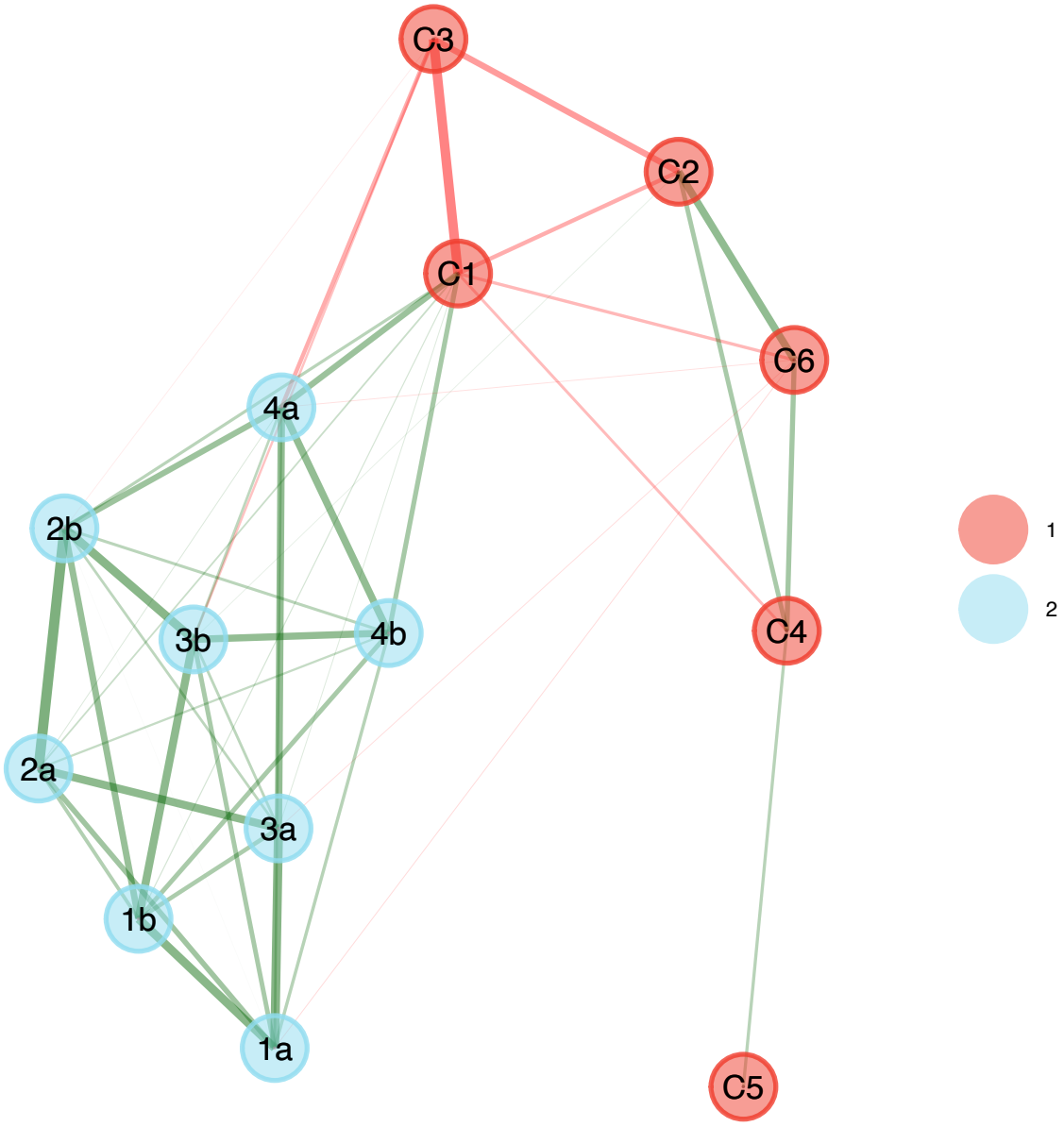
Exploratory graph analysis (EGA)



Note. Network model visualizing the clusters detected using exploratory graph analysis (EGA). The network layout used a modified version of the Fruchterman-Reinhold algorithm, placing more connected nodes closer to one another. The colors of the nodes represent the clusters resulting from the EGA, with blue nodes representing structural dimensions and red nodes representing psychodynamic conflicts. Green edges represent positive associations, red edges represent negative associations. Thicker edges represent stronger associations. See Supplementary Table S1 for item descriptions.

Figure S9

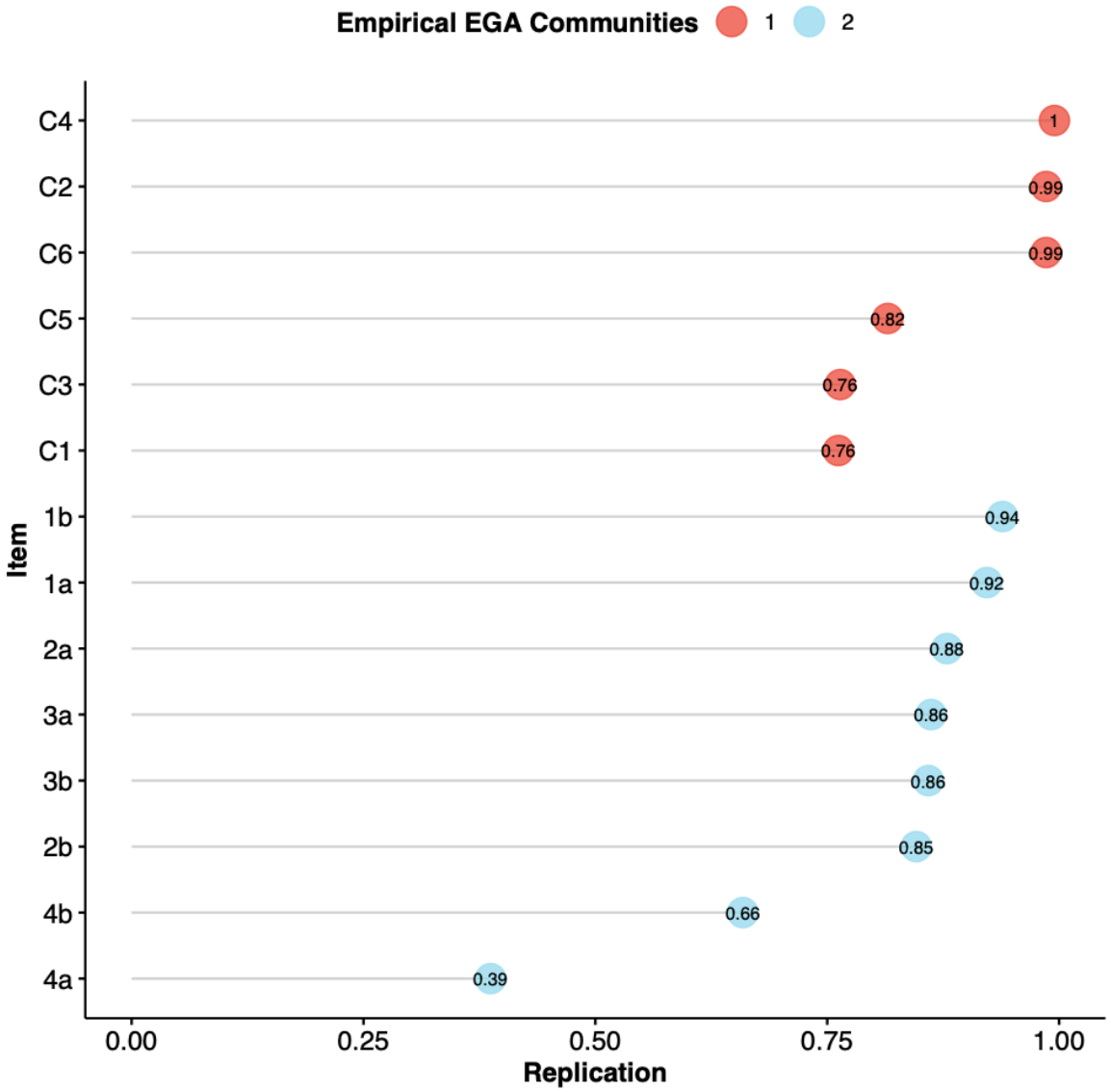
BootEGA network plot



Note: The network plot visualizes the most typical EGA network structure across n = 1000 bootstrap iterations. The network replicated the original EGA clusters, therefore supporting their reliability.

Figure S10

EGA item stability



Note: The plot visualizes the item stability. The numbers in the nodes represent the proportion of times an item is replicated in the cluster specified by EGA across n = 1000 iterations during bootstrap analysis.

8.5 Study 3:

All the same? Different measures of personality functioning are similar but distinct. A comparative study from a psychodynamic perspective using exploratory graph analysis

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Data availability statement

The R code has been made publicly available at the Open Science Framework and can be accessed at https://osf.io/muh95/. The raw data of this study are available from CS upon reasonable request.

Disclosure statement

The authors report there are no competing interests to declare.

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Author contributions

LV performed data analyses and drafted the first manuscript. SHS, CB, CS, and FJ provided critical revisions. All authors contributed to the article and approved the submitted version.

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Abstract: 197 words

Abstract

Personality functioning (PF) is a central construct in many theories of personality pathology. Based on psychodynamic theories, two screening questionnaires to assess PF are widely used: The Inventory of Personality Organization – 16 item version (IPO-16) and the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS). This study aimed to explore the similarities and differences of the two questionnaires in a large clinical sample of $N = 1636$ psychotherapeutic inpatients. Correlation analyses were conducted to examine the associations between the global scores and between the subscales. The study further used Exploratory Graph Analysis (EGA) to explore the dimensionality of the items. The stability of estimates was evaluated using a bootstrap version of EGA (bootEGA). The results indicated that the two questionnaires are highly correlated, yet not multicollinear, and moderate to large correlations were found between their subscales. EGA revealed six dimensions that fairly represented the original subscales. BootEGA showed that the dimensions and items were stable, except for one item that did not load sufficiently on any dimension. The findings suggest that although the questionnaires are highly correlated, their subscales tap into distinct domains of PF. We discuss implications stemming from these findings for clinical and scientific practice.

Introduction

Traditionally, personality disorders (PDs) have been conceptualized categorically by the presence of a combination of symptom criteria. In the last decades, however, disadvantages of this approach have increasingly been highlighted, including the problem of an artificially high comorbidity (e.g., Tyrer et al., 2015), insufficient evidence of the ten distinct PD categories (O'Connor, 2005), and arbitrary thresholds (Clark, 2006). Further, subthreshold difficulties also provide important clinical information (Karukivi et al., 2017). Therefore, the conceptualization of PD has shifted from a categorical to a dimensional approach, i.e., personality difficulties are scaled for severity from absent to very severe, rather than being described as dichotomous categories (PD absent vs present). This perspective has been integrated into the current classification systems of the International Classification of Diseases (11th ed.; ICD-11; World Health Organization, 2019) and the Alternative Model of Personality Disorders (AMPD) of the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013). The two systems are conceptually quite similar: in both ICD-11 and AMPD of the DSM-5, the essential criterion for a PD diagnosis is severity of impairments in personality functioning (PF). PF is defined by both *intra*personal functioning (e.g., identity integration and self-direction) and *inter*personal functioning (e.g., empathy and intimacy; American Psychiatric Association, 2013).

This dimensional perspective of PD resembles the current and long-established psychodynamic conceptualizations of personality pathology, where there is also a strong focus on intra- and interpersonal functioning (Blüml & Doering, 2021; Zimmermann et al., 2012). Yet, a key difference between the psychodynamic approaches and the new personality classification systems is their theoretical foundation. While the ICD-11 and DSM-5 AMPD are predominantly descriptive diagnostic systems, the psychodynamic concepts also provide theoretical frameworks, including clear implications for differential treatment planning and prognosis

(Blüml & Doering, 2021). There are various psychodynamic theories and models of PF (for an overview of the proposed models and measures please see Doering & Hörz, 2012). Two contemporary psychodynamic models of PF that are widely used for treatment planning and scientific purposes are the concept of personality organization according to Kernberg (1984, 1996) and the level of structural integration according to Operationalized Psychodynamic Diagnosis (OPD; OPD Task Force, 2008, 2023). While Kernberg's model is considered to be one of the most influential theories in contemporary psychodynamic approaches internationally (Doering et al., 2014; Koelen et al., 2012), the OPD is particularly well established in German speaking countries and in Latin America. These two models differ in their conceptualizations, theoretical background, and terminology, which we will discuss in more detail later. Both constructs have been found to be theoretically and empirically related to the new PD classification in ICD-11 and DSM-5 AMPD (Blüml & Doering, 2021; Clarkin et al., 2020; Hörz-Sagstetter, Ohse, et al., 2021; Kampe et al., 2018; Zettl et al., 2019; Zimmermann, Böhnke, et al., 2015; Zimmermann et al., 2012; Zimmermann et al., 2020). Yet, it is important to highlight that compared to AMPD or ICD-11, the psychodynamic models are not limited to the conceptualization and understanding of PDs but are applicable more broadly to any kind of mental disorder and to nonclinical individuals.

In psychodynamic treatment, PF has always been a key construct that is essential to many psychodynamic theories of psychopathology and personality, and that is relevant for treatment planning and prognosis (e.g., Doering & Hörz, 2012). In a systematic review by Koelen and colleagues (2012), the initial level of PF was associated with treatment outcome in such way that greater impairments in PF at baseline resulted in poorer course of and poorer response to psychotherapy. Further, PF has been shown to be related to psychopathology, such as posttraumatic stress symptomatology (Baie et al., 2020), depression (Dagnino et al., 2020; Vierl et al., 2023), anxiety (Doering et al., 2018; Gruber et al., 2020), somatization (Macina et al.,

2021; Vierl et al., 2023), substance abuse (Rentrop et al., 2014), and eating disorder symptomatology (Klein et al., 2022; Rohde et al., 2023). PF has also been found to mediate between child maltreatment and psychopathological symptoms, such as depression (Freier et al., 2022; Kerber et al., 2023; Krakau et al., 2021), anxiety (Freier et al., 2022; Kerber et al., 2023), somatization (Kerber et al., 2023), and posttraumatic stress disorder (Kampling et al., 2022). Consequently, a profound diagnostic evaluation of PF is crucial for psychotherapeutic treatment planning and for case conceptualizations. For the psychodynamic models of PF according to Kernberg or OPD, measures have been developed, including time-efficient, questionnaire based, self-assessment screening tools to assess impairments in PF. Both the Inventory of Personality Organization – 16 item version (IPO-16; Zimmermann et al., 2013; Zimmermann, Benecke, et al., 2015) that is based on Kernberg's model of personality organization, and the Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS; Ehrenthal et al., 2015) with its 12 items are highly prominent. Yet, the question arises in scientific as well as in clinical contexts, which screening questionnaire to use or whether it is beneficial to use both. In other words: Do the IPO-16 and the OPD-SQS assess the same construct (i.e., PF) or do they tap into distinct aspects of PF? To explore this question, this study will examine the empirical overlap of the screening tools on item -, subscale -, and global score level. First, however, we will describe their theoretical and conceptual differences.

Kernberg's model of Personality Organization

Kernberg developed a theoretical model of personality organization, drawing upon contemporary object relations theory (Kernberg, 1984, 1996). The key assumption is that personality pathology is caused by enduring and mostly unconscious patterns of personality characteristics, which develop in early childhood from an interplay of temperament and relational experiences. Personality organization plays a key role in understanding developmental aspects of PDs, has important prognostic implications, and can be used for treatment planning

(Kernberg & Caligor, 2005). According to Kernberg (1984), personality organization is conceptualized by three domains: (1) identity (i.e., the ability to develop stable and nuanced images of the self and others), (2) maturity of defense mechanisms (i.e., the capacity to process threatening internal and external stimuli in an adaptive manner), and (3) reality testing (i.e., the ability to distinguish self from non-self, as well as internal from external stimuli, and the capacity to deal with social criteria of reality). Later he added two additional domains to his model: (4) aggression (i.e., the ability to modulate the experience and expression of aggression) and (5) moral values (i.e., the availability of stable values). The degree of impairment in these domains is described on a continuum from normal to pathological personality characteristics. Severity of personality disturbance can be differentiated on four levels: normal, neurotic, borderline, and psychotic.

To assess levels of personality organization according to Kernberg, a Structured Interview of Personality Organization (STIPO; Clarkin et al., 2004) and its short revision, the STIPO-R (Clarkin et al., 2016) can be applied. Additionally, the Inventory of Personality Organization (IPO; Clarkin et al., 1995; Lenzenweger et al., 2001) has been developed as a self-assessment questionnaire and has been translated into several languages (e.g., Chinese: Wang et al., 2022; Dutch: erghuis et al., 2009; French: ormandin et al., 2002; German: örz-Sagstetter et al., 2021b; Italian: reti et al., 2015; Japanese: garashi et al., 2009; Portuguese: arreto et al., 2017). Moreover, Zimmermann and colleagues (2013) developed a 16-item short version of the IPO, the IPO-16. This questionnaire comprises items that assess Kernberg's three key domains: identity diffusion, primitive defenses, and reality testing. The IPO-16 has been originally validated and standardized for the German language (Zimmermann et al., 2013; Zimmermann, Benecke, et al., 2015).

OPD level of structural integration axis (OPD-LSIA)

The OPD is a multi-axial diagnostic and classification system which can be used to assess psychodynamic constructs relevant for treatment planning and psychotherapy research (OPD Task Force, 2008, 2023). Originally developed in the 1990s by a group of psychodynamic researchers and clinicians in Germany, Austria and Switzerland, the system has gained great international recognition over the last decades and has been translated into several other languages (e.g., English, Spanish, Italian, Chinese, Russian). In its third version (OPD-3; OPD Task Force, 2023), the OPD system assesses four axes: (I) Experience of illness and prerequisites for treatment and mental and psychosomatic disorders according to the DSM or ICD; (II) interpersonal relations; (III) conflicts; and (IV) structure. The axis that captures personality functioning is the fourth axis, which is also referred to as the OPD level of structural integration axis (OPD-LSIA). The OPD-LSIA is based on various psychodynamic theories (e.g., object relation models, ego-psychological models, self-psychology, attachment theories, and developmental psychology; Doering & Hörz, 2012). It is conceptualized by four dimensions: perception, regulation, communication, and attachment. These dimensions are assessed on a self-related and on an object-related scale ("object" = "others" in psychodynamic terminology). Thus, the OPD-LSIA represents (similar to ICD-11 and AMPD of DSM-5) an intra- and interpersonal perspective. In the most recent version, OPD-3, the dimension 'defense mechanisms' has been additionally included. All dimensions are further specified by means of three subdimensions to describe specific capacities and skills. The amount of differentiation and integration of these capacities is classified in seven levels: Four main levels of structural integration: good, moderate, low, and disintegrated and three levels in between: good-moderate, moderate-low, and low-disintegrated.

Similar to the assessment of personality organization, the OPD-LSIA can be assessed through a psychodynamic expert interview (OPD Task Force, 2008, 2023). As a self-assessment tool the 95-item OPD Structure Questionnaire (OPD-SQ; Ehrenthal et al., 2012) and its 12-item

short version OPD-SQS (Ehrenthal et al., 2015) were developed. Originally developed and validated in German, the long version has also been translated into Spanish (Lorenzini et al., 2021) and into English (unpublished). The OPD-SQ assesses the eight dimensions of the OPD-LSIA according to OPD-2. For the OPD-SQS three subscales were identified, ´self-perception`, reflecting aspects of self and emotion regulation skills, ´relationship model` that captures representations of previous relationship experiences and corresponding expectations of new relationships, and ´interpersonal contact` that assesses interactional skills and aspects of self-uncertainty (Ehrenthal et al., 2015).

Empirical overlap of the psychodynamic instruments

Since both Kernberg's model of personality organization and the OPD-LSIA are rooted in psychodynamic theories of PF, it is reasonable to anticipate some degree of empirical overlap between these constructs. Large correlations were found between the STIPO and OPD-LSIA interviews in a sample of $N = 122$ psychiatric inpatients ($r = .68$; $p < .001$; Doering et al., 2013), between the long versions of the questionnaires (IPO and OPD-SQ) in a sample of $N = 223$ inpatients and outpatients ($r = 0.81$; $p < .01$; König et al., 2016), and between the short versions (IPO-16 and OPD-SQS) in a mixed sample of $N = 534$ clinical and nonclinical individuals ($r = .76$; $p < .001$; Benecke et al., 2018). Regarding the short versions, Zimmermann and colleagues (2020) reported that they share a common factor (namely impairments in PF) along with other measures of PF, such as the Level of Personality Functioning Scale Self Report (LPFS-SR; Morey, 2017) or LPFS Brief Form 2.0 (LPFS-BF; Weekers et al., 2019).

Aim of the present study

Given their large correlation reported in a previous study (Benecke et al., 2018) and their common underlying general factor (Zimmermann et al., 2020), it remains unclear whether the screening questionnaires capture similar or distinct aspects of PF. This information, however, has practical implications for clinical and research settings to determine which questionnaire to use.

Despite the reported correlation between the global scores of the two measures, no study yet has examined the similarity between the IPO-16 and the OPD-SQS on both the subscale- and item-level. Therefore, the objective of the present study was to examine the empirical overlap of the IPO-16 and OPD-SQS across global score -, subscale -, and item level.

First, we wanted to replicate the correlation between the global scores of the IPO-16 and OPD-SQS. A correlation coefficient exceeding .80 would indicate a multicollinear association between the measures, suggesting that they measure the same construct (Young, 2018). Building on the previous finding of Benecke and colleagues (2018), we hypothesized a large correlation between the global scores, albeit not indicative of a multicollinear relationship. Extending the previous literature, we also want to evaluate the correlations between the subscales of the two questionnaires.

Our second objective was to examine the dimensional structure of the items to investigate the extent to which the questionnaires assess distinct aspects of PF. To achieve this aim, we employed Exploratory Graph Analysis (EGA), a promising technique from the field of network psychometrics that provides an alternative to traditional dimension reduction methods (Golino & Epskamp, 2017). Simulation studies revealed that EGA presents comparable or even higher accuracy in presenting the correct estimation of dimensions than other traditional factor analytic methods (e.g., parallel analysis or minimum average partial; Christensen et al., 2021; Cosemans et al., 2022; Golino & Demetriou, 2017; Golino & Epskamp, 2017; Golino et al., 2020). Especially when the constructs are highly correlated (which is the case between IPO-16 and OPD-SQS), EGA has been found to outperform other methods (Forkmann et al., 2018; Golino & Epskamp, 2017). Cosemans et al. (2022) therefore conclude that EGA is the preferred method for continuous data.

Method

Participants

This study is a secondary analysis of data collected for routine quality assessment. Use of this data for research purposes was approved by the ethics commission of the University Medical Center Rostock (registration number: AZ A 2020-0025). All patients gave written consent for use of data for both treatment evaluation and, anonymously, for research purposes.

The sample consisted of adult inpatients who were hospitalized at the Asklepios Clinic Tiefenbrunn in Germany between June 2016 and March 2020. Its inpatient program is based on psychodynamic therapy. More detailed information on the treatment concept can be found elsewhere (Leichsenring et al., 2019). At admission, all patients were asked to complete a routine quality assessment, which comprises a battery of sociodemographic and diagnostic measures. Exclusion criteria were cognitive impairments, severe formal thought disorders, and insufficient German language skills. In the present study only patients who completed the IPO-16 and OPD-SQS without any missing values were included (N = 1636). The average age of the included participants was 33.9 years (SD = 13.3; range: 17 - 69) and 62.8% were female. Concerning educational status, 46.7% had at least 12 years of education of whom 39.0% had a university degree. 51.0% of the participants reported being employed, 24.2% stated they were unemployed, 17.4% were students and 9.2% were retired. Almost three quarters (74.0%) had been in previous psychotherapeutic outpatient treatment and 40.1% had already had a previous inpatient stay. Diagnostic information was available for n = 1572 (96.1%) of the patients. The number of clinical diagnoses according to ICD-10 (World Health Organization, 1992) ranged between one and seven. 84.7% of the patients had at least two diagnoses. Most patients (82.4%) were diagnosed with a major depression, followed by anxiety disorders (35.5%) and posttraumatic stress disorders (21.5%). In total, 42.2% of the patients were diagnosed with a PD.

Measures

Inventory of Personality Organization (IPO-16)

The items of the IPO-16 (Zimmermann et al., 2013; Zimmermann, Benecke, et al., 2015) are rated on a 5-point Likert scale ranging from 1 (´never true`) to 5 (´always true`), with higher scores signifying greater impairment in PF. The screening tool captures items of Kernberg's (1984) three key domains: identity diffusion, primitive defenses, and reality testing. However, employing the questionnaire as a unidimensional tool can be considered reasonable, given that a substantial proportion of the variance in the individual subscales is accounted for by the second-order factor of "structural impairment" (Zimmermann et al., 2013). The scores of the questionnaire are reported as mean values. The German version had a good internal reliability (Cronbach's $\alpha = .85$) and good criterion validity in form of significant correlations with other constructs assessing the severity of impairment in PF and with personality pathology in a clinical sample of $N = 1300$ outpatients and inpatients (Zimmermann et al., 2013). Two cut-off scores were proposed: a global mean score greater than 1.97 indicates an increased likelihood for a PD, and a score greater than 2.38 is suggestive of structural impairments (Zimmermann et al., 2013). In our sample, the internal reliability of the IPO-16 was $\alpha = .86$ for the global score and ranged from $\alpha = .68 – .82$ for the subscales.

Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS)

The 12 items of the OPD-SQS (Ehrenthal et al., 2015) are rated on a 5-point Likert scale from 0 (´fully disagree`) to 4 (´fully agree`), with higher scores representing greater structural impairment. Summated scores are formed for the global score and the three subscales (self-perception, relationship model, and interpersonal contact). Given the high correlations among the subscales, it is appropriate to compute the sum score and use the questionnaire as a unidimensional measure (Ehrenthal et al., 2015). The OPD-SQS has shown good internal reliability ($\alpha \geq 0.88$), as well as good criterion validity with symptomatology and personality characteristics in nonclinical, outpatient, and inpatient samples (Ehrenthal et al., 2015; Obbarius

et al., 2019). In the presented sample, internal reliability was $\alpha = .86$ for the entire scale and ranged from $\alpha = .70 – .78$ for the subscales.

Statistical Analysis

All statistical analyses were performed using *R* version 4.2.3 (R Core Team, 2023). We provide the *R* script along with the adjacency matrix online at https://osf.io/muh95/.

To evaluate the similarities between the IPO-16 and OPD-SQS global scores and their subscales we calculated Pearson correlations. The correlation coefficients were interpreted according to Cohen's (1988) benchmarks, with correlations of $r < .30$ representing small, $.30 < r < .50$ medium, and $r \geq .50$ large associations.

To evaluate the dimensional structure of the two questionnaires we used EGA. EGA utilizes cluster detection on estimated psychological networks to identify dimensions underlying the data. The dimensions found in the network are statistical equivalent to latent variables (Christensen & Golino, 2021b; Golino & Epskamp, 2017). However, the difference to EGA is that EGA does not assume that the covariation among the items is caused by an unobserved latent variable. In contrast, it is assumed that the items within one dimension are more strongly associated with each other than with the items of another dimension (Golino & Epskamp, 2017). In other words, EGA identifies dimensions by focusing on the direct relationships between the items. Beyond the advantages in performance outlined in the study aim section, another important advantage is that unlike more traditional factor analytic methods, EGA does not require prior decision on the type of rotation to be used (which has significant consequences for validation results; Sass & Schmitt, 2010) but operates in a data-driven way. Moreover, EGA automatically places items in dimensions so that no factor loading matrix must be interpreted. This allows for stability analyses, which, for example, can determine the stability of each item in the dimension. Last but least, EGA provides an insightful visualization (i.e., network plot) that depicts which items cluster together and visualizes the associations between all items, improving

the interpretation of results (Bringmann & Eronen, 2018). Thus, EGA is a promising tool to evaluate how items are organized.

We calculated EGA using the *R* package *EGAnet* v. 1.2.3 (Golino et al., 2022). EGA first applies the Gaussian Graphical Model (GGM) to estimate the network (Epskamp et al., 2022). In GGM, an *edge* (i.e., link) between two *nodes* (i.e., items) represents a partial correlation after conditioning on all other nodes in the network. To detect the dimensionality structure underlying the data we applied the louvain algorithm (Blondel et al., 2008). Given that the network results tend to be sample-specific, we employed bootstrap exploratory graph analysis (bootEGA; Christensen & Golino, 2021a) to derive the most typical network structure from 1,000 non-parametric bootstrap samples. BootEGA provides a sampling distribution of the bootstrapped EGA networks, of which several descriptive statistics can be obtained, such as *item stability* (i.e., the number of times each item is placed in each dimensions), *dimension stability* (i.e., the number of times the same number of dimensions replicates) or *structural consistency (*i.e., the extent to which items in a dimension are interrelated and homogeneous. Item stability can range between 0 (i.e., completely instable) to 1 (i.e., perfectly stable), with items being considered less stable with values lower than 0.65 (Christensen & Golino, 2021a). The contribution of each item to the coherence of the dimensions was then captured with *network loadings*, which are calculated as the absolute sum of all edge weights of a given node within each EGA dimension. Network loadings can be roughly interpreted equivalent to factor loadings (Christensen & Golino, 2021b). Yet, their magnitude is comparatively smaller, as the edge weights represent partial correlations. Christensen and Golino (2021b) recommended to use .15 for small, .25 for moderate, and .35 for large effect sizes. The network loadings matrix can be used to identify items that exhibit cross-loading or multidimensionality, reflecting items that replicate equally across multiple dimensions (Christensen et al., 2020). Finally, *structural consistency* was calculated as an alternative to internal consistency measures in latent variable models. Structural

consistency values range from 0 (“structural inconsistency”) to 1 (“identical item composition across all bootstrap samples”), with values of ≥.75 being considered acceptable (Golino et al., 2021). Item stability provides insight into which items might cause structural inconsistency.

Results

Descriptives

The patients showed, on average, moderate impairment in PF, with IPO-16 mean values of $M = 2.33$ ($SD = 0.64$; range: 1 – 4.94) and OPD-SQS mean values of $M = 26.94$ ($SD = 9.37$; range: 0 – 48). The mean values correspond with T-scores of 57.40 and 59.77, respectively (Zimmermann et al., 2020). 43.2% of the patients showed an IPO-16 mean score above the cut-off to detect severe structural impairment (cut-off > 2.38; Zimmermann et al., 2013). The IPO-16 and OPD-SQS global scores were found to be significantly and highly correlated ($r = .69$, $p < .001$). Table 1 shows the correlations between the subscales that were all statistically significant, with moderate to large values.

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Dimensionality

The EGA bootstrap identified six dimensions as the most stable dimensional organization of the data (median = 6; SE = 0.53; 95% CI [4.96, 7.05]; frequency of 4 factors = 12.0%, of 5 factors = 35.8%, of 6 factors = 62.9%). The EGA network plot of the combined IPO-16 and OPD-SQS items is shown in Figure 1. Table 2 presents a list of all items along with their descriptions and allocation to both the original subscales and EGA dimensions. The six dimensions were represented as follows: dimension 1 (red nodes) is formed by all items of the OPD-SQS subscale relationship model (items: SQS3, SQS7, SQS9, SQS12), together with the item IPO4 (“*It is hard for me to trust people because they so often turn against me or betray me.*”; original subscale: primitive defenses), and with the item IPO13 (“*After becoming involved with people, I am surprised to find out what they are really like.”*; original subscale: identity

diffusion). We named this new dimension “relationship distrust” since the focus of all included items is a rather paranoid/distrustful perception of others. The remaining items from the IPO-16 subscale identity diffusion (items: IPO1, IPO5, IPO9, IPO10, IPO16) formed dimension 2 (blue nodes). Dimension 3 (green nodes) is formed by all items from the IPO-16 subscale reality testing (items: IPO2, IPO3, IPO8, IPO11, IPO15). Dimension 4 (orange nodes) comprises items that belong to the OPD-SQS subscale self-perception (items: SQS1, SQS2, SQS5, SQS8). Dimension 5 (yellow nodes) is formed by all items from the OPD-SQS subscale interpersonal contact (items: SQ4, SQS6, SQS10, SQS11). Lastly, dimension 6 (purple nodes) comprises the remaining items from the IPO-16 subscale primitive defenses (items: IPO6, IPO7, IPO12, IPO14). Except for the first dimension, the remaining dimensions were named according to the respective subscale of their included items (i.e., identity diffusion, reality testing, self-perception, interpersonal contact, primitive defenses).

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The structural consistency was good to excellent for the dimensions 2 (identity diffusion), 3 (reality testing), 4 (self-perception) and 5 (interpersonal contact), with values of 0.89, 0.93, 0.97 and 0.98, respectively. The structural consistency for dimension 6 (primitive defenses) was 0.67, which is slightly below the recommended threshold of 0.75 (Golino et al., 2021). For dimension 1 (relationship distrust), the structural consistency was found to be insufficient with a value of 0.43. Inspecting the corresponding item stabilities (see Figure 2 and Table 3), it was discovered that item IPO13 (“*After becoming involved with people, I am surprised to find out what they are really like.”*) exhibited the lowest item stability with a value of 0.44, which falls below the recommended threshold of 0.65. The network loadings (see Table 4) suggest that item IPO13 may be multidimensional, as the network loadings were similar across four dimensions: it showed a value of .10 on dimension 1 (relationship distrust), .08 on dimension 2 (identity

diffusion), .08 on dimension 3 (reality testing), and .09 on dimension 6 (primitive defenses). After removing item IPO13 from the data, the structural consistency of the dimension relationship distrust was excellent (1.00). The analysis of the item stabilities showed that the items belonging to the dimension primitive defenses replicated in their original dimension in 67.1% of bootstrap replications, while in 32.7% of iterations they shared a common cluster with the items of reality testing (see Table 3).

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Discussion

Our main aims of the study were (1) to examine the correlations between the global scores and between the subscales of the IPO-16 and OPD-SQS and (2) to explore the dimensionality structure of their items using EGA (Golino & Epskamp, 2017). Regarding our first aim, we observed a significant and large correlation ($r = .69$, $p < .001$) between the global scores of the two questionnaires, which is only slightly smaller than the correlation reported in a previous study ($r = .76$, $p < .001$; Benecke et al., 2018). Importantly, the observed correlation does not suggest multicollinearity ($r < .80$) between the instruments, indicating that the IPO-16 and OPD-SQS measure closely related but not identical constructs. This study extends previous research by also inspecting the correlations between the subscales. We found significant moderate to large correlations (see Table 1). Specifically, the correlations between the two questionnaires ranged from $r = .33$ to $r = .58$, the correlations between the OPD-SQS subscales ranged from $r = .49$ to $r = .54$, and between the IPO-16 subscales from $r = .46$ to $r = .61$. These positive moderate to large correlations indicate that the subscales measure related yet distinct aspects of PF.

Concerning our second research question, EGA revealed that the items of IPO-16 and OPD-SQS were best represented in six dimensions. Notably, the dimensions discovered by EGA

overall represent the original subscales of the questionnaires. Except for two items (i.e., IPO4, IPO13) that loaded on a dimension inconsistent with their original subscale, all remaining items loaded on dimensions that were consistent with their respective original subscale. These two items formed a new dimension along with all items of the OPD-SQS subscale relationship model. We labeled this new dimension relationship distrust, due to the common theme of the included items capturing a general sense of mistrust towards others. The fact that item IPO4 loads together with the OPD-SQS relationship model items is reasonable given their very similar wording. For example, item IPO4 states "*It is hard for me to trust people because they so often turn against me or betray me*", while OPD-SQS item 12 says: "*My experience is: if you trust people too much, you can get nasty surprises*" (see Table 2). All other dimensions were named in accordance with their respective original subscale.

The bootEGA revealed that most dimensions (i.e., interpersonal contact, identity diffusion, self-perception, and reality testing) had high structural consistency, indicating that their items were interrelated and conceptually homogenous. However, the new dimension relationship distrust showed insufficient structural consistency. Upon examination of the pertinent items, it is evident that the structural consistency of the dimension was limited by item IPO13 *("After becoming involved with people, I am surprised to find out what they are really like.")*, which showed insufficient item stability (0.44) and notable cross loadings (see Table 4), indicative of multidimensionality. Considering the high cross loadings, it might be necessary to revise this item in the IPO-16. After the removal of the item the structural consistency of the dimension was excellent (1.00). Hence, when item IPO13 is excluded, the dimension relationship distrust can be regarded as a distinct and internally consistent dimension. Since the content of the dimension relationship distrust corresponds to the underlying OPD-SQS subscale relationship model, we consider the new dimension to be equivalent to the original subscale and refer only to the subscale relationship model in the following.

The structural consistency of the dimension primitive defenses (0.67) was slightly below the recommended threshold of 0.75, as its items only replicated in 67.1% of all bootstrap iterations. Interestingly, in almost a third (32.8%) of the iterations, the items shared a dimension with the items of the dimension reality testing, suggesting some conceptual similarity between the two dimensions and, therefore, between their underlying subscales. This is also reflected in the large intercorrelation of the corresponding subscales (r = .60). This seems reasonable from a theoretical point of view, since maladaptive defense mechanisms (e.g., projection, projective identification, or splitting) often result in a distortion of reality perception and prevent the successful adaptation to the external reality as well as the accurate differentiation between inner and external realities (Kernberg, 1984). Although the constructs (primitive defenses and reality testing) interact, Kernberg (1984) included them as separate dimensions into his model because both offer important diagnostic information for the severity of (personality) pathology. The presence of impairments in reality testing is an important diagnostic criterion to distinguish borderline personality organization (which is not necessarily a borderline personality disorder according to DSM or ICD) from psychotic personality organization. For example, a person with a borderline personality disorder may show a permanent state of identity diffusion and may predominantly use maladaptive defenses such as splitting, projection, denial or dissociation but shows maintained (yet restricted) capacity for reality testing. In contrast, patients who have additionally impaired capacity of reality testing, for example when a patient has lost the ability to differentiate self from non-self, or intrapsychic thoughts from thoughts of external origin, the diagnosis of psychotic personality organization is warranted (Kernberg, 2019). Differences between the subscales have also been shown in previous research, where reality testing was more strongly associated with dissociation symptoms compared to primitive defenses or identity diffusion (Spitzer et al., 2006). In addition, Hörz et al. (2010) found reality testing to be most associated with cluster A personality disorders (i.e., paranoid, schizotypal, schizoid), while

primitive defenses or identity diffusion showed the strongest associations with cluster B personality disorders (i.e., histrionic, narcissistic, borderline).

Similarly, a strong correlation was found between the two IPO-16 subscales primitive defenses and identity diffusion ($r = 0.61$). The strong correlation between the subscales suggests that – despite the corresponding dimensions being clearly distinct in the network – they may share some conceptual similarities and/or may mutually reinforce each other. This is consistent with previous findings showing identity diffusion and primitive defenses to be highly correlated (Lenzenweger et al., 2001) and with Kernberg's (1984) assumptions that maladaptive defenses and identity diffusion are closely linked, especially in patients with severe personality pathology. Stern et al. (2018) propose that it is the patient's defensive style that determines the quality of identity. For example, by splitting individuals respond to aversive affects or undesirable and conflicting experiences by compartmentalizing opposite affect states. This process results in a formation of two dissociated aspects, with one characterized by intense positive emotions (idealization) and the other marked by intense negative emotions (devaluation). This segregation may lead to an unstable, chaotic, superficial, or polarized perception of self and other, which is an important feature of identity diffusion. Nonetheless, identity integration has an independent and important position in the model: it is the most important criterion to differentiate between neurotic and borderline personality organization (Kernberg & Caligor, 2005). This fits to empirical research that have characterized identity diffusion as a core feature of several personality disorders that can be placed in Kernberg's borderline personality organization (Kernberg & Caligor, 2005), such as borderline (Bogaerts et al., 2018; Diamond et al., 2023; Jørgensen, 2009; Westen et al., 2011), narcissistic (Biberdzic et al., 2023; Di Pierro et al., 2017), schizotypal (Meisner et al., 2021), or antisocial (Chabrol & Leichsenring, 2006; Leichsenring et al., 2003). Further, identity diffusion has been found to be associated with the severity of psychiatric symptoms (Sollberger et al., 2012), with interpersonal difficulties (Biberdzic, 2023),

and with suicidal ideation and attempts (Sekowski et al., 2022), highlighting its crucial role for psychotherapy.

Defense mechanisms, on the other hand, represent a core phenomenon in psychodynamic psychotherapy (Freud, 1938). These mechanisms serve to protect individuals from experiencing unpleasant affects (Remmers et al., 2023) or threads to self-esteem (Di Giuseppe & Perry, 2021). The prevalence of maladaptive defense mechanisms significantly impacts treatment (De Roten et al., 2021) and are considered pathognomonic indicators of personality pathology (Kernberg & Caligor, 2005). For example, defense mechanisms were found to be essential for the conceptualization and differential diagnosis of types of narcissism (Kampe et al., 2021). However, one should take into account that defense mechanisms can only be captured to a limited extend through self-report questionnaires, as they are primarily unconscious (Cramer, 2015; Davidson & MacGregor, 1998).

Notably, we found that identity diffusion was distinct from self-perception, with only a few connections (i.e., edge weights) between the two dimensions in the network. This suggests that the underlying IPO-16 subscale identity diffusion and the OPD-SQS subscale self-perception capture different aspects, which is surprising as ´identity` is a facet of the OPD-LSIA facet self-perception (OPD Task Force, 2008). However, the OPD-SQS subscale capture aspects of several OPD-LSIA facets, as it includes items related to identity, self-reflection, affect differentiation, and affect tolerance. Therefore, this subscale focuses on self-perception as well as on self- and emotion regulation skills. In contrast, the IPO subscale identity diffusion is more focused on differentiating self from others (e.g., IPO1: *"I feel that my tastes and opinions are not really my own, but have been borrowed from other people."*). Yet, both are highly significant and valuable constructs for psychopathology and treatment. The importance of identity has been mentioned above. Affect regulation has been highlighted as a transdiagnostically relevant factor for the development and maintenance of psychopathology (Fernandez et al., 2016; Sloan et al., 2017)

and is therefore highly relevant for psychotherapy (Greenberg, 2012). Also, difficulties in affect tolerance and affect differentiation have been found to be related to psychopathology (e.g., Mattingley et al., 2022; Seah & Coifman, 2022). Both subscales have significant conceptual overlap with the AMPD and ICD-11 intrapersonal facets of PF (i.e., identity and self-direction). However, to confirm the associations empirically, future studies are needed that examine OPD-SQS and IPO-16 subscales together with AMPD and ICD-11 PF instruments. Yet, an empirical overlap of the underlying psychodynamic dimensions with AMPD facets of PF has been found in prior studies using interview data (Kampe et al., 2018; Zimmermann et al., 2012). In sum, using both OPD-SQS self-perception and IPO-16 identity diffusion expands the spectrum of diagnostics for intrapersonal functioning.

In contrast to the intrapersonal focus of the OPD-SQS subscale self-perception, the two other OPD-SQS subscales (relationship model and interpersonal contact) have a greater focus on interpersonal functions according to AMPD or ICD-11, even though they also include some aspects of self-functioning (e.g., self-esteem regulation). Interpersonal contact includes items focusing on affect communication, contact establishment, anticipation, and self-esteem regulation, thus mapping interactional skills. In contrast, the subscale relationship model covers aspects of internalizing, self-object differentiation, and realistic object perception. The subscale therefore relates to previous relationship experiences and covers the corresponding expectations of new relationships (Ehrenthal et al., 2015). In general, the two OPD-SQS subscales were found to be quite similarly associated to various psychopathologies. Yet, compared to relationship model, interpersonal contact was stronger associated to most personality disorders according to DSM-IV (Obbarius et al., 2019). Differences between the subscales were also found in relation to conspiracy endorsement, with relationship model being positively related to conspiracy mentality, while interpersonal contact was negatively associated (Hettich et al., 2022). This may

also highlight the somewhat paranoid character of the subscale relationship model. To conclude, both OPD-SQS subscales assess related, yet distinct aspects of interpersonal functioning.

Implications for clinical and scientific practice

Our findings have important implications for both clinical and scientific practice. As mentioned above, a profound diagnosis of PF is essential for psychotherapeutic treatment and case conceptualizations, as PF is a key construct that is associated with several psychopathologies (e.g., Gruber et al., 2020; Vierl et al., 2023) and is important for treatment outcome (Koelen et al., 2012). The two measures were significantly correlated with $r = .67$, indicating that the two measures assess strongly related, but not multicollinear constructs. In addition, the EGA dimensions show that the questionnaires tap into distinct domains of PF, with the dimensions representing the subscales of the individual screening tools. Given the distinctiveness of the six dimensions resulting from EGA, and the theoretical and conceptual differences between them discussed earlier, we recommend the use and interpretation of the subscales. The subscales capture different facets of PF and encompass both *intra*personal (e.g., identity diffusion, self-perception) and *inter*personal facets (e.g., relationship model, interpersonal contact) of PF. This is in line with results reported by Zimmermann et al. (2020) who found both the IPO-16 and OPD-SQS to be comparable to self-rating measures assessing PF according to the AMPD or ICD-11. However, the psychodynamic subscales also capture domains beyond AMPD or ICD-11. For example, reality testing is only partially represented in the ICD-11 (by the cognitive manifestation “accuracy of situational and interpersonal appraisals under stress”), and in the AMPD (by the personality trait “psychoticism”), while maladaptive defenses are not included in neither classification system. Yet, assessing defenses has important clinical implications, as it is often the maladaptive defense mechanisms that impedes psychotherapeutic process and makes emotions inaccessible (Yeomans et al., 2015). Recognizing and understanding these mechanisms may thus help clinicians in making sense of the often

rapidly shifting and seemingly chaotic behavior displayed by patients (Blüml & Doering, 2021). Consequently, the diagnostic information gained from all six subscales offers essential information regarding severity of (personality) pathology that can be used for case conceptualization, differential treatment planning and to formulate a prognosis of treatment response. Therefore, for both clinical and scientific purposes, using both questionnaires and interpreting the subscales can be beneficial. In case only one questionnaire is used for time reasons, it is up to the clinician or scientist to decide which theoretical model to focus on in the diagnostic process.

Regardless of whether both or only one questionnaire is used, De Beurs et al. (2022) advocate reporting results in common metrics. Common metrics are standardized scores (e.g., T-scores) or percentile ranks, based on normative samples, which facilitate the interpretation of test results and enable the comparison between studies across different measures. It also makes it easier to monitor changes during treatment. For both the IPO-16 and OPD-SQS a conversion of the global scores into T-scores has been conducted by Zimmermann and colleagues (2020). For example, the average amount of impairments in PF in the general population (T = 50) correspond with global scores of IPO-16 = 1.69 and OPD-SQS = 13, while highly elevated severity in PF (T = 70) correspond with global score values of IPO-16 = 3.56 and OPD-SQS = 41 (Zimmermann et al., 2020). Researchers and clinicians who want to transfer a global score of the IPO-16 or the OPD-SQS into a T-score can find a crosswalk table in Zimmermann et al. (2020). Gender- and age-specific T-scores can be found for the IPO-16 in Zimmermann, Benecke, et al. (2015) and for the OPD-SQS in Gisch et al. (2021).

Limitations and future research

A particular strength of the study is its large clinical sample of $N = 1636$ adult psychotherapeutic inpatients, comprising individuals with a broad range of structural impairment in both the IPO-16 and the OPD-SQS. Moreover, this is the first study to examine the

relationship between the two screening tools by exploring the dimensionality at the item level. However, our study has certain limitations that must be acknowledged. For instance, it is unclear whether our findings can be extended to nonclinical or less impaired populations, as well as to other clinical contexts such as outpatient psychotherapy. Additionally, since the questionnaires were administered in German, it is uncertain to what extent our results can be generalized to other languages. Another limitation is that we did not control for symptomatology, which may have impacted the results. Zimmermann et al. (2013) found the IPO-16 to be significantly correlated with the OPD-LSIA interview ($r = .42$, $p < .001$), yet the correlation vanished after adding psychopathology as a covariate. Similarly, the OPD-SQS subscale self-perception was shown to be highly associated with depression and anxiety (Obbarius et al., 2019). Also, the absence of external measures, such as measures for ICD-11 PF or DSM-5 AMPD, is a significant methodological limitation, which should be the focus of future studies. Further, the response scales of the two questionnaires slightly differ, with the IPO-16 asking for the frequency of the items (never true to always true) and the OPD-SQS asking for the quantity (fully disagree to fully agree). This may have impacted the results, as items are more likely to group together when sharing the same response scale. However, both questionnaires consist of a 5-point Likert scale and the items descriptions were quite similar (see Table 2). Considering this and the fact that EGA is a very robust method (Golino et al., 2020), the influence should be marginal, if any. Future research is needed to address several additional questions. For example, it would be beneficial to compare the temporal stability of the screening tools as they may differ in their sensitivity to detect change over time (Lübke et al., 2021). Additionally, it would be informative to investigate which dimensions are most relevant for therapy outcome or the therapeutic process such as the therapeutic relationship. Finally, it is worth exploring whether it is advantageous to combine both questionnaires into one instrument. Our results may inspire the development of a revised or combined version of the screening tools.

Conclusion

In conclusion, the present study examined the association between the IPO-16 and OPD-SQS in a large clinical sample of $N = 1636$ psychotherapeutic inpatients. The results showed that the two questionnaires are closely related but not multicollinear. The EGA revealed that the items of both questionnaires were best represented in six dimensions that fairly represent the original subscales. The distinctiveness of these dimensions suggests that the subscales of IPO-16 and OPD-SQS tap into different aspects of PF. The findings support the use of the subscales from both questionnaires, rather than relying solely on their global scores. The use of both questionnaires and their subscales can provide clinicians and researchers with a more detailed assessment of PF. However, for a more thorough diagnosis of PF, the use of the longer versions and/or clinical interviews is still recommended.

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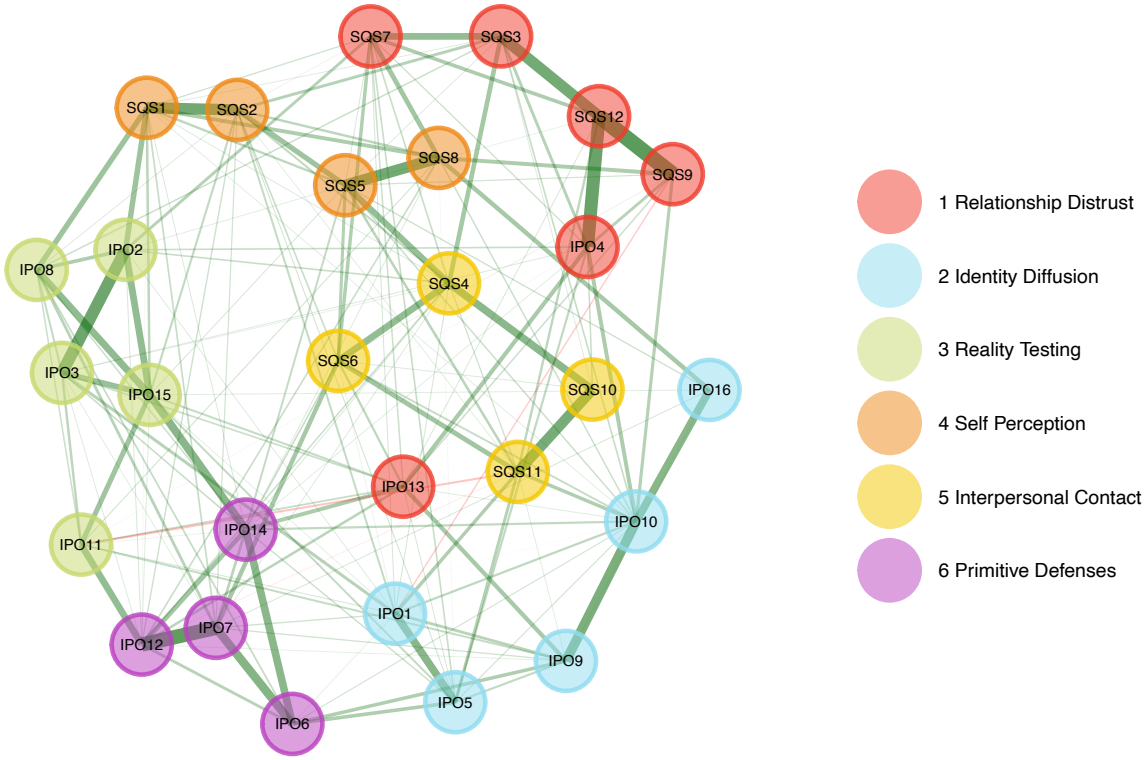
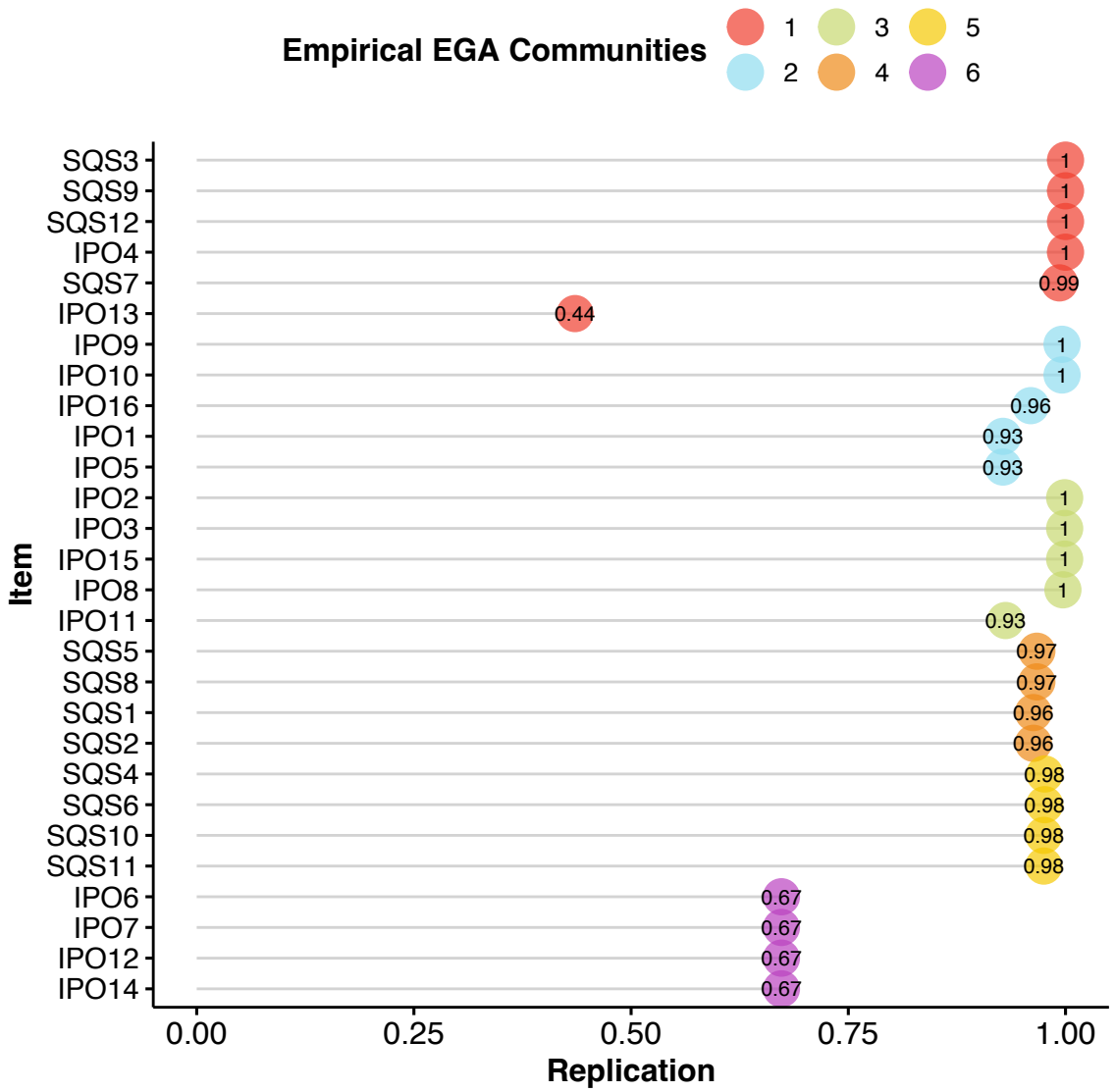
Figures

Figure 1



Note. Network plot and dimensionality structure of the items of the Inventory of Personality Organization – 16 item version (IPO-16) and the Operationalized-Psychodynamic Diagnosis – Structure Questionnaire Short Form (OPD-SQS) using Exploratory Graph Analysis (EGA). Green edges represent positive associations, red edges represent negative associations. Thicker edges represent stronger associations. See Table 2 for item descriptions.

Figure 2



Note. Item stability. The numbers in the nodes represent the proportion of times an item is replicated in the original EGA dimensions across 1000 iterations during bootstrap analysis. Items are considered instable with values lower than 0.65. EGA = Exploratory Graph Analysis. Dimensions: 1 = relationship distrust, 2 = identity diffusion, 3 = reality testing, 4 = self-perception, 5 = interpersonal contact, 6 = primitive defenses

Tables:

Table 1

Correlations between the subscales

Variable	*M*	*SD*	1	2	3	4	5
1. OPD-SQS SP	7.73	3.98					
2. OPD-SQS RM	9.79	4.03	.54** [.50, .57]				
3. OPD-SQS IC	9.42	3.40	.50** [.46, .53]	.49** [.45, .53]			
4. IPO-16 ID	2.75	0.76	.52** [.48, .55]	.47** [.43, .51]	.46** [.42, .50]		
5. IPO-16 RT	1.76	0.69	.54** [.50, .57]	.39** [.34, .43]	.33** [.29, .37]	.46** [.42, .50]	
6. IPO-16 PD	2.39	0.83	.58** [.54, .61]	.52** [.48, .55]	.46** [.42, .50]	.61** [.58, .64]	.60** [.57, .63]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < .05$. ** indicates $p < .01$. IC = interpersonal contact; ID = identity diffusion; IPO-16 = Inventory of Personality Organization – 16 item version; OPD-SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form; PD = primitive defenses; RM = relationship model; RT = reality testing; SP = self-perception.

Table 2

List of all items, item descriptions, and allocations to the original subscales and EGA dimensions

Item	Description	Dimension	
		Original	EGA
SQS1	I sometimes feel like a stranger to myself.	SP	SP

SQS2	If I think too much about myself, I tend to get confused.	SP	SP
SQS3	It can be dangerous to let others get too close to you.	RM	RD
SQS4	I find it difficult to make others understand me.	IC	IC
SQS5	There is often such a chaos of feelings inside me that I couldn't even describe it.	SP	SP
SQS6	I sometimes misjudge how my behaviour affects others.	IC	IC
SQS7	If others know a lot about me, I often feel somehow controlled or observed.	RM	RD
SQS8	Sometimes my feelings are so intense that I get scared.	SP	SP
SQS9	I've been hurt badly because I misjudged someone.	RM	RD
SQS10	I find it hard to get in contact with other people.	IC	IC
SQS11	I don't have good self-esteem.	IC	IC
SQS12	My experience is: If you trust people too much you can get nasty surprises.	RM	RD
IPO1	I feel that my tastes and opinions are not really my own but have been borrowed from other people.	ID	ID
IPO2	I am not sure whether a voice I have heard, or something that I have seen is my imagination or not.	RT	RT
IPO3	I think I see things which, when I take a closer look, turn out to be something else.	RT	RT
IPO4	It is hard for me to trust people because they so often turn against me or betray me.	*PD*	*RD*
IPO5	I get into relationships with people I don't really like because it's hard for me to say no.	ID	ID
IPO6	I find myself doing things which at other times I think are not too wise like having promiscuous sex, lying, drinking, having temper tantrums, or breaking the law in minor ways.	PD	PD
IPO7	People tell me I behave in contradictory ways.	PD	PD
IPO8	I can't tell whether certain physical sensations I'm having are real, or whether I am imaging them.	RT	RT
IPO9	When others see me as having succeeded, I'm elated and, when they see me as failing, I feel devastated.	ID	ID

IPO10	I am afraid that people who become important to me will suddenly change in their feelings toward me.	ID	ID
IPO11	I understand and know things that nobody else is able to understand or know.	RT	RT
IPO12	I act in ways that appear to others as unpredictable and erratic.	PD	PD
IPO13	After becoming involved with people, I am surprised to find out what they are really like.	*ID*	*RD*
IPO14	I find myself doing things which feel okay while I am doing them but which I later find hard to believe I did.	PD	PD
IPO15	I can't tell whether I simply want something to be true, or whether it really is true.	RT	RT
IPO16	Being alone is difficult to me.	ID	ID

Note. EGA = Exploratory Graph Analysis; IC = Interpersonal Contact; ID = Identity Diffusion; IPO = Inventory of Personality Organization – 16 item version; PD = Primitive Defenses; RD = Relationship Distrust; RM = Relationship Model; RT = Reality Testing; SP = Self Perception; SQS = Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form. Italic characters indicate discrepancies between the item's allocation to the original subscale and the EGA-derived dimension.

Table 3

Item stability

	1 RD	2 ID	3 RT	4 SP	5 IC	6 PD
SQS3	**1**	0	0	0	0	0
SQS9	**1**	0	0	0	0	0
SQS12	**1**	0	0	0	0	0
IPO4	**1**	0	0	0	0	0
SQS7	**0.993**	0	0	0.005	0.002	0
IPO13	**0.436**	0.288	0.109	0	0	0.166
IPO9	0.001	**0.998**	0	0	0	0.001

IPO10	0.001	**0.998**	0	0.001	0	0
IPO16	0.001	**0.962**	0	0.036	0.001	0
IPO1	0.001	**0.928**	0.001	0	0.070	0
IPO5	0.001	**0.928**	0.001	0	0.070	0
IPO2	0.001	0	**0.999**	0	0	0
IPO3	0.001	0	**0.999**	0	0	0
IPO15	0.001	0	**0.999**	0	0	0
IPO8	0.001	0	**0.995**	0.004	0	0
IPO11	0.001	0	**0.929**	0	0.001	0.069
SQS5	0.001	0.006	0	**0.967**	0.026	0
SQS8	0.001	0.006	0	**0.967**	0.026	0
SQS1	0.001	0	0.034	**0.965**	0	0
SQS2	0.001	0	0.034	**0.965**	0	0
SQS4	0.001	0.001	0	0.021	**0.977**	0
SQS6	0.001	0.001	0	0.021	**0.977**	0
SQS10	0.001	0.003	0	0.020	**0.976**	0
SQS11	0.001	0.003	0	0.020	**0.976**	0
IPO6	0.001	0.001	0.327	0	0	**0.671**
IPO7	0.001	0.001	0.327	0	0	**0.671**
IPO12	0.001	0.001	0.327	0	0	**0.671**
IPO14	0.001	0.001	0.327	0	0	**0.671**

Note: The values represent each item's contribution to structural consistency. Bold values indicate the allocation to the EGA dimension.

Table 4

Network loadings

	Dimension					
Item	1 RD	2 ID	3 RT	4 SP	5 IC	6 PD
SQS3	**0.249**	0.023	0.019	0.057	0.079	0.002
SQS9	**0.228**	0.067	0.002	0.067	0.007	0.004
SQS12	**0.519**	0.002	0.001	0.008	0.034	0.003

IPO4	**0.262**	0.096	0.035	0.001	0.028	0.019
SQS7	**0.148**	0.041	0.039	0.099	0.079	0.007
IPO13	**0.095**	0.080	0.080	0.001	0.034	0.089
IPO9	0.023	**0.217**	0.041	0	0.013	0.083
IPO10	0.107	**0.282**	0.012	0.052	0.079	0.047
IPO16	0.002	**0.111**	0.010	0.079	0.005	0.012
IPO1	0.003	**0.166**	0.064	0.028	0.077	0.025
IPO5	0.049	**0.146**	0.041	0.019	0.050	0.069
IPO2	0.053	0.009	**0.266**	0.081	0.025	0.013
IPO3	0.018	0.043	**0.267**	0.003	0.009	0.042
IPO15	0.012	0.045	**0.313**	0.072	0.006	0.121
IPO8	0.017	0.005	**0.186**	0.082	0	0.079
IPO11	0.014	0.045	**0.127**	0.017	-0.028	0.094
SQS5	0.038	0.039	0.026	**0.255**	0.172	0.028
SQS8	0.102	0.082	0.023	**0.235**	0.003	0.032
SQS1	0.022	0.009	0.167	**0.233**	0.014	0.036
SQS2	0.042	0.041	0.046	**0.256**	0.066	0.035
SQS4	0.075	0.012	0.035	0.124	**0.227**	0.040
SQS6	0.057	0.040	0.021	0.066	**0.179**	0.087
SQS10	0.029	0.005	0	0.003	**0.269**	-0.005
SQS11	0.033	0.137	-0.021	0.045	**0.244**	-0.001
IPO6	0.001	0.114	0.076	0.003	0.004	**0.248**
IPO7	0	0.046	0.118	0.041	0.073	**0.333**
IPO12	0.013	0.019	0.163	0.043	0.025	**0.305**
IPO14	0.027	0.062	0.180	0.047	0.039	**0.212**

Note: Network loadings represent the contribution of each node to the coherence of the dimension. Bold values indicate the most salient item loadings. Values of .15 represent small, .25 moderate, and .35 large effect sizes. Dimensions: RD = Relationship Distrust, ID = Identity Diffusion, RT = Reality Testing, SP = Self Perception, IC = Interpersonal Contact, PD = Primitive Defenses.

8.6 Study 4

Unravelling inter-relations within and between psychodynamic constructs and psychopathology using network analysis

This is the post-peer-reviewed and pre-copyedited version. The Version of Record of this manuscript has been published and is available in Personality and Mental Health at https://doi.org/10.1002/pmh.1628

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Statement of Ethics

The use of data was approved by the Ethics Committee of the Medical Faculty at the University of Rostock (registration number: AZ A 2020-0025). All patients gave written consent for use of data for research purposes.

Data availability statement

The adjacency and correlation matrices and R code have been made publicly available at the Open Science Framework and can be accessed at https://osf.io/2y6xz/.

Conflict of interest disclosure

The authors report there are no competing interests to declare.

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Author contributions

LV conceptualized the study and performed data analyses with the help of PW. LV and PW drafted the first manuscript. CS coordinated data acquisition. All authors reviewed the manuscript critically and contributed to the manuscript.

Abstract

Background: Psychodynamic constructs and psychopathology are closely inter-related, but more detailed insight is needed. We investigated these complex inter-relations using network analysis. **Method:** A gaussian graphical model in a sample of $N = 2232$ psychotherapeutic inpatients was estimated. Self-administered questionnaires to assess interpersonal relations (Inventory of Interpersonal Problems-32), psychodynamic conflicts (Operationalized Psychodynamic Diagnosis – Conflict Questionnaire), personality functioning (Operationalized Psychodynamic Diagnosis – Structure Questionnaire - Short Form, Inventory of Personality Organization - Short Form) and psychopathology (Brief Symptom Inventory) were utilized. We investigated the network structure, identified the most inter-related psychodynamic constructs and the psychodynamic constructs with the strongest inter-relations to psychopathology, and explored the clustering of all included constructs. **Results:** Active and passive conflict processing modes were negatively inter-related in most conflicts. Passive conflict processing modes were more strongly related to psychopathology than active ones in all conflicts, apart from the care vs. autarky conflict. Identity diffusion shared the strongest inter-relations within psychodynamic constructs. The psychodynamic constructs that were most strongly related to psychopathology were impairments in self-perception and the passive self-worth conflict. Psychopathology and psychodynamic constructs formed distinct clusters. **Discussion:** Our results emphasize the relevance of personality functioning within psychodynamic constructs and in relation to psychopathology.

Keywords: operationalized psychodynamic diagnosis, personality functioning, psychodynamic conflicts, interpersonal relations, psychopathology, network analysis

Introduction

The interplay of psychodynamic constructs and their inter-relations to psychopathology has always been of interest for empirical research and clinical practice (Cierpka et al., 2007). Different analytical schools, each with their own specific or overlapping nomenclature, have led to theoretical heterogeneity, making coherent communication difficult (Cierpka et al., 2007). Therefore, the Operationalized Psychodynamic Diagnosis (OPD) system was developed as an empirical and theory-based instrument which extends the International Classification of Diseases (ICD) classification to include psychodynamic dimensions (Cierpka et al., 2007). It can be used to assess psychodynamic constructs, as well as for treatment planning, focus determination and process evaluation (Cierpka et al., 2007). The OPD has gained wide international acceptance over the past few decades and has been translated into several languages, including English, Spanish, Portuguese and Chinese. In German-speaking countries, it has become the gold standard of psychodynamic research and practice. The third revision encompasses four independent axes: (I) Mental and psychosomatic disorders according to the ICD or DSM, as well as experience of illness and prerequisites for treatment, (II) interpersonal relations, (III) psychodynamic conflicts and (IV) personality structure (OPD-3; OPD Task Force, 2023). For a better understanding, we will first introduce the psychodynamic constructs we examine in our study. For a more detailed description we refer to the respective manual (OPD Task Force, 2023).

Psychodynamic constructs

Interpersonal relations are recurring patterns of maladaptive interpersonal behavior that have an impact on the development and maintenance of mental disorders (Hopwood et al., 2013; Luborsky & Crits-Christoph, 1997). Based on circumplex models of interpersonal behaviors (e.g., Benjamin, 1974), the variety of interpersonal problems can be portrayed in a circular model along the dimensions “communion” (hostility vs. friendliness) and “agency” (dominance vs.

submissiveness), resulting in eight specific interpersonal behavior patterns (i.e., domineering, vindictive, cold, socially inhibited, non-assertive, exploitable, self-sacrificing and intrusive; Horowitz, 2004).

Psychodynamic conflicts refer to enduring, often unconscious basal inner motivational themes that shape an individual's perception and behavior across various areas of life. A conflict emerges when contrasting demands or motives collide within a person. Their origins frequently trace back to recurring encounters, such as conflictual interactions with significant others during the early years of childhood (Benecke et al., 2018). In the OPD, seven conflicts are described: individuation vs. dependency (C1), submission vs. control (C2), need for care vs. autarky (C3), self-worth conflict (C4), guilt conflict (C5), oedipal conflict (C6) and identity conflict (C7). At best, the conflicts can be resolved flexibly. However, some individuals can only solve the inner conflict by totally endorsing one side of the conflict, while suppressing the other. These extreme modes of processing can be described as active (a) or passive (p). Active modes can be understood as (pseudo-)progressive, while passive modes emphasize a more regressive side. For a short description of the OPD conflicts, their basal motivational themes and their extreme ways of processing, please see Table 1.

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Personality structure is conceptualized as the availability of basic psychological core functions. Four structural dimensions are described (i.e., perception, regulation, communication and attachment), each of which consist of a self-related and an object-related sub-dimension ("object" = others, according to psychoanalytic terminology). In the OPD-3, the dimension defense mechanisms has been added (OPD Task Force, 2023).

The concept of personality organization developed by Kernberg (1984) is another influential psychodynamic concept of personality functioning (cf., Hörz-Sagstetter et al., 2021). The model is conceptualized by three key domains: (1) identity (i.e., the ability to develop stable and

nuanced images of self and others), (2) maturity of defense mechanisms (i.e., the capacity to process threatening internal and external stimuli in an adaptive manner) and (3) reality testing (i.e., the ability to distinguish between internal and external stimuli and the capacity to deal with an external reality).

Although personality organization is not part of the personality structure axis in the OPD, we decided to include it in our study. This is supported by the findings that both concepts seem to capture different aspects of personality functioning and are of clinical relevance (Hörz-Sagstetter et al., 2021; Vierl et al., 2024).

Both personality structure and personality organization very much resemble the new perspective on personality disorders as described in ICD-11 (World Health Organization, 2019) and DSM-5 AMPD (American Psychiatric Association, 2013), where similar to the psychodynamic constructs impairments in intra- and interpersonal functioning has been included as the main criterion of the severity of personality disorder pathology (Hörz-Sagstetter et al., 2021). Yet, while the ICD-11 and the DSM-5 AMPD are rather atheoretical descriptive diagnostic systems, the psychodynamic concepts also provide a thorough theoretical underpinning, including implications for treatment (Blüml & Doering, 2021).

Associations within psychodynamic constructs and with psychopathology

Regarding *interpersonal relations* and *psychodynamic conflicts*, it has been shown that a relationship pattern cannot be allocated to a specific conflict (Henkel et al., 2022). Rather, the same patterns can occur in different psychodynamic conflicts (e.g., domineering patterns are common in patients with active modes of the submission vs. control (C2a), the self-worth (C4a) or the oedipal conflict (C6a); Henkel et al., 2022). Within a conflict, the processing modes tend to be associated with opposing impairments in interpersonal relations. For example, patients with an active submission vs. control conflict (C2a) described themselves as dominating, while patients with a passive submission vs. control conflict (C2p) tended to experience themselves as

submissive (Henkel et al., 2022). Furthermore, interpersonal problems were found to be associated with several *psychopathologies,* such as depression, anxiety or eating disorders (e.g., McEvoy et al., 2013). Studies that have investigated the relationship between *interpersonal relations* and *personality functioning* suggest that increased impairments of personality functioning relate to increased interpersonal problems (Dowgwillo et al., 2018; Spitzer et al., 2004; Stone & Segal, 2022). Regarding the associations between *psychodynamic conflicts* and *personality functioning,* the passive modes of conflict processing were found to show generally higher associations with personality functioning, compared to active modes (expect for the care vs. autarky conflict (C3); Benecke et al., 2018; Henkel et al., 2022; Remmers et al., 2023). The strongest associations between conflicts and personality functioning were found for the passive modes of the self-worth (C4p) and the guilt conflict (C5p) (Benecke et al., 2018; Remmers et al., 2023). Yet, when partial correlations were considered, controlling for psychopathology, the strongest association was found for the passive individuation vs. dependency conflict (C1p) (Henkel et al., 2022).This is in line with previous studies, showing that the individuation vs. dependency conflict (C1) is often assessed in individuals with greater impairments in personality functioning (Grande et al., 1998; Kaufhold et al., 2017; Vierl, Von Bremen, et al., 2023). Regarding the associations of *psychodynamic conflicts* with *psychopathology,* researchers have documented that passive modes of conflict processing were more strongly associated with psychopathology compared to active modes. A reverse finding has been found for the care vs. autarky conflict (C3), with the active mode being more strongly associated with psychopathology compared to the passive mode (Benecke et al., 2018; Henkel et al., 2022; Perlinger et al., 2023; Remmers et al., 2023). Particularly strong associations with psychopathology were found for the passive self-worth (C4p) and the passive guilt conflict (C5p). In contrast, the respective active modes (C4a and C5a) were found to be negatively associated with symptomatology (Benecke et al., 2018; Henkel et al., 2022; Remmers et al.,

2023), suggesting that people who tend to overvalue themselves or project guilt on others do not report psychic distress in self-report measures. *Personality functioning* has been shown to be related to all kind of *psychopathologies*, such as depression (Dagnino et al., 2020), anxiety (Doering et al., 2018), somatization (Macina et al., 2021), substance abuse (Rentrop et al., 2014), posttraumatic stress disorders (Baie et al., 2020), or eating disorders (Klein et al., 2022).

Network analysis

Network analysis has emerged as a promising statistical methodology for examining the interplay of various constructs. This methodology offers the advantage to account for the influence of all other variables within the network, resulting in partial correlations that unveil meaningful associations (Borsboom & Cramer, 2013). Using partial correlations is particularly useful when analyzing the associations between psychodynamic constructs, given the substantial shared variance that has been found in previous studies (Henkel et al., 2022; Obbarius et al., 2021; Remmers et al., 2023). Networks can be visualized as a graph and consist of *nodes* (e.g., psychodynamic constructs) and their pairwise associations portrayed as *edges*. Nodes can be investigated in terms of interconnectivity and significance within the network. With increasing interconnectivity, a node becomes more influential and may maintain the overall network (Borsboom & Cramer, 2013). Consequently, the most interconnected nodes are thought to be potential treatment targets (McNally, 2016). Network analysis also allows the identification of bridge nodes that connect different defined communities. In clinical data, bridge nodes may help to understand comorbidity and can represent targets for psychotherapeutic intervention (Jones et al., 2019). Lastly, network analysis allows exploration of node clustering. Clustering refers to the tendency of nodes to group into clusters based on their interconnectedness within and outside the cluster (Golino & Epskamp, 2017).

Recently, Vierl, Juen, et al. (2023) examined the associations between psychodynamic constructs (based on the OPD) and their associations with psychopathology via network analyses in a

sample of psychotherapeutic outpatients ($N = 341$). Interpersonal relations, active and passive modes of psychodynamic conflicts, personality functioning, depression and somatic problems were included at a global level in the network. Active and passive modes of conflict processing were negatively associated with each other. While the passive modes of conflict processing shared strong associations with the included psychopathologies, the active modes showed no associations. Personality functioning was the most interconnected node in the network and the psychodynamic construct that shared the strongest associations with psychopathology. Psychopathology and psychodynamic constructs formed distinct but interrelated clusters. As all concepts were included at a global level, only preliminary hypotheses could be postulated. Yet, a more thorough understanding of the associations between the psychodynamic constructs and their relation to psychopathology is important for both clinical and scientific practice.

Aim of the present study

Given the complex associations within psychodynamic constructs, our primary aim was to replicate and expand upon the findings of Vierl, Juen, et al. (2023) by investigating the fine-grained associations between psychodynamic constructs and psychopathology on subscale level in a large psychotherapeutic inpatient sample. Based on the findings of Vierl, Juen, et al. (2023) and the reviewed literature, (i) we expected negative associations between active and passive modes of conflict processing within all conflicts. (ii) Passive modes of conflict processing were expected to exhibit stronger associations with psychopathology compared to active modes. In accordance with prior studies, a reverse effect was predicted for the care vs. autarky conflict (C3). (iii) We expected domains of personality functioning to emerge as the most interconnected psychodynamic constructs within the network. (iv) Among psychodynamic constructs, we expected personality functioning domains to share the strongest associations with psychopathology. (v) Lastly, psychodynamic constructs and psychopathology were expected to form distinct but interrelated clusters.

Method

Participants

The sample consisted of $N = 2232$ adult inpatients who were hospitalized at the Asklepios Clinic Tiefenbrunn in Germany between June 2016 and March 2020. At admission, all patients were asked to complete a battery of sociodemographic and clinical measures for routine quality assessment. Exclusion criteria were insufficient German language skills, severe formal thought disorders and severe cognitive impairments. All patients gave written consent for use of data for research purposes. The clinical routine assessment was approved by the Ethics Committee of the Medical Faculty at the University of Rostock (registration number: AZ A 2020-0025) and was carried out in accordance with the Declaration of Helsinki.

The included patients were 34.25 years old on average ($SD = 13.25$; range: 17 – 73). The majority was female (62.6%). In terms of relationship status, 44.4% were in a relationship and 17.2% were married. Concerning educational background, 46.9% had completed at least 12 years of education and 19.0% held an academic degree. Regarding employment status, 45.3% of the participants reported being employed, 23.9% stated they were unemployed, 23.7% were students or in training and 9.5% were retired. Almost three quarters (74.0%) of the participants had previously undergone outpatient psychotherapeutic treatment and 39.8% had previously been admitted to a psychiatric inpatient facility. The number of clinically assigned psychiatric diagnoses varied from one to seven. A significant proportion of patients (83.0%) had at least one comorbid disorder. The most prevalent diagnoses were affective disorders, which were rated in 74.6% of the patients, followed by anxiety disorders that were reported in 38.7% of the patients. In total, 41.6% of the patients were diagnosed with a personality disorder.

Measures

The *Inventory of Interpersonal Problems-32* (IIP-32; Barkham et al., 1996; Thomas et al., 2011) was utilized to assess a variety of challenging interpersonal patterns experienced by individuals.

The IIP-32 is a self-administered questionnaire comprising 32 items that are rated on a five-point Likert scale from 0 (´not at all`) to 4 (´very much`). The IIP-32 is based on the interpersonal circumplex model (Horowitz, 1996) with each item belonging to one of the eight octants along the axes agency and communion (i.e., domineering, vindictive, cold, socially inhibited, nonassertive, exploitable, self-sacrificing and intrusive). The psychometric evaluation of the German version demonstrated satisfactory to good reliability and validity (Thomas et al., 2011). In the present study the internal consistency was good (McDonald's (1999) ω = 0.87) for the IIP-32 total score and satisfactory to good for the subscales with ω values ranging between 0.76 and 0.84.

The *OPD Conflict Questionnaire* (OPD-CQ; Benecke et al., 2018) is a self-report measure consisting of 66-items designed to assess six psychodynamic conflicts based on the OPD, including their active and passive modes of processing (see Table 1 for a short description of the conflicts and their conflict modes). Participants rate items on a five-point Likert scale ranging from 0 (´completely false`) to 4 (´completely true`), with higher scores indicating a greater presence of the respective conflict. Similar to previous research (Benecke et al., 2018; Henkel et al., 2022), the internal reliability of the OPD-CQ in the present sample was good for the total score ω = .87) and satisfactory to good for most subscales (.71 ≤ ω ≤ .89), except for the C2p ω(= 0.56).

The *Operationalized Psychodynamic Diagnosis – Structure Questionnaire Short Form* (OPD-SQS; Ehrenthal et al., 2015) is a brief self-report questionnaire to assess the levels of structural integration. The OPD-SQS consists of 12 items, each rated on a five-point Likert scale ranging from 0 (´fully disagree`) to 4 (´fully agree`). Three subscales can be derived: self-perception, interpersonal contact and relationship model. Previous literature has shown good psychometric properties (Ehrenthal et al., 2015). The current sample demonstrates good internal reliability for

the OPD-SQS total score (ω = .89), as well as satisfactory to good reliabilities for the subscales with ω values ranging between .75 and .83.

The *short form of the Inventory of Personality Organization* (IPO-16; Zimmermann et al., 2013; Zimmermann et al., 2015) was utilized to assess personality organization according to Kernberg (1984). The IPO-16 comprises 16 items that assess impairments in the three key domains of the model: identity diffusion, primitive defenses and reality testing. The items are rated on a five-point Likert scale ranging from 1 (´never true`) to 5 (´always true`). Previous research has shown good psychometric properties (Zimmermann et al., 2013). In this study, the IPO-16 exhibited good internal reliability, with ω = .88 for the global score and satisfactory to good reliabilities for the subscales (.77 ≤ ω ≤ .82).

The *Brief Symptom Inventory* (Derogatis, 1993; Franke, 2000) is a well-established self-report measure consisting of 53 items specifically designed to assess clinically relevant psychological symptoms. Participants are instructed to rate the extent to which they have been affected by each symptom over the past week on a five-point Likert scale ranging from 0 (´not at all`) to 4 (´extremely`). The BSI encompasses nine scales capturing the following syndromes: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. The BSI has demonstrated robust psychometric properties in previous research (Derogatis & Melisaratos, 1983). In the present sample, the total score exhibited excellent internal consistency with ω = .96. The internal reliabilities of the BSI subscales were satisfactory to good and ranged from ω = .73 to .86.

Statistical approach

All statistical analyses were conducted with *R*, v. 4.2.3 (R Core Team, 2023). The *R* script is available online (https://osf.io/2y6xz/9), where we also provide the adjacency and correlation matrices. Mainly, the following *R* packages were used: *qgraph,* v.1.9.2. (Epskamp et al., 2012),

networktools, v.1.5.0 (Jones, 2023), *bootnet*, v.1.5 (Epskamp et al., 2018), *EGAnet,* v.1.1.0 (Golino & Christensen, 2023). All packages and their versions can be found in the *R* script.

Missing data

The OPD-CQ and the IPO-16 were missing for $n = 583$ and $n = 595$, respectively, as these questionnaires were included later into the test battery. We handled the missing data through pairwise deletion that utilizes all available data to estimate any individual partial correlations (i.e., edges) in the network.

Network estimation

We computed a regularized partial correlation network, also known as a Gaussian graphical model (GGM). The model with the best fit was selected with the Extended Bayesian Information Criterion graphical least absolute shrinkage selection operator (EBICglasso; Epskamp et al., 2018), with a hyperparameter gamma (γ) value of 0.5. This approach penalizes the model for its complexity and minimizes the risk of false positive edges. Due to the skewed nature of the data, spearman correlations were used for network estimation (Epskamp & Fried, 2018). We estimated node predictability, a measure that can be interpreted akin to R^2 and quantifies how effectively a node can be predicted by the other nodes in the network (Haslbeck & Waldorp, 2018). During network visualization, a minimum of .025 for the edge weights was applied to create a more parsimonious network plot. Predictability was visualized as a ring-shaped pie chart surrounding each node.

Bridge expected influence

An important index in our study is bridge expected influence, which reflects the relative sum of all edge weights connecting a node from a given community to all nodes from other communities (Jones et al., 2019). Bridge centrality difference tests were used to test whether the bridge expected influence significantly differs between two nodes (Epskamp et al., 2018). Consistent

with previous research (Levinson et al., 2018), we defined those nodes as bridge nodes that had a greater bridge expected influence than at least 85% of the other nodes.

Network stability and robustness analyses

Network stability was assessed using bootstrapping (nboots = 1,000) procedures. We computed correlation-stability (CS)-coefficients for the estimated bridge expected influences and edge weights. CS-coefficients exceeding .5 are indicative of strong stability (Epskamp et al., 2018). Additionally, we employed bootstrapping routines to generate 95% Confidence Intervals (CIs) around edge weights, with narrower CIs suggesting more accurate estimates.

Robustness analyses were conducted by comparing the presented network model with different network estimation approaches. In addition to the regularized network used in our study, we also conducted a regularized network including a threshold and a *ggmModSelect* network (see Supplementary Figure S8). Notably, these networks showed high correlations with the regularized network model presented here ($r \geq 0.94$; see Supplementary Table S4).

Operationalization of our hypotheses

(i) To determine the relationship between the active and passive modes of a conflict, we analyzed their Spearman correlations and respective CIs. (ii) To determine how the conflict modes are related to psychopathology, we calculated bridge expected influence between the constructs. (iii) To identify the most interconnected psychodynamic constructs, we calculated the bridge expected influence between interpersonal relations, psychodynamic conflicts and personality functioning. To account for different community sizes, the bridge expected influences were normalized. (iv) To investigate which psychodynamic constructs are most strongly associated to psychopathology, we calculated the bridge expected influence between them. (v) To empirically investigate whether psychodynamic constructs and psychopathology are distinct entities, we identified clusters within the network using the spinglass community detection algorithm. We used the bootstrap version of Exploratory Graph Analysis (bootEGA; Golino & Epskamp, 2017)

to identify the most common clusters across 1,000 non-parametric bootstrap iterations. EGA has been found to perform at least as well as other traditional factor analytic methods in identifying the correct dimensions (Cosemans et al., 2022).

Results

Descriptive statistics

The IIP-32 total scores ranged from 0.00 to 3.91, with a mean of 1.74 (*SD* = 0.56). The patients mostly described themselves as being too non-assertive (*M* = 2.36, *SD* = 1.05), while the lowest values were found for self-descriptions as too domineering (*M* = 0.69, *SD* = 0.72). Regarding conflicts, the passive modes of conflict processing were in general more pronounced (*M* = 2.02, *SD* = 0.59), compared to the active modes of conflict processing (*M* = 1.44, *SD* = 0.40). Yet, the most pronounced conflict was C3a (*M* = 2.46, *SD* = 0.71), followed by C4p (*M* = 2.28; *SD* = 1.12). In contrast, C4a (*M* = 0.80, *SD* = 0.66) was the conflict that was least expressed. OPD-SQS total scores ranged from 0.00 to 48.00, with a mean of 26.69 (*SD* = 9.44). The IPO-16 mean values ranged from 1.00 to 4.94, with a mean of 2.33 (*SD* = 0.64). The OPD-SQS and IPO-16 mean values correspond with T-scores of 59.77 and 57.40, respectively (Zimmermann et al., 2020). 43.13% of the patients showed an IPO-16 mean value above the cutoff of 2.38, indicating severe structural impairments. Descriptive statistics (including mean, sd, range, skew and kurtosis) of all variables can be found in Supplementary Table S2. A list of all subscale descriptions can be found in Supplementary Table S1.

Network analysis

The network was found to be accurate and stable (edge CS-coefficient = .75, bridge expected influence CS-coefficients = .75), allowing reliable interpretations (see Supplementary Figure S2 – S4). The CI of the edge-weights were relatively narrow, indicating accurate estimations of the edge weights (see Supplementary Figure S1).

Figure 1 shows the resulting network plot including the description of the nodes. All edge weight values can be found in the adjacency matrix online (https://osf.io/2y6xz/9). The average node predictability was 0.47, indicating that, on average, 47% of the variance in each node could be predicted by the other nodes. This is slightly higher than the average predictability in the study of Vierl, Juen, et al. (2023) and indicates quite substantial overall covariance between the constructs.

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Hypotheses 1: Active and passive conflict modes

The Spearman correlation between active and passive modes was negative in conflicts C3, C4, C5 and C6 (r = -0.07, -0.36, -0.41, -0.45, respectively). In C2, the modes were positively correlated (r = 0.28). For C1 no significant correlation was found (r = 0.02 [-0.02; 0.07]).

Hypothesis 2: Conflict modes and psychopathology

In most conflicts, the passive modes of conflict processing were more strongly associated with psychopathology compared to the active modes. However, reverse effects were found for C3 and C6 where the active modes were more strongly associated with psychopathology compared to the passive modes (see Figure 3). Yet, in both conflicts the difference was not significant (see Supplementary Figure S6). The strongest association between the conflict modes with psychopathology was found for C4p, followed by C2p and C1p. Negative associations between conflicts and psychopathology were found for C3p, C4a, C5a, C6a and C6p.

Hypothesis 3: Most inter-connected psychodynamic constructs

The IPO-16 subscale identity diffusion was found to be the psychodynamic construct that exhibited the strongest inter-connectivity with other psychodynamic constructs (see Figure 2 and Supplementary Table S3). Its bridge expected influence value was significantly higher compared to all other psychodynamic constructs (see Supplementary Figure S5).

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Hypothesis 4: Psychodynamic constructs and psychopathology

Regarding bridge nodes, the OPD-SQS subscale self-perception and C4p emerged as the psychodynamic constructs with the strongest associations to psychopathology (see Figure 3 and Supplementary Table S3). Their expected influence values were significantly higher compared to the other psychodynamic constructs (see Supplementary Figure S6).

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Hypothesis 5: Clusters

The community detection algorithm resulted in distinct clusters for psychopathologies and psychodynamic constructs. All BSI subscales were found to form a single cluster. Within the psychodynamic constructs, five distinct clusters emerged (see Supplementary Figure S7). The bootEGA identified six dimensions as the most stable dimensional organization of the data (median = 6; SE = 0.78; 95% CI [4.47, 7.52]; frequency of 5 factors = 11.1%, of 6 factors = 44.3% and of 7 factors = 37.7%).

Discussion

The present study replicated and expanded upon a previous study (Vierl, Juen, et al., 2023) by investigating the fine-grained associations between psychodynamic constructs and various dimension of psychopathology on subscale level. Active and passive modes of conflict processing were negatively associated in most conflicts. Passive modes of conflict processing were generally more strongly associated with psychopathology than active modes. Personality functioning emerged as a key component, as its domains were strongly inter-related within psychodynamic constructs and shared strong associations with psychopathology. Psychodynamic constructs appeared to be distinct from psychopathology, forming separate but interrelated clusters. In the following, we will discuss our findings in more detail.

Regarding our first hypothesis, which concerned the associations between the active and passive modes of conflict processing, we detected a negative association between the modes in most

conflicts. However, for the individuation vs. dependency conflict (C1) no significant correlation was found between the modes, while the modes were positively correlated in the submission vs. control conflict (C2). Our results are broadly consistent with the operationalization of conflicts in the OPD, where the two modes of a conflict generally represent contrasting ways of dealing with an inner conflict. The findings for C1 and C2 have been previously mentioned but haven't been discussed in depth (Gisch et al., 2020; Henkel et al., 2022). Regarding C2, a possible explanation could be the unsatisfactory internal consistencies of the two modes in the OPD-CQ (Benecke et al., 2018; Gisch et al., 2020; Henkel et al., 2022) resulting from a questionable one-dimensionality of the respective scales (Gisch et al., 2020). For C1, the absence of correlation may be indicative of the conflictual nature of this conflict. Patients may be less likely to fully identify with one side, suggesting that they may experience difficulties with both being too close and being alone.

Secondary findings also indicated that the modes of processing tended to be often positively associated across conflicts. For example, participants with a high expression of the active self-worth conflict (C4a) tended to score higher also on the active modes of the submission vs. control conflict (C2a), the guilt conflict (C5a) and the oedipal conflict (C6a). This finding replicates previous studies (Benecke et al., 2018; Henkel et al., 2022). For the need vs. autarky conflict (C3) we found a reversed effect, as the active mode shared stronger associations with other passive modes. We will discuss this finding below, as a similar effect occurs in the context of psychopathology.

Regarding our second hypothesis, which focused on the associations between the psychodynamic conflict modes and psychopathology, we found mainly stronger associations between passive modes (vs. active) and psychopathology. This is in line with Vierl, Juen, et al. (2023) who argue that the passive processing modes describe a more regressive approach that often results in negative emotions and, ultimately, in psychic distress. In contrast, active

processing modes reflect a (pseudo-) progressive approach that repress or reject feelings of guilt, one's desires for dependency or one´s own inadequacies. As long as this can be maintained, no psychological symptoms develop; if they do, they are often either trivialized or explained rationally. Our results expand on the findings by Vierl, Juen, et al. (2023) by demonstrating that while most passive modes are associated with psychopathology, not all are. Further, in contrast to the absent association between active modes and psychopathology in Vierl, Juen, et al. (2023), a more differentiated picture has now emerged: certain active processing modes (C4a, C5a, C6a) were even negatively associated with psychopathology, while others (C1a, C2a, C3a) were overall positively linked to psychopathology. These findings are consistent with a recent study of Remmers and colleagues (2023). The authors discussed the negative associations of the active self-worth (C4a) and active guilt conflict (C5a) with psychopathology as a result of possible self-report biases and conflict-specific defense mechanisms.

Consistent with previous research (Benecke et al., 2018; Henkel et al., 2022; Remmers et al., 2023), we found an inverse association between the modes of the care vs. autarky conflict (C3), where the active mode was slightly more strongly associated with psychopathology than the passive mode. An explanation could be found in the conflict dynamic of C3: We found strong associations between the active care vs. autarky conflict (C3a) with the active submission vs. control conflict (C2a), the passive guilt conflict (C5p) and the passive oedipal conflict (C6p), as well as with the interpersonal relations domain of self-sacrificing. It is possible that C3a serves as a compensatory mechanism for other often passive conflicts. By suppressing personal needs and self-sacrificing care for others, feelings of guilt or inadequacy can be diminished, while still maintaining control over others. Remmers et al. (2023) propose that this inverse relationship could also indicate a general reversal of the conflict modes of C3 in OPD. The active mode (C3a) is associated with the tendency to prioritize the needs of others over one's own, which can be seen as a passive component. In contrast, the passive mode (C3p) involves a demanding agentic

behavior, that may align better with an active approach. However, it is also possible that the inverse association is due to unsatisfactory scale conceptualization of the respective conflict modes in the OPD-CQ. In the past, C3a has demonstrated insufficient internal consistency (Gisch et al., 2020; Henkel et al., 2022).

For our third hypothesis on the inter-relations among psychodynamic constructs, we found the personality functioning subscale identity diffusion (IPO-16) to share the most and strongest associations within psychodynamic constructs. Identity diffusion is conceptualized as a lack of differentiated integration of self and other representations (Kernberg, 1984). Identity diffusion was particularly strongly associated with several passive conflicts (e.g., C1p, C3p, C5p). Our results suggest that identity diffusion may be particularly pronounced in passive conflicts.

Concerning our fourth hypothesis on the associations between psychodynamic constructs and psychopathology, we found self-perception (OPD-SQS) to share the strongest associations with psychopathology. This finding indicates that impairments in self-perception correspond with higher symptom burden. The self-perception subscale captures aspects of identity, self-reflection, affect differentiation and affect tolerance (Ehrenthal et al., 2015). All these aspects have been found to be relevant factors for the development, the maintenance and the severity of psychopathology (Mattingley et al., 2022; Seah & Coifman, 2022; Sollberger et al., 2012). The subscale shares a significant conceptual overlap with the self-functioning aspects of personality functioning in the DSM-5 AMPD and ICD-11. Self-functioning has been found to be more closely linked to negative affect (Rossi & Diaz-Batanero, 2024) and global functioning (Buer Christensen et al., 2020) compared to interpersonal functioning. Although the finding seems reasonable, it is noteworthy that the subscale self-perception has been criticized, because of its high correlations with depression and anxiety, with a third of its variance being accounted for by depressiveness (Obbarius et al., 2019). The strong associations with psychopathology could, therefore, also be due to the symptom-oriented nature of the scale.

Personality functioning assessed by the IPO-16 subscales (identity diffusion, primitive defenses and reality testing) shared only few associations, except for reality testing, which had a particularly strong association with psychoticism. Reality testing measures the ability to distinguish between internal and external stimuli and to maintain contact with a shared external reality (Kernberg, 1984). Elevated impairments in reality testing are an important diagnostic criterion of the psychotic personality organization (Kernberg, 2019), making the association in our network comprehensible. Contrary to our expectations, identity diffusion showed only marginal associations with psychopathology, although previous studies have shown relevant associations between identity diffusion and the severity of both psychiatric symptoms and personality disorder pathology (e.g., Diamond et al., 2023; Ponton Rodriguez et al., 2018; Sekowski et al., 2022; Sollberger et al., 2012). By contrast, in our network identity diffusion was most inter-related within psychodynamic constructs. This could indicate that identity diffusion according to Kernberg's model (1984) is less symptom-orientated, but assesses a more basic impairment of personality functioning (Sharp & Oldham, 2023).

Lastly, community detection revealed six clusters, whereby psychopathology and psychodynamic constructs were found to form distinct clusters. This aligns with previous research (Vierl et al., 2023). The formation of separate but interconnected clusters is consistent with psychodynamic theory, which postulates that psychodynamic constructs and psychopathology are distinct concepts. According to the theory, individual differences in psychopathology can be explained by differences in psychodynamic constructs (OPD Task Force, 2008).

Implications for clinical and scientific practice

Our research findings have significant implications for clinical and scientific practice. We have extended the investigation conducted by Vierl, Juen, et al. (2023), yielding more nuanced and detailed outcomes that can inform case conceptualization and treatment planning. Our present

study demonstrates the crucial role of personality functioning within psychodynamic constructs and psychopathology. The individual subscales of OPD-SQS and IPO-16 differed in their associations with psychopathologies and psychodynamic constructs, supporting the finding of Vierl et al. (2024) that the subscales assess distinct and clinically relevant aspects of personality functioning. Our findings build on previous studies that have found a strong relationship between personality functioning and general psychopathology (Benecke et al., 2018; Crempien et al., 2017; Ehrenthal et al., 2015). Obbarius et al. (2021) suggest that this relationship may be due to patients with more significant impairments in personality functioning experiencing greater difficulties in managing negative emotions, resulting in the emergence or persistence of symptoms. Therefore, our results suggest that it is advisable and potentially critical to achieving optimal therapeutic outcomes to include a thorough structural diagnosis and to focus on structural impairments during treatment. Although our conclusions are limited due to the cross-sectional nature of our data, the importance of personality functioning for treatment success has also been shown in previous studies (e.g., Huber et al., 2017; Koelen et al., 2012; Rueckert et al., 2023). Another notable aspect of our study is that we provide elaboration on the inverse relationship of the care vs. autarky conflict (C3) and encourage discussion on the potential revision of the respective subscales in OPD-CQ or of the conflict in general in OPD.

Strengths and limitations

A particular strength of the study is its large sample of inpatient psychotherapy participants, covering various symptom severities and levels of structural impairment. Additionally, our analyses were stable and robust, allowing a reliable interpretation of the results. Further, our network is based on multi-item subscales, improving reliability of the findings compared to single items as nodes. Importantly, this is the first study to unravel the fine-grained associations between psychodynamic constructs and various psychopathologies on a subscale level using network analysis.

Nevertheless, several methodological challenges and limitations must be acknowledged. Network analysis is often criticized due to concerns about replicability (e.g., Forbes et al., 2019, 2021). However, Fried and colleagues (2021) argue that these criticisms are largely unjustified, provided that the tutorial for network stability analyses (Epskamp et al., 2018) is strictly adhered to. Moreover, it is important to avoid overinterpreting point estimates. To address the issue of false positive edges in the network, Fried and Cramer (2017) recommend using regularized partial correlation networks. However, it should be noted that while fewer false positives are included in the network model, regularization methods may increase the likelihood of false negative edges (Epskamp & Fried, 2018). Some scholars have also expressed criticism of centrality and questioned its interpretability iin psychological networks (Bringmann et al., 2019; Dablander & Hinne, 2019; Hallquist et al., 2021; Neal et al., 2022). Certainly, additional research is needed using longitudinal data to test the extent to which focused interventions targeting central symptoms are effective in disrupting the network structures. It is also possible that cross-sectional data are inadequate for identifying treatment targets because no causal inferences can be made. The cross-sectional nature of our data significantly limits the interpretability of our findings. Moreover, our network is a between-subjects model and, therefore, the results cannot be applied to individuals (Bringmann, 2021; Fried & Cramer, 2017). In addition to the limitations that affect the methodology, the utilized questionnaires also need to be criticized. We employed brief forms to measure personality functioning (i.e., OPD-SQS and the IPO-16). Given that the subscales comprise only a few items, the results should be interpreted with caution. Moreover, we utilized all nine BSI subscales, which enabled us to analyze the associations of psychodynamic constructs with a wide variety of psychopathologies. It is worth mentioning that the factor structure should be interpreted with caution, as a general factor is being discussed more recently (Serpa et al., 2022). We relied solely on self-report questionnaires, which may have introduced a potential self-report bias, especially as

psychodynamic constructs are largely unconscious. In particular, the OPD-CQ showed insufficient internal consistencies for certain scales, which can be partly explained by questionable one-dimensional scales. To validate our results, future research should utilize OPD-3 interview data conducted by trained clinicians. Lastly, our sample consisted of psychotherapeutic inpatients with significant impairments. It remains uncertain whether our findings can be generalized to other populations.

Conclusion

This study unraveled the fine-grained associations within psychodynamic constructs (i.e., interpersonal relations, active and passive modes of psychodynamic conflicts and personality functioning) and their inter-relations with psychopathology. Patients who tend to process psychodynamic conflicts passively exhibit higher scores in psychopathology than those who primarily use active processing strategies. Both modes of processing were mainly negatively associated, highlighting the difference between the two ways of processing inner conflicts. Our study found that personality functioning plays a significant role within psychodynamic constructs and in the context of psychopathology. This suggests that it is crucial to assess personality functioning as part of the diagnostic process and to focus on it in therapy. Our findings support the notion that psychodynamic constructs and psychopathology are separate yet inter-related.

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Table 1

Conflicts according to the Operationalized Psychodynamic Diagnosis (OPD)

Conflict	Theme	Passive mode	Active mode

C1: Individuation vs. dependency	Affiliation	Excessive dependency	Excessive autonomy
C2: Submission vs. control	Agency	Submitting to others	Striving for dominance and control
C3: Need for care vs. autarky	Care	Demanding care	Deferring own needs, taking care of others
C4: Self-worth conflict	Self-worth	Devaluing oneself	Overvaluing oneself
C5: Guilt conflict	Responsibility	Feeling guilty	Rejecting responsibility
C6: Oedipal conflict	Sexual roles	Avoiding attention and competition	Seeking admiration and competition
(C7: Identity conflict[1])	Identity	Inconsistent identity	Adoption of identity
(Impaired perception of Conflict and Affect[2])	Tendency to not experience conflicting strivings, or emotional reactions		

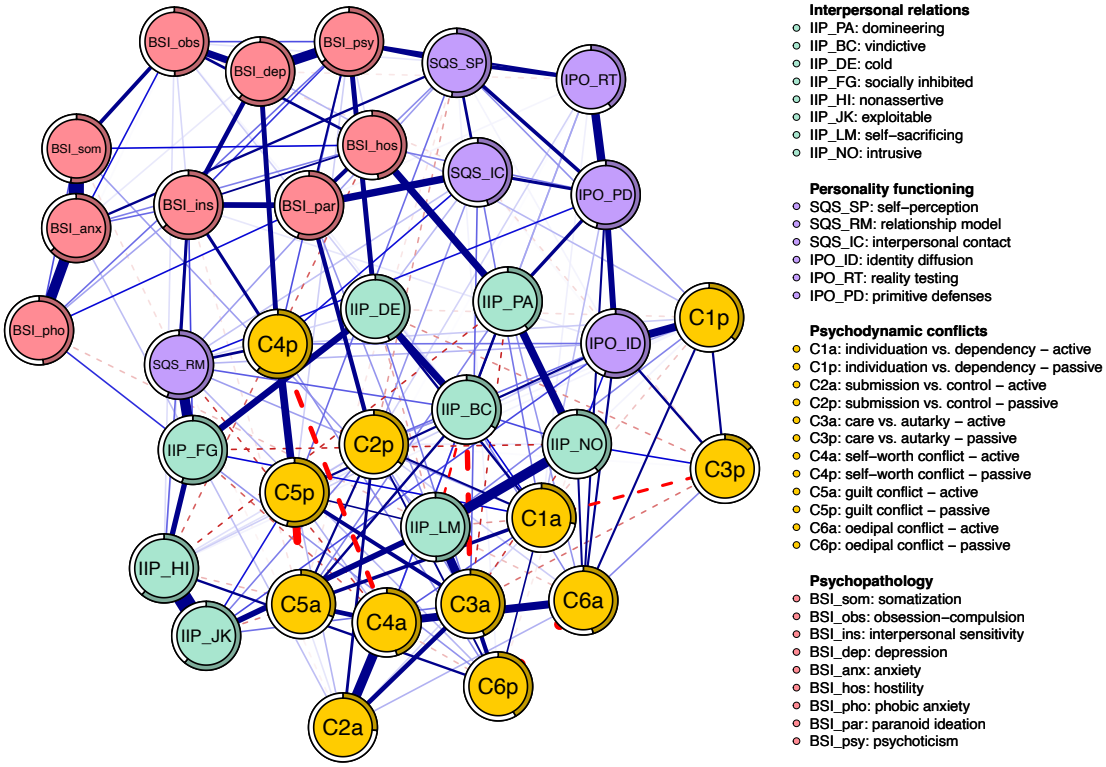
[1] The identity conflict has not been included in the OPD-CQ as it was not possible to develop enough items meeting the expert criteria for this conflict (Benecke et al., 2018). Further, the identity conflict is only very sparsely diagnosed (e.g., Kaufhold et al., 2017). It will therefore not be part of this study.

[2] The impaired perception of conflict and affect showed insufficient reliability parameters (ω = .44; Henkel et al., 2022) in the OPD-Conflict Questionnaire (OPD-CQ; Benecke 2018). Henkel and colleagues (2022) therefore recommended to not use this conflict, as it might not be accessible to self-assessment. It will therefore not be part of this study.

Figures

Figure 1

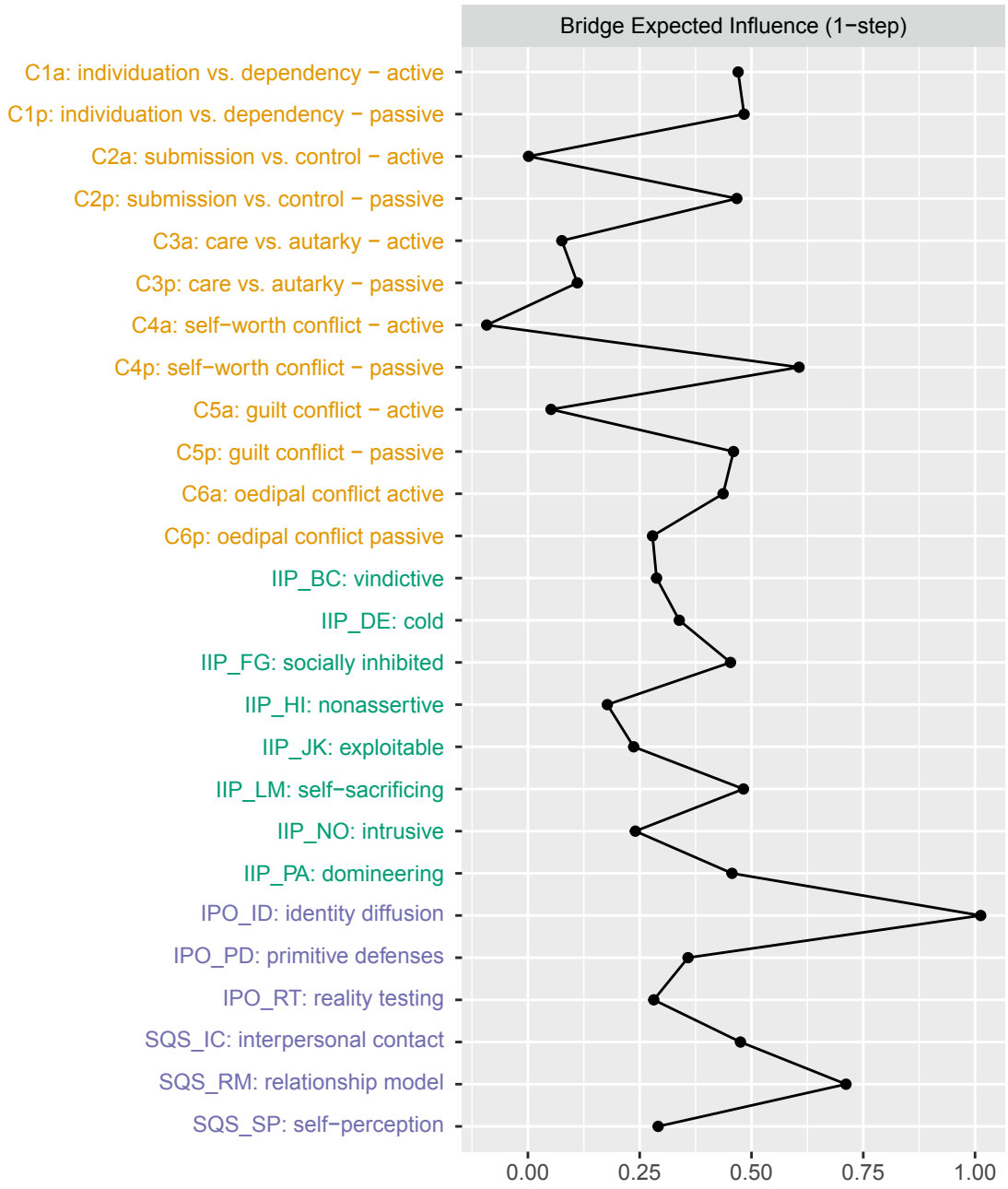
Network plot



Note. Blue edges represent positive associations, red dashed edges represent negative associations. Thicker edges represent stronger associations. Only edges ≥ |0.025| are visualized in the network plot.

Figure 2

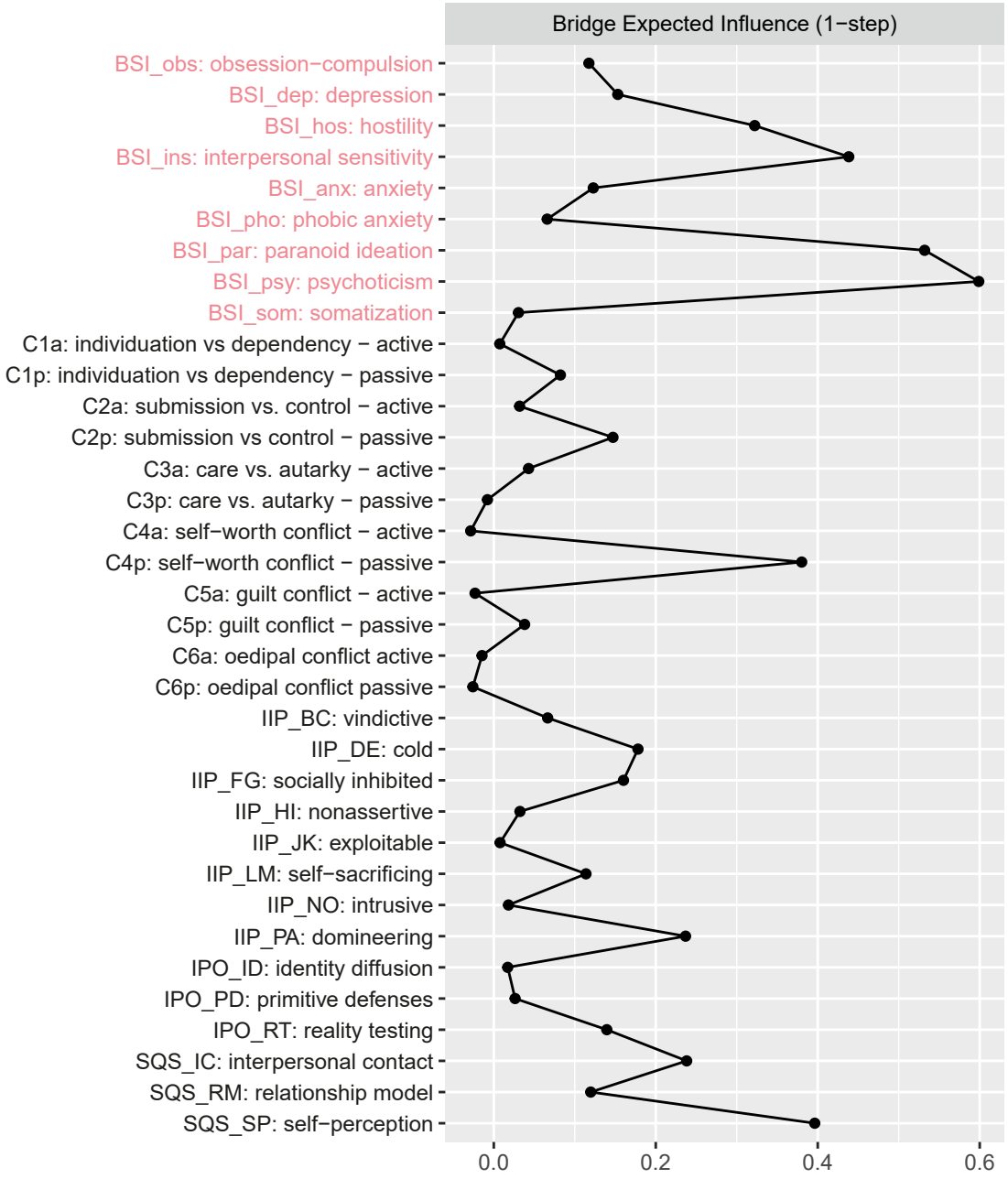
Bridge expected influence to identify the most interconnected psychodynamic constructs



Note. The value represents the relative sum of all edge weights that a psychodynamic construct from one community (conflicts = yellow, interpersonal relations = green, personality functioning = purple) shares with all psychodynamic constructs from the other two communities. The values are normalized.

Figure 3

Bridge expected influence to identify the bridge nodes



Note. The value represents the relative sum of all edge weights that a psychodynamic construct (black) shares with all psychopathologies (red) and vice versa.

8.7 Supplementary Materials for Study 4

Unravelling inter-relations within and between psychodynamic constructs and psychopathology using network analysis.

Supplementary Tables and Figures

Table S1

List of all subscale labels and their descriptions

Label	Description
BSI_som	Somatization
BSI_obs	Obsession-compulsion
BSI_ins	Interpersonal sensitivity
BSI_dep	Depression
BSI_anx	Anxiety
BSI_hos	Hostility
BSI_pho	Phobic anxiety
BSI_par	Paranoid ideation
BSI_psy	Psychoticism
IIP_PA	Too domineering
IIP_BC	Too vindictive
IIP_DE	Too cold
IIP_FG	Too socially inhibited
IIP_HI	Too nonassertive
IIP_JK	Too exploitable
IIP_LM	Too self-sacrificing
IIP_NO	Too intrusive
C1a	Individuation vs. dependency conflict – active mode
C1p	Individuation vs. dependency conflict – passive mode
C2a	Submission vs. control conflict – active mode
C2p	Submission vs. control conflict – passive mode
C3a	Care vs. autarky conflict – active mode
C3p	Care vs. autarky conflict – passive mode
C4a	Self-worth conflict – active mode
C4p	Self-worth conflict – passive mode
C5a	Guilt conflict – active mode
C5p	Guilt conflict – passive mode
C6a	Oedipal conflict – active mode
C6p	Oedipal conflict – passive mode
SQS_SP	OPD-SQS self-perception
SQS_RM	OPD-SQS relationship model
SQS_IC	OPD-SQS interpersonal contact

IPO_ID	IPO-16 identity diffusion
IPO_RT	IPO-16 reality testing
IPO_PD	IPO-16 primitive defenses

Table S2

Descriptive characteristics of the subscales

	N	Mean	SD	Min	Max	Skew	Kurtosis
BSI_som	2232	1.21	0.80	0	4	0.74	0.20
BSI_obs	2232	1.90	0.87	0	4	0.08	-0.58
BSI_ins	2232	1.97	1.01	0	4	0.06	-0.81
BSI_dep	2232	2.03	0.95	0	4	-0.11	-0.85
BSI_anx	2232	1.58	0.88	0	4	0.32	-0.61
BSI_hos	2232	1.16	0.79	0	4	0.86	0.50
BSI_pho	2232	1.28	1.00	0	4	0.67	-0.43
BSI_par	2232	1.42	0.94	0	4	0.42	-0.59
BSI_psy	2232	1.40	0.85	0	4	0.41	-0.46
IIP_PA	2232	0.68	0.72	0	3.75	1.23	1.22
IIP_BC	2232	1.01	0.83	0	4	0.73	-0.02
IIP_DE	2232	1.80	1.06	0	4	0.08	-0.88
IIP_FG	2232	2.28	1.01	0	4	-0.24	-0.76
IIP_HI	2232	2.36	1.04	0	4	-0.33	-0.73
IIP_JK	2232	2.34	0.98	0	4	-0.29	-0.66
IIP_LM	2232	2.10	0.97	0	4	-0.18	-0.62
IIP_NO	2232	1.37	0.91	0	4	0.42	-0.44
C1a	1649	1.53	0.85	0	4	0.30	-0.29
C1p	1645	1.90	0.85	0	4	-0.02	-0.47
C2a	1648	1.71	0.72	0	4	0.10	-0.26
C2p	1649	1.74	0.78	0	4	0.02	-0.25
C3a	1648	2.46	0.71	0	4	-0.30	-0.01
C3p	1648	1.98	0.89	0	4	-0.19	-0.43
C4a	1649	0.80	0.66	0	3.4	0.70	-0.07
C4p	1649	2.28	1.12	0	4	-0.26	-0.88

C5a	1650	1.07	0.68	0	4	0.41	0.04
C5p	1649	1.97	1.08	0	4	-0.06	-0.90
C6a	1649	1.05	0.75	0	3.71	0.59	-0.24
C6p	1648	2.25	0.85	0	4	-0.17	-0.35
SQS_SP	2232	7.66	4.02	0	16	-0.07	-0.80
SQS_RM	2232	9.36	3.40	0	16	-0.33	-0.31
SQS_IC	2232	9.68	4.05	0	16	-0.41	-0.61
IPO_ID	1637	2.75	0.76	1	5	-0.02	-0.45
IPO_RT	1637	1.76	0.69	1	5	1.00	0.74
IPO_PD	1637	2.39	0.83	1	5	0.36	-0.54

Table S3

Bridge expected influence

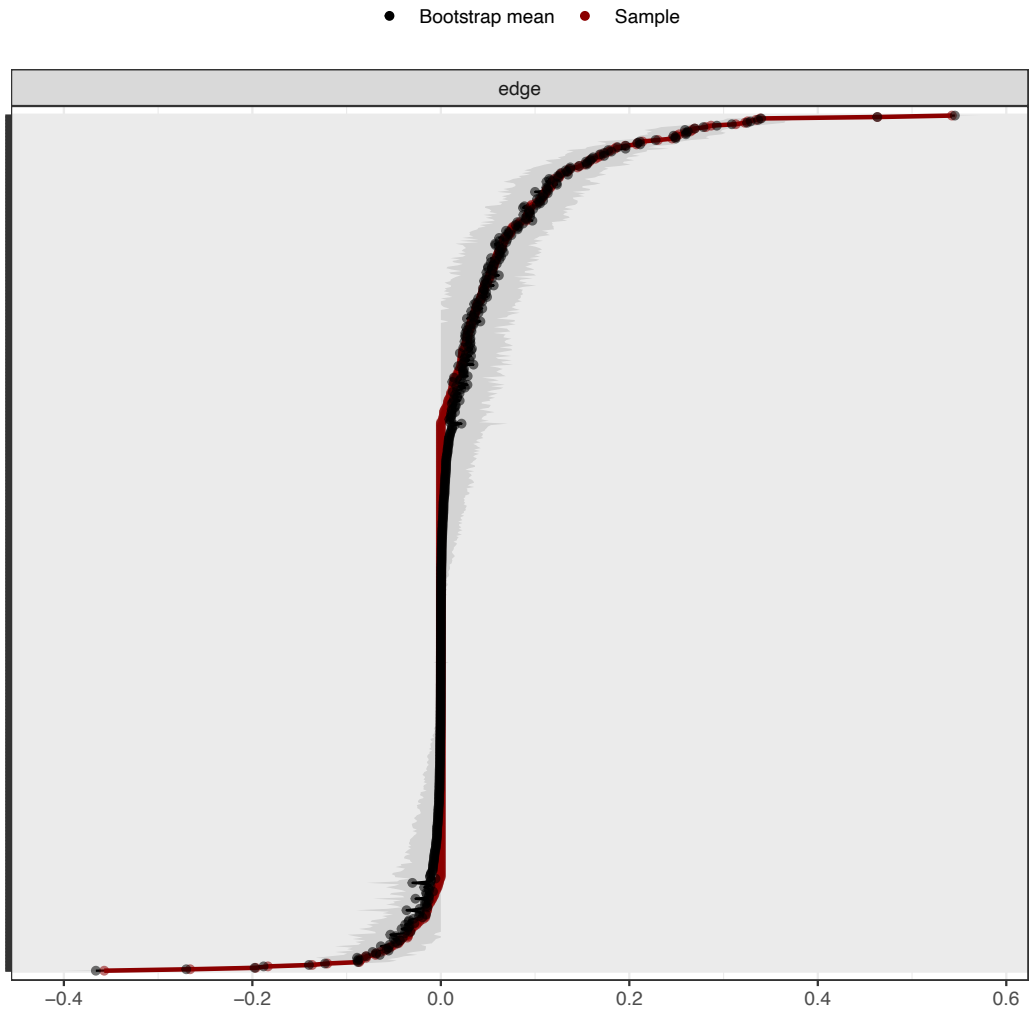
Variable	BEI[a]	BEI[b]
BSI_som	--	0.03
BSI_obs	--	0.12
BSI_ins	--	0.44
BSI_dep	--	0.15
BSI_anx	--	0.12
BSI_hos	--	0.32
BSI_pho	--	0.07
BSI_par	--	0.53
BSI_psy	--	0.6
IIP_PA	0.012	0.24
IIP_BC	0.009	0.07
IIP_DE	0.007	0.18
IIP_FG	0.014	0.16
IIP_HI	0.006	0.03
IIP_JK	0.008	0.01
IIP_LM	0.015	0.11
IIP_NO	0.009	0.02

C1a	0.019	0.01
C1p	0.018	0.08
C2a	-0.001	0.03
C2p	0.015	0.15
C3a	0.003	0.04
C3p	0.005	-0.01
C4a	-0.003	-0.03
C4p	0.014	0.38
C5a	0.003	-0.02
C5p	0.018	0.04
C6a	0.019	-0.01
C6p	0.013	-0.03
SQS_SP	0.002	0.4
SQS_RM	0.020	0.12
SQS_IC	0.012	0.24
IPO_ID	0.034	0.02
IPO_RT	0.007	0.14
IPO_PD	0.011	0.03

Note. [a] Normalized bridge expected influence (nBEI) between the OPD axes. To normalize, the BEI values were divided by the number of nodes in the two other psychodynamic axes. [b] Bridge expected influence (BEI) between psychodynamic constructs and psychopathology.

Figure S1

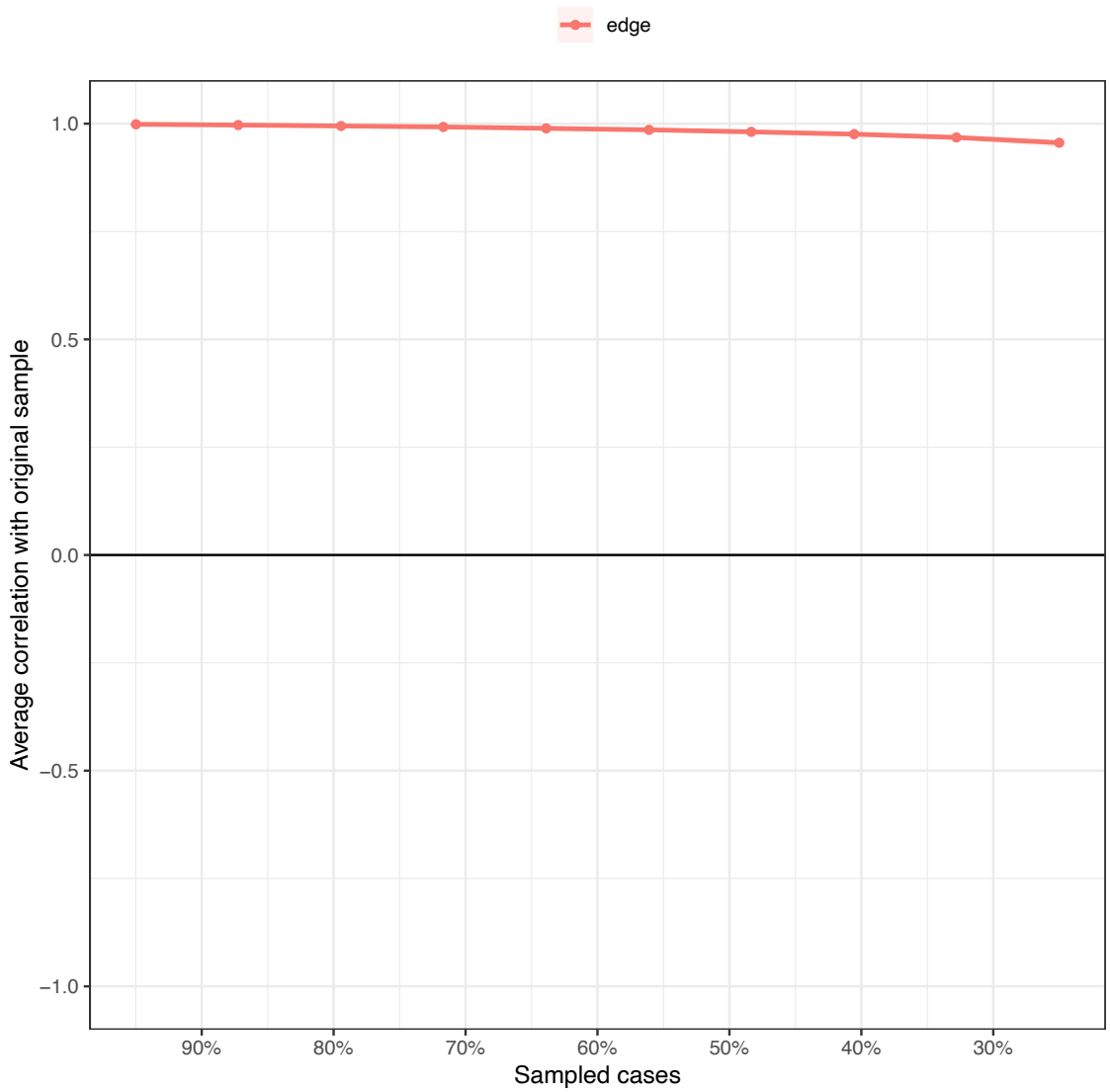
Bootstrapped confidence intervals of estimated edge weights



Note. Bootstrapped confidence intervals (CIs) of the estimated edge weights in the network across 1,000 bootstraps. The red line indicates the original edge weight values, the black line the bootstrap mean edge weight values and the gray-shaded area the bootstrapped 95% CIs of the edge weight values. Each horizontal line indicates one edge of the network, ordered from the edge with the highest edge weight to the edge with the lowest edge weight. The sample values lie within the bootstrapped CIs and the bootstrapped CIs are relatively small, thus indicating accurate estimations. The y-axis labels were removed for ease of visual perception.

Figure S2

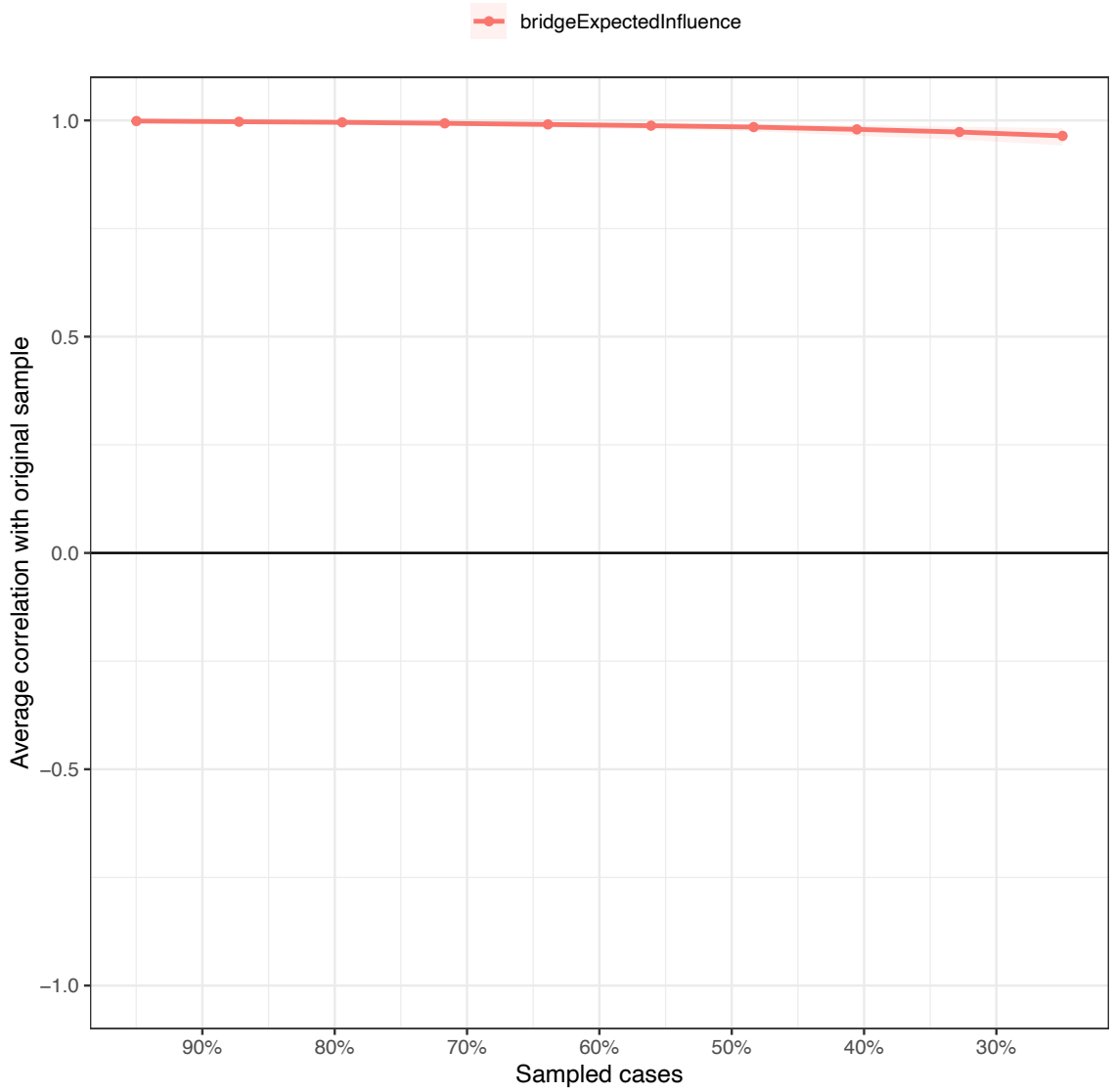
Edge weights stability



Note. The average correlation between the original edge weights and the edge weights after dropping a percentage of subjects at random from the data. The line represents how the edge weights of the nodes change when dropping different proportions of the data. The straighter the line, the more reliable the edge weights. In our network, the plot indicates a very reliable and accurate estimation of edge weights. The corresponding correlation-stability-coefficient is .75, demonstrating very high stability.

Figure S3

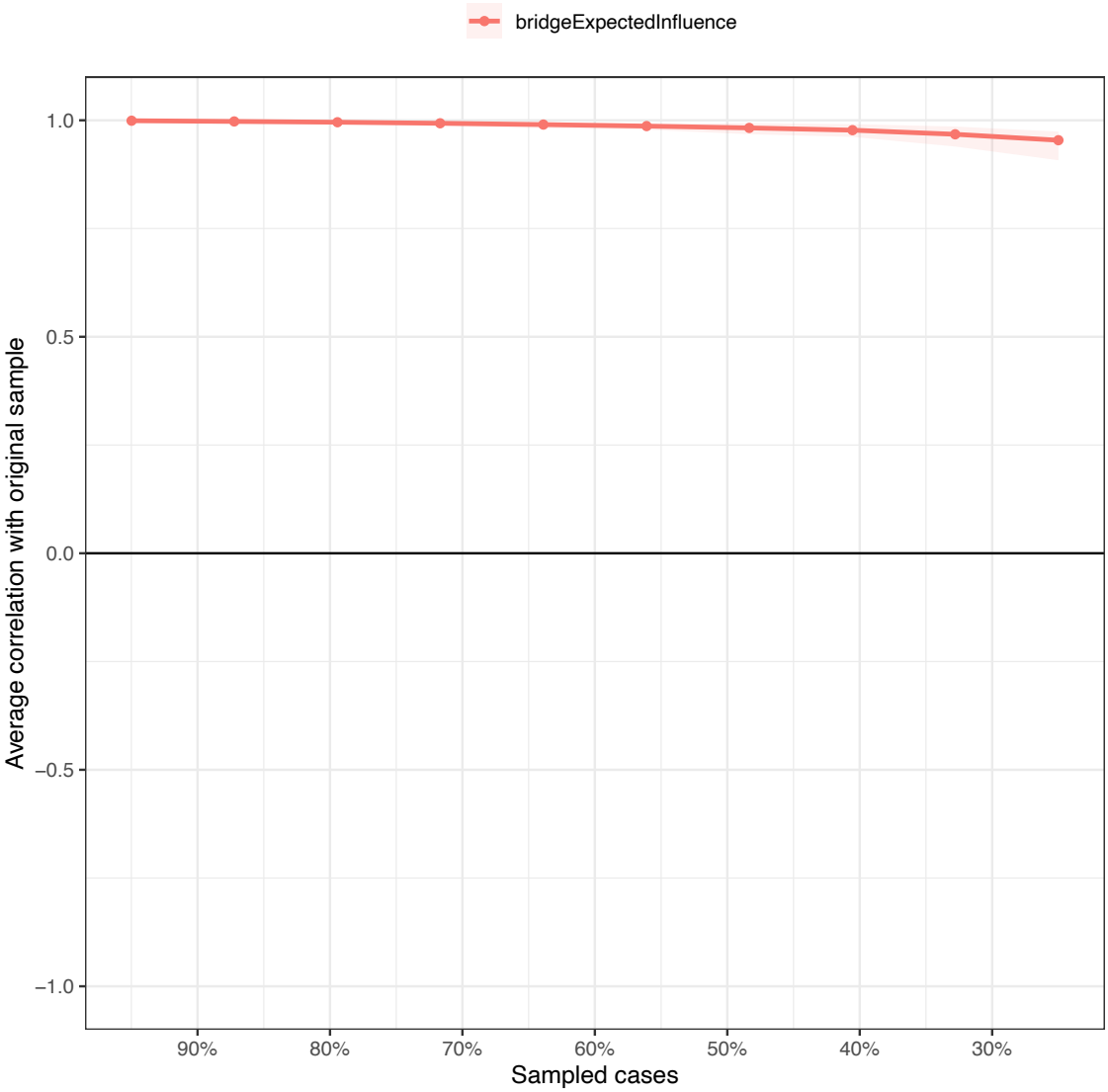
Bridge expected influence stability (between psychodynamic constructs)



Note. The average correlation between the original bridge expected influence and the bridge expected influence after dropping a percentage of subjects at random from the data. The line represents how the bridge expected influence centrality of the nodes changes when dropping different proportions of the data. The straighter the line, the more reliable the bridge centrality. In our network, the plot indicates a very stable and reliable estimation of bridge expected influence centrality. The corresponding correlation-stability-coefficient is .75, demonstrating very high stability.

Figure S4

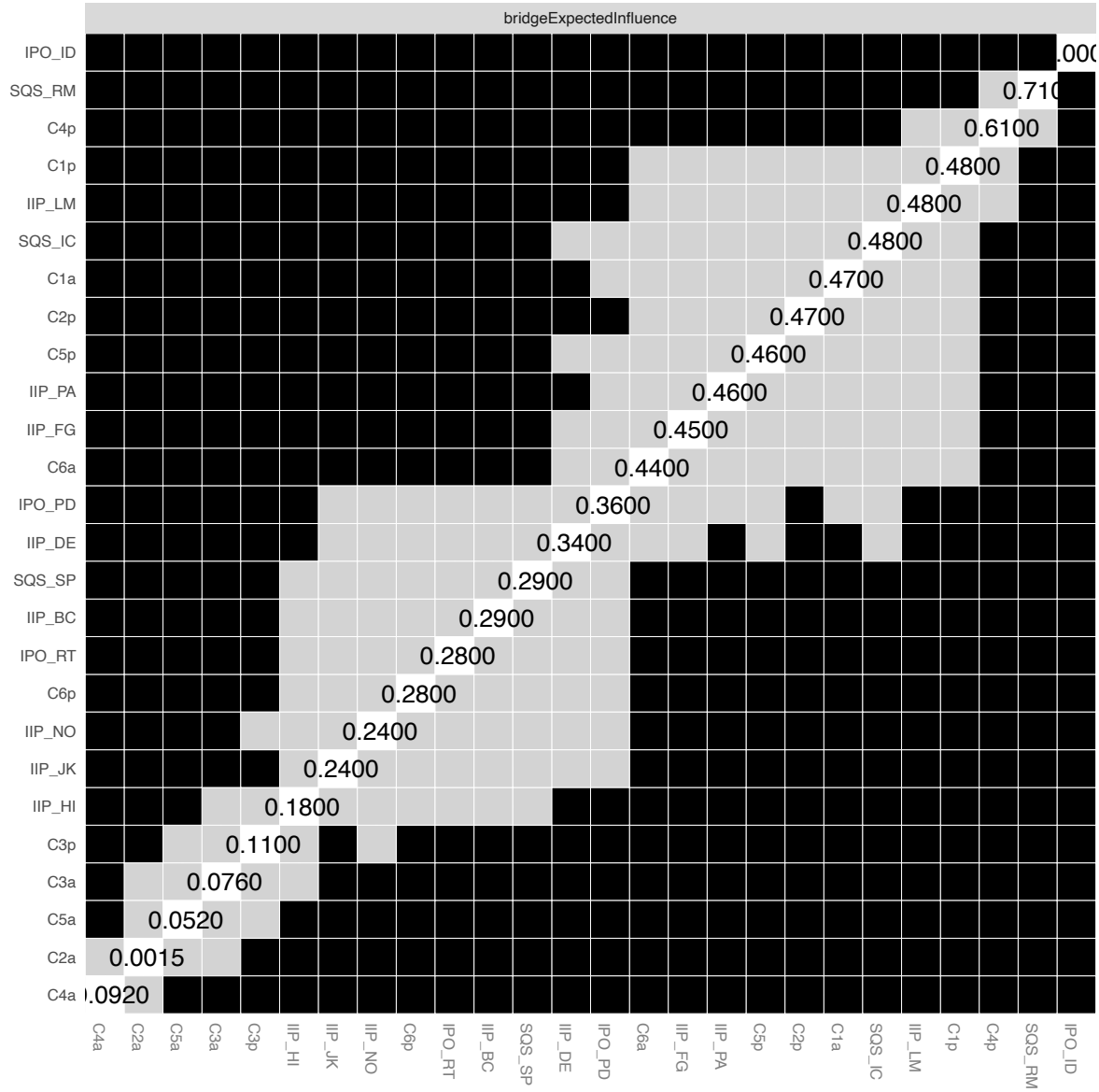
Bridge expected influence stability (between psychodynamic constructs and psychopathology)



Note. The average correlation between the original bridge expected influence and the bridge expected influence after dropping a percentage of subjects at random from the data. The line represents how the bridge expected influence centrality of the nodes changes when dropping different proportions of the data. The straighter the line, the more reliable the bridge centrality. In our network, the plot indicates a very stable and reliable estimation of bridge expected influence centrality. The corresponding correlation-stability-coefficient is .75, demonstrating very high stability.

Figure S5

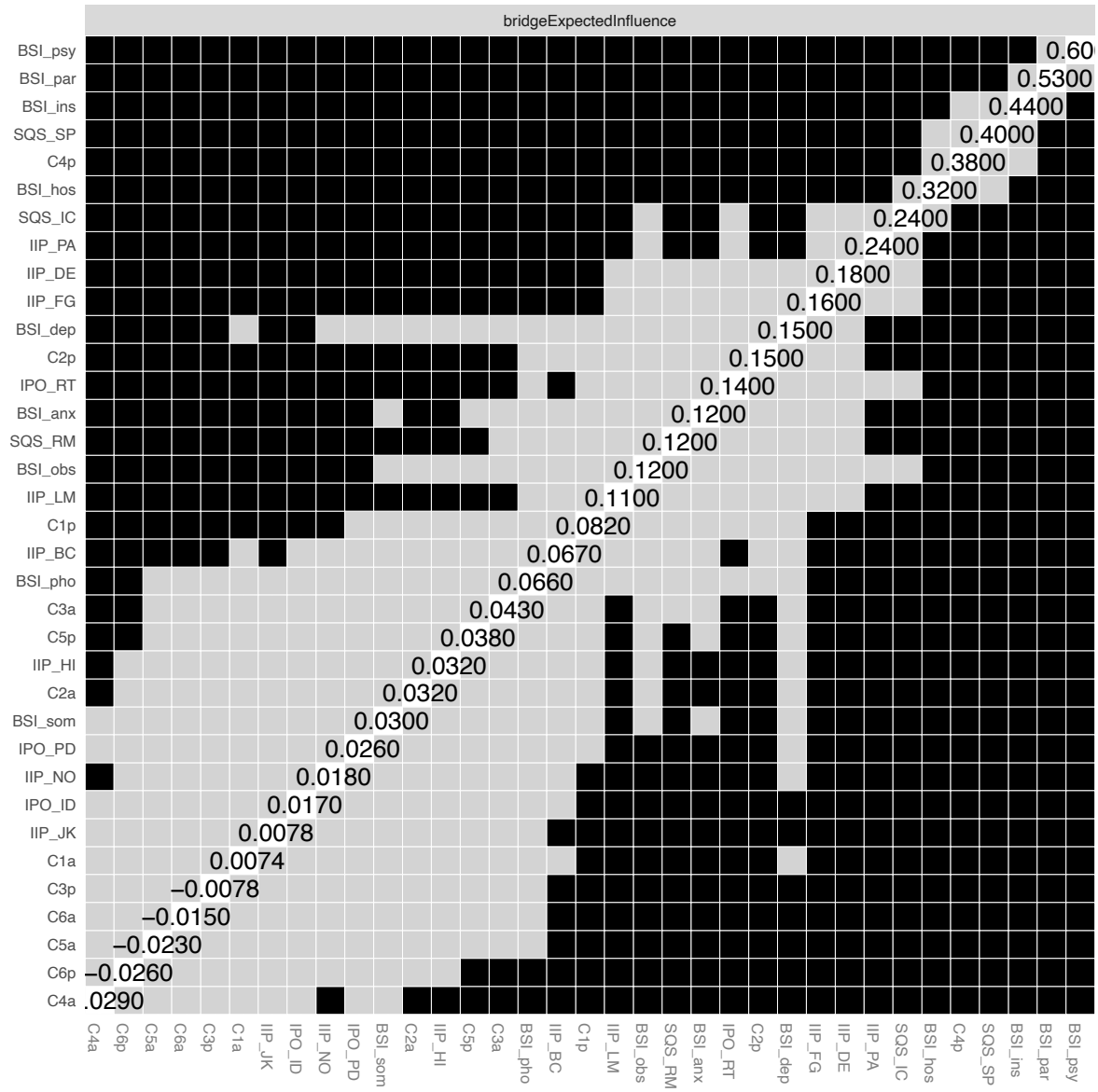
Bridge expected influence difference test (between psychodynamic constructs)



Note. Each row and column indicate a node. Black boxes represent nodes that do differ significantly from one-another in their bridge expected influence (α = 0.05), gray boxes indicate non-significant differences. The description of the subscale labels can be found in Supplementary Table S1.

Figure S6

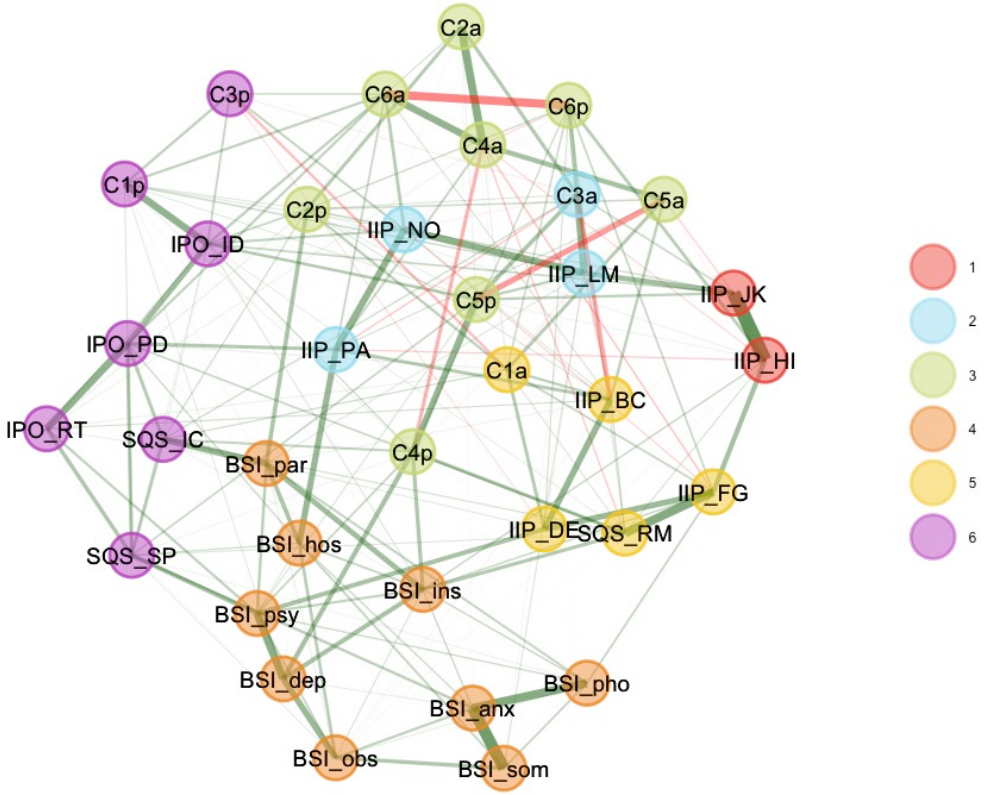
Bridge expected influence difference test (between psychodynamic constructs and psychopathology)



Note. Each row and column indicate a node. Black boxes represent nodes that do differ significantly from one-another in their bridge expected influence (α = 0.05), gray boxes indicate non-significant differences. The description of the subscale labels can be found in Supplementary Table S1.

Figure S7

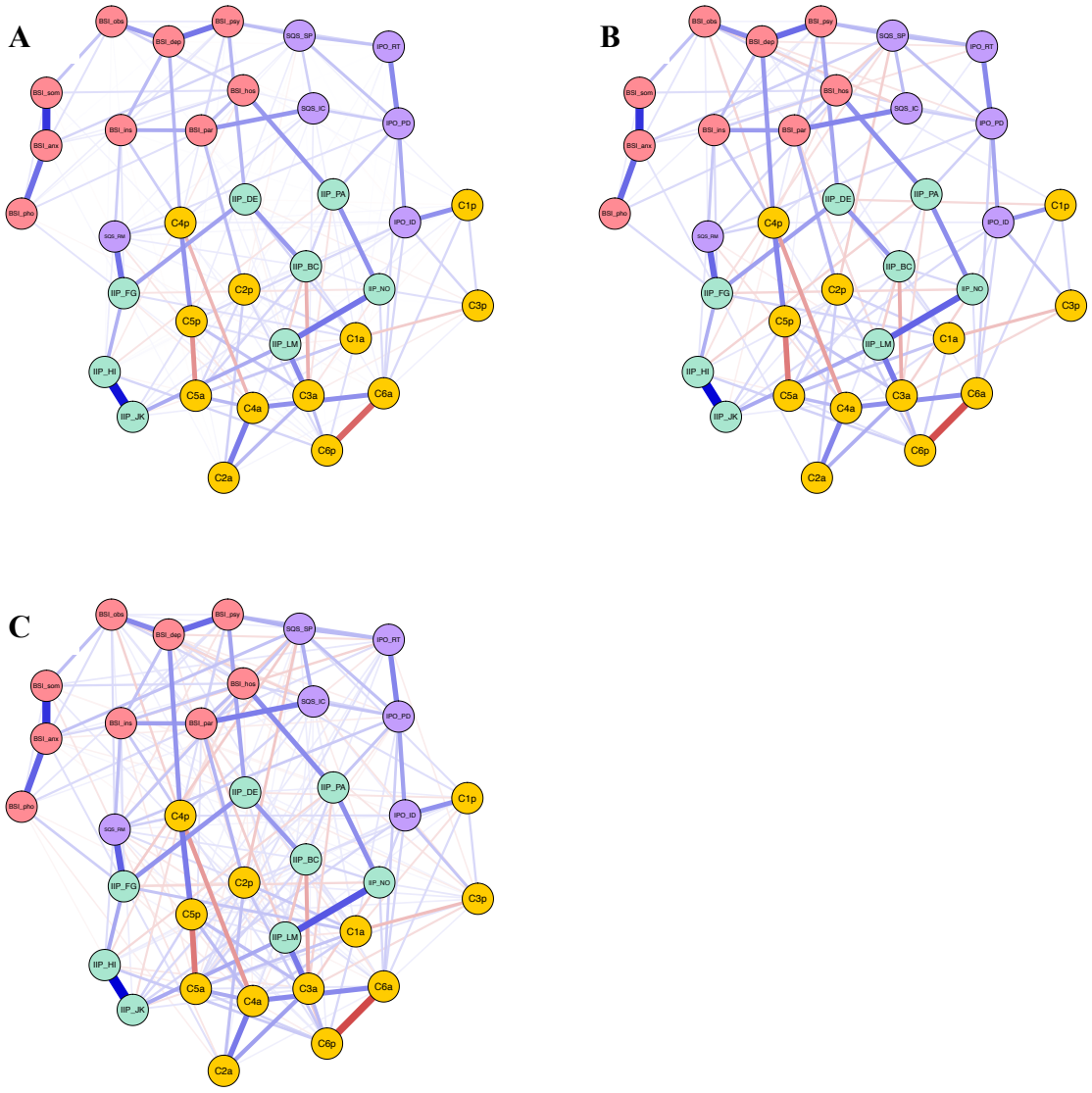
Cluster analysis



Note. Network plot including the clusters using Exploratory Graph Analysis. The color of the node reflects the belonging to the cluster. All BSI psychopathologies were found to form a single cluster (orange nodes). Within the psychodynamic constructs, five distinct clusters emerged. Most psychodynamic conflicts (except C1a, C1p, C3a, C3p) formed a cluster (green nodes). Almost all personality functioning domains (excluding OPD-SQS relationship model) clustered together with C1p and C3p (purple nodes). Interpersonal relations characterized by lower levels of communion (i.e., vindictive, cold, and socially inhibited) formed a cluster, including C1a and the OPD-SQS subscale relationship model (yellow nodes). The interpersonal relations reflecting higher levels of communion and agency (i.e., self-sacrificing, intrusive, and domineering) shared a cluster with C3a (blue nodes). Lastly, interpersonal relations characterized by lower levels of agency (i.e., nonassertive and exploitable) formed a distinct cluster (red nodes).

Figure S8

Alternative approaches to estimate the network model



Note. Comparison of three different approaches to estimate the network model: regularized network model without thresholding (panel A), regularized network model with thresholding (panel B), and network model estimated with *ggmModSelect* (panel C). The color of the node reflects the belonging to the community: red = psychopathology, purple = personality functioning; turquoise = interpersonal relations; orange = psychodynamic conflicts. For the item descriptions please see Table 1.

Table S4

Correlations between the three estimated network models

	A	**B**	**C**
A	-		
B	0.96	-	
C	0.94	0.94	-

Note. A = regularized network model without thresholding (original network model), B = regularized network model with thresholding, C = network model estimated with ggmModSelect

9 Declarations

In the following, declarations on the thesis and on authorship are presented in German.

Erklärungen zur Promotionsleistung (Dr. phil)

Erklärung gemäß §8 der Allgemeinen Bestimmungen für Promotionen der Universität Kassel vom 14.07.2021.

1. Bei der eingereichten Dissertation zu dem Thema „Operationalized Psychodynamic Diagnosis – Using Network Analysis to Explore the Associations between Psychodynamic Constructs“ handelt es sich um meine eigenständig erbrachte Leistung.
2. Anderer als der von mir angegebenen Quellen und Hilfsmittel habe ich mich nicht bedient. Insbesondere habe ich wörtlich oder sinngemäß aus anderen veröffentlichten oder unveröffentlichten Werken übernommene Inhalte als solche kenntlich gemacht.
3. Die Dissertation oder Teile davon habe ich bislang nicht an einer Hochschule des In- oder Auslands als Bestandteil einer Prüfungs- oder Qualifikationsleistung vorgelegt.
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5. Ich habe mich keiner unzulässigen Hilfe Dritter bedient und insbesondere die Hilfe einer kommerziellen Promotionsberatung nicht in Anspruch genommen.
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7. Die Richtigkeit der vorstehenden Erklärungen bestätige ich.

_____ _____

Datum Unterschrift

Erklärung zur kumulativen Dissertation im Promotionsfach Psychologie

Universität Kassel, Fachbereich Humanwissenschaften

Erklärung über den Eigenanteil an den veröffentlichten oder zur Veröffentlichung vorgesehenen wissenschaftlichen Schriften innerhalb meiner Dissertationsschrift, Ergänzung zu § 5a Abs. 4 Satz 1 der Allgemeinen Bestimmungen für Promotionen an der Universität Kassel vom 13. Juni 2011.

1) **Name, Institut, und Thema der Dissertation**

Name: Vierl, Larissa Katharina

Institut: Institut für Psychologie, Universität Kassel

Titel der Dissertation: „Operationalized Psychodynamic Diagnosis – Using Network Analysis to Explore the Associations between Psychodynamic Constructs"

2) **Nummerierte Aufstellung der eingereichten Schriften**

Nr. 1. Vierl, L., Juen, F., Benecke, C. & Hörz-Sagstetter, S. (2023). Exploring the associations between psychodynamic constructs and psychopathology: a network approach. *Personality and mental health.* 17(1), 40-54. doi:10.1002/pmh.1559

Nr. 2. Vierl, L. †, Von Bremen, C. †, Hagmayer, Y., Benecke, C., & Sell, C. (2023). How are psychodynamic conflicts associated with personality functioning? A network analysis. *Frontiers in Psychology.* 15:1152150. doi:10.3389/fpsyg.2023.1152150

Nr. 3. Vierl, L., Hörz-Sagstetter, S., Benecke, C., Spitzer, C., & Juen, F. (2024). All the same? Different measures of personality functioning are similar but distinct. A comparative study from a psychodynamic perspective using exploratory graph analysis. *Journal of personality assessment.* 106(3), 314-327. doi: 10.1080/00223891.2023.2251150

Nr. 4. Vierl., L. †, Wülfing, P. †, Juen, F., Hörz-Sagstetter, S., Spitzer, C. & Benecke, C. (2024). Unravelling inter-relations within and between psychodynamic constructs and psychopathology using network analysis. *Personality and mental health.* 1-14. doi: 10.1002/pmh.1628

† geteilte Erst-Autorenschaft

3) Darlegung des eigenen Anteils an diesen Schriften

Zu Nr. 1: Konzeption: *vollständig*; Literaturrecherche: *vollständig*; Datenerhebung: *in Teilen*; Datenaufbereitung: *vollständig*; Datenanalyse: *vollständig*; Ergebnisdiskussion: *überwiegend*; Erstellen des Manuskripts: *überwiegend*; Überarbeitung des Manuskripts im Zuge des Reviews: *überwiegend*

Zu Nr. 2: Konzeption: *in Teilen*; Literaturrecherche: *in Teilen*; Datenanalyse: *in Teilen*; Ergebnisdiskussion: *in Teilen*; Erstellen des Manuskripts: *mehrheitlich*; Überarbeitung des Manuskripts im Zuge des Reviews: *überwiegend*

Zu Nr. 3: Konzeption: *vollständig*; Literaturrecherche: *vollständig*; Datenanalyse: *vollständig*; Ergebnisdiskussion: *überwiegend*; Erstellen des Manuskripts: *überwiegend*; Überarbeitung des Manuskripts im Zuge des Reviews: *überwiegend*

Zu Nr. 4: Konzeption: *überwiegend*; Literaturrecherche: *mehrheitlich*; Methodenentwicklung: *mehrheitlich*; Datenauswertung: *vollständig*; Ergebnisdiskussion: *in Teilen*; Erstellen des Manuskripts: *mehrheitlich*

_____ _____

Ort, Datum Unterschrift

Dokumentation der Forschungsdaten

In Studie 1 wurden Daten, die im Rahmen der Routinediagnostik in der Ambulanz der Akademie für Psychoanalyse und Psychotherapie erhoben wurden, untersucht. In Studie 2 wurden Daten analysiert, die im Rahmen einer RCT-Studie erhoben wurden. In Artikel 3 und 4 wurden Daten analysiert, die im Rahmen der Routinediagnostik in der Klinik Tiefenbrunn erhoben wurden. Für alle Studien wurden die Korrelations- und Partial-Korrelationsmatrizen online zur Verfügung gestellt (https://osf.io/3cbnd/). Diese können zusammen mit den ebenfalls veröffentlichten *R* Skripten verwendet werden, um die Ergebnisse der Studien zu reproduzieren. Die Rohdaten werden auf Anfrage von Larissa Vierl zur Verfügung gestellt werden.