DEVELOPMENT AND APPLICATION OF A NOVEL METHOD FOR THE ASSESSMENT OF INTERPERSONAL JUDGMENT: RELATIONSHIPS WITH PERSONALITY PATHOLOGY

A Dissertation

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ABSTRACT

Although interpersonal impairment represents a core feature of personality pathology, the exact nature of the interpersonal impairment remains unclear. One barrier to comprehensively assessing interpersonal functioning in this population is a current lack of suitable methodology. The current study presents the development and initial validation of a novel methodology which 1) utilizes a dynamic (i.e., video-based) behavioral assessment method, 2) assesses the accuracy and biases of both interpersonal perceptions and anticipated reactions, and 3) aligns with interpersonal theory and the structure of the interpersonal circumplex. The final method, named the Video-based Interpersonal Behavioral Evaluation (VIBE), presents a respondent with eight stimulus videos depicting dyadic interpersonal interactions, each representing one octant of the interpersonal circumplex, and asks the respondent to make judgments regarding their perception of the interpersonal behavior of one target (Person A) and the interpersonal reaction they anticipate from the second target (Person B) for each video. The VIBE was found to be highly reliable and demonstrated good fit with circumplex structure in both the development and cross-validation samples, comprised of undergraduates and mixed community/clinical participants, respectively. However, contrary to hypotheses, performance on the VIBE was not consistently associated with personality pathology, although some significant relationships were observed. This method is anticipated to better direct research efforts investigating the interpersonal judgments of individuals with personality pathology, which to date have produced inconsistent findings, and ultimately aid in the development of more specifically targeted treatment interventions.

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INTRODUCTION*

Interpersonal functioning appears to play a fundamental role in psychosocial adjustment, and it is through cumulative relationship experiences with childhood caregivers, friends, and romantic partners that one develops the capacity to establish and sustain reciprocal relationships. While there is natural variation in how people relate to others, as reflected by individual differences in personality domains such as extraversion or agreeableness, severe disruptions to the normative process of interpersonal development can lead to interpersonal behaviors that deviate markedly from societal norms and expectations. For instance, an individual who experiences harsh or inconsistent parenting from childhood caregivers may not develop the same capacity for interpersonal trust and intimacy as others raised in consistent, nurturing environments (e.g., Jeung & Herpertz, 2014). Such deviations in interpersonal behavior are common across a variety of psychiatric disorders (Girard et al., 2017; Horowitz, 2004) and can develop and manifest in different ways. However, these deviations are similar in that they can contribute to severe functional impairments, including increased psychological distress, poor physical health (Aanes, Mittelmark, & Hetland, 2010), and risk for suicidal behavior (Van Orden et al., 2010). Thus, there is considerable need to understand individuals' difficulties in social relationships in order to develop better targeted clinical research and interventions.

Although interpersonal dysfunction is common across distinct forms of psychopathology (Girard et al., 2017), the issue is particularly salient to personality pathology, as chronic and severe disturbance in interpersonal functioning represents a core feature of what constitutes a personality disorder (Hopwood et al., 2013; Wright et al., 2012). Personality disorders are

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relatively common in the general adult population, with a prevalence rate estimated as approximately 12.2% in Western countries (Volkert et al., 2018) and 7.8% globally (Winsper et al., 2020). Individuals with personality disorders have significant contact with the mental health system, with disproportionately high prevalence rates observed in psychiatric outpatient settings (i.e., 45-51% in the United States; Beckwith et al., 2014). Indeed, when compared with individuals with other psychiatric diagnoses, such as major depressive disorder, individuals with personality disorders have been shown to be more likely to seek psychological treatment, receive psychotropic medications, and be psychiatrically hospitalized (Bender et al., 2001; Bender et al., 2006).

Contemporary theories of personality pathology, such as the Alternative Model for Personality Disorders (AMPD; Skodol et al., 2011), suggest that the discrete personality disorder diagnoses categorized in the *Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (*DSM-5*) all share underlying core impairment in self and interpersonal functioning, referred to as Criterion A, that is manifested in unique constellations of pathological personality traits, referred to as Criterion B. The self-impairment of Criterion A refers to disturbances in one's self-concept, marked specifically by issues related to identity (i.e., lack of a coherent and stable sense of self) and self-direction (i.e., inability to set and attain meaningful personal goals). The interpersonal impairment refers to disturbances in relating to others, marked specifically by issues relating to intimacy (i.e., experiencing closeness with others) and empathy (i.e., sharing in the emotional experience of others). Notably, although these core aspects of personality pathology can be differentiated into self and interpersonal components, they are highly intertwined and thus represented together in Criterion A as a single rating of personality

pathology severity. This notion has also been supported empirically, as the self- and interpersonal components demonstrate quite high intercorrelations when assessed using self-report (Hopwood et al., 2018; Morey, 2017). Furthermore, there is empirical evidence to suggest that both Criterion A (Dowgwillo et al., 2018) and Criterion B (Wright et al., 2012) are highly correlated with indices of interpersonal distress, consistent with conceptualizations of personality pathology as a fundamentally interpersonal disorder (Hopwood et al., 2013).

Such interpersonal difficulties associated with personality pathology hinder and complicate day-to-day interactions and, ultimately, interpersonal relationships, and are pervasive such that the impairment occurs across different situations and relationships, including in the therapeutic setting (Hopwood et al., 2013). For instance, psychotherapy clients with personality pathology may manifest an initial interpersonal style marked by suspicion, fear, or distrust towards their therapist, which can in turn evoke a pessimistic, withdrawn, or combative stance on the part of the therapist and reinforce the client's dysfunctional interpersonal behaviors (Anchin & Pincus, 2010; Aviram et al., 2006; Bowers, 2002). This interpersonal pattern is likely to complicate and impede the development of the therapeutic alliance, which has important clinical implications given the robust relationship between alliance and positive therapeutic outcomes (Flückiger et al., 2012). For instance, Lewis and Appleby (1988) found that psychiatrists presented with case vignettes which described clients as having a previous personality disorder diagnosis were more likely to view those clients as manipulative, annoying, attention-seeking, unlikely to respond well to treatment, and less deserving of mental health resources, as compared to the same vignettes in which no personality disorder diagnosis was explicitly indicated. As such, the ability to recognize and address interpersonal complications which arise in the

treatment of personality disorders, both in the client's interpersonal behavior and the therapist's response, is essential for fostering the therapeutic alliance and facilitating positive change (Hopwood et al., 2013).

Borderline Personality Disorder

Despite theoretical and empirical evidence to suggest that interpersonal impairment is evident across different manifestations of personality pathology (Benjamin, 1996; Wilson et al., 2017; Wright et al., 2012), these issues appear to be of particular clinical importance to borderline personality disorder (BPD). BPD has been shown to be representative of the general factor of personality pathology, and as such may serve as a proxy for the core personality impairment captured by Criterion A (Sharp et al., 2015; Wright et al., 2016). Furthermore, self-reported BPD symptomatology has been shown to correlate highly with self-report measures of Criterion A (Hopwood et al., 2018; Morey, 2017), thus offering support for this assertion. As such, the interpersonal difficulties associated with BPD are likely to be representative of the interpersonal problems associated with severe personality pathology defined broadly.

BPD is one of the most commonly diagnosed personality disorders in both inpatient and outpatient settings (Beckwith et al., 2014; Sansone & Sansone, 2011; Widiger & Trull, 1993) and is characterized by emotional instability, self-destructive impulsivity, incoherent or unstable identity, and tumultuous interpersonal relationships. However, despite the range of symptoms associated with BPD, interpersonal dysfunction is often the primary focus of treatment of BPD given its integral role in the development and maintenance of the disorder (Bateman & Fonagy, 2010), as well as its implications in the clinical setting. Cognitive theories of personality disorders suggest that individuals with BPD are prone to negative biases in their evaluation of

others (Beck & Freeman, 2015), such as in their evaluations of the therapeutic process and their therapists (Bender et al., 2003; Zeeck et al., 2006) and relationships with hospital staff and other clients in psychiatric inpatient settings (Benjamin & Wonderlich, 1994). Additionally, clients with BPD are prone to countertherapeutic behaviors, such as intense and unpredictable mood fluctuations and dangerous and impulsive self-harm behaviors, which can be demoralizing and emotionally draining for mental health treatment providers (Anchin & Pincus, 2010; Aviram et al., 2006; Hopwood et al., 2013).

These difficult interpersonal experiences with clients appear to perpetuate the stigmatization of BPD within the mental health treatment community, such that mental health treatment providers often expect clients with BPD to demonstrate difficult, manipulative, demanding, and attention-seeking interpersonal behaviors (Aviram et al., 2006; Gallop et al., 1989; Lam et al., 2016). Indeed, the BPD diagnostic label alone has been empirically shown to affect the degree to which mental health treatment providers are warm and empathic (Fraser & Gallop, 1993). The combination of the treatment provider's emotional response to the client's challenging interpersonal behaviors and pessimistic a priori expectations about the course of treatment sometimes results in a phenomenon which has been termed "emotional retreat," in which treatment providers defend against strong emotional reactions to "difficult" personality disordered clients by becoming withdrawn or rejecting (Hinshelwood, 1999). In turn, this response can strengthen the belief that caregivers will ultimately become neglectful or abusive, thus reinforcing suspicion, distrust, and fear towards the clinician. While there is some evidence to suggest that treatment providers' attitudes towards individuals with BPD have improved in recent years (Day et al., 2018), stigma towards clients with BPD continues to present an issue in

the mental health treatment community (Ring & Lawn, 2019), with a large minority (47%) of treatment providers reporting a preference against working with clients with BPD (Black et al., 2011). Thus, interpersonal problems continue to present a barrier to effective treatment in this population, in part due to misconceptions as a result of poor understanding of the nature of these clients' interpersonal difficulties.

Interpersonal issues are additionally salient to the heightened risk for self-harm and suicide in this population, with approximately 84% of individuals diagnosed with BPD reporting suicidal behavior and a suicide completion rate estimated at up to 10% of all individuals with BPD (Black et al., 2004). Interpersonal influence was cited among 61% of BPD clients who self-harmed and 45% of BPD clients who attempted suicide (Brown, Comtois, & Linehan, 2002); furthermore, interpersonal problems were more likely to be cited as a reason for a suicide attempt amongst individuals diagnosed with comorbid BPD and major depression as compared to individuals diagnosed with depression alone (Brodsky et al., 2011). This suggests that the influence of interpersonal impairment on self-harm and suicide risk is particularly pronounced for individuals with borderline pathology as compared to those with other psychiatric disorders. As such, addressing interpersonal issues appears to be essential for effective treatment of BPD, and thus has been a focus of several interventions developed for BPD (e.g., dialectical behavior therapy, transference-focused psychotherapy, Dammann et al., 2016; interpersonal therapy for BPD; Markowitz et al., 2006).

Contemporary Interpersonal Theory

Contemporary interpersonal theory provides a framework through which to conceptualize the interpersonal difficulties associated with personality pathology. Sullivan (1953) defined

personality as the "relatively enduring pattern of recurrent interpersonal situations which characterize a human life" (p. 110-111), in which the "interpersonal situation" is an event occurring between the self and other which is associated with an affective experience (Hopwood et al., 2013). While the interpersonal situation often is conceptualized as an interaction between two actual people, the interpersonal situation may also refer to interactions between mental representations of the self and others, such as in memories, fantasies, and expectations of future experiences (Hopwood et al., 2019; Lukowitsky & Pincus, 2011; Sullivan, 1953). The fundamental motive in an interpersonal situation is to satisfy basic needs for security and self-esteem. If these needs are met, the interaction is experienced as pleasant, anxiety is reduced, and the interpersonal behavior is reinforced; alternatively, if these needs are not met, the interaction is experienced as unpleasant, anxiety is heightened, and dysregulation and distress occur in response (Hopwood et al., 2013; Pincus & Ansell, 2003). Patterns of interpersonal situations, referred to as dynamisms, develop and are encoded into memory via age-appropriate social learning. Dynamisms characterized by frustrated motives, in which security and self-esteem needs are repeatedly unmet, can manifest as distress, dysregulation, distortions, and in extreme cases, dissociation (Hopwood et al., 2013). Such phenomena are characteristic of the interpersonal dysfunction associated with personality pathology.

Contemporary interpersonal theory integrates the motives of security and self-esteem proposed by Sullivan (1953) within the metaconcepts of agency and communion, which were initially introduced by Wiggins (1991, 2003) and parallel the self- and other-impairment underlying personality pathology (i.e., Criterion A; Pincus, 2011). Agency and communion serve as the broad dimensions providing structure by which to conceptualize the interpersonal situation

(Anchin & Pincus, 2010; Wright, 2011). Agency refers to one's condition as an autonomous and self-directed individual, marked by strivings for power and mastery which preserve and augment one's sense of differentiation. Communion refers to one's condition as being a part of a larger social entity, marked by strivings for intimacy and solidarity in relationships with others. These two dimensions of agency and communion provide the underlying structure of the interpersonal circumplex (IPC; Wiggins, 1979), an extensively validated model for conceptualizing and assessing interpersonal behavior (Fournier, Moskowitz, & Zuroff, 2011; Pincus & Wiggins, 1990; Wiggins, 1991; Wiggins, 1996).

Interpersonal Circumplex

The IPC (Figure 1) is defined by a two-dimensional circular plot comprised of two orthogonal (i.e., statistically independent) factors: the *y*-axis corresponding to agency (ranging from dominance to submission) and the *x*-axis corresponding to communion (ranging from coldness to warmth). IPC theory suggests that interpersonal behaviors can be plotted anywhere on the two-dimensional plane as a representation of a blend of the two orthogonal dimensions (i.e., dominance and warmth, representing agency and communion, respectively) at varying degrees of intensity (i.e., closer to the origin of the circumplex or farther away). For instance, if an individual were to share a funny story with others at a party, that interpersonal behavior would be characterized as both dominant (i.e., demonstrating control in the situation) and warm (i.e., seeking closeness with others). Alternatively, if an individual were to stand to the side and not socialize with others at the party, that interpersonal behavior would be characterized as both submissive (i.e., not demonstrating control of the situation) and cold (i.e., withdrawing from closeness with others). For measurement purposes, the circle is often organized into octants,

which have been shown to be a reliable method of assessing the content domain of each area on the circumplex (Gurtman, 2011). For instance, an interpersonal behavior that is both hostile and controlling, such as angrily yelling a command at someone (e.g., "Shut up!"), would be best characterized in the upper left or *"Arrogant-Calculating"* octant of the circumplex. Notably, although the IPC conceptualizes agency and communion as orthogonal dimensions, research has suggested that these dimensions tend to show within-person positive relationships, particularly among healthy, well-adjusted individuals (Fournier et al., 2009; Roche, Pincus, Hyde, et al., 2013). Likewise, the interpersonal trait dimensions of dominance and warmth (i.e., representing agency and communion, respectively) have been shown to be normally distributed and moderately correlated among undergraduate students ($r = .26$; Ansell et al., 2011).

Wilson et al. (2017) conducted a meta-analysis examining relationships between the 10 categorical DSM-5 personality disorders and the octants of the IPC in order to determine if patterns of interpersonal dysfunction differ across pathological personality manifestations. Interpersonal dysfunction was found to be represented across all 10 categorical personality disorders, offering support for interpersonal impairment as a core feature of personality pathology. However, level of interpersonal distress varied across the personality disorder types, with borderline and avoidant personality disorders associated with the greatest interpersonal distress (i.e., as represented by the mean level of interpersonal problems across the octants of the IPC), and antisocial and schizoid personality disorders associated with the least interpersonal distress. Paranoid, schizoid, and schizotypal personality disorders were primarily associated with cold interpersonal traits, whereas avoidant personality disorder was associated with cold and submissive interpersonal traits. Antisocial, histrionic, and narcissistic personality disorders were

primarily associated with dominant interpersonal traits. BPD demonstrated interpersonal problems across nearly all of the problematic interpersonal traits, consistent with previous research suggesting that BPD does not consistently adhere to a particular interpersonal theme (Horowitz et al., 2006; Locke, 2000) and may instead reflect the general factor of pathological personality (Sharp et al., 2015; Wright et al., 2016).

Applying more contemporary dimensional models of personality disorder, Dowgwillo et al. (2018) extended the meta-analysis conducted by Wilson et al. (2017) by examining the relationship between Criterion A (i.e., global impairment in self and interpersonal functioning underlying personality pathology) and interpersonal problems as assessed by the IPC. Both self- and interpersonal dysfunction were positively associated with overall interpersonal distress, supporting the assertion that Criterion A is largely representative of fundamental impairments in relating to others (Pincus, 2018). Likewise, several relationships were demonstrated between the components of Criterion A (i.e., self and interpersonal impairment) and specific aspects of the IPC. The interpersonal impairment of Criterion A demonstrated clear relationships with interpersonal problems and sensitivities, such that empathy impairment was associated with problems of interpersonal vindictiveness and sensitivity to others' dependent behavior, whereas intimacy impairment was associated with interpersonal coldness and sensitivity to others' affiliative behavior. Regarding the self-impairment components of Criterion A, impairment in self-direction was found to be associated with interpersonal coldness, whereas identity impairment was associated with sensitivity to others' demonstrations of dominance. Thus, these findings offer support for use of the IPC as a conceptual model by which to understand the interpersonal impairment underlying personality pathology.

Interpersonal Complementarity

Interpersonal theory suggests that interpersonal situations, both transpiring in real-time and as mental representations, occur as dynamic and enduring "recurrent patterns" (Sullivan, 1953, p. 109). Per interpersonal theory, interpersonal situations typically follow normative patterns of interpersonal behavior between interactants, such that particular interpersonal behaviors tend to elicit or constrain particular interpersonal reactions (Carson, 1969; Leary, 1957). Interpersonal *complementarity* refers to an interpersonal pattern in which there is a reciprocal match between the interpersonal motives of the interactants, such that the interactional pattern is reinforced (Hopwood et al., 2019; Hopwood et al., 2013). Specifically, as reflected on the IPC, complementarity is manifested by sameness for the horizontal dimension (i.e., warmth pulls for warmth; coldness pulls for coldness) and oppositeness for the vertical dimension (i.e., dominance pulls for submission; submission pulls for dominance), as depicted in Figure 2. For instance, a warm submissive behavior (e.g., a frightened child seeking a parent) communicates a bid for reassurance that can elicit either a complementary (e.g., parent soothes the child) or non-complementary (e.g., parent scolds the child) response. Empirical research has generally offered support for naturally-occurring complementarity in dyadic interactions (Locke & Sadler, 2007; Markey et al., 2003; Markey et al., 2010; Sadler et al., 2009; Sadler & Woody, 2003; Strong et al., 1988; Tracey, 1994) and has found that complementarity in interactions is associated with positive relational outcomes, such as increased liking and productivity (Estroff & Nowicki, 1992; Markey et al., 2010; Thomas et al., 2014). Notably, it has been suggested that complementarity may occur more consistently for warm interpersonal interactions as compared to cold interpersonal interactions (Orford, 1986), which has been attributed to base rate differences in

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warm versus cold behaviors (Tracey, 1994). Additionally, the degree of complementarity may be associated with situational factors, such as role discrepancy between the interactants (e.g., therapist/client; parent/child) and individual difference variables (Bluhm et al., 1990; Kiesler, 1982; Moskowitz, 1988). Despite some mixed findings (Orford, 1986), complementarity is useful such that it serves as a normative baseline for reciprocal interpersonal behavior associated with appropriate social development. Chronic deviations from complementarity may suggest disruptions in interpersonal processes indicative of personality pathology (Hopwood et al., 2019; Hopwood et al., 2013; Roche, Pincus, Conroy, et al., 2013).

Interpersonal Process of Personality Disorders

Dysregulation

Recurrent failure to meet the basic motives of security and self-esteem in interpersonal interactions can result in dysregulation and distortion in a variety of domains, which, when chronic and extreme, may be indicative of pathological personality functioning (Hopwood et al., 2019; Hopwood et al., 2013). Dysregulation may be manifested in three psychological domains: self, affect, and the interpersonal field (Pincus & Hopwood, 2012). Self-regulation refers to one's ability to maintain a stable and coherent, but appropriately flexible, self-concept, particularly with respect to how one views oneself in relation to others (Hopwood, 2018; Hopwood et al., 2013). DSM-5 AMPD features of self-dysfunction, such as identity incoherence, lack of self-directed goal-seeking, unstable self-esteem, poor self-differentiation, and difficulties with self-reflection, are all reflective of impaired self-regulation (Hopwood et al., 2013). Affect regulation refers to the ability to recognize and manage one's internal and external emotional states, particularly with respect to how one feels in interpersonal interactions (Gratz & Roemer, 2004;

Hopwood et al., 2019; Hopwood et al., 2013). Extreme affective rigidity or lability, which are conceptualized as aspects of self-dysfunction in the DSM-5 AMPD, are reflective of impaired affect regulation. Finally, interpersonal field regulation refers to one's capacity for modulation of interpersonal processes within reciprocal interpersonal transactions, as reflected by one's interpersonal behavior and the ways in which one impacts the interpersonal behaviors of others (Hopwood et al., 2019; Wiggins & Trobst, 1999). DSM-5 AMPD features of interpersonal dysfunction, such as difficulties with intimacy and empathy, are reflective of field dysregulation (Hopwood et al., 2013). Although dysregulation can co-occur across these three domains, their manifestations are distinct; for example, BPD symptoms include identity problems (self-dysregulation), affective instability (affective dysregulation), and tumultuous interpersonal relationships (field dysregulation; Pincus & Hopwood, 2012).

Perceptual Distortions

Sullivan (1953) first proposed the concept of "parataxic distortions," which were described as internally-occurring subjective interpersonal situations, generally occurring outside of the individual's cognitive awareness, which do not align with the objective interpretation of the observable interpersonal situation. In other words, a parataxic distortion, or *perceptual distortion*, indicates a mismatch between the individual's internal representation of an interpersonal interaction and the external reality of that interaction (Hopwood, 2018; Hopwood et al., 2019; Hopwood et al., 2013). For instance, a client with an entrenched fear of abandonment might perceive his therapist's failure to immediately return an after-hours phone call as an indicator of disinterest in his well-being, which then might evoke anger and hostility as a self-protective defensive response. In turn, the therapist may respond to the client's anger in a

self-protective manner by becoming withdrawn or irritated, which then reinforces the client's perception of the therapist as uncaring. Such distortions are distressing for both the client and the therapist, as neither person's interpersonal motives for security and self-esteem are met. Notably, in such an example, the client's response (i.e., anger) can be viewed as appropriate with respect to the client's perception (i.e., the therapist is disinterested), but inconsistent with the objective interpersonal behavior (i.e., failing to immediately return an after-hours call). Perceptual distortions are deeply rooted in learned experiences from the individual's social development, are reinforced over time, and represent a core feature of the maladaptive interpersonal functioning associated with personality pathology (Hopwood, 2018; Hopwood et al., 2013; Pincus & Hopwood, 2012). Such distortions, in turn, give rise to dysregulation; for instance, in the above example, the client's perceptual distortion leads to self-dysregulation (i.e., need to protect from abandonment), affective dysregulation (i.e., fear; anger), and field dysregulation (i.e., defensive behavior; hostility). Thus, evaluating and addressing perceptual distortions in order to improve dysregulation represents an important target for clinical intervention (Hopwood et al., 2013).

Interpersonal Assessment of Personality Pathology

Several different tools and paradigms have been employed to assess for interpersonal deficits among individuals with personality pathology, including both self-report measures and laboratory-based behavioral assessments (Lazarus et al., 2014; Wilson et al., 2017). Although interpersonal dysfunction is thought to underlie all personality pathology presentations (Wilson et al., 2017), the majority of empirical research to date has focused on the interpersonal impairment associated with BPD. As previously noted, BPD has been shown to be representative

of the general factor of personality pathology, and thus may serve as a proxy of severe personality impairment as captured by Criterion A (Sharp et al., 2015; Wright et al., 2016). As such, the following section will primarily highlight research findings pertaining to interpersonal assessment of individuals with BPD, but such findings are likely to be applicable to conceptualizations of interpersonal impairment in personality pathology defined broadly.

Self-Reported Interpersonal Problems

A number of self-report assessment instruments have been used to evaluate interpersonal problems associated with personality pathology, including several which employ scoring approaches which align with the IPC [e.g., Inventory of Interpersonal Problems-Circumplex (IIP-C; Pincus & Wiggins, 1990); Circumplex Scales of Interpersonal Problems (CSIP; Boudreaux et al., 2018)]. Self-report assessments of interpersonal problems are useful such that they enhance understanding of the subjective interpersonal distress associated with personality pathology; for instance, both the global self- and interpersonal impairment (i.e., Criterion A) and pathological personality traits (i.e., Criterion B) underlying personality pathology have demonstrated strong relationships with self-report measures of interpersonal problems (Dowgwillo et al., 2018; Wright et al., 2012), highlighting the interpersonally distressing nature of personality disorders. Regarding specific personality disorder diagnoses, BPD has been shown to be associated with more severe self-reported interpersonal problems when compared against individuals with other clinical diagnoses, including other personality disorders (Hilsenroth et al., 2007; Stepp et al., 2011). Thus, it is evident that self-report methods of interpersonal assessment offer important information regarding the interpersonal experience of individuals with personality pathology. However, it has been argued that self-report instruments may offer an incomplete picture of

interpersonal functioning in this population (Lazarus et al., 2014), as the self-report method may be more prone to response bias (Paulhus & Vazire, 2007), particularly among individuals with BPD who are prone to negative self- and other-evaluations (Baer et al., 2012). Furthermore, disturbances in interpersonal judgments may not necessarily occur for the same IPC octants in which interpersonal problems are self-reported. For instance, an individual may self-report an interpersonal style that is overly self-sacrificing (i.e., LM problems), whereas interpersonal judgment tasks reveal a tendency to overperceive dominance in others (i.e., misperceptions of PA). Thus, self-report measures assess interpersonal problems, whereas assessments of interpersonal judgment point to the potential mechanisms underlying such problems. As such, it has been suggested that behavioral assessments of interpersonal functioning, which ask individuals to *demonstrate* their interpersonal abilities using approximations of real-world interpersonal situations, may offer a more comprehensive and nuanced assessment of interpersonal difficulties as they occur in actual interpersonal transactions (Lazarus et al., 2014).

Behavioral Assessments of Interpersonal Problems

Several different behavioral assessment tools have been employed to better understand how individuals with personality pathology make sense of their social environment, including the degree to which individuals are cognizant of others' emotions and interpersonal motives, referred to as social cognition (Roepke et al., 2013). One common type of behavioral task asks individuals to infer another person's mental state (Lazarus et al., 2014), such as recognition of facial emotional expressions based on photographs (e.g., the "Reading the Mind in the Eyes" Test; RMET; Baron-Cohen et al., 2001). Although individuals with BPD do not consistently demonstrate significant impairments in perceptual tasks such as facial emotion recognition,

meta-analyses have offered some evidence that individuals with BPD do exhibit a negative bias in responding to such stimuli when compared to control groups, particularly in response to ambiguous or neutral facial expressions (Daros et al., 2013; Mitchell et al., 2014; Richman & Unoka, 2015). Individuals with BPD have also been shown to demonstrate attentional bias towards angry faces (Kaiser et al., 2019) and to perceive anger in facial expressions more often than control participants (Bertsch et al., 2017; Domes et al., 2008). Likewise, clients with BPD have been shown to judge individuals in photographs as less trustworthy and less approachable as compared to judgments made by control participants (Nicol et al., 2013). These findings have been attributed to the association between BPD symptomatology and hypersensitivity to interpersonal threat, which is likely to be reflective of the internal representations underlying perceptual distortions in this population (Hopwood et al., 2019; Hopwood et al., 2013). Given that one's perception of others' emotions and mental states is important to developing and maintaining relationships (Andersen & Przybylinski, 2014), it is possible that these deficits in perception may contribute to the interpersonal difficulties experienced by individuals with BPD. However, there is also substantial counterevidence to suggest that individuals with BPD are sometimes more accurate in their facial emotion recognition than healthy controls (Fertuck et al., 2009; Frick et al., 2012; Lynch et al., 2006; Schulze et al., 2013; Scott et al., 2011; Wagner & Linehan, 1999). In some cases (Schulze et al., 2013; Scott et al., 2011; Wagner & Linehan, 1999), enhanced facial emotion recognition was primarily limited to negative facial expressions (e.g., anger, fear), which may be attributed to the negative evaluative bias commonly demonstrated among individuals with BPD (Mitchell et al., 2014; Richman & Unoka, 2015). However, other studies have found that individuals with BPD are also able to more quickly

(Lynch et al., 2006) and accurately (Fertuck et al., 2009; Frick et al., 2012) detect positive facial expressions (e.g., happiness), which is counterintuitive given that a negative evaluative bias would in theory make detection of positive emotional states more difficult. It is plausible that individuals with BPD demonstrate heightened sensitivity to all social cues, thus contributing to generally "accurate" perceptions, but are unable to effectively process those cues and thus respond in an amplified and emotionally dysregulated manner (Dinsdale & Crespi, 2013).

Although facial emotion recognition paradigms are commonly used to assess interpersonal deficits among individuals with BPD, static stimuli, such as photographs, are limited in that they may lack the external validity needed to representatively assess interpersonal deficits as they occur in the environment (Reichenberger et al., 2017). Some researchers have employed dynamic assessment tools, such as video clips, which integrate both verbal and nonverbal cues and thus may be more representative of the real-world interactions in which interpersonal deficits occur. For instance, Veen and Arntz (2000) asked participants to rate individuals depicted in brief video clips (i.e., approximately 10 minutes), including clips selected to represent themes relevant to borderline pathology, such as relationship crises, abandonment, sexual abuse, and rejection. Participants with BPD demonstrated more extreme judgments of the target individuals as compared to control participants and participants with other personality disorder diagnoses, but this finding was specific to the videos depicting BPD-relevant content and did not occur for the videos depicting more generalized interpersonal content (i.e., a business disagreement) or neutral (i.e., farm life) content. These differences may be attributed to the degree of emotional arousal elicited by the BPD-relevant video content, which may lead to greater interferences in interpersonal perceptions when combined with the already high baseline

level of arousal in individuals with BPD (Daros et al., 2013). Sieswerda et al. (2013) extended the study conducted by Veen and Arntz (2000) to include a more emotionally arousing video of generalized interpersonal content. Although Sieswerda et al. (2013) did not find evidence for greater extremity in judgments made by participants with BPD, participants with BPD did demonstrate more negative evaluations of the stimuli, which was also related to history of childhood sexual abuse. In another study using more neutral stimuli, Barnow et al. (2009) asked participants with and without BPD to make judgments about short video clips (i.e., 10 seconds) depicting a person walking into a room and taking a seat. Ratings of the target person by the participants with BPD were significantly negatively skewed, such that the BPD sample rated the target person as more neurotic (d = .64), less extraverted (d = -.62), less open (d = -.69), less agreeable (d = -.84), and less conscientious (d = -.66) as compared to the ratings of the control sample. Additionally, the BPD sample rated the target person as less serious (d = -.55), less respectful (d = -.54), less nice (d = -.55), more exploitive (d = .62), more brutal (d = .96), and more mischievous (d = .87). Thus, individuals with BPD appear to demonstrate altered interpersonal perceptions across different degrees of emotional valence, offering a potential explanation for the interpersonal difficulties reported across various types of real-world interpersonal interactions.

A variety of standardized dynamic assessment tools have also been developed to assess social cognition [e.g., Empathic Accuracy Paradigm (Marangoni et al., 1995); Interpersonal Perception Task (Costanzo & Archer, 1989)]. For instance, the Profile of Nonverbal Sensitivity (PONS; Rosenthal et al., 1979) presents respondents with 20 short video clips of a single woman acting out various scenes, in which various channels of non-verbal communication are

manipulated (i.e., presentation of the face, body, and voice). No explicit verbal information is conveyed, but the voice is sometimes presented in a masked format, such that respondents can hear various aspects such as the rhythm, tempo, and loudness but cannot understand the intended words. The videos were selected to provide coverage across combinations of two categories: dominance (i.e., dominant versus submissive) and valence (i.e., positive versus negative). For instance, "nagging a child" is an example of a video clip that was considered dominant and negative. For each video, respondents are presented with two choices (e.g., "nagging a child" or "expressing motherly love") and are asked to choose which is a more fitting description for the given video. Schaffer et al. (2015) demonstrated that participants with BPD perform more poorly on the PONS task when compared to control participants, supporting the assertion that misperceptions of social stimuli may underlie the experience of interpersonal problems in this population. However, in direct contrast, Frank and Hoffman (1986) examined scores on the PONS for individuals with and without BPD and found that the sample with BPD demonstrated higher overall accuracy scores as compared to the control sample. Perceptual accuracy was furthermore found to differentially correlate with parenting practices in these samples, such that accuracy on the PONS correlated with negative parental practices in the BPD sample and positive parental practices in the control sample. These findings highlight the complex and unique nature of the interpersonal difficulties experienced by individuals with personality pathology, which is likely to be a contributing factor in the equivocality of research findings to date.

One video-based assessment in particular, the *Movie for the Assessment of Social Cognition* (MASC; Dziobek et al., 2006), has been used with increasing frequency among

individuals with personality disorders, primarily BPD (Andreou et al., 2015; Fossati et al., 2018; Preißler et al., 2010; Ritter et al., 2011; Wingenfeld et al., 2014; Vaskinn et al., 2015). The MASC, which utilizes a 15-minute video involving four characters having a dinner party, was originally developed to assess social difficulties in Autism Spectrum Disorder (ASD) but has recently been used as an assessment of social cognition for individuals with BPD. Several studies have examined differences in performance on the MASC between individuals diagnosed with BPD and control samples, and many of these studies have found significant perceptual deficits in the BPD sample (Andreou et al., 2015; Fossati et al., 2018; Preißler et al., 2010; Ritter et al., 2011). For instance, Preißler et al. (2010) reported no group differences between inpatient women diagnosed with BPD and healthy controls on the RMET (i.e., facial emotion recognition) but found that the women with BPD performed significantly worse on the MASC. Similarly, Andreou et al. (2015) found that a combination of clinical inpatient and outpatient participants diagnosed with BPD demonstrated significantly poorer performance on the MASC as compared to healthy controls, controlling for initial performance on a static measure of facial emotion recognition. Likewise, Fossati et al. (2018) found a medium effect size relationship ($r = .37$) between self-reported borderline pathology and performance deficits on the MASC among adult outpatients. Nevertheless, some researchers (Wingenfeld et al., 2014; Vaskinn et al., 2015) have failed to demonstrate differences on the MASC between participants diagnosed with BPD and comparison samples, which has been attributed in part to the specificity of the items for capturing autism spectrum related interpersonal difficulties (e.g., difficulties understanding metaphors or sarcasm). Taken together, these findings generally indicate that video-based stimulus materials, which combine both verbal and nonverbal information, may offer the

complexity necessary to discern interpersonal deficits in this population, as compared to more static social cognition tasks.

Although behavioral assessments have tended to suggest that individuals with BPD demonstrate unique interpersonal patterns, empirical results have been mixed, and the exact nature of the interpersonal impairment remains unclear. Specifically, the question still remains as to whether the interpersonal impairment observed in individuals with BPD represents an issue with perception of others' interpersonal behaviors or a lack of understanding of how to react appropriately to perceived interpersonal stimuli. Some studies have attempted to answer this question by examining facial emotional expressions as a way to gauge how individuals with BPD react to laboratory-derived interpersonal situations (Herpertz et al., 2001; Lobbestael & Arntz, 2010; Renneberg et al., 2005; Staebler et al., 2011). For instance, Staebler et al. (2011) videotaped the reactions of individuals playing Cyberball, a computer-based social paradigm in which participants are either included in or excluded from a ball-tossing game, and found that participants with BPD demonstrated more blended facial expressions (i.e., two or more facial expressions at one time) in the exclusion condition as compared to control participants. This finding is consistent with other research suggesting that individuals with BPD are difficult for others to "read"; i.e., others experience more difficulty inferring the personality characteristics and thoughts and feelings of individuals with BPD relative to non-BPD counterparts (Flury et al., 2008). However, while facial emotional reactions may offer some information regarding potential differences in the ways in which individuals with BPD implicitly react to interpersonal stimuli, this method does not assess the extent to which individuals with BPD are aware of the appropriate behavioral reaction in a typical interpersonal transaction.

Furthermore, this method is not embedded in a more comprehensive interpersonal theory, such as the concept of complementarity. It is widely theorized that interpersonal difficulties may arise when misperceptions lead to reactions that are complementary with respect to the subjective internal perception but situationally inappropriate with respect to the external reality (Hopwood, 2018; Hopwood et al., 2013; Pincus & Hopwood, 2012). However, there are very few empirical studies which attempt to address this question. Roche, Pincus, Conroy, et al. (2013) conducted a daily diary study in which participants recorded perceptions of the interpersonal behaviors of those they interacted with in their day-to-day lives, as well as their own interpersonal behaviors. Pathological narcissistic personality traits were found to moderate the relationship between interpersonal perceptions and the complementarity of agentic behavior, such that high levels of grandiosity led to non-complementarity when the interaction partner was perceived to be more communal (i.e., higher in warmth). However, while the daily diary method offers important insights regarding the manifestation of complementarity in real-world interactions, such an approach is not time- and cost-efficient in most research and clinical settings. Thus, complementarity (or lack thereof) appears to be a reasonable but understudied approach to examining deficits in interpersonal reactions associated with personality pathology, in part due to lack of a suitable methodology.

Development of a Novel Methodology

Although there are a variety of behavioral assessments which ask respondents to perceive others' behaviors and mental states, the only existing interpersonal assessments which are structured per the IPC are self-report questionnaires, in which an individual is asked to report on their own interpersonal tendencies. Developing a novel methodology with response choices that

align with the IPC would improve upon currently existing behavioral assessments of interpersonal functioning, as such an approach would allow for more nuanced evaluation of interpersonal patterns. For example, it is plausible that an individual may accurately perceive the general emotional content of an interpersonal behavior (e.g., unfriendliness), but may perceive that emotional content to a much more extreme degree than typical respondents (e.g., perceiving extreme hostility versus mild irritability). Furthermore, there currently exists no behavioral assessment in which an anticipated interpersonal reaction is recorded; i.e., participants are not asked "What will he/she do next?" in response to the interpersonal situation provided. Thus, an exploratory goal of the present study is to assess the accuracy and biases of anticipated interpersonal reactions, as the current lack of suitable methodology has presented a critical barrier to addressing the research question of whether the difficulties in interpersonal functioning associated with personality pathology are a result of deficits in interpersonal perception or poor awareness of appropriate interpersonal reactions.

The proposed study seeks to address this research question via the development of a novel methodology which 1) utilizes a dynamic (i.e., video-based) behavioral assessment method, 2) assesses the accuracy and biases of both interpersonal perceptions and anticipated reactions, and 3) aligns with interpersonal theory and the structure of the IPC. The goal of developing this methodology is to contribute to a more comprehensive and nuanced understanding of the interpersonal impairment associated with personality pathology. Specifically, this study aims to use this developed methodology to examine relationships between interpersonal judgments (i.e., interpersonal perceptions and anticipated reactions) and pathological personality. In turn, this information is anticipated to better direct research efforts to understand interpersonal impairment

in BPD and personality pathology broadly, which to date have produced inconsistent findings

(Dinsdale & Crespi, 2013), and aid in the development of more specifically targeted treatment

interventions.

PRELIMINARY DATA*

Preliminary data were collected across two independent samples in order to develop and refine a set of stimulus materials to serve as a novel methodology allowing for the assessment of individual differences in interpersonal perceptions and anticipated reactions, relative to normative performance on these tasks. Stimulus videos of dyadic interpersonal interactions were selected for inclusion on the basis of demonstrating adequate representation across the IPC octants, such that participants' responses demonstrated generally high consensus but also allowed for normative variability. A large initial set of stimulus videos were evaluated in the first sample, and these analyses guided the selection of a smaller subset of videos to be administered to the second sample. Although data were collected from two independent samples, the majority of analyses were conducted with these samples combined. However, given notable differences in the time burden between the two data administrations (i.e., 65 videos versus 27 videos), some comparisons of the two samples in this respect are also presented. The resultant methodology is intended to assess the accuracy and potential biases of interpersonal perceptions and anticipated interpersonal reactions. Development of this novel method is intended to allow for the comprehensive assessment of normative interpersonal transactional patterns, as well as the evaluation of interpersonal characteristics of unique samples, such as individuals with personality pathology.

Method

Participants

Sample 1. A total of 184 participants (80.4% female) ranging from 18 to 22 years of age (M_{age} = 19.09, SD_{age} = 1.07) were recruited from the Texas A&M University undergraduate

subject pool. The majority of participants were White/Caucasian (64.2%), followed by

Hispanic/Latino (20.3%), Black or African American (2.7%), Asian or Pacific Islander (8.8%),

and bi-racial/multiracial (4.1%). Some participant demographic data was missing for age ($n =$

32.6%), gender ($n = 19.6$%), and race/ethnicity ($n = 19.6$%). Participants were compensated with

course credit for research participation.

Sample 2. A total of 68 participants (55.9% female) ranging from 18 to 38 years of age

($M_{age} = 20.09$, $SD_{age} = 2.62$) were recruited from the Texas A&M University undergraduate

subject pool. The majority of participants were White/Caucasian (66.2%), followed by

Hispanic/Latino (20.6%), Black or African American (4.4%), Asian or Pacific Islander (4.4%),

bi-racial/multiracial (2.9%), and Other (1.5%). Participants were compensated with course credit

for research participation.

Materials

Stimulus Videos. *Sample 1.* A total of 65 video clips were administered to the first

sample, with at least 8 video clips selected by the investigators as approximate representations of

each octant of the IPC. Video clips were selected from black-and-white movies and television

shows filmed in the 1930s-1950s. Video clips were selected from black-and-white films, as such

films are (a) available freely in the public domain, (b) expected to maintain a "classic" rather

than "dated" aesthetic with the passage of time, and (c) the odds of participants being familiar

with such films or the actors in the film is relatively low. All videos were approximately 10 to 30

seconds long and depicted a dyadic interpersonal interaction with one person labeled as "Person

A" and the other person labeled as "Person B." Each video segment was accompanied by two

identical items, one asking the participant to *perceive* an interpersonal behavior shown in the

video (i.e., "To what extent would you characterize Person A's behavior as...?") and one asking the participant to anticipate an interpersonal behavior that will happen in *reaction* (i.e., "To what extent do you expect Person B's response to Person A to be characterized as...?"). Each item consisted of eight stems derived from each octant of the IPC. Items are presented in Appendix A. Respondents were asked to indicate the likelihood of each response stem being the most appropriate answer on a scale of 1-6. Thus, for each video segment, respondents rated a total of 16 possible responses (i.e., eight per item), each on a 6-point scale. This approach allows for the use of circumplex statistics to evaluate normative interpersonal patterns of responding as well as the interpersonal features of unique samples of interest (e.g., clients with personality pathology).

Sample 2. Participants in the second sample were presented with a total of 27 stimulus videos. Twenty-three of the videos were retained from the first stimulus set based on the results of analyses of the data gathered in Sample 1. Additionally, four new videos were selected and included as representations of octants in which there were less conclusive or consistent results based on the analyses conducted in Sample 1. These new videos represented the PA, BC, or JK octants.

Data Analysis

In both data samples, the eight scaled responses to each item, each corresponding to one octant of the IPC, were evaluated to determine the extent to which responses to the item form an interpersonal profile that aligns with circumplex structure. Thus, responses to the eight response stems for each item were expected to follow a pattern in which the correlations between octants (i.e., stems) are inversely related to their angular distance on the circumference of the circle. In other words, neighboring octants were expected to correlate most highly, and opposite octants

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were expected to correlate least highly. Alignment with circumplex structure is important, as this allows for the use of circumplex statistics to model interpersonal data. Using the structural summary method (SSM) approach to modeling circumplex data, this pattern of correlations can be plotted linearly, creating a cosine curve (Figure 3) consisting of three structural parameters: *angular displacement, amplitude,* and *elevation.* The *angular displacement* refers to the location on the IPC representing the dominant interpersonal theme or typology of the profile. The *elevation* is the average score across all eight octants, indicating the mean level of the profile as a whole. The extent to which the interpersonal content of the profile is distinct is represented by the *amplitude*, or vector length, indicating the degree to which the predominant interpersonal theme or typology is differentiated from the other octants (i.e., the degree to which an interpersonal behavior is characterized by one octant versus the other seven). Finally, the goodness-of-fit between the predicted and observed cosine curves is represented as R^2, which indicates the degree to which an interpersonal profile is prototypical and thus represented by these three structural parameters. Acceptable model fit with circumplex structure is indicated by an R^2 value of .7 or higher.

These structural parameters were used to evaluate group patterns of responding in order to develop a final set of stimulus videos that demonstrate normative response patterns per IPC theory. Videos were first evaluated on the basis of the first item (i.e., the interpersonal perception of Person A). Videos were initially retained on the basis that the perception item responses: a) show a clear prototypical interpersonal profile (i.e., $R^2 > .7$); b) align closely with the octant of interest (i.e., displacement as close as possible to the angular location of the octant); c) are differentiated such that one distinct interpersonal theme emerges (i.e., moderate amplitude); and

d) demonstrate adequate interrater reliability among study participants, measured using intraclass correlation (ICC) and Q-correlation analyses (described below).

The response patterns to the second item (i.e., the anticipated reaction of Person B to Person A) were then evaluated using the same parameters. Preference in video selection was given to items which demonstrated conformance to the prototypical interpersonal profile (i.e., R^2), higher amplitude (i.e., a more differentiated profile), and an approximately complementary response (i.e., angular displacement as close as possible to being complementary to the angular displacement of the perception). Although the primary goal was selecting videos in which there was generally high consensus regarding the expected reaction, approximate complementarity was preferred given that complementary interactional patterns align with interpersonal theory. Additionally, for each video, Q-correlations were calculated for each participant as a person-level representation of the relationship between the observed response pattern and the expected response pattern per IPC theory (i.e., perfect circumplex structure). Q-correlations were calculated for both the perception and anticipated reaction items. For the perception item, the expected response pattern was one in which the intended octant was rated highest, with neighboring octants also rated highly and opposite octants rated least highly. For instance, the expected response pattern for a video selected to represent the assured and dominant (i.e., PA) octant would have the highest score on the PA octant stem (i.e., 6) and the lowest score on the unassured and submissive (i.e., HI) octant stem (i.e., 1). For the anticipated reaction item, the expected response pattern was one which was complementary to the expected response pattern of the perception item. For instance, the complementary expected response pattern for a video selected to represent the arrogant and calculating (i.e., BC) octant would have the highest score

on the aloof and introverted (i.e., FG) octant stem (i.e., 6) and the lowest score on the friendly

and extraverted (i.e., NO) octant stem (i.e., 1). Thus, *Q*-correlations were computed as an

estimate of the degree to which each participant's observed response pattern for a particular item

corresponded to the expected response pattern for that item. These procedures were used

concurrently to develop a final set of stimulus videos which produce clear normative patterns of

interpersonal perceptions and anticipated reactions but are still expected to be sensitive to natural

differences in interpersonal style. In other words, these stimulus videos are intended to produce a

consistent general pattern of responses in a "healthy" normative sample, but some individual

differences in responding are still expected to be present even within the normal range.

Results and Discussion

Evaluation of the SSM parameters for each of the stimulus videos was conducted using

the analytic strategy described above, resulting in a final stimulus set of 8 videos meeting the

established criteria (i.e., with one video selected as a representation of each octant). Seven of the

videos were selected from the set of videos administered to both data samples; however, one

video (i.e., selected to represent the DE octant) was only administered to the first sample, as this

video outperformed the videos included in the second data sample based on the aforementioned

selection parameters. Table 1 presents descriptive data for the octant scores in each of the

stimulus videos. Table 2 presents the SSM parameters (i.e., model fit, amplitude, and

displacement) for the perception and anticipated reaction items for the 8 selected videos in the

combined sample ($n = 252$), with the exception of the DE video which was administered only to

the first sample ($n = 184$). Responses to the perception (R^2 range: .74-.90) and reaction (R^2 range:

.70-.92) items for each of the 8 selected videos met the minimum acceptable threshold for model

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fit to circumplex structure. The mean *Q*-correlation values for each video are also presented in Table 2. *Q*-correlations (i.e., averaged using Fisher's *z* transformation and then back-transformed to a mean *r* value) ranged from .43 through .80 for the perception item and .30 through .64 for the response item, indicating medium to large effect size relationships between the mean response pattern and hypothesized circumplex structure for each of the 8 videos.

The inter-rater reliabilities of participants' ratings for each of the octants, for both the perception and anticipated reaction items, were computed as an average measures intraclass correlation coefficient (ICC) using a two-way random effects model. The ICCs were calculated with the participants' ratings for a single octant (e.g., PA) across different videos as cases, and the participants as raters. This process was repeated for the perception and anticipated reaction items, resulting in a total of 16 ICC values. Table 3 presents the average measures ICC values, which were computed in the initial data sample ($n = 184$), as one of the selected 8 videos (i.e., representing the DE octant) was not administered to the second data sample. ICC values ranged from .991-.995 for the perception items and .980-.995 for the reaction items, indicating very high reliability across participants in both the perceptions and anticipated reactions.

Given the known association between test length and reliability, a 16-video stimulus set was also evaluated using the aforementioned parameters. However, the 8-video stimulus set was ultimately retained for several reasons. First, brevity appeared to impact data quality, such that data quality appeared to be improved in the second data set in which participants were presented with substantially fewer stimulus videos (i.e., 27 versus 65) and thus a reduced time burden. For instance, mean octant scores for the target octant were higher in the second sample ($M = 4.93$, $SD = .67$) as compared to the first sample ($M = 4.44$, $SD = .47$) for the retained 7 videos included

in both samples [$t(7) = 5.17$, $p = .001$], indicating that participants appeared more attuned to the interpersonal content of the stimulus videos when task demands were reduced. Second, all 16 ICC values (i.e., 8 octants across both the perception and anticipated reaction items) were found to be higher in the 8 video stimulus set ($M = .990$, $SD = .01$) as compared to the 16 video stimulus set ($M = .986$, $SD = .01$), indicating improved reliability even with a reduced stimulus set. As such, the 8-video stimulus set was determined to be psychometrically superior to the 16-video stimulus set, with the added benefit of increased time-efficiency.

This preliminary study was intended to facilitate the development of a set of stimulus materials to be used as a methodology in the assessment of interpersonal perceptions and anticipated reactions. A final set of 8 stimulus videos was identified, with each video portraying a dyadic interpersonal interaction representing one of the octants of the IPC. Participants' perceptions of the selected videos were found to be highly reliable, consistent with IPC structure, and representative of their intended octants. Additionally, although exploratory in nature, participants' anticipated interpersonal reactions for the selected videos demonstrated similarly high reliability and consistency with IPC structure, as well as broad complementarity to the respective perceptions. Thus, the developed methodology appears promising as a means by which to assess participants' interpersonal perceptions and anticipated responses with respect to normative comparisons. The data collected in this preliminary study will provide a normative reference point for the proposed study, which seeks to examine relationships between personality pathology and deviations from normative patterns of responding in a sample selected to represent individuals across a range of personality pathology severity.

STUDY AIM AND HYPOTHESES

The present study utilized this novel methodology for the study of interpersonal processes in a sample which includes participants across a spectrum of personality pathology severity (i.e., no/mild symptoms to severe), as it is anticipated that personality pathology will be manifested by deviations from normative patterns of interpersonal perceptions and anticipated reactions. Specifically, the following hypotheses were proposed:

1. Perceptions

    a. Higher levels of personality pathology will be associated with global-level deviations from "accurate" interpersonal perceptions (i.e., with accuracy determined by normative data).

    b. Higher levels of personality pathology will be associated with a global-level bias towards colder interpersonal perceptions.

    c. At the octant-level, the cold evaluative bias will be strongest for perceptions of videos selected to represent warm interpersonal themes (i.e., videos reflecting the NO, LM, and JK octants).

Previous research has generally demonstrated mixed findings regarding the perceptual accuracy of individuals with personality pathology, particularly BPD (Dinsdale & Crespi, 2013). However, existing measures have often defined "accuracy" as selection of a predetermined categorical response, such as identification of the "correct" facial emotional expression (e.g., the RMET or the Ekman faces). As demonstrated by previous research (e.g., Barnow et al., 2009; Daros et al., 2013; Mitchell et al., 2014; Richman & Unoka, 2015), it is plausible that individuals with personality pathology may generally be able to identify the gist of an interpersonal stimulus

(and thus select the "accurate" categorical response) but may be more prone to a negative evaluative bias relative to normative samples. This negative evaluative bias is expected to be particularly pronounced for videos selected to represent the warm interpersonal octants, as participants low in personality pathology are expected to perceive very little interpersonal coldness in these videos.

2. Anticipated Reactions

    a. Higher levels of personality pathology will be associated with global-level deviations from "accurate" anticipated reactions (i.e., with accuracy determined by normative data).

    b. Higher levels of personality pathology will be associated with a global-level bias towards colder anticipated reactions.

    c. At the octant-level, the cold evaluative bias will be strongest for the anticipated reactions in response to videos selected to represent warm interpersonal themes (i.e., videos reflecting the NO, LM, and JK octants).

    d. Higher levels of personality pathology will not be associated with larger deviations from complementarity relative to individual perceptions, suggesting that individuals higher in personality pathology are responding in a complementary manner to distorted perceptions.

It is theorized that individuals with personality pathology may demonstrate interpersonal behaviors which are complementary with respect to their subjective perceptions but non-complementary with respect to the external reality (Hopwood, 2018; Hopwood et al., 2013; Pincus & Hopwood, 2012). However, few, if any, studies have evaluated this possibility

empirically. Examining deviations from complementarity of anticipated reactions with respect to *individual* perceptions (i.e., each participant's unique perception) allow for this theory to be tested empirically. It was hypothesized that personality pathology would be associated with inaccuracy and bias in anticipated reactions (i.e., hypotheses 2a and 2b), but that these anticipated reactions would be complementary with respect to individual perceptions (i.e., hypothesis 2d). This finding would offer evidence to suggest that the interpersonal difficulties experienced by individuals with personality pathology are a result of distorted perceptions rather than poor awareness of the typical patterns of interpersonal transactions.

However, several other possible findings should be noted. If the first set of hypotheses were not supported (i.e., personality pathology is *not associated* with inaccuracy or bias of interpersonal perceptions), but personality pathology *was* associated with deviations from complementarity (i.e., hypothesis 2d is also not supported), this would suggest that individuals with personality pathology demonstrate poor awareness of the typical patterns of interpersonal transactions, despite perceiving interpersonal stimuli in a typical manner. In other words, this would indicate that individuals with personality pathology maintain accurate and unbiased perceptions but do not follow normative transactional patterns in responding to those perceptions. Alternatively, if the first set of hypotheses were to be supported (i.e., personality pathology *was* associated with inaccuracy or bias of interpersonal perceptions), but personality pathology was also associated with deviations from complementarity in reactions (i.e., hypothesis 2d not supported), this would suggest that the interpersonal difficulties experienced by individuals with personality pathology are a result of both distorted perceptions *and* poor awareness of the typical patterns of interpersonal transactions. In other words, this finding would

indicate that individuals with personality pathology both perceive interpersonal stimuli in an atypical manner *and* respond to those distorted perceptions in an atypical manner. Finally, if the first and second set of hypotheses were both unsupported, this would suggest that personality pathology is not associated with differences in interpersonal perceptions or anticipated reactions as assessed using the developed methodology, and thus these might not be the mechanisms by which the interpersonal problems of individuals high in personality pathology are developed or sustained.

METHOD

Participants

A total of 207 participants (50.2% female) were recruited from Amazon's MTurk platform, with the requirement that they be at least 18 years old and located in the United States (as verified by their IP address). The CloudResearch online recruitment platform was used to recruit approximately equal subsamples of participants who were currently engaged in mental health treatment (i.e., therapy; $n = 101$) and those who had no history of mental health treatment ($n = 91$); an additional 15 participants reported a history of mental health treatment but no current treatment. Participants ranged from 20 to 71 years of age, with a mean age of 38.35 years ($SD = 11.63$). The majority of participants identified as White/Caucasian (75.4%), followed by Black or African-American (7.7%), Asian or Pacific Islander (8.2%), Hispanic or Latino/a (4.8%), and bi-racial/multiracial (2.9%). Individuals located outside the United States were restricted from participation given that the study measure was normed using data collected within the United States, and all study materials were in English.

As intended, the sample was clinically diverse. Per the DSM-5 Cross-Cutting Symptom Measure, 49.3% of the sample met the threshold for follow-up evaluation for depression, 41.1% for anger, 30.9% for mania, 59.4% for anxiety, 29.5% for somatic problems, 43% for sleep problems, 19.8% for memory problems, 25.1% for repetitive behavior, 15.9% for dissociative symptoms, 33.3% for personality problems, 38.2% for substance use, 10.6% for psychosis, and 15% for suicidality. Most participants (79.7%) met criteria for follow-up on at least one domain, further supporting the clinical diversity of the sample.

Raw scores of 9 (75*T*) or above on the PAI Infrequency (INF) scale (Morey, 1991) have been recommended as a cut score for identifying careless or random responding. Eight (3.9%) participants obtained raw scores of 9 or above on the PAI-INF scale; as such, these participants were excluded from analyses due to concerns regarding invalid responding.

Materials

Video-Based Interpersonal Behavioral Evaluation (VIBE)

Participants were administered the final 8-video stimulus set, named the VIBE. Videos in the final stimulus set range in length from 6 seconds to 31 seconds and are described in further detail in the Preliminary Data section of this manuscript. Each video is accompanied by two items (Appendix A), which are identical across the 8 videos. The first item (perception) asks respondents to characterize the interpersonal behavior of Person A depicted in the video, and the second (reaction) asks respondents to anticipate the interpersonal response of Person B. Each item consists of eight stems derived from each octant of the IPC. Respondents were asked to indicate the degree to which each response stem applies to their perception of the interpersonal behavior depicted by Person A and the reaction they anticipate from Person B on a scale of 1-6. Thus, for each video segment, respondents were asked to rate a total of 16 stems (i.e., eight each for perceptions and reactions), with each rating made on a 6-point scale.

Clinical Symptoms

DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure--Adult (APA, 2013). The DSM-5 Cross-Cutting Symptom Measure is a 23-item self-report questionnaire which screens for clinical symptoms across 13 psychiatric domains, including depression, anger, mania, anxiety, somatic symptoms, suicidal ideation, psychosis, sleep problems, memory, repetitive

thoughts and behaviors, dissociation, personality functioning, and substance use. Respondents are asked to report on problems occurring within the past two weeks in order to gauge current symptomatology. This measure was used in the current study to provide descriptive data regarding the clinical problems experienced by the mental health treatment sample.

Personality Assessment

Personality Assessment Inventory Borderline Features (PAI-BOR) Scale (Morey, 1991). The PAI-BOR scale consists of 24 self-report items which assess the primary symptoms associated with a diagnosis of BPD. The PAI-BOR scale includes four subscales: Affective Instability (BOR-A), Identity Problems (BOR-I), Negative Relationships (BOR-N), and Self-Harm (BOR-S; impulsivity). The PAI-BOR scale was used to examine relationships between participants' responses to the stimulus materials and self-reported borderline personality pathology. The PAI-BOR scale is highly internally consistent (α = .91) and has demonstrated relationships with other self-report measures of general pathological personality (e.g., the LPFS-SR; r = .78, Morey, 2017) as well as other measures of borderline pathology, including the Structured Clinical Interview for Axis II disorders BPD scale (r = .58, Jacobo et al., 2007).

Level of Personality Functioning Scale--Self-Report (LPFS-SR; Morey, 2017). The LPFS-SR is an 80-item self-report questionnaire which corresponds to Criterion A of the AMPD and assesses global personality dysfunction across two broad domains: self (i.e., self-direction and identity) and interpersonal (i.e., intimacy and empathy) impairment. The LPFS-SR was used to examine relationships between participants' responses to the stimulus materials and self-reported global personality pathology. The LPFS-SR total score is highly internally consistent (α = .95) and has demonstrated relationships with other pathological personality (e.g., Personality

Inventory for DSM-5; Computer Adaptive Test of Personality Disorder, Personality Diagnostic Questionnaire–4) and interpersonal problems (e.g., Inventory of Interpersonal Problems–Short Circumplex) self-report measures (Hopwood et al., 2018).

The Personality Inventory for DSM-5 Brief Form (PID-5-SF; Krueger et al., 2013). The PID-5-BF is a 25-item self-report questionnaire which assesses five domains of personality pathology: Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism. The total score and domain scores of the PID-5-BF were used to examine relationships between participants' responses to the stimulus materials and self-reported pathological personality. The PID-5-BF total score is highly internally consistent ($\alpha = .92$) and the domain scores have demonstrated convergent relationships with other self-report pathological personality (Anderson et al., 2018) and clinical symptom (Hyatt et al., 2020; Porcerelli et al., 2019) measures.

Data Quality

The PAI Infrequency (INF; Morey, 1991) scale consists of 8 items which are unlikely to be endorsed in both community and clinical samples. High scores on the INF scale tend to be indicative of random or careless responding, or poor understanding of item content (e.g., reading difficulties). In order to ensure data quality, participants with scores of $75T$ or greater on the INF scale were excluded from analyses.

Procedure

All study participation occurred online via electronic completion of the study materials. Participants were required to complete the survey on a desktop or laptop computer (i.e., not a mobile phone) in order to have some degree of consistency in the size and quality of the video

presentation. Participants were first presented with the stimulus video set and accompanied items

and then completed the self-report questionnaires in a randomized order.

Data Analysis

Cross-Validation

Descriptive data, including means and standard deviations, were calculated for each of

the octant stems across all items. Intraclass correlation coefficients (ICCs) and mean Q-

correlations were computed for each of the octant scores across the 8 videos in order to cross-

validate the reliability of the developed methodology. These analyses were conducted in the

subsample of participants who reported no current mental health treatment ($n = 103$), as these

analyses were intended to determine the extent to which the VIBE demonstrated comparable

reliability and fit with circumplex structure in an independent community sample, without the

added influence of clinical pathology.

Accuracy and Bias

Scores on the eight octants of the IPC can be combined into two scores representing the

axes of the IPC: a horizontal vector (i.e., representing the participant's tendency to perceive or

anticipate communal or warm behavior) and a vertical vector (i.e., representing the participant's

tendency to perceive or anticipate agentic or dominant behavior). These vectors are calculated

using the following formulas:

$$\textbf{Communal Vector} = \Sigma\ z_i \times \cos(\theta_i)$$

$$\textbf{Agentic Vector} = \Sigma\ z_i \times \sin(\theta_i)$$

where z_i is the participant's standard score on octant i and θ_i is octant i's angle in the IPC

(Locke & Adamic, 2012; Gurtman, 2011). These two vectors can be examined concurrently as a

point estimate on the two-dimensional plane of the IPC, with the communal vector representing

the *x* coordinate and the agentic vector representing the *y* coordinate. Communal and agentic

vector scores were calculated for the perception and anticipated reaction items across the 8

stimulus videos, thus resulting in a total of 32 vector scores (i.e., 16 communal vectors and 16

agentic vectors) for each participant. These vectors were summed for each dimension and type of

judgment, thus resulting in a global-level communal vector and a global-level agentic vector for

both the perception and anticipated reaction items, scores that reflect a global tendency (bias) to

evaluate interpersonal interactions in a particular way.

The accuracy of perceptions and anticipated reactions can be calculated as the distance

between the participant's point estimate on the IPC and the normative sample's mean point

estimate for a given video (i.e., deviation from the "accurate" response with respect to the

normative sample mean) in the two-dimensional space defined by the communal and agentic

vectors. The preliminary study sample served as the normative sample from which the mean

point estimates were calculated. The distance is calculated using the Euclidean distance:

$$\textbf{Distance (Accuracy)} = \sqrt{(\textbf{Communal}_i - \textbf{Communal}_n)^2 + (\textbf{Agentic}_i - \textbf{Agentic}_n)^2}$$

where $Communal_i$ and $Agentic_i$ are the participant's communal and agentic vector scores, and

$Communal_n$ and $Agentic_n$ are the mean communal and agentic vector scores in the normative

sample. These distance scores were calculated for the responses to the perception and anticipated

reaction items for each of the 8 stimulus videos, thus resulting in 16 total distance scores for each

participant (i.e., 8 representing accuracy of perceptions and 8 representing accuracy of

anticipated reactions). These distance scores were then summed for both the perception and

anticipated reaction items, thus resulting in two global-level accuracy scores for each participant (i.e., one each for the interpersonal perception and anticipated reaction).

Hypotheses 1a and 2a. For hypotheses 1a and 2a, the global-level perception and anticipated reaction accuracy scores were correlated with the total scores and component scores of the self-report measures of personality pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-BF). Hypotheses 1a and 2a predicted that the self-report measures of personality pathology would be positively correlated with the global-level deviations from accurate interpersonal perceptions and anticipated reactions, respectively. In other words, higher personality pathology was expected to be associated with less accurate perceptions and anticipated reactions, when accuracy is defined as distance from the normative mean.

Hypotheses 1b and 2b. For hypotheses 1b and 2b, the global-level communal and agentic vector scores (i.e., one each for the interpersonal perceptions and anticipated reactions) were correlated with the total scores and component scores of the self-report measures of personality pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-BF). Hypotheses 1b and 2b predicted that global-level biases in interpersonal perceptions and anticipated reactions would be represented by significant correlations between the self-report measures of personality pathology and the global-level communal vectors for the perception and anticipated reaction vectors, respectively. Specifically, higher personality pathology was expected to be associated with lower overall warmth in global-level perceptions and anticipated reactions.

Hypotheses 1c and 2c. In order to examine biases of perceptions and anticipated reactions at the octant level, the communal and agentic vectors were correlated individually with the self-report measures of personality pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-

BF). Hypotheses 1c and 2c predicted that the strongest correlations between the communal

vectors and the self-report measures of personality pathology would be observed for the videos

selected to represent warm octants (i.e., NO, LM, and JK). In other words, the cold evaluative

bias demonstrated by individuals higher in personality pathology was expected to be most

pronounced for videos selected to represent warm interpersonal content.

Complementarity

The complementarity of anticipated reactions was assessed with respect to the

participants' individual perceptions. The communal and agentic vectors representing the

individual participants' perceptions were used to calculate the communal and agentic vectors

which would correspond to the complementary point estimate [i.e., the same vector score on the

x (i.e., communal) axis and the opposite vector score on the y (i.e., agentic) axis]. The distance

between the participants' anticipated reactions and the complementary anticipated reaction per

the participants' individual perceptions were calculated using the Euclidean distance:

Distance (Complementarity to Individual Perception) =

$$\sqrt{(\mathbf{Communal}_i - \mathbf{Communal}_{ic})^2 + (\mathbf{Agentic}_i - \mathbf{Agentic}_{ic})^2}$$

where $Communal_i$ and $Agentic_i$ are the participant's communal and agentic vector scores for the

anticipated reaction, and $Communal_{ic}$ and $Agentic_{ic}$ are the complementary communal and

agentic vector scores with respect to the participants' individual perceptions. This resulted in a

total of 8 complementary distance scores for each participant (i.e., one per video), which were

also summed as a global-level distance score assessing complementarity.

Hypothesis 2d. In order to examine relationships between personality pathology and

global-level deviations from person-level complementarity, these global-level complementarity

distance scores were correlated with the total scores and component scores of the LPFS-SR, PAI-BOR scale, and the PID-5-BF. Hypothesis 2d predicted that there would be no significant correlations between distance from complementarity to the individual perception and the self-report personality pathology variables, indicating that personality pathology is *not associated* with deviations from complementarity with respect to unique perceptions. Of note, Hypothesis 2d was only concerned with the complementarity of anticipated reactions with respect to perceptions; as such, personality pathology *was* expected to be associated with differences from normative anticipated reactions (i.e., significant results for Hypotheses 2a, 2b, and 2c), but the reactions were expected to be complementary with respect to individual perceptions (i.e., producing a non-significant result for Hypothesis 2d). To further explore complementarity at the octant level, correlational analyses were additionally conducted using video-level distance scores to determine where the strongest effects for non-complementarity associated with personality pathology were occurring.

Descriptive Data and Cross-Validation

Table 1 presents descriptive data in the cross-validation sample ($n = 103$) for the octant

scores in each of the stimulus videos. Table 2 presents the SSM parameters (i.e., model fit,

amplitude, and displacement) for the perception and anticipated reaction items for the 8-video

stimulus set in the cross-validation sample. Responses to the perception (R^2 range: .71-.91) and

reaction (R^2 range: .74-.96) items for each of the 8 videos met the minimum acceptable threshold

for model fit to circumplex structure. In general, both the perception and reaction items for each

of the eight videos demonstrated equivalent or higher amplitudes upon cross-validation,

suggesting that each of the eight videos demonstrated good differentiation for the octant of

interest. Angular displacement values were generally similar to those in the development sample,

although some notable shifts were observed. Specifically, the cross-validation sample

demonstrated more submissive perceptions of the DE video as compared to the development

sample, such that the angular displacement for the perception item of the DE video was located

at approximately the border between the DE and FG octants (i.e., 211°). On the contrary, the

cross-validation sample anticipated more dominant reactions to the NO video as compared to the

development sample, such that the angular displacement for the reaction item of the NO video

was shifted from the border between the HI and JK octants to a more central position in the JK

octant (i.e., 320°).

The mean Q-correlation values for each video are also presented in Table 2. Q-

correlations (i.e., averaged using Fisher's z transformation and then back-transformed to a mean

r value) ranged from .29 through .86 for the perception item and .39 through .69 for the reaction

item, indicating medium to large effect size relationships between the mean response pattern and hypothesized circumplex structure for each of the 8 videos in the cross-validation sample. The inter-rater reliabilities of participants' ratings for each of the octants, for both the perception and anticipated reaction items, were computed as an average measures ICC coefficient using a two-way random effects model. Table 3 presents the average measures ICC values in the cross-validation sample. ICC values ranged from .990-.995 for the perception items and .983-.995 for the reaction items, indicating comparably high reliability across participants in both the perceptions and anticipated reactions relative to the development sample.

Interpersonal Perceptions

Hypothesis 1a

As a test of Hypothesis 1a, the global-level perception accuracy score was correlated with the total scores and component scores of the self-report measures of personality pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-BF). These correlations are presented in Table 4. Most correlations were not significant; one exception, however, was significant negative relationships between the global-level perception accuracy score (i.e., with higher scores indicating greater deviation from the normative score and thus poorer accuracy) and the PID-5-BF Total score ($r = -.16$), as well as the Detachment ($r = -.15$) and Psychoticism ($r = -.17$) domain scores. In other words, higher personality pathology on these scales was associated with slightly more accurate perceptions, when accuracy was defined as distance from the normative mean. Thus, Hypothesis 1a was not supported.

Hypothesis 1b

As a test of Hypothesis 1b, the global-level communal and agentic vector scores for the interpersonal perceptions were correlated with the total scores and component scores of the self-report measures of personality pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-BF). These correlations are presented in Table 4. None of the correlations were significant. As such, higher personality pathology was not associated with lower overall warmth in global-level perceptions, and thus Hypothesis 1b was not supported.

Hypothesis 1c

As a test of Hypothesis 1c, the communal and agentic vectors for the interpersonal perceptions of each video were correlated individually with the self-report measures of personality pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-BF). These correlations are presented in Table 5. Although most correlations were not significant, a small number of significant, small effect size relationships emerged. Several of these correlations were with the communal vector of the PA video; specifically, higher perceptions of warmth in the video were associated with greater global-level personality pathology, as assessed by the total score and component scores of the LPFS-SR (r range: .15-.22), and identity problems, as assessed by BOR-I ($r = .15$). Additionally, higher perceptions of warmth in the BC video were associated with greater impulsivity, as assessed by BOR-S ($r = .14$), whereas lower perceptions of dominance were associated with less antagonism, as assessed by the PID-5-BF ($r = -.15$). For the FG video, higher perceptions of warmth were associated with greater reported self-direction problems, as assessed by the LPFS-SR ($r = .14$). Finally, higher perceptions of warmth on the LM video were associated with fewer empathy problems, as assessed by the LPFS-SR ($r = -.14$).

This pattern of results is not consistent with the prediction of Hypothesis 1c that the strongest correlations between the communal vectors and the self-report measures of personality pathology would be observed for the videos selected to represent warm octants (i.e., NO, LM, and JK); as such, Hypothesis 1c was not supported.

Interpersonal Reactions

Hypothesis 2a

As a test of Hypothesis 2a, the global-level anticipated reaction accuracy score was correlated with the total scores and component scores of the self-report measures of personality pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-BF). These correlations are presented in Table 4. None of these correlations were significant, suggesting that higher personality pathology was not associated with less accurate anticipated reactions, when accuracy was defined as distance from the normative mean. Thus, Hypothesis 2a was not supported.

Hypothesis 2b

As a test of Hypothesis 2b, the global-level communal and agentic vector scores for the interpersonal anticipated reactions were correlated with the total scores and component scores of the self-report measures of personality pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-BF). These correlations are presented in Table 4. None of the correlations were significant. As such, higher personality pathology was not associated with lower overall warmth in global-level anticipated reactions, and thus Hypothesis 2b was not supported.

Hypothesis 2c

As a test of Hypothesis 2c, the communal and agentic vectors for the anticipated reactions of each video were correlated individually with the self-report measures of personality

pathology (i.e., the LPFS-SR, PAI-BOR scale, and PID-5-BF). These correlations are presented in Table 6. As in the case of the interpersonal perceptions, most of these correlations were not significant. However, a small number of significant, small effect size relationships emerged. Several of these correlations were with the communal vector of the LM video; specifically, the expectation of a warmer reaction was associated with fewer problems with global personality pathology, namely problems with self-direction (r = -.16), empathy (r = -.15), and intimacy (r = -.16) as assessed by the LPFS-SR, and less impulsivity, as assessed by BOR-S (r = -.16). Furthermore, the expectation of a more dominant reaction in the LM video was associated with fewer identity problems, as assessed by the LPFS-SR (r = -.20), less detachment, as assessed by the PID-5-BF (r = -.20), and less relational problems, as assessed by BOR-N (r = -.19).

Several additional significant correlations were also found for the remaining videos. The expectation of a more dominant reaction in the PA video was associated with greater problems with empathy, as assessed by the LPFS-SR (r =.18). Additionally, the expectation of a warmer reaction in the BC video was associated with greater problems with empathy (r = .14) and self-direction (r = .15), as assessed by the LPFS-SR. For the HI video, the expectation of a warmer reaction was associated with lower levels of both detachment (r = -.17) and antagonism (r = -.19), as assessed by the PID-5-BF. For the JK video, the expectation of a more dominant reaction was associated with fewer empathy problems (r = -.14), as assessed by the LPFS-SR. Finally, the expectation of a warmer reaction in the NO video was associated with less reported antagonism (r = -.15), as assessed by the PID-5-BF. Given the predominance of significant correlations associated with the LM video, as well as significant correlations for JK and NO, Hypothesis 2c was partially supported.

Hypothesis 2d

As a test of Hypothesis 2d, global-level complementary distance scores were correlated with the total scores and component scores of the LPFS-SR, PAI-BOR scale, and the PID-5-BF. These correlations are presented in Table 4. Consistent with Hypothesis 2d, there were no significant correlations between global-level distance from complementarity to the individual perception and the self-report personality pathology variables, indicating that personality pathology is *not associated* with deviations from complementarity with respect to unique perceptions. While this technically offers support for Hypothesis 2d, this finding must be interpreted in relation to the previously reported results. It was predicted that personality pathology *would be* associated with differences from normative anticipated reactions (i.e., Hypotheses 2a, 2b, and 2c), but that the reactions would be complementary with respect to individual perceptions (i.e., producing a non-significant result for Hypothesis 2d). Hypotheses 2a and 2b were not supported, and only partial support was found for Hypothesis 2c. Thus, individuals higher in personality pathology are just as likely to anticipate reactions that are complementary to their unique perceptions, but such individuals also demonstrate perceptions and anticipated reactions that are generally normative, with a few exceptions. The most notable exception to this finding which was consistent with expectations was that individuals with higher levels of personality pathology both perceived more coldness in the LM video, which represents pure warmth/communion, and anticipated a colder reaction.

In order to examine the possibility that the degree of complementarity may be octant-specific, distance from complementarity scores were correlated individually for each video with the personality pathology variables. These correlations are presented in Table 7. Most of these

correlations were not significant; however, a small number of significant, small effect size relationships emerged. First, poorer complementarity for the HI video was associated with greater reported empathy problems ($r = .14$) and psychoticism ($r = .15$). Notably, however, none of the examined personality pathology variables correlated significantly with the accuracy scores for either the interpersonal perceptions or anticipated reactions of the HI video. Thus, although greater empathy problems and higher levels of psychoticism were associated with small deviations from complementarity, the interpersonal significance of these slight deviations is questionable given the normativity of both the perception and the reaction.

For the NO video, poorer complementarity was associated with greater reported self-direction problems ($r = .14$) and higher levels of detachment ($r = .15$). However, unlike the HI video, significant relationships were observed between the perceptual accuracy scores of the NO video and some of the personality pathology variables. Specifically, higher levels of personality trait pathology, predominantly antagonism and psychoticism, were associated with *better* accuracy in interpersonal perceptions of the NO video, contrary to expectations. No significant relationships were found for anticipated reaction accuracy. These findings suggest that while some forms of personality pathology served as a slight advantage in interpersonal perception in the NO video, other forms of personality pathology inhibited complementary responding to those perceptions.

DISCUSSION*

This study developed and cross-validated a novel method for the assessment of interpersonal judgment and conducted a preliminary validation study of the method with respect to relationships with personality pathology. The final method, named the VIBE, presents a respondent with eight stimulus videos depicting dyadic interpersonal interactions and asks the respondent to make judgments regarding their perception of the interpersonal behavior of one target (Person A) and the interpersonal reaction they anticipate from the second target (Person B) for each video. The VIBE was developed within the framework of contemporary interpersonal theory, such that the videos and response format align with the IPC, allowing for the data to be examined with respect to circumplex structure. This method was designed to offer a behavioral approach to interpersonal assessment, using a dynamic method that captures both a respondent's capacity to perceive interpersonal stimuli and respond to such stimuli following normative interpersonal transaction patterns.

The VIBE was developed using data collected among undergraduate participants and then was cross-validated in an independent community sample recruited online. In the cross-validation study, participants' perceptions and anticipated reactions for the final set of 8 stimulus videos were found to be highly reliable and consistent with IPC structure, and participants' perceptions were representative of their intended octants to a similar degree as found in the development sample. However, some shifts in angular displacement were noted, particularly for the perception of the DE video and anticipated reaction for the NO video. While these findings do suggest variation in the perceptions and anticipated reaction of participants across different types of samples (i.e., undergraduates versus Murk workers), it should be recognized that the 8-

video stimulus set still provided adequate coverage of the full range of interpersonal constructs described by the IPC octants.

Despite demonstrating strong evidence of cross-validation in an independent sample, however, performance on the VIBE was not consistently related to indicators of personality pathology as hypothesized when examined among clinically diverse respondents. First, lower global-level accuracy in interpersonal perceptions and anticipated reactions was not associated with higher levels of personality pathology (Hypothesis 1a/b); indeed, the opposite was found for perception accuracy, such that better accuracy was associated with higher levels of trait pathology, primarily detachment and psychoticism. Furthermore, none of the personality pathology variables correlated with overall level of warmth or dominance in the interpersonal perceptions or anticipated reactions, suggesting that individuals higher in personality pathology did not demonstrate a generalized cold perceptual bias as hypothesized (Hypothesis 2a/2b). These correlations were further examined at the video level to determine if the videos selected to represent warm octants (i.e., NO, LM, and JK) demonstrated stronger correlations between the communal vectors and the self-report measures of personality pathology as compared to the other videos (Hypothesis 1c/2c).

For the interpersonal perceptions, some significant correlations of small magnitude were observed, although those correlations were not specifically associated with videos selected to represent warm octants and thus Hypothesis 1c was not supported. Some of these significant correlations were intuitive; for instance, perception of greater warmth where warmth was to be expected (i.e., the LM video) was associated with fewer empathy problems, whereas perception of greater warmth where warmth was not expected (i.e., the BC and FG video) was associated

with impulsivity and problems in self-direction, respectively. Thus, perceiving higher levels of warmth in a warm interpersonal situation seems to be beneficial for interpersonal connectedness, whereas perceiving higher levels of warmth in an interpersonal situation where the other is behaving coldly is more problematic, and may be indicative of problems with lack of autonomy or impulsivity. Interestingly, higher perception of warmth in the PA video, which was selected to be as close as possible to neutral in terms of the communion dimension, was also associated with personality problems. Specifically, individuals who perceived higher levels of warmth in the PA video demonstrated more global-level personality pathology, and identity problems specifically. Again, these findings suggest that personality pathology, particularly as it relates to aspects of the self, may be associated with greater perception of warmth in situations where warmth is less readily observed by others. It is possible that individuals who struggle with their sense of self may misperceive warmth in others as a reflection of their desire to seek direction and/or caretaking from others, even in interpersonal situations where such behavior is unlikely. On the contrary, lower perceptions of dominance in the BC video, which was selected to be high in dominance, was associated with lower levels of antagonism. This suggests that those who are less antagonistic themselves may perceive less antagonism in others, even in situations where others are objectively acting in an antagonistic manner.

Some small, significant correlations were also observed for the anticipated reactions, and contrary to the interpersonal perceptions, these correlations were somewhat more concentrated on the warm side of the circumplex, particularly the LM octant. Thus, Hypothesis 1c was partially supported. Similar to the interpersonal perceptions, anticipation of a warmer reaction in the LM video was associated with overall healthier personality functioning, including fewer

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problems with self-direction, empathy, intimacy, and impulsivity. Interestingly, the expectation of a more dominant reaction was also associated with healthier personality functioning, including fewer identity problems, less detachment, and less relational problems, despite the complementary response to LM being neutral on the agency dimension. The LM video is unique in that it is the only stimulus video which includes a parent-child relationship; specifically, the video depicts a warm interaction between a mother and son, in which the respondent is asked to perceive the behavior of the mother (i.e., Person A) and anticipate the reaction of the son (i.e., Person B). Given the relationship between personality pathology and childhood maltreatment by a caregiver (Waxman et al., 2014), it is perhaps unsurprising that individuals higher in personality pathology might perceive greater coldness in a parental figure and in turn expect a colder and more submissive reaction of a child to that parental figure. It is also worth noting that the LM video performed quite well in terms of its consistency with circumplex structure. Thus, it seems as though the parent-child relationship appears to both a) conform well to the expectations of a prototypical, complementary dyadic interpersonal interaction and b) pull for variation in interpersonal perceptions and anticipated reactions as a function of personality pathology. Future research examining differences in interpersonal perceptions and anticipated reactions as they relate to the type of interpersonal interaction observed (e.g., parent-child, romantic, platonic, same sex, opposite sex, etc.) would be informative with respect to the influence of the interaction context.

In addition to LM, several of the videos representing other octants demonstrated modest but significant relationships as well. For instance, in further support of Hypothesis 1c, the expectation of a warmer reaction in the NO video, which would be the expected complementary

reaction, was associated with lower antagonism. Furthermore, the expectation of a more dominant reaction in the JK video, which would again be the expected complementary reaction, was associated with fewer empathy problems, whereas the expectation of a more dominant reaction in the PA video, which would not be the expected complementary reaction, was associated with greater problems with empathy. Similarly, the expectation of a warmer reaction in the BC video was associated with greater problems with empathy and self-direction. As such, these findings suggest that complementarity, at least on a *single dimension*, may be associated with healthier personality functioning. On the contrary, a warmer reaction in the HI video, for which the complementary reaction is expected to be neutral in terms of warmth, was associated with lower levels of detachment and antagonism. Nonetheless, it is conceivable that a friendly individual who tends to seek emotional connection with others might be more likely to respond to one's display of pure submissiveness with warmth.

The results of Hypothesis 2c offer some indication that a reaction which trends in the direction of complementarity, at least for a single dimension, may be associated with healthier personality functioning. However, the findings pertaining to the complementarity of respondent's anticipated reactions to their unique interpersonal perceptions (Hypothesis 2d) are somewhat difficult to interpret, particularly considering the mixed results with respect to the first hypotheses (Hypotheses 1a/2a, 1b/2b, 1c/2c). As hypothesized (2d), personality pathology *was not* associated with global-level deviations from complementarity. However, this hypothesis also assumed that personality pathology would be associated with deviations from normative interpersonal perceptions and anticipated reactions, which was not consistently the case. When examined at the octant level, complementarity correlated significantly with measures of

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personality pathology for two videos: HI and NO. Poorer complementarity of the anticipated reaction to the perception of the HI video was associated with empathy problems and greater psychoticism, whereas poorer complementarity for the NO video was associated with problems with self-direction and greater detachment. However, poorer complementarity was not associated with poorer accuracy in either case; indeed, for the NO video, personality trait pathology was associated with *better* accuracy in interpersonal perceptions. Nevertheless, the magnitudes of these correlations were quite small, and the social significance of the poorer complementarity for these two videos is questionable considering the normative perceptions and anticipated reactions. Taken together, these findings suggest that when assessed using the VIBE, individuals with higher levels of personality pathology generally perceive and anticipate interpersonal behaviors similarly to others in a manner that aligns with complementary transactional patterns, with a few exceptions.

While this study was not intended to evaluate the degree to which the rules of complementarity uphold, it does raise some interesting questions for future research in this area. As previously described, videos were selected to conform to the rules of complementarity as closely as possible, but it was notable that very few did so completely as expected. Indeed, one of the reasons that videos were excluded in the initial selection phase was because the depicted transaction blatantly violated the principles of complementarity, despite the video performing well on other circumplex metrics. Other studies have questioned whether the rules of complementarity always uphold, particularly with respect to the cold octants (e.g., Orford, 1986). Although previous studies have demonstrated naturally occurring complementarity in dyadic interactions (Locke & Sadler, 2007; Markey et al., 2003; Markey et al., 2010; Sadler et al., 2009;

Sadler & Woody, 2003; Strong et al., 1988; Tracey, 1994), it would be interesting to study the extent to which anticipated reactions are complementary to interpersonal perceptions across a wide variety of interactions. This would be difficult to examine with the VIBE given that the 8 stimulus videos were selected to adhere to the principles of complementarity. However, while outside of the scope of the current study, the large pool of stimulus videos included in the initial selection phase might lend itself to addressing this question in future research endeavors.

Although many of the significant relationships observed in these analyses are conceptually intuitive, some are less so. It should be recognized that these analyses relied upon a large number of correlations, and that some of these correlations would be expected to be significant purely based upon chance (e.g., at an alpha level of .05, there is a 5% chance that a correlation coefficient would be significant by chance alone). Given this, in conjunction with the relatively small magnitude of most of these correlations, the specific relationships reported here should be interpreted cautiously. Nevertheless, the significant relationships often seemed to be concentrated on particular octants (e.g., LM), thus lending some credence to their meaningfulness. Additionally, these correlations represent cross-method relationships (i.e., self-reported personality and behavior on a performance-based measure), which have generally been found to rarely exceed .30 (i.e., Mischel, 1968). Further research is necessary to determine if the patterns observed in this study replicate in independent samples.

Taken together, these findings suggest that despite interpersonal dysfunction being a core feature of personality disorder, individuals with higher levels of personality pathology do not necessarily demonstrate deviations from normative interpersonal perceptions and anticipated reactions, at least not to the extent expected. This finding is consistent with previous research

using other dynamic social cognition tasks (e.g., the MASC; Wingenfeld et al., 2014; Vaskinn et al., 2015) and may be reflective of challenges associated with assessing interpersonal behavior in a laboratory and/or clinical setting. Although the use of video was meant to increase the real-world applicability of the method, the respondent is observing an interaction occurring between unknown others rather than participating in an interaction themselves, thus adding a significant level of emotional distance between the respondent and the targets. It is possible that under such conditions, which are presumably low-stakes and relatively emotionally neutral, individuals higher in personality pathology are generally capable of normative interpersonal perceptions and anticipated reactions. However, under more emotionally charged conditions where there is real-life impact of social behavior, the effects of emotional dysregulation may contribute to greater distortion. It is difficult to conceive of a method that would be perfectly representative of the nuances which occur in real-life interpersonal interactions; however, it is possible that one might be able to use simple manipulations to enhance the degree of connectedness that participants feel towards the depicted interactions. For example, using the VIBE, one could alter the instructions slightly to encourage the respondent to mentally insert themselves into the interaction (e.g., "When you watch the video, imagine you are Person B. You will be asked to make judgments regarding the behavior of Person A and to share how you would most likely respond." Alternatively, one could attempt to prime an interpersonally relevant emotional response prior to having the respondent complete the VIBE; for instance, one could ask the respondent to write about an upsetting interpersonal interaction. Such a study could offer information regarding the influence of emotional state on interpersonal judgment. Future research exploring the effects of such manipulations and/or modifications would be beneficial.

Although the VIBE shows promise as an interpersonal assessment method, several limitations should be noted. First, although efforts were made to select videos which aligned as closely as possible with their represented octant, the naturalistic nature of these videos made it such that their angular displacements aligned roughly but not perfectly with the theoretical angular displacements of their respective octants. Furthermore, each octant is represented by only one video, which may limit the extent to which this method can capture the full range of interpersonal behavior within each octant. Nevertheless, the eight stimulus videos provide adequate coverage across the IPC, and thus still capture a full range of interpersonal behaviors. Second, there was some variability in the extent to which responses to the stimulus videos demonstrated fit with circumplex structure; nonetheless, all selected videos met the minimum acceptable threshold (i.e., $R^2 > 0.7$). Third, these videos were selected from older, black-and-white films and television shows, which were filmed at a time in which on-screen cultural diversity was highly limited. As such, all the actors in these video clips appear to be Caucasian. This is a limitation of using dated videos, and it is possible that the lack of representation from diverse racial and ethnic groups may impact the performance of this method among diverse groups. Future research in diverse samples will be necessary to evaluate the cross-cultural applicability of this method. Fourth, although these videos were selected from older, existing black-and-white films and television shows, it is plausible that some respondents may be familiar with the video or the actor(s), which could lead to biases in responding. However, given the date of production of the selected videos, this possibility seems unlikely for most potential respondents. Lastly, it is possible that the use of an online convenience sample may limit the generalizability of these findings.

Future research will be necessary to cross-validate the VIBE in novel samples and assessment contexts, with a particular interest in evaluation in diverse clinical samples. If the VIBE continues to demonstrate high reliability and consistency with IPC structure upon further cross-validation, future studies might use the VIBE as a novel means by which to explore the interpersonal patterns of a diverse range of individuals. It is hoped that the VIBE will ultimately offer a more comprehensive and nuanced means by which to evaluate interpersonal functioning, thereby continuing to elucidate the nature of interpersonal problems among individuals for which previously used methods have produced mixed or inconsistent findings and allowing for the development of better targeted clinical research and interventions.

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Table 1

Descriptive Data for Octant Scores in Development (n = 252) and Cross-Validation (n = 103) Samples

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Stimulus Video	Octant	Development		Cross-Validation	
		Mean	SD	Mean	SD
PA	PA	4.63	1.60	4.96	1.39
	BC	3.30	1.76	3.50	1.72
	DE	2.61	1.48	2.55	1.52
	FG	1.60	1.11	1.35	.89
	HI	1.48	0.97	1.20	.73
	JK	2.55	1.52	2.55	1.53
	LM	2.61	1.48	2.65	1.54
	NO	3.64	1.51	4.04	1.51
BC	PA	5.37	1.25	5.75	.88
	BC	5.09	1.44	5.45	.850
	DE	4.65	1.67	4.73	1.65
	FG	1.55	1.26	1.17	.56
	HI	1.52	1.29	1.08	.44
	JK	1.52	1.13	1.13	.39
	LM	1.46	1.16	1.06	.24
	NO	1.59	1.22	1.21	.59
DE[1]	PA	2.64	1.59	2.20	1.46
	BC	2.84	1.65	2.30	1.60

Table 1

Descriptive Data for Octant Scores in Development (n = 252) and Cross-Validation (n = 103) Samples…Continued

Stimulus Video	Octant	Development		Cross-Validation	
		Mean	SD	Mean	SD
DE[1]	DE	3.30	1.67	3.28	1.88
	FG	3.24	1.58	3.80	1.82
	HI	2.62	1.49	2.60	1.60
	JK	2.01	1.32	2.07	1.18
	LM	2.02	1.27	2.26	1.34
	NO	1.90	1.23	2.03	1.18
FG	PA	1.58	1.22	1.40	1.26
	BC	1.68	1.27	1.50	1.19
	DE	2.52	1.69	2.51	1.61
	FG	4.48	1.78	4.36	1.79
	HI	4.77	1.69	5.05	1.61
	JK	2.02	1.35	2.06	1.23
	LM	1.59	1.04	1.46	.85
	NO	1.66	1.12	1.44	1.05
HI	PA	1.77	1.33	1.49	1.15
	BC	1.63	1.15	1.34	.91
	DE	2.05	1.43	1.67	1.02
	FG	3.52	1.75	3.37	1.70
	HI	4.39	1.63	4.61	1.64

Table 1

Descriptive Data for Octant Scores in Development (n = 252) and Cross-Validation (n = 103) Samples…Continued

Stimulus Video	Octant	Development		Cross-Validation	
		Mean	SD	Mean	SD
	JK	2.75	1.62	2.92	1.56
	LM	2.55	1.49	2.59	1.47
	NO	2.42	1.46	2.51	1.39
JK	PA	2.14	1.41	1.80	1.22
	BC	1.56	1.17	1.21	.62
	DE	1.49	1.07	1.17	.54
	FG	2.38	1.57	1.86	1.38
	HI	4.21	1.68	4.48	1.69
	JK	3.67	1.64	4.29	1.56
	LM	2.70	1.62	3.04	1.75
	NO	2.97	1.52	3.14	1.61
LM	PA	2.81	1.73	2.40	1.46
	BC	1.44	1.04	1.08	.44
	DE	1.37	0.97	1.06	.50
	FG	1.49	1.09	1.17	.72
	HI	1.58	1.16	1.44	.94
	JK	5.04	1.46	5.44	.97
	LM	5.41	1.18	5.83	.65
	NO	4.84	1.46	5.17	1.08

Table 1

Descriptive Data for Octant Scores in Development (n = 252) and Cross-Validation (n = 103) Samples…Continued

Stimulus Video	Octant	Development		Cross-Validation	
		Mean	SD	Mean	SD
NO	PA	4.83	1.53	4.45	1.74
	BC	2.89	1.83	2.79	1.74
	DE	1.71	1.25	1.50	1.01
	FG	1.53	1.11	1.33	.92
	HI	1.49	1.08	1.40	1.04
	JK	3.36	1.72	3.56	1.64
	LM	3.48	1.69	3.48	1.57
	NO	4.35	1.49	4.65	1.26

Note. [1]Video administered only in one subsample (*n* = 184) of the development sample.

Table 2

Descriptive Data for Final Video Set in Development (n = 252) and Cross-Validation Samples (n = 103)

	Development				Cross-Validation			
	Q	R^2	Amp.	Disp.	Q	R^2	Amp.	Disp.
PA								
Perception	.67	.89	1.30	79.92	.73	.91	1.62	78.17
Reaction	.45	.89	1.12	313.22	.45	.93	1.64	328.03
BC								
Perception	.75	.79	2.14	131.62	.81	.79	2.56	130.77
Reaction	.64	.70	1.58	239.48	.69	.74	1.88	249.03
DE[1]								
Perception	.43	.94	0.71	187.04	.29	.71	0.71	211.35
Reaction	.30	.73	1.40	120.91	.39	.76	1.82	123.24
FG								
Perception	.60	.74	1.51	243.63	.65	.77	1.67	245.97
Reaction	.57	.79	1.41	112.16	.62	.84	1.58	114.15
HI								
Perception	.56	.74	1.06	276.93	.61	.76	1.26	286.51
Reaction	.53	.80	1.18	60.13	.63	.85	1.46	69.41
JK								
Perception	.56	.76	1.11	314.70	.68	.84	1.58	321.36
Reaction	.51	.84	1.24	15.16	.60	.86	1.61	15.98

Table 2

Descriptive Data for Final Video Set in Development (n = 252) and Cross-Validation Samples (n = 103)...Continued

| | Development | | | | Cross-Validation | | | |
	Q	R^2	Amp.	Disp.	Q	R^2	Amp.	Disp.
LM								
Perception	.80	.89	2.26	6.74	.86	.89	2.68	3.79
Reaction	.64	.92	1.45	346.19	.68	.94	1.80	334.71
NO								
Perception	.68	.90	1.62	50.82	.54	.91	1.72	44.82
Reaction	.52	.81	1.14	293.37	.69	.96	1.46	320.21

Note. [1]Video administered only in one subsample (*n* = 184) of the development sample.

Table 3

ICC Coefficients (8 Videos) in Development (n = 252) and Cross-Validation (n = 103) Samples

	Average Measures ICC	
	Development	Cross-Validation
Perception		
PA	.994	.995
BC	.992	.994
DE	.992	.990
FG	.991	.991
HI	.995	.995
JK	.991	.993
LM	.992	.994
NO	.992	.995
Predicted Reaction		
PA	.995	.995
BC	.992	.994
DE	.979	.983
FG	.990	.987
HI	.991	.992
JK	.989	.991
LM	.988	.988
NO	.980	.985

Table 4

Relationships between Personality Pathology, and Global-Level Accuracy, Warmth, Dominance, and Complementarity (n =199)

	Global Accuracy		Global Warmth		Global Dominance		Complementarity
	Per.	Rea.	Per.	Rea.	Per.	Rea.	
LPFS-SR							
Identity	-.01	.02	.01	.002	-.05	-.05	.05
Self-Direction	-.002	-.03	.11	.03	-.03	-.04	.07
Empathy	.02	.01	.10	.03	-.02	.02	.08
Intimacy	-.01	-.01	.05	.02	-.03	.01	.03
Total	-.004	-.003	.07	.02	-.04	-.02	.06
PID-5-BF							
Negative Affect	-.12	-.11	-.08	-.06	.02	-.06	-.10
Detachment	-.15*	-.13	-.06	-.05	-.01	-.03	.002
Antagonism	-.10	-.03	.02	-.13	.05	-.09	-.09
Disinhibition	-.07	-.02	.01	.02	.05	-.04	-.02
Psychoticism	-.17*	-.09	.05	.02	.02	-.08	-.07
Total	-.16*	-.11	-.02	-.05	.03	-.08	-.07
PAI-BOR							
BOR-A	-.10	-.09	-.08	-.08	-.05	-.07	-.04
BOR-I	-.001	-.03	.01	.01	.00	-.09	-.04
BOR-N	-.05	-.002	-.04	-.04	-.01	-.07	-.03
BOR-S	-.03	-.01	.08	.03	.06	-.10	.01
Total	-.06	-.04	-.01	-.03	.002	-.10	-.03

Note. Global accuracy and complementarity are both represented as distance scores, wherein higher scores indicate poorer accuracy and poorer complementarity, respectively. Per. = Perception; Rea. = Reaction; LPFS-SR = Levels of Personality Functioning Scale—Self-Report (Morey, 2017); PID-5-BF = Personality Inventory for the DSM-5 Brief Form (Krueger et al., 2013); PAI-BOR = Personality Assessment Inventory (PAI) Borderline Features scale (Morey, 1991); BOR-A = Affective Instability; BOR-I = Identity Problems; BOR-N = Negative Relationships; BOR-S = Self-Harm/Impulsivity. *$p < .05$ **$p < .01$

Table 5

Relationships Between Personality Pathology and Video-Level Warmth and Dominance of Perceptions (n =199)

	PA		BC		DE		FG	
	WRM	DOM	WRM	DOM	WRM	DOM	WRM	DOM
LPFS-SR								
Identity	.15*	-.01	-.07	-.02	-.04	-.06	-.03	-.06
Self-Direction	.16*	-.03	.03	-.13	.06	-.06	.14*	.01
Empathy	.19**	-.03	.04	-.14	-.01	.02	.09	-.03
Intimacy	.22**	-.03	.01	-.07	-.03	.01	.06	.02
Total	.19**	-.02	-.01	-.09	-.01	-.03	.06	-.02
PID-5-BF								
Negative Affect	.04	.07	-.04	-.05	.004	.003	-.11	-.04
Detachment	.03	.09	-.01	.01	-.04	.02	.06	-.02
Antagonism	.12	-.08	.09	-.15*	-.01	.07	.05	.04
Disinhibition	.10	-.01	.10	-.05	.01	.04	-.02	-.03
Psychoticism	.14	.01	.06	.03	.08	-.02	-.07	-.01
Total	.10	.03	.04	-.05	.01	.02	-.03	-.02
PAI-BOR								
BOR-A	.08	.001	-.02	-.08	.05	-.01	-.07	-.02
BOR-I	.15*	-.01	.01	.01	-.003	-.02	-.04	.06
BOR-N	.12	.03	-.07	.11	-.03	-.04	-.02	.03
BOR-S	.09	-.01	.14*	-.14	.05	.04	.08	.04
Total	.13	.005	.02	-.03	.02	-.01	-.02	.03

Note. LPFS-SR = Levels of Personality Functioning Scale—Self-Report (Morey, 2017); PID-5-BF = Personality Inventory for the DSM-5 Brief Form (Krueger et al., 2013); PAI-BOR = Personality Assessment Inventory (PAI) Borderline Features scale (Morey, 1991); BOR-A = Affective Instability; BOR-I = Identity Problems; BOR-N = Negative Relationships; BOR-S = Self-Harm/Impulsivity.
*p < .05 **p < .01

Table 5

Relationships Between Personality Pathology and Video-Level Warmth and Dominance of Perceptions (n =199)…Continued

	HI		JK		LM		NO	
	WRM	DOM	WRM	DOM	WRM	DOM	WRM	DOM
LPFS-SR								
Identity	.01	-.03	-.002	-.01	.02	-.002	-.05	.05
Self-Direction	.04	.00	.02	.05	-.11	-.10	-.03	.04
Empathy	.12	.02	.02	.02	-.14*	.005	-.04	.01
Intimacy	-.01	-.06	-.04	.003	-.11	-.003	-.01	-.02
Total	.03	-.02	-.003	.01	-.08	-.03	-.04	.02
PID-5-BF								
Negative Affect	-.11	-.04	-.03	.05	.05	-.02	-.08	.07
Detachment	-.14	-.07	-.05	-.06	-.04	-.03	-.01	.04
Antagonism	-.04	.03	-.02	.12	-.10	.03	-.04	.04
Disinhibition	-.03	.05	-.07	.08	-.01	.04	-.03	.04
Psychoticism	-.08	.01	.02	.04	.01	-.05	-.01	.05
Total	-.11	-.01	-.04	.05	-.02	-.01	-.04	.06
PAI-BOR								
BOR-A	-.11	-.06	-.10	-.02	-.10	-.07	-.11	.05
BOR-I	-.04	-.07	.03	.01	.03	-.05	-.10	.07
BOR-N	.02	-.08	-.12	-.03	.03	-.07	-.13	.05
BOR-S	.03	.09	-.06	.09	-.07	.01	-.001	-.002
Total	-.03	-.04	-.07	.01	-.03	-.06	-.10	.05

Note. LPFS-SR = Levels of Personality Functioning Scale—Self-Report (Morey, 2017); PID-5-BF = Personality Inventory for the DSM-5 Brief Form (Krueger et al., 2013); PAI-BOR = Personality Assessment Inventory (PAI) Borderline Features scale (Morey, 1991); BOR-A = Affective Instability; BOR-I = Identity Problems; BOR-N = Negative Relationships; BOR-S = Self-Harm/Impulsivity.
*$p < .05$ **$p < .01$

Table 6

Relationships Between Personality Pathology and Video-Level Warmth and Dominance for Anticipated Reactions (n = 199)

	PA		BC		DE		FG	
	WRM	DOM	WRM	DOM	WRM	DOM	WRM	DOM
LPFS-SR								
Identity	.11	.09	.06	-.09	.05	.02	.02	.01
Self-Direction	.09	.07	.14*	.01	.01	-.01	.07	-.06
Empathy	.11	.18**	.15*	.004	.05	-.03	.03	.02
Intimacy	.10	.13	.07	-.05	.06	.01	.05	-.01
Total	.11	.12	.10	-.04	.04	.001	.05	-.01
PID-5-BF								
Negative Affect	.07	-.04	-.06	.02	.03	-.04	-.02	.02
Detachment	.02	-.06	.01	-.02	.03	.06	.03	.02
Antagonism	.06	.10	-.08	.09	.06	-.11	.05	-.11
Disinhibition	.10	.04	-.04	.03	.05	.001	.02	-.02
Psychoticism	.08	-.003	-.09	.01	.12	.01	.05	.0002
Total	.08	-.001	-.07	.03	.08	-.01	.03	-.02
PAI-BOR								
BOR-A	-.02	-.03	-.02	.04	.02	-.04	-.05	.03
BOR-I	.09	.05	.00	-.05	.13	-.01	-.02	-.05
BOR-N	.08	.03	-.05	-.07	-.04	.06	-.02	-.01
BOR-S	.03	-.01	.10	.06	.10	-.05	.08	-.03
Total	.05	.01	.002	-.01	.06	-.01	-.01	-.01

Note. LPFS-SR = Levels of Personality Functioning Scale—Self-Report (Morey, 2017); PID-5-BF = Personality Inventory for the DSM-5 Brief Form (Krueger et al., 2013); PAI-BOR = Personality Assessment Inventory (PAI) Borderline Features scale (Morey, 1991); BOR-A = Affective Instability; BOR-I = Identity Problems; BOR-N = Negative Relationships; BOR-S = Self-Harm/Impulsivity.
*$p < .05$ **$p < .05$

Table 6

Relationships Between Personality Pathology and Video-Level Warmth and Dominance for Anticipated Reactions (n = 199)…Continued

	HI		JK		LM		NO	
	WRM	DOM	WRM	DOM	WRM	DOM	WRM	DOM
LPFS-SR								
Identity	-.07	.04	-.01	-.06	-.12	-.20**	-.01	-.04
Self-Direction	-.04	.01	-.01	-.11	-.16*	-.08	.04	.01
Empathy	-.03	-.004	-.03	-.14*	-.15*	-.08	.03	.05
Intimacy	-.05	.07	.04	-.10	-.16*	-.10	-.04	.02
Total	-.06	.04	.001	-.11	-.16*	-.14	.0007	.002
PID-5-BF								
Negative Affect	-.10	.04	-.002	-.03	-.04	-.10	-.06	-.10
Detachment	-.17*	.10	.05	-.01	-.07	-.20**	-.07	-.04
Antagonism	-.19**	-.07	-.09	-.08	-.09	-.03	-.15*	-.06
Disinhibition	.01	-.09	.03	-.04	-.11	-.04	.005	-.001
Psychoticism	-.02	-.04	.05	-.12	-.003	-.01	-.10	-.10
Total	-.12	.00	.02	-.07	-.08	-.11	-.09	-.08
PAI-BOR								
BOR-A	-.07	-.01	.03	-.03	-.13	-.08	-.04	-.12
BOR-I	-.07	.01	-.004	-.11	-.01	-.07	-.05	-.08
BOR-N	-.01	.05	.05	-.09	-.10	-.19**	-.06	-.07
BOR-S	.03	-.13	-.03	-.10	-.16*	-.08	-.03	.02
Total	-.04	-.02	.02	-.10	-.12	-.13	-.06	-.08

Note. LPFS-SR = Levels of Personality Functioning Scale—Self-Report (Morey, 2017); PID-5-BF = Personality Inventory for the DSM-5 Brief Form (Krueger et al., 2013); PAI-BOR = Personality Assessment Inventory (PAI) Borderline Features scale (Morey, 1991); BOR-A = Affective Instability; BOR-I = Identity Problems; BOR-N = Negative Relationships; BOR-S = Self-Harm/Impulsivity.
*p < .05 **p < .05

Table 7

Relationships between Personality Pathology and Video-Level Complementarity (n = 199)

	PA	BC	DE	FG	HI	JK	LM	NO
LPFS-SR								
Identity	-.06	.01	-.02	.01	.09	-.02	.12	.08
Self-Direction	-.09	.10	-.02	.02	.09	-.08	.12	.14*
Empathy	-.01	.07	.01	-.01	.14*	-.05	.08	.06
Intimacy	-.10	.02	-.03	.03	.10	-.07	.10	.09
Total	-.08	.05	-.02	.02	.11	-.06	.12	.10
PID-5-BF								
Negative Affect	-.05	-.05	-.01	-.09	.01	-.06	-.002	-.10
Detachment	-.12	.003	.06	-.08	.03	-.09	.08	.15*
Antagonism	-.08	-.12	-.02	-.06	.11	-.10	.01	-.07
Disinhibition	-.03	-.04	.01	-.02	.11	-.13	.04	-.02
Psychoticism	-.09	-.10	-.01	-.07	.15*	-.11	-.04	.01
Total	-.10	-.07	.01	-.08	.10	-.12	.02	-.003
PAI-BOR								
BOR-A	-.10	-.02	.02	-.05	.04	-.02	.04	-.06
BOR-I	-.04	-.06	-.04	-.02	.09	-.08	.03	-.01
BOR-N	-.05	-.06	-.04	-.05	.10	-.005	.11	-.09
BOR-S	-.05	.004	-.03	-.003	.11	-.07	.07	.01
Total	-.07	-.04	-.02	-.04	.10	-.05	.07	-.05

Note. Complementarity is represented as a distance score, wherein higher scores indicate poorer complementarity LPFS-SR = Levels of Personality Functioning Scale—Self-Report (Morey, 2017); PID-5-BF = Personality Inventory for the DSM-5 Brief Form (Krueger et al., 2013); PAI-BOR = Personality Assessment Inventory (PAI) Borderline Features scale (Morey, 1991); BOR-A = Affective Instability; BOR-I = Identity Problems; BOR-N = Negative Relationships; BOR-S = Self-Harm/Impulsivity. *p < .05 **p < .01

Figure 1

The Interpersonal Circumplex
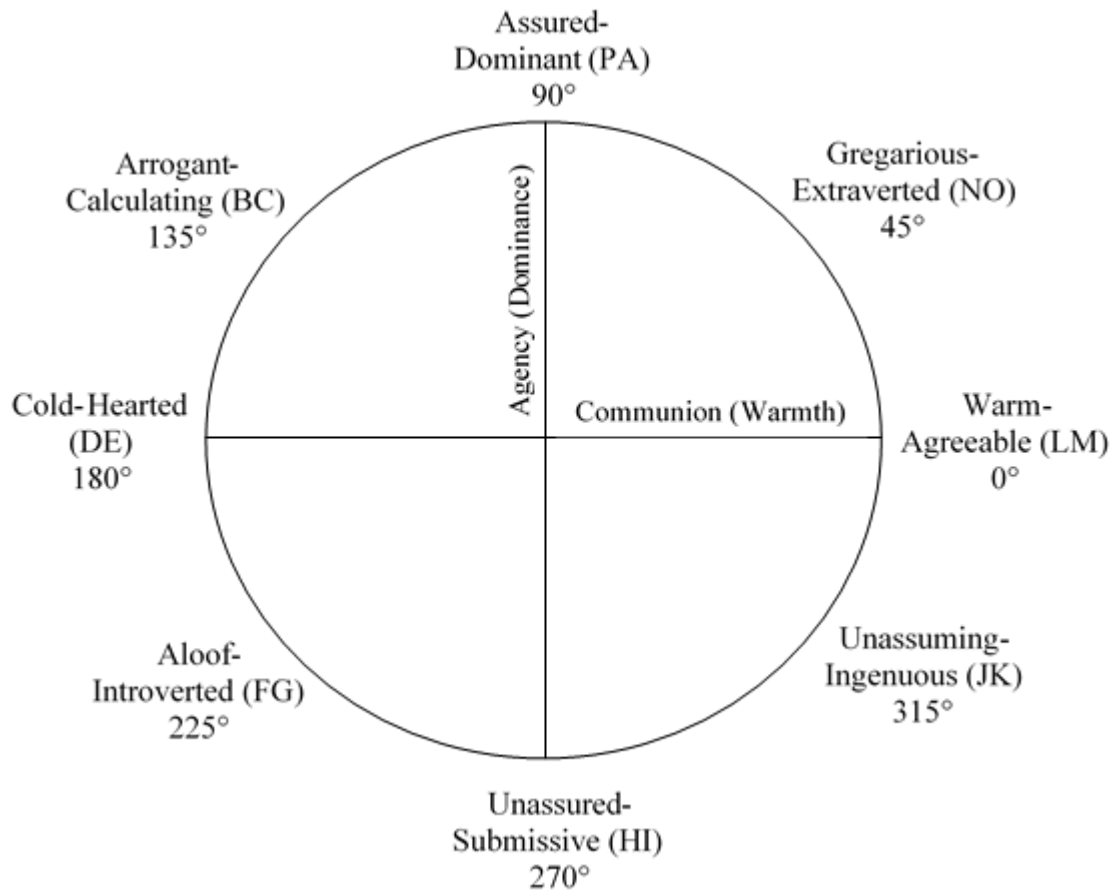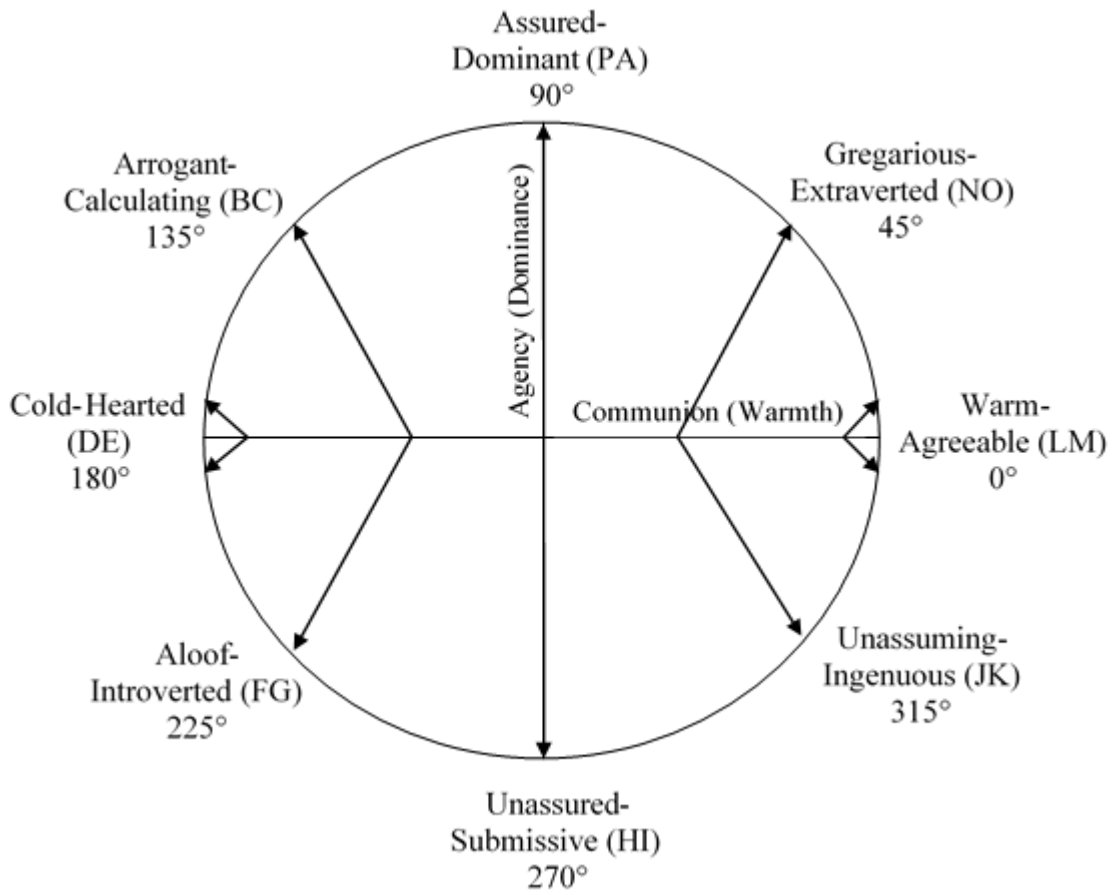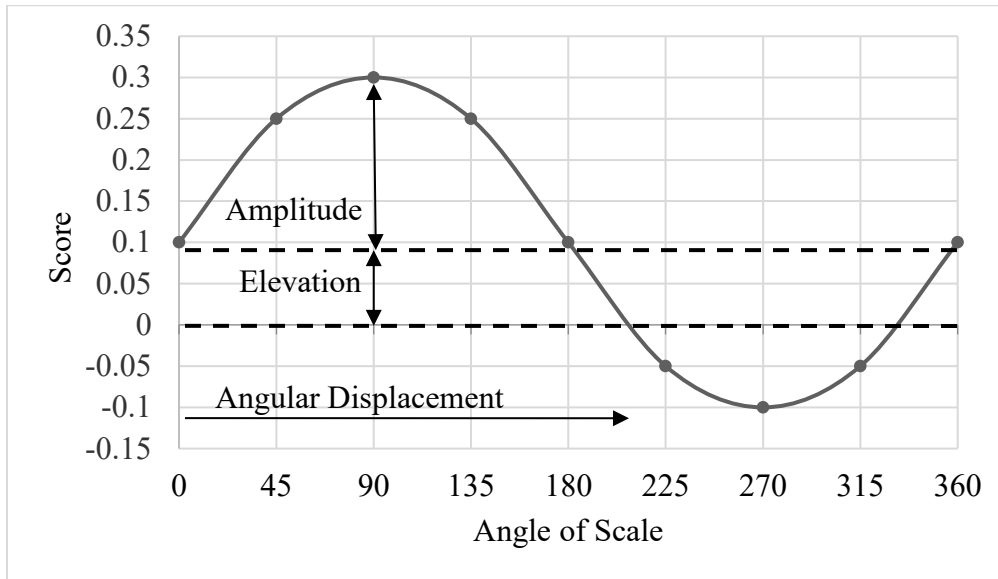
Figure 2

Model of Complementarity

Note. Each octant depicts an arrow pointing to its complementary octant.

Figure 3

Cosine Curve of Structural Summary Method

Note. Figure presents a sample cosine curve with an elevation of 0.10, an amplitude of 0.20, and an angular displacement of 90°.

APPENDIX B

Perception item:

To what extent would you characterize _____'s behavior as….

Anticipated response item:

To what extent do you expect _____'s response to _____ to be characterized as….

Not at All					**Very Much**
1	**2**	**3**	**4**	**5**	**6**

Response stems:

1) Assured and dominant, such as by controlling the interaction, being assertive, or speaking in a loud voice?

2) Arrogant and calculating, such as by being condescending towards, argumentative with, or talking at rather than with the interaction partner?

3) Cold-hearted and unsympathetic, such as by demonstrating disinterest, irritation, or ignoring the interaction partner?

4) Aloof and introverted, such as by being reserved or unexpressive, saying very little, or appearing emotionally distant from the interaction partner?

5) Unassured and submissive, such as by speaking softly, being unassertive, or behaving in a fearful or timid manner?

6) Trusting and accommodating, such as by showing genuine interest, putting the interaction partner first, or seeking reassurance or guidance from the interaction partner?

7) Warm and empathic, such as by expressing love, offering reassurance, or inquiring about the interaction partner's well-being?

8) Friendly and extraverted, such as by demonstrating comfort and initiative in the interaction, offering guidance, or being animated and expressive?