The Pennsylvania State University

The Graduate School

College of the Liberal Arts

PREDICTORS OF UNPREDICTABILITY AND COVARIATES OF INVARIABILITY: MULTIMETHOD ASSESSMENT OF INTERPERSONAL RIGIDITY AND OSCILLATION

A Thesis in

Psychology

by

Thane M. Erickson

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August 2006

The thesis of Thane M. Erickson was reviewed and approved* by the following:

Michelle G. Newman
Associate Professor of Psychology
Thesis Adviser
Chair of Committee

Aaron L. Pincus
Associate Professor of Psychology

Kenneth N. Levy
Assistant Professor of Psychology

David E. Conroy
Associate Professor of Kinesiology

Kevin R. Murphy
Professor of Psychology
Head of the Department of Psychology

*Signatures are on file in the Graduate School.

ABSTRACT

That psychological maladjustment commonly derives from, and manifests itself in, problematic interpersonal relations forms a central tenet of interpersonal theory. Leary (1957) proposed that interpersonal functioning and adjustment are linked by two dynamic processes related to behavioral variability: unstable oscillation—cross-situational reactive lability, and rigidity—inflexible reliance on a limited class of social behaviors. However, within the parallel tradition of interpersonal circumplex (IPC) assessment, little research examines the construct of oscillation, and the scant studies on rigidity have employed indices with questionable construct validity. The present study sought to clarify the meaning of these personality indices on several IPC instruments vis-à-vis criterion variables reflecting variability of cross-situational social behavior and perceptions, true to Learian formulation. Personality indices included amplitude and elevation scores on the Inventory of Interpersonal Problems-Circumplex scales (IIP-C) and Interpersonal Adjective Scales (IAS), as well as the Battery of Interpersonal Capabilities (BIC). Participants completed these measures, and then recorded their social perceptions and behavior in response to both standard written stimuli and one week of actual daily interactions. Structural equation models suggested that personality indices previously thought to reflect interpersonal rigidity failed to consistently predict restricted variability of social behavior or perceptions. In contrast, indices related to interpersonal distress consistently predicted high variability of imagined and real social behavior, as well as restricted variability of social perceptions of written interpersonal stimuli, suggesting a form of social cognitive bias. Results provide new insights into the relation between interpersonal distress and social variability, as well as underscore the need to more rigorously operationalize interpersonal rigidity.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGMENTS

This research was supported by a PSU Research and Graduate Student Organization dissertation support award. I also wish to express gratitude to the members of my dissertation committee for their helpful feedback, patience, and flexibility.

INTRODUCTION

Psychosocial Adjustment and Interpersonal Theory

Historically, the majority of theories of abnormal behavior in psychiatry and psychology have located the nexus of psychopathology exclusively within the individual. For instance, common theories have posited that dysfunction resides primarily in the intrapsychic reservoir of instinctual drives and conflicting mental forces, the central nervous system in isolation, intransigent belief structures, or among particular clusters of intrapersonal affective symptoms (e.g., depression, anxiety, obsessions) as propounded in the *DSM-IV*. Similarly, in the enterprise of diagnosis and assessment of maladjustment, many perspectives tend to assume the sufficiency of intrapsychic symptom description, sometimes rendering interactional dynamics and social functioning as peripheral or epiphenomenal to emotional or cognitive symptoms. In contrast, the interpersonal tradition in psychiatry, psychotherapy, and assessment, whether in classic or contemporary accounts, ascribes a central role to interpersonal processes in elucidating and diagnosing psychological functioning.

According to Harry Stack Sullivan, the progenitor of interpersonal theory, the relational processes *between* persons and the intrapsychic contents *within* persons are inextricably linked (1953a, 1953b). For instance, the self (or "self-system"), internalized social perceptions ("personifications"), and other aspects of personality are depicted as constituted by enduring, reoccurring patterns of social interaction: One's interpersonal history shapes self-definition, which conversely exerts constraining influence on current social behavior and relationships, with inner (mental) and outer (relational) processes mutually sustaining each other. Interpersonal factors impact one's sense of security and felt anxiety, leading to further interpersonal actions intended to restore inner security. Moreover, persons are ceaselessly situated in interpersonal

interaction, whether real or imagined, even when alone. Thus, from this perspective, the entwinement of psychological disturbance and disordered social relations appears almost as a tautology. Sullivan posited problematic interpersonal functioning (including behavior and perceptions) as both cause and symptom of maladjustment.

Subsequent to Sullivan's theoretical formulations, successive generations of interpersonalists have shared his assumption that problematic interpersonal behavior and social perception form quintessential indicators of psychopathology, despite considerable diversity of formulation (e.g., Benjamin, 2003; Carson, 1969; Horowitz, 2004; Leary, 1957; Kiesler, 1996; Pincus & Ansell, 2003). Contemporary interpersonal theory continues to conceptualize social functioning as a *sine qua non* of adjustment, arguing that interpersonal problems often constitute primary problems that may cause, maintain, or exacerbate dysfunction. Some theorists go as far as treating abnormal behavior as isomorphic with "disturbed interpersonal relations" (Kiesler, 1982). A number of authors have discussed how social perceptions and behavior crystallize into problematic, repetitive cycles: Constricted self-definitions or interpersonal expectations may lead to dysfunctional behavior, eliciting negative social reactions and thereby providing apparent "confirmation" of expectations in a problematic feedback loop (e.g., Andrews, 1988; 1991; Carson, 1982; Safran, 1984, 1990a, 1990b; Secord & Backman, 1961; Kiesler, 1991). Also emphasized are the relationships between interpersonal processes and various symptoms (e.g., Benjamin, 1996, 2003; Henry, 1994; Horowitz, 2004; Horowitz & Vitkus, 1986), with some advocating a distinctively interpersonal nosology to supplement or displace traditional symptom reporting within standard psychiatric diagnostic categories via the *DSM* (Adams, 1964, Benjamin, 1986; McLemore & Benjamin, 1979; McLemore & Brokaw, 1987). Thus, whether interactional processes are viewed as complementing or eclipsing intrapsychic emotional

symptoms in importance with regard to understanding adjustment, the interpersonal tradition asserts that psychological functioning and diagnosis remain incomplete without reference to interpersonal processes.

General Links Between Interpersonal Behavior, Social Perception, and Maladjustment

Abundant research, not necessarily confined to the interpersonal tradition, has borne out the assertion of intimate links between dysfunctional interpersonal processes and psychological maladjustment. With regard to behavior, individuals suffering from psychological distress or disorder demonstrate relatively heightened levels of hostile or conflicted social behavior (e.g., Humes & Humphrey, 1994), endorse greater excesses or deficiencies of interpersonal behavior (e.g., Alden & Phillips, 1990; Kachin, Newman, & Pincus, 2001; Ruiz et al., 2004), find relationships unrewarding (e.g., Nezlek, Hampton, & Shean, 2000), rigidly seek social reassurance (Joiner, Metalsky, Katz, & Beach, 1999) or negative feedback (Giesler, Josephs, & Swann, 1996; Swann, Wenzlaff, Krull, & Pelham, 1992), and elicit negative responses from others (Coyne, 1976; Creed & Funder, 1998; Gotlib & Robinson, 1982; Gurtman, 1987; Papsdorf & Alden, 1998; Strack & Coyne, 1983). Furthermore, such individuals often manifest negative expectancies or perceptions of other people, such as romantic partners, family members, and strangers (e.g., Benjamin & Wonderlich, 1994; Blatt, Auerbach, & Levy, 1997; Erickson & Pincus, 2005; Essex, Klein, Lohr, & Benjamin, 1985; Ichiyama et al., 1996; Soyguet & Savasir, 2001; Soyguet, Nelson, & Safran, 2001). Moreover, dysfunctional chronic social perceptions often predict particular types of interpersonal problems (e.g., Bartholomew & Horowitz, 1991; Noyes et al., 2003). Most frequently, important individual differences in social behavior or perception occur along two superordinate dimensions, the meta-constructs of agency (subsuming

interpersonal control, dominance, or "getting ahead") and communion (affiliation, nurturance, or "getting along"; Bakan, 1966; Foa & Foa, 1974; Kiesler, 1983; Wiggins, 1991).

Whereas all of the foregoing studies contain findings in support of general links between interpersonal processes or variables and psychological adjustment, only some of them employ constructs or measures that derive uniquely from the interpersonal tradition. It bears noting that this tradition incorporates numerous disparate theoretical strands and lines of research. However, the broadest demarcation relevant to theory and research inspired by Sullivan is between interpersonal theory, which tends to focus on conceptualization of normal and abnormal personality in a relational framework, and an interpersonal assessment tradition, which emphasizes measurement issues pertinent to the "interpersonal circle." These twin traditions have evolved in tandem since the time of Sullivan's seminal writings, though without one-to-one correspondence. Although existing interpersonal assessment technologies neither correspond fully to, or provide comprehensive operationalization of, the full spectrum of psychosocial variables described in interpersonal theory, attempts have been made to measure many key concepts linking maladjustment to social relations, with the assessment tradition sometimes exerting a reciprocal influence on the development of interpersonal theory (Pincus, 1994).

The present study aims to test whether several personality assessment indices drawn from the interpersonal assessment tradition, purported to operationalize key interpersonal theoretical concepts linking relational factors to maladjustment, truly demonstrate criterion validity. However, prior to introducing these concepts and associated personality indices, as well as relevant gaps in the assessment literature, an introduction to the fundamentals of interpersonal circumplex assessment is merited.

An Introduction to Interpersonal Circumplex Assessment

Timothy Leary and colleagues at the Kaiser Foundation Psychology Research Group pioneered attempts at interpersonal assessment, endeavoring to provide conceptual and empirical systematization of the theories of Sullivan (Freedman, Leary, Ossorio, & Coffey, 1951; LaForge, Leary, Naboisek, Coffey, & Freedman, 1954; Leary, 1957). During the course of research into group psychotherapy processes, they noted that interpersonal behaviors are best described with transitive verbs (e.g., submit), whereas enduring personality tendencies or "interpersonal traits" are readily labeled via adjectival descriptors (e.g., submissive). Repeated iterations of attempts to conceptually sample the universe of interpersonal behaviors and traits led to the emergence of the two salient dimensions of dominance versus submission and love versus hate (LaForge, Freedman, & Wiggins, 1985); when represented in a two-dimension Euclidean space, the former constitutes the vertical axis and the latter, the horizontal axis (see Figure 1). Any combination of these two dimensions may be characterized by Cartesian coordinates (x, y) in a space uniquely circular, in that each variable or scale in the interpersonal space forms a bipolar contrast with the variable opposing it, and scale content blends into that of neighboring scales.

With the introduction of the Leary circle (Freedman et al., 1951), interpersonal circle assessment commenced. Although many alternative circular models have emerged since that time, they tend to share several key features (Gurtman, 1994; Gurtman & Balakrishnan, 1998): (1) two-dimensionality, in that variation in characteristics (behaviors or traits) measured may be reduced to differences along two latent dimensions reflecting variants of the meta-constructs of agency and communion (Bakan, 1966; Wiggins, 1991); (2) constant radius, in which all characteristics fall at an equal distance from the origin of the circle, and thereby measure similar levels of behavior/trait intensity; and (3), continuous distribution, or equal distance between

behaviors/traits around the circle (45 degrees between octants, 22.5 degrees for sixteenths, etc.). Such a model also entails a particular type of factor model designated as a "circumplex" or circulant matrix (Guttman, 1954), in which each variable or scale on the circle exhibits a pattern of progressively decreasing correlations with other scales as one moves around the perimeter toward the opposing (at a 180º angle) scale, after which the correlations begin to increase again. In other words, conceptual and empirical relatedness of the scales is spatially represented according to circular geometry. Hence, assessment devices that sample the interpersonal domain of content and conform to a circumplex factor model receive the designation of interpersonal circumplex (IPC) instruments.

One of the important benefits of such a format is the quantitative (rather than qualitative) focus, in that the perimeter of the circle provides seamless measurement of the full continuum of types of interpersonal content. Furthermore, the distance from the origin to perimeter of the circle facilitates measurement of extremity; thus, both normal and abnormal interpersonal behavior or traits can be measured along the same continuum (Leary, 1957). Additionally, qualitative or categorical measurement remains feasible by parsing the content of the circle into equally-spaced portions (often octants), permitting "interpersonal diagnosis."

Initial measurement efforts by the Kaiser group culminated in the Interpersonal Check List (LaForge & Suczek, 1955), comprised of trait adjectives and verb phrases, with the circle divided equally into sixteen categories of interpersonal content. Since that time, the field has witnessed the proliferation of other interpersonal circumplex measures, such as those focused upon behavioral acts: for instance, the Interpersonal Behavior Inventory (IBI; Lorr & McNair, 1965) and Checklist of Interpersonal Transactions/Checklist of Psychotherapy Transactions (CLOIT/CLOPT; Kiesler, 1984, 1987); one measure is suitable as a behavior checklist for

experience sampling, the Social Behavior Inventory (SBI; Moskowitz, 1994). Benjamin's Structural Analysis of Social Behavior (SASB; 1974; 1996) assesses social actions and reactions with others, as well as self-directed actions, by questionnaire or coding system; SASB assumes circumplex form diverging from standard IPC measures by its adoption of three surfaces (actions, reactions, self-direction actions) and inclusion of a dimension of autonomy giving and taking. Other key IPC measures assess interpersonal traits (Wiggins, 1979; Wiggins, Phillips, & Trapnell, 1988), covert interpersonal impacts of oneself on others (Kiesler & Schmidt, 1993), interpersonal values (Locke, 2000), and interpersonal problems (Alden, Wiggins, & Pincus, 1990; Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988). Existing IPC measures differ in the extent to which they conform to ideal circumplex structure, how they parse the circle (e.g., octancts, sixteenths, etc.), whether they emphasize molar tendencies versus specific acts, and the intensity or extremity of the interpersonal content included (some models differentiate between mild-moderate versus extreme behaviors; Kiesler, 1983; Leary, 1957). Many reviews of IPC assessment exist (e.g., Kiesler, 1996; Wiggins, 1982; 1996; Van Denburg, Schmidt, & Kiesler, 1992).

IPC measures afford examination of the "circular profile" of individuals or groups, the derivation of a distinct pattern of scores across scales (octants, in the present discussion). Such circular profiles are unique in that they fully sample the theoretical universe of interpersonal content and tend to show a characteristic sinusoidal (i.e., wave-like) pattern of scale scores; individuals' scale profiles tend to show a peak or high-point, low point for the scale opposing the peak, and intermediate scores between these. This pattern may be represented pictorially as either a "polar coordinate space" based on the two orthogonal dimensions (see Figure 2) or a

"rectangular coordinate system" (see Figure 3) which permits viewing the commonly sinusoidal pattern of scale scores (Gurtman & Balakrishnan, 1998).

The power of IPC assessment lies in its potential to create summary indexes that yield maximal interpersonal information with few "terms" required. Laforge et al. (1954) first explicated the use of "structural analysis" for the simplification of scale scores from a profile to three pieces of information: (a) a singular "vector," or point plotted on the dimensions of dominance and affiliation in Euclidean space, summarizing a respondent's average interpersonal tendency (see Figure 2), (b) the angle of this vector on the circle (which is relevant to "diagnosis" of interpersonal behavior or styles into particular quadrants, octants, or sixteenths of the circle), and (c) vector length, the distance of the vector from the circle's origin (thought to be an index of the intensity of one's interpersonal tendency). Of course, this third score is somewhat redundant in that it may easily be calculated given the Pythagorean theorem and the x and y coordinates (i.e., sides of a right triangle) for an individual's vector point:

$$\text{Vector length} = [(\text{dominance})^2 + (\text{affiliation})^2]^{1/2}$$

A more recently devised, but mathematically equivalent form of profile analysis is "the structural summary" method (Gurtman, 1994; Gurtman & Balakrishnan, 1998), which favors a rectangular coordinate system and analyzes profiles into component parts for curve modeling at the level of the individual. This approach involves structuring each respondent's profile scores as two additive components: a structured element corresponding to the ideal circumplex prototype (i.e., the extent to which one's profile of scales approaches a cosine curve), and an element representing deviation from this ideal. This method produces several basic parameters. Elevation represents the average of scale scores or score on a general factor, if the instrument has one.

Amplitude reflects profile variability moderated by goodness of fit to the circular model or cosine function.

High amplitude indicates a structured, differentiated profile pattern with a single peak and single valley, whereas low amplitude corresponds to "flat" profiles with low variability between scales. Angular displacement denotes the phase shift of a profile curve from where the highest profile peak is expected (see Figure 3). Lastly, the structural summary method facilitates the calculation of *R*-squared, a goodness of fit estimate of the precision with which one's profile curve corresponds to the structured element in the overall equation. Mathematical conversions permit demonstration that some of the basic "structural summary" parameters correspond to "structural analysis" parameters: amplitude corresponds to vector length, whereas angular displacement corresponds with vector angle. The present paper refers to vector length and amplitude interchangeably.

Empirical Links Between IPC Indices and Adjustment

Many studies have examined the links between information gleaned from IPC assessment (namely, the aforementioned indices) and indicators of maladjustment, finding evidence for such linkages. A cursory review of such findings follows, remaining "blindly empirical," then resuming consideration of theory shortly thereafer.

Octant Scales

The most basic index derived from IPC measurement is often the set of scale scores for the particular measure. Such scores assess relative levels of behavior, traits, etc. within particular octants most typically. Such information reflects the intensity or extremity of behaviors. Thus, abnormally high levels of behaviors from any octant are presumed to indicate maladjustment. The Inventory of Interpersonal Problems-Circumplex scales questionnaire (Alden, Wiggins, &

Pincus, 1990; Horowitz, Alden, Wiggins, & Pincus, 2000) serves as the most commonly used IPC measure upon which high scores on any octant are interpreted as pathological. Indeed, associations between elevated IIP-C octant scores and distress, psychopathology, or diminished treatment response have consistently surfaced (e.g., Borkovec, Newman, Pincus, & Lytle, 2002; Erickson & Newman, 2003; Kachin, Newman, & Pincus, 2001; Noyes et al., 2003; Ruiz et al., 2004; Vittengl, Jarrett, & Clark, 2003).

Circular Location

Related to octant scale scores, differential information about individuals' levels of behavioral tendencies in particular regions of circumplex space shows ties to undesirable psychosocial outcomes. Examples of such findings include a general pattern of relatively positive treatment process and outcomes for friendly-submissive problems, in contrast to interpersonal problems of a hostile or hostile-dominant sort (Davies-Osterkamp, Strauss, & Schmitz, 1996; Gurtman, 1996; Horowitz, Rosenberg, & Bartholomew, 1993; McMullen & Conway, 1997; Maling, Gurtman, & Howard, 1995; Muran, Segal, Samstag, & Crawford, 1994). Type of interpersonal problems may serve as a moderator variable for which patients benefit from particular forms of treatment (e.g., Alden & Capreol, 1993). Patients' angular displacement of their peak IIP-C scores map onto particular forms of personality pathology (e.g., Gurtman, 1996; Soldz, Budman, Demby, & Merry, 1993). Similarly, emotional symptoms and clinical syndromes most often pertain to overabundance of behavior or perceptions in the hostile hemisphere of the SASB model (e.g., Benjamin, 1994; Benjamin & Wonderlich, 1994; Erickson & Pincus, 2005). Hence, though studies do not often employ angular location itself as a substantive variable, circumplex regions within particular angular ranges convey important predictive information for adjustment.

Elevation

Whereas IPC octant scales differentially relate to various criterion variables associated with adjustment, the mean elevation of scales provides a summary score of a respondent's nonspecific endorsement across octants. Elevation scores have most frequently been derived as a substantive variable on the IIP-C, for which they represent mean endorsement of interpersonal problems or "interpersonal distress" (for an exception, see Bartholomew & Horowitz, 1991). Elevation scores on the IIP-C predict therapist ratings of patient personality pathology (Gurtman, 1996), a broad range of life functioning variables (Gurtman & Balakrishnan, 1998), and subclinical affective distress (Erickson, 2002). Whereas elevation tends to predict poor treatment response (Ruiz et al., 2004), though not universally (Mohr et al., 1990), it also shows sensitivity to changes in treatment (Vittengl et al., 2003). Intriguingly, elevation predicts the ability to describe significant others clearly (Horowitz, Rosenberg, & Kalehzan, 1992), which may have import for the psychotherapy process. At present, the IIP-C elevation index serves as "…the best structural index of an individual's interpersonal adjustment" (Gurtman & Balakrishnan, 1998, p. 350).

To date, elevation scores calculated on other IPC measures of normal personality (e.g., Interpersonal Adjective Scales, IAS; Wiggins, 1995) have often been considered as response bias or nonsubstantive (e.g., Gurtman, 1994; Wiggins et al., 1989), despite the fact that such measures may yield a large elevation factor. However, whether elevation on such measures fails to demonstrate meaningful correlates has yet to be evaluated empirically.

Amplitude

The few studies examining relations between amplitude (vector length) and processes or variables relevant to adjustment yield inconsistent results. For instance, Dietzel and Abeles (1975) utilized vector length of behavior ratings of clients in therapy as an index of maladjustment, finding that clients with high vector length exhibited a stronger constraining effect on therapist behavior during the initial phase of treatment (Dietzel & Abeles, 1975). In studies utilizing the IIP-C in the course of psychotherapy, amplitude predicted reduced treatment response and longer treatment length in one study (Ruiz et al., 2004), but did not correlate with measures of adjustment and functioning elsewhere (Gurtman & Balakrishnan, 1998). In an experience-sampling study of aggregated social behavior, vector length of aggregated behavior showed small positive associations with adaptive traits (Extraversion, Agreeableness) and correlated inversely with Neuroticism (Moskowitz & Zuroff, 2004).

The few studies that have categorized or "diagnosed" individuals based on the angular placement of their dominance and love scores have uncovered relations between vector length/amplitude and dysfunction. Using the IAS, Wiggins et al. (1989) found that although vector length did not correlate with maladjustment in general, after categorizing participants into respective octants, vector length correlated with measures of social nonconformity (a purported index of similarity to incarcerated prisoners), distress, and impulsivity, depending on the octant. Additionally, vector length within particular octants showed numerous moderate associations with corresponding self-reported interpersonal problems (e.g., vector length of the Arrogant-Calculating octant related to interpersonal problems marked by competitiveness; Wiggins, Phillips, & Trapnell, 1989). At high levels of vector length, the entire range of specific interpersonal traits converges substantially with respective interpersonal problems, although

interpersonal distress tends to cluster most highly in the hostile-submissive quadrant (Gurtman & Pincus, 2005). Erickson (2003) similarly detected moderate to large correlations between social anxiety symptoms and IAS vector length for persons categorized as *unassured-submissive*, as well as moderate to large associations between symptoms of generalized anxiety/worry and vector length within all submissive octants (i.e., *aloof-introverted, unassured-submissive, unassuming-ingenuous*). Overall, despite some findings of links between amplitude/vector length and adjustment, especially when examining specific octants and respective problems, the variable has not performed as a consistent predictor of pathology.

Profile Complexity

A final form of index derived from IPC assessment measures and receiving attention as a marker of maladjustment pertains to "conflict" or complexity in profiles. For instance, as calculated on SASB Intrex self-report measures (Benjamin, 2000), persons who simultaneously report high levels of contradictory self-directed actions or social perceptions on the dimensions of autonomy or affiliation (conceptually related to dominance and love) also demonstrate relatively high levels of psychiatric symptoms (Alpher, 1996; Erickson & Pincus, 2005; Ruiz, Pincus, & Bedics, 1999). A pattern of multiple peak scores around the circumplex typifies some personality disorders (Kiesler, 1986; Kiesler, Van Denburg, Sikes-Nova, Laurs, & Goldston, 1990). Insecure attachment (Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994) and complicated bereavement (Bonnano, Notarius, Gunzerath, Keltner, & Horowitz, 1998) similarly exhibit ambivalence of social perceptions on measures that approximate IPC dimensions. Although the goodness of fit (R^2 scores) in the "structural summary" method for deriving IPC indices may measure profile complexity (Gurtman & Balakrishnan, 1998), such complexity may sometimes reduce to measurement error (Haslam & Gurtman, 1999). Nevertheless, across

several methods of operationalizing "conflict" on IPC dimensions, the tendency to report opposing descriptions for the self or for others appears problematic for psychosocial adjustment.

Variability as a Central Concept Related to Adjustment in Interpersonal Theory

Thus, numerous studies directly implicate various types of dysregulated interpersonal behavior and perception in psychological disturbance, and in many cases do so via IPC assessment technologies and indices. However, whereas the foregoing review incorporated little attention to the role of theory to account for or explicate such relations, meaningful advances in understanding interpersonal dynamics and adjustment require consideration of theory. Fortunately, interpersonal theorists have provided a rich tradition of conceptual articulation specifying hypothetical links between interpersonal dynamics and psychosocial adjustment. However, as noted previously, although the traditions of interpersonal theory and IPC measurement dovetail at many points, the extent to which the latter provides adequate operationalization of the former for tests of substantive theory remains unclear. For this reason, advancement in both arenas presently requires rigorous tests of whether indices derived from IPC measurement relate meaningfully to processes central in interpersonal theory.

Leary (1957), of the first generation to establish a beachhead for the enterprise of operationalizing classic Sullivanian theory, extended the theory by articulating mechanisms by which interpersonal behavior may relate to psychopathology. At the core of his theorizing lie propositions related to variability, subsuming such diverse forms as variability within a single personality domain (vector length within self-reported traits), across domains as inter-level discrepancies (e.g., between public behavior, conscious self-report, preconscious fantasies, unconscious factors, and values), and across situations. Remarkably prescient of the recent burgeoning interest in dynamic processes in personality and affect (e.g., Eid & Deiner, 1999;

Greenier et al., 1999), he underscored assessment of variability for understanding personality (Leary & Coffey, 1955, p. 124):

> Diagnostic classification should include a quantitative summary pattern of hundreds of reliable variable measures *from each level of personality* [original emphasis]. The same should be repeated at least once over a temporal span. Intensity and rigidity of the behavior at each level and the amount of variation among levels due to conflict or oscillation should also be indicated.

Consistent with his belief in a continuum between normal and abnormal behavior and personality, Leary (1957; Leary & Coffey; 1954) posited various healthy and unhealthy forms of interpersonal variability, with the latter at the extremes of a spectrum. Specifically, with regard to the temporal dimension across situations, he postulated that high variability of interpersonal behavior may either reflect well-balanced and flexible responding or else chaotic, "oscillating behavior." At the other end of the continuum, he envisaged restricted variability of behavior, reflecting personality consistency or a more pathological form of "interpersonal rigidity." Unfortunately, a promised follow-up volume explicating operational means of discriminating these normal and abnormal processes exhaustively was never completed. Nonetheless, as noted by Kiesler (1996), Leary (1957) contributed the basic theoretical notion that interpersonal behavior relates to psychopathology by way of two "basic maladjustive factors" (p. 121) tapping variability: maladaptive behavioral fluctuation (oscillation) and pathological behavioral rigidity.

The process of maladaptive oscillation was characterized as problematic in that individuals high on this attribute over-react to environmental stimuli, endeavoring to adjust to each new aspect. Such a conceptualization would suggest a portrait of inordinate instability, lability, changeability, or chaotic fluctuation, with the individual's behavior largely a function of

situational forces; this picture contrasts with individuals high in variability resulting from self-directed, skilled behavioral adjustment to situations (Paulhus & Martin, 1988). Interestingly, though the pathological form of variability dubbed oscillation was framed as a central concept in Leary's formulation, little research has directly examined the phenomenon. However, Moskowitz and Zuroff (2004, 2005) apparently captured it in their finding that trait Neuroticism positively predicted several forms of variability in social behavior over several weeks. No extant study examines the relationship of IPC indices to this theory-central form of behavioral lability.

If oscillation may be conceptualized at one end of the person-situation influence continuum in which the situation largely determines behavior, interpersonal rigidity might be characterized as extreme influence of the personality on behavior with scant situational influence (Pincus, 1994). Whereas temporal oscillation has received little attention, Leary's formulation of interpersonal rigidity has taken a central position in interpersonal theory. In fact, rigidity constitutes perhaps the theoretical centerpiece linking interpersonal behavior to pathology (Brokaw & McLemore, 1991; Carson, 1969; 1991; Leary, 1957; Kiesler, 1996; Pincus, 1994; Wiggins, Phillips, & Trapnell, 1989). Specifically, the relatively well-adjusted person is thought to be adept at employing a wide spectrum of interpersonal behaviors when situationally apposite, possessing a full complement of social skills with which to navigate the nuances of social interactions. In contrast, the poorly adjusted individual is theorized to possess a restricted range of interpersonal stances with others, relying on these excessively and avoiding behaviors outside this range. He or she "…tends to overdevelop a narrow range of one or two interpersonal responses. These are expressed intensely and often, whether appropriate to the situation or not…" (Leary, 1957, p. 126). Importantly, this formulation suggests that interpersonal rigidity entails poor ability to attend to and calibrate or modify behavior according to the specific

situation (i.e., interpersonal behavior of the other person), as well as a pattern of chronically over-emitting a few behaviors from a specific class. Whereas normal individuals inevitably display characteristic interpersonal styles, their behavior may remain relatively less extreme and more malleable in accordance with normal situational factors, and they should possess the ability to utilize non-characteristic behaviors when suitable. Such flexibility contrasts with the theorized invariance of problematic social behavior.

The concept of interpersonal rigidity derives some of its apparent explanatory power from theoretical links to the notion of complementarity, an index of the extent to which behaviors on the dominance dimension probabilistically pull for reciprocal responses from others (i.e., dominance for submission and *vice versa*) and affiliation-related behaviors elicit similar interpersonal responses (i.e., affiliation begets affiliation, hostility begets hostility; Carson, 1969). Complementary social behavior is theorized to sustain interactions and relationships, fostering predictability, with the most adaptive forms permitting a flexible dance of give and take of mutual self-definition between interactants (Carson, 1969; Kiesler, 1983). Although not all research unequivocally supports the construct (e.g., Orford, 1986), several well-designed tests have supported the notion that complementarity is a normal social phenomenon (Markey, Funder, & Ozer, 2003; Sadler & Woody, 2003; Strong et al., 1988; Tracey, 1994), and failure to consider of the role of perceived motives of interactants may account for inconsistent findings (Horowitz et al., 2006). The aforementioned formulation of interpersonal rigidity suggests that whereas normal, well-adjusted individuals' social behavior remains responsive to variations in others' interpersonal bids for complementarity, maladjusted individuals' persistent overuse of a restricted range of social behaviors implies insensitivity to other's cues, a failure to engage in the ebb and flow of normal interaction. Such constriction of behavior, coupled with constricted

perceptions of others, may elicit subtle or overt aversive social reactions and sustain dysfunction (Kiesler, 1996). Of course, it should be noted that well-adapted individuals should be capable of non-complementary interaction (e.g., when therapists purposely "unhook" from negative interaction cycles with clients in order to prevent reinforcement of existing behaviors; Safran & Segal, 1996); nonetheless, the ability to emit complementary behavior across a range of others' behaviors implies latitude in responding.

Existing Operationalizations of Interpersonal Rigidity

Amplitude/Vector Length

Given the theoretical centrality and compelling plausibility of the notion of rigidity, researchers have made several attempts to operationalize the construct in relation to the interpersonal circumplex. The Kaiser Research Group (LaForge, Leary, Noboisek, Coffey, & Freedman, 1954; Leary, 1957) first operationalized rigidity, equating it to vector length on circumplex measurements as previously described in the present paper. They postulated that vector length provides a measure of profile extremity and variability indicating the degree to which one's interpersonal behavior is pulled toward and restricted to a limited outer portion of circular space. Similarly, vector length has been conceived as an index of interpersonal behavior inflexibility based upon the assumption that persons who endorse self-descriptions constrained toward one region of the circumplex may rely on these behaviors in an intense, inflexible fashion and omit other modes of responding (Wiggins et al., 1989), in contrast to the "flat" profiles (i.e., few peaks and valleys) thought to reflect interpersonal flexibility (e.g., Wiggins & Holzmuller, 1978, 1981).

Although vector length/amplitude appears to convey important information with regard to profile variability of interpersonal traits or problems, it remains unclear whether the variance it

captures adequately operationalizes the construct of interpersonal rigidity. Gurtman and Balakrishnan (1998) suggest that it captures rigidity only indirectly, and should be considered an "overtaxed and ultimately flawed measure" of the construct (p. 356). For one thing, willingness to endorse lexical self-descriptors limited to a particular region of circumplex space may be more aptly characterized as differentiation or articulation of self-perceptions and problems (Gurtman & Pincus, 2005), rather than rigidity *per se*. It remains an empirical question whether this sort of restricted variability of self-description overlaps with restricted variability of behavior across interactions. Furthermore, vector length on existing circumplex measures entails reporting of generalized self-perceptions, failing to take into account situational factors or variability across perceived situations. Such qualifications merit critical investigation of the extent to which vector length represents interpersonal rigidity, given that the traditional definition incorporated the idea of invariance of interpersonal behavior across situations, without regard for situational constraint or appropriateness.

Interpersonal Capabilities

With the Battery of Interpersonal Capabilities (BIC), Paulhus and Martin (1987, 1988) made greater strides at incorporating the importance of situational appropriateness into an operationalization of interpersonal rigidity (under the rubric of *functional flexibility*, the inverse of rigidity). Based on the possibility that capabilities may be more important than traits for measuring situational adaptation, this measure requires respondents to rate their global perceived capability of exhibiting each of 16 interpersonal behaviors around the interpersonal circumplex (e.g., "How capable are you of being dominant when the situation requires it?"). Respondents also indicate the difficulty of performing each behavior, anxiety experienced as function of so doing, and tendency to avoid situations demanding each behavior. All items intercorrelate such

that persons scoring high on the measure report greater capability of a broad range of social behaviors; interestingly, separate Nurturance and Hostility factors have emerged, suggesting that individuals may report capability of both types of behavior (in contrast to trait measures in which these are opposites). A series of studies suggested that many interpersonal capabilities (e.g., the capability to be extraverted, gregarious, calculating, or arrogant depending on the situation) correlate with self-esteem and interpersonal control (Paulhus & Martin, 1987). Likewise, persons high in global functional flexibility report higher self-esteem and are rated by peers as relatively flexible and well-adjusted (Paulhus & Martin, 1988). Thus, functional flexibility perhaps provides a more theoretically consistent operationalization of the theory that well-adjusted persons demonstrate the ability to adjust their behavior to the situation (but see Hofsess & Tracey, 2005, for an alternative conception of the BIC).

Analogous to vector length calculated on interpersonal circumplex profiles, functional flexibility seemingly provides a useful, but incomplete means of operationalizing interpersonal flexibility. Although the latter takes account of situations by requiring respondents to indicate their ability to respond with a given class of behavior when appropriate to the situation, such judgments remain rather global and do not require consideration of particular situations or interaction contexts. Also, this scale presumes that people have the ability to judge when a particular behavior is appropriate. Additionally, the BIC measures variability of hypothetically possible behaviors, but not restricted variability of how one thinks one would actually act in pertinent situations. Lastly, the BIC may, to a large extent, reflect self-efficacy or internal locus of control (in contrast to *situationality* or feeling as though behavior depends on the situation; Paulhus & Martin, 1988), variables that likely comprise correlates of dominance (Wiggins & Broughton, 1991) and therefore do not fully capture variance around the circumplex. In

summary, the extant operationalizations of interpersonal rigidity (amplitude, BIC) measure meaningful and important constructs with implications for adjustment, but fail to take specific situations or cross-situational variability into account. As such, neither examines latitude of nor restriction of range of interpersonal behaviors across interactions, and both thereby fail to satisfactorily test the tenet of interpersonal theory that such restriction accompanies maladjustment. Capturing interpersonal rigidity must incorporate consideration of behavior across situations and time (Gurtman & Balakrishnan, 1998).

Revisiting the Role of Variability in Social Behavior and Perceptions

Because existing measures do not fully operationalize the construct in its cross-situational aspects, research must test whether these indices truly predict this sort of variability, employing criterion variables that take into account the interpersonal situations to which individuals respond. In this manner, rigidity as a criterion may be defined vis-à-vis person-situation contingencies, rather than global generalizations. Such an assertion bears similarity to the Cognitive-Affective Processing System model, which searches for stable individual differences in behavior, not in terms of global dispositions or aggregated behaviors, but in unique "if…, then…" situation-behavior profiles (e.g., children's level of aggression in response to teasing by peers versus praise by adults; Mischel & Shoda, 1995; Shoda & Mischel, 1995). Several lines of research corroborate if-then aspects of personality in that perceived contexts or interpersonal cues activate particular scripts or relational schemas that influence behavior (for reviews, see Andersen & Chen, 2002; Baldwin, 1997; Cervone & Shoda, 1999). Given that individuals' perceptions of self and others vary in terms of their level of if-then understanding (i.e., viewing people as static entities versus varying in behavior across situations; e.g., Dweck, Hong, & Chiu, 1997), and that such differences relate meaningfully to emotional processes and adjustment (e.g.,

Levy, Blatt, & Shaver, 1998; Linville, 1985, 1987; Mendoza-Denton, Ayduk, Mischel, Shoda, & Testa, 2001), it may be that individuals vary in ability to fully recognize and respond to the full spectrum of others' social behavior. The question of rigidity has previously only been asked in terms of traits (e.g., "I tend to be dominant") and capabilities (e.g., "I am capable of being dominant"), but not an interactionist paradigm (e.g., "When others submit, I behave dominantly"). The latter remains most consistent with interpersonal theory's insistence on the dyad (self in relation to other) as the basic unit of study (Kiesler, 1982).

With regard to interpersonal theory, assessing the impact of interpersonal situations on social behavior (and its variability in particular) might entail examination of how individuals respond to a range of stimuli/situations in experimental and naturalistic settings; this would facilitate assessment of the extent to which individuals make fine discriminations between their if-then contingencies for particular classes of interpersonal behavior (i.e., "when others behave x, I behave y"). Given the proposition of interpersonal theory that complementary interactions are the normal and relatively adaptive state of affairs, one might expect relatively well-adapted persons to be able to make meaningful perceptual discriminations between different interpersonal situations (i.e., others' behavior and interpersonal bids) and perhaps respond in complementary fashion; in response to the full range of perceived interpersonal behaviors around the circumplex, normal persons should, more or less, exhibit the full range of interpersonal responses. In contrast, according to interpersonal theory, less adjusted individuals might respond with fewer classes of reactions, suggesting either poor discrimination of the meaning of others' behavior or over-reliance on a few behaviors, or both. This type of behavioral consistency (i.e., decreased intra-individual variability) would accord with past assertions (Kiesler, 1996; Leary, 1957) that less adapted persons should manifest more behavioral consistency than well-adjusted

person, as well as the notion that maladapted persons emit social behaviors without regard to social norms and the unique situational press (Carson, 1991).

As noted by Pincus (1994), rigidity is less a characteristic of behavior *per se* than the individual who emits it, and occurs in both overt behavior and covert responses (e.g., perceptions, expectancies, schemas). The latter point corresponds to Sullivan's (1953b) central notions of selective inattention and parataxic distortion, processes whereby relatively disordered individuals' perceptual systems distort incoming social information to fit preexistent templates for significant others ("personifications"), based theoretically upon developmental experiences; many studies have documented similar biases in social cognition and person perception (e.g., Andersen & Chen, 2002; Mathews & MacLeod, 1994; Kenny, 1994). Consistent with this idea, the psychological features of situations, rather than objective aspects (Endler & Magnusson, 1976; Murray, 1938), constitute the important stimuli in person × situation interactions (e.g., Mischel & Shoda, 1995). Such an idea suggests the possibility that individuals high in behavioral rigidity might also show a restricted range of interpersonal perceptions, consistent with the notion that both behavior and perception contribute to the reification of maladaptive processes. Because complementarity likely exists in responses to perceived behavior (rather than actual behavior; Kiesler, 1991; Pincus, 1994), it may simply be that interpersonal rigidity derives from complementary reactions to rigid or constrained perceptions of others.

According to Gurtman and Balakrishnan (1998): "…to do full justice to the adjustment concept, indices may need to be developed that incorporate assessments conducted across time, situations, and perspectives, similar in spirit to what Leary envisioned in his original diagnostic system" (p. 356). Existing IPC measures and associated indices clearly do not provide this type of comprehensive assessment. However, the central variability concepts of interpersonal

oscillation and rigidity in interpersonal theory cannot truly be measured and studied apart from multiple assessments of this sort across time and situations. Thus, both the fields of IPC assessment and interpersonal theory would benefit from research examining the empirical linkages between existing IPC measures and indices and the criterion of cross-situational variability of social behavior and perception, consistent with Learian theory. Such research would provide both more rigorous tests of the construct (criterion) validity of purported measures of rigidity, as well as a context for testing whether other IPC indices predict the other extreme end of the variability dimension: unstable oscillation.

The present paper aims to fill such a role by testing the potential of key indices on standard IPC measures to predict several forms of variability in social behavior and perception. Criterion variables included two types of cross-situational variability of social behavior and perceptions: a) dimensional variability of dominance and affiliation, and b) circular variability around the IPC (the present paper uses the respective terms "flux" and "spin" based upon the conventions of Moskowitz & Zuroff, 2004). Both forms of variability were examined in a task requiring perceptions and imagined behavioral responses to standardized written interpersonal scenarios (Study 1) and for social behavior and perceptions of others in "diary" study of social interactions (Study 2) with less control, but enhanced ecological validity.

The Present Study

Predictor variables included several indices previously considered to operationalize the construct of interpersonal rigidity: the Battery of Interpersonal Capabilities (Paulhus & Martin, 1988) and amplitude scores on the Interpersonal Adjective Scales and the Inventory of Interpersonal Problems-Circumplex scales. Also included as predictors were elevation scores on the latter two IPC measures. Based on the past findings that general distress (Neuroticism)

predicts variability in social behavior (Moskowitz & Zuroff, 2004, 2005), IIP-C elevation (interpersonal distress) was included as a possible predictor of "oscillation," given that high variability found to correlate with interpersonal distress would likely merit interpretation as problematic fluctuation. Such a finding would expand the known correlates of this clinically-relevant index.

The inclusion of IAS elevation as a predictor may appear perplexing, given that researchers have typically ignored or removed the elevation factor on the IAS (e.g., Gurtman, 1994). However, a number of considerations provided impetus for its inclusion in the present study. First, even if IAS elevation solely reflects response bias, such biases often comprise substantive variables to study and possess meaningful correlates (e.g., Paulhus & John, 1998; McCrae & Costa, 1983). Because elevation constitutes the first and largest IAS factor, it may similarly capture consequential variance. Additionally, an elevation factor on a circumplex, with its distinctive interrelationships between scales, possesses different meaning than elevation on measures such as the MMPI-2, which possesses no such relationships; as noted by Paulhus & Martin (1988), high endorsement across a circumplex of traits (i.e., IAS) suggests contradictory responding (e.g., endorsing high levels of both nurturance and hostility, dominance and submission, etc.). Several studies have shown such contradictory endorsement of IPC trait adjectives in description of the self (e.g., Campbell, 1990) or others (e.g., Bonnano et al., 1998) to relate meaningfully to distress; such conflict constitutes a substantive notion in interpersonal theory (Benjamin, 1996; Leary, 1957). Though often overlooked, it should be noted that IIP-C elevation taps this sort of conflict as well, rather than distress alone. Of course, high levels of "conflict" necessarily coincide with high elevation scores only in upper ranges; in the lower range of scores, elevation may indicate distress located in only one region of circumplex space,

for example. Lastly, IAS elevation was included in the study due to its mathematical similarity to IIP-C elevation, for parallelism in analyses (to be explained in Results section), and because the prediction of interpersonal variability by the elevation is ultimately an empirical question.

Hypotheses

1. Based upon their traditional interpretation as measures of interpersonal rigidity, IIP-C amplitude and IAS amplitude were hypothesized to predict restricted dimensional and circular variability (flux and spin) of social perceptions and behavior in response to both written social scenarios (Study 1) and daily interactions (Study 2). BIC scores were expected to show the inverse pattern of prediction, given the conceptualization of the BIC as assessing "functional flexibility" (opposite of rigidity). The inclusion of both social behavior and perception provided an examination of low variability that might comprise rigidity in both overt and covert forms.
2. IIP-C elevation and IAS elevation were expected to positively predict high levels of variability in imagined social behavior and perceptions (Study 1) and actual behavior and perceptions (Study 2). Positive relationships between elevation and such variability might be interpreted as indicating chaotic "oscillation."

Figure 1. The Interpersonal Circumplex

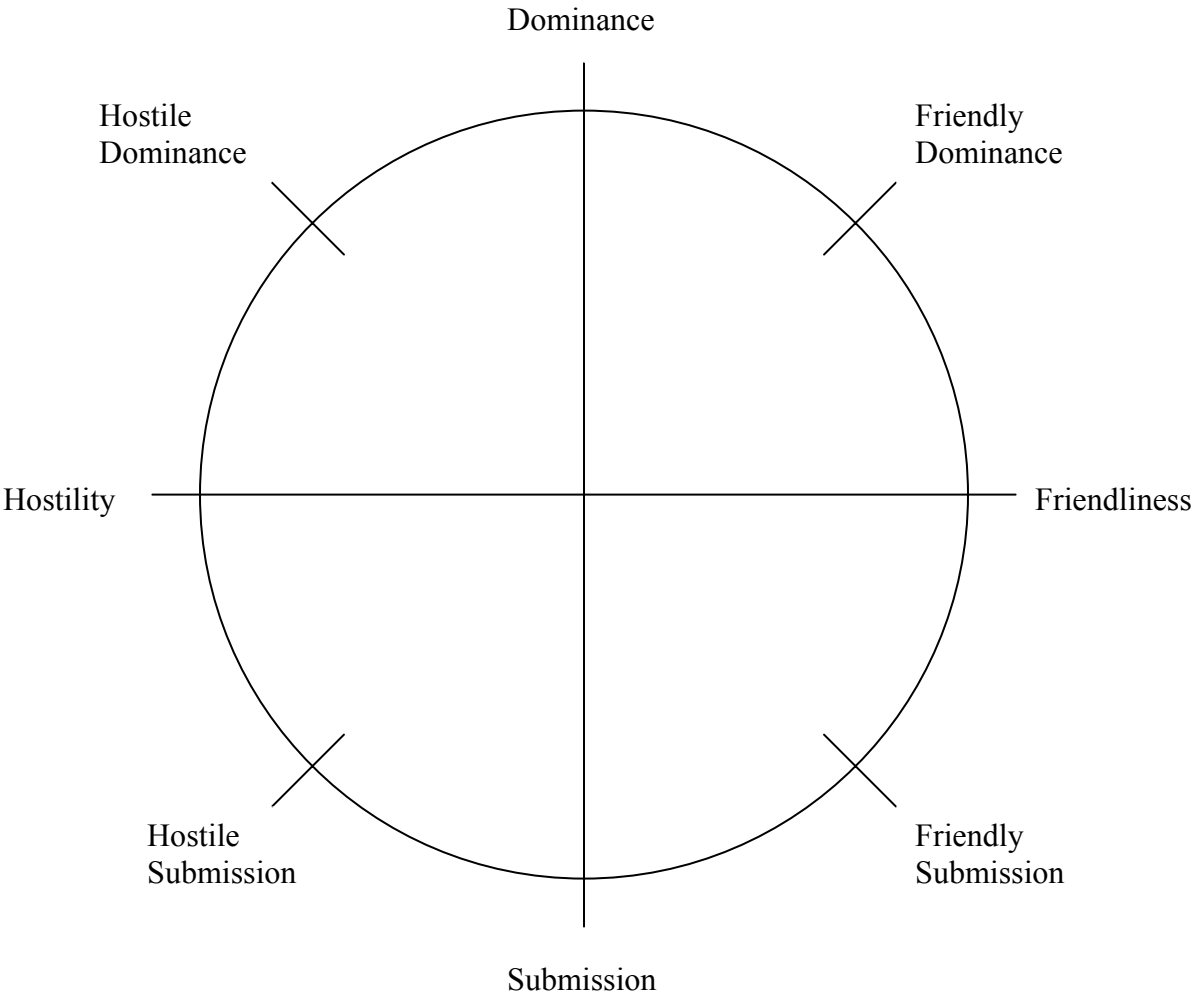


Figure 2. Portrayal of IPC Scores in Polar Coordinate Space

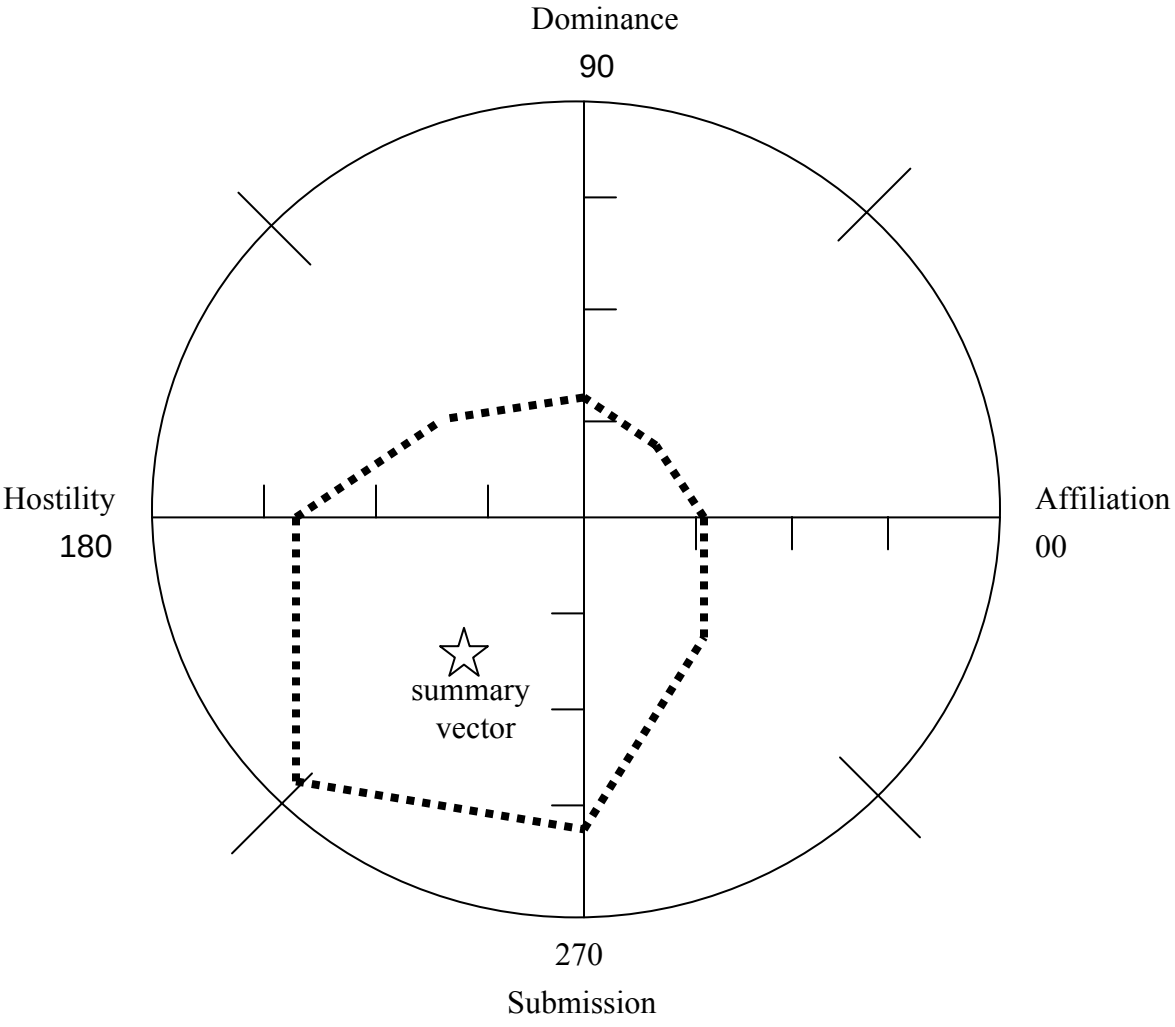
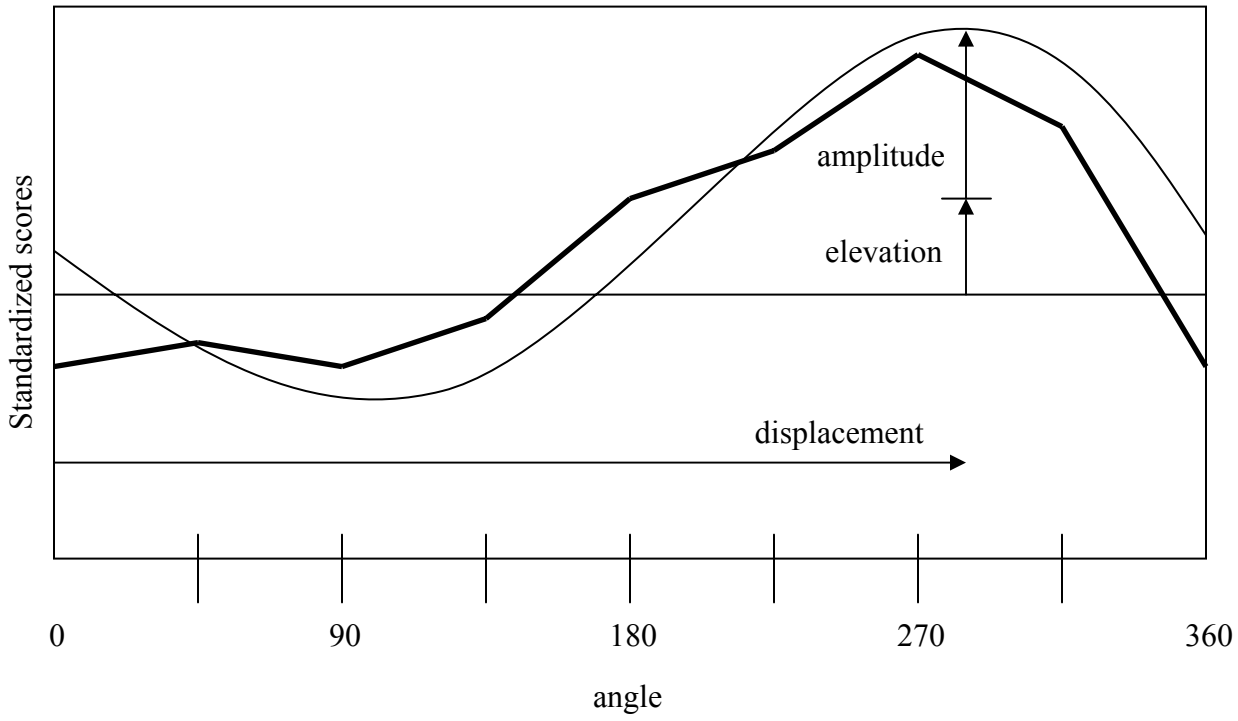


Figure 3. Portrayal of IPC Scores in Rectangular Coordinate System



Method

Study 1

Overview

Because past research has not explored the meaning of IPC indices in relation to cross-situational variability of social behavior, a core concept in classic Learian theory, the first study involved creation of a set of written interpersonal scenarios and response options to provide standard stimuli against which to calculate variability of imagined social behavior. Such a self-report methodology seemed an appropriate first effort at capturing situational variability (or restricted range thereof) as a criterion variable, in that it both provided controlled prompts and likely minimized non-shared method variance by the use of a common methodology (i.e., self-report). Of course, written scenarios provide less of the nuance and ambiguity of real-life interactions, but nonetheless were deemed appropriate as experimental stimuli given numerous past demonstrations of social-cognitive processes in response to verbal cues (e.g., Andersen & Baum, 1994; Baldwin, Baccus & Fitzsimons, 2004). Furthermore, to facilitate examination of possible constriction in covert responses (or other variability) in addition to estimated behavioral reactions, the present study included assessment of participants' social perceptions of stimuli. This methodology, in turn, permitted tests of the relationships between selected IPC personality indices, variability of imagined social behavior in response to others' behavior, and variability of social perceptions related to others' behavior.

Construction of Stimulus Materials

A set of written "interpersonal scenarios" were developed to serve as stimuli, as well as response options reflecting possible behavioral reactions for participants to choose (see Appendix A). Both stimuli and response options were based upon the 1982 Interpersonal Circle

(Kiesler, 1983). Whereas stimuli were abridged or combined versions of items taken verbatim from the Checklist of Interpersonal Transactions (Kiesler, 1984, 1987), face valid response options were inspired by multiple sources including the CLOIT, adjectival descriptors from the 1982 Interpersonal Circle-Acts Version (Kiesler, 1985), and behavioral descriptions from other IPC domains (Benjamin, 1974; Wiggins, 1979). Verbatim phrases from the CLOIT appeared too dense and lengthy to serve as response options, so briefer verb phrase stems were created. Each stimulus portrayed a target "other" person making a single interpersonal action toward the respondent (e.g., describing a specific friendly-dominant behavior); each response portrayed a possible behavioral reaction to the other person. To span the full circumference of the interpersonal circle, stimuli were chosen to represent each of eight octants of IPC content, unique combinations of the dimensions of dominance versus submission and affiliation versus hostility). Also, because the intensity or extremity of interpersonal behaviors is thought to account for the strength with which they "pull" or constrain the range of possible responses from others (Kiesler, 1983; Leary, 1957), behaviors from each octant were represented at two levels of intensity, as specified by Kiesler (1985, 1987). Thus, a single behavioral exemplar represented each octant and intensity level: one set of 16 standard behaviors for stimuli, a different set of 16 behaviors for responses, with the latter briefer and more succinct for ease of use. For instance, the dominant target behavior at the mild-moderate level of intensity: "[He/she] is quick to take charge of the conversation, or to offer suggestions about what needs to be done." An example of a mild-moderate submissive behavioral response: "[You] go along with his/her preferences or directions." Stimuli and responses were selected as representative of particular octants, rather than exhaustive in content coverage; this translates into loss of reliability and "bandwidth," but minimizes inconvenience and time requirements.

Additionally, to provide representation of several classes of interpersonal situations, and thereby provide a fuller test of whether behavior and perception varies across them, each standard set of stimuli was presented for two types of relationships: with a friend and with an authority figure (e.g., employer or professor). This choice was based upon both past demonstrations of important variance in social interactions captured by status differences (e.g., Fournier, Moskowitz, & Zuroff, 2002), as well as the rationale of casting a broad net to assess variability of social behavior and perceptions. In total, a total of 32 stimuli were used (i.e., 8 interpersonal acts × 2 levels of intensity × 2 types of relationships). The same 16 response options were used for all stimuli. Ideally, gender would serve as an additional factor; however, time and participant fatigue constraints precluded this option. Participants were asked to consider a friend and authority figure of the same gender when responding. For the set of interpersonal stimuli, participants received the following instructions:

> On this survey, you will be presented with a series of hypothetical scenarios in which another person displays a specific social action toward you. Your job is to vividly imagine the situation and think of what your most likely way of responding would be.
>
> After you have an idea of how you would likely respond, pick one of the sixteen responses that would be most likely for you. Please select a response based upon what you ACTUALLY WOULD DO, not what you IDEALLY would do. You may use each response as many or as few times as you want.

Imagine that a FRIEND [or AUTHORITY FIGURE (e.g., employer or professor)]…[specific behavior toward respondent].

How would you most likely respond?

Because the interpersonal stimuli were taken in abridged, but verbatim form from an IPC measure with demonstrated circumplexity (e.g., Tracey & Schneider, 1995), their validity was assumed in the present study. Furthermore, the presence of social perception ratings for each stimulus provided for empirical examination of content coverage (see Results section). However, because the response options drew from multiple IPC sources, two experts in IPC assessment were consulted as coders to ensure acceptable content validity beyond "face validity." Each coder independently categorized the response options based upon both IPC octants and level of behavioral intensity. Calculation of Kappa coefficients permitted examination of interrater agreement for the response options. For the first iteration of ratings of response options, the coders achieved acceptable interrater agreement, Kappa = .60, with agreement indicating congruence on both circumplex octant and intensity level. On the basis of these results, five response options were revised or replaced. Subsequent coding of response options by expert raters achieved perfect agreement, Kappa = 1.0, with all stems coded into expected octants and intensity levels. Therefore, response stems demonstrated reasonable and intersubjectively consistent conformity to intended IPC locations.

Participants

Students enrolled in undergraduate psychology courses at a large mid-Atlantic state university comprised the sample of participants. The study offered students an opportunity to participate in a study of "how college students think about social interactions" in exchange for

course credit or extra credit. Participants were given the option to participate in Study 1 solely or both Study 1 and Study 2. A total of 309 participants were involved, including 176 women and 120 men (13 declined to indicate gender). Participant age ranged from 18 to 49 (M = 20.42, SD = 2.94). The sample predominantly included Caucasian participants (74%), though also inclusive of Asian American (7%), African American (7%), Latino/Latina (4%) and American Indian (n = 1) students, as well as 3% endorsing "other." Five percent failed to indicate race or ethnicity.

Procedure

All data was collected by the use of a professionally administered survey server on the world-wide web. Internet survey research has demonstrated validity and utility as a methodology for data collection, with findings convergent with paper-and-pencil formats and robust across various presentations layouts (Gosling, Vazire, Srivastava, & John; 2004). After logging onto the study website from any computer with Internet access, participants provided demographic information and then completed the battery of questionnaires. Questionnaires included several IPC instruments (IAS, IIP-C, BIC; described below in Measures section), the constructed set of stimuli and response options, and a measure (Interpersonal Grid) for rating interpersonal perceptions of each scenario stimulus provided. Response options for interpersonal scenarios were presented in random order for each stimulus to minimize adoption of participant response sets.

Measures

Interpersonal Adjective Scale (IAS; Wiggins, 1995; Wiggins, Trapnell, & Phillips, 1988). The IAS is a 64-item self-report measure assessing interpersonal traits that conform to circumplex structure. Respondents rate the degree to which individual adjectives describe them, using eight Likert-type response options. Eight items represent each octant scale; alpha

coefficients were adequate in the present study: Assured-Dominant (.84), Arrogant-Calculating (.81), Cold-Hearted (.88), Aloof-Introverted (.88), Unassured-Submissive (.84), Unassuming-Ingenuous (.73), Warm-Agreeable (.89), Gregarious-Extroverted (.83). The IAS consistently demonstrates excellent circumplex structure and psychometric properties (Gurtman & Pincus, 2000; Wiggins, 1995).

Inventory of Interpersonal Problems-Circumplex Scales (IIP-C; Alden, Wiggins, & Pincus, 1990; Horowitz et al., 2000). This instrument, a 64-item version of the Inventory of Interpersonal Problems (IIP: Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1998) that conforms to circumplex structure, is a self-report measure of the full range of interpersonal difficulties signifying varying degrees of dominance and nurturance. Participants respond via a 5-option Likert format. Items of the IIP-C were selected based on angular position, thematic content, and communality, and comprise eight octant scales reflecting various interpersonal deficiencies and excesses. Octant scales exhibited adequate alpha coefficients in the present sample: Domineering (.82), Vindictive (.81), Cold (.84), Social Avoidant (.86), Nonassertive (.90), Exploitable (.84), Overly-Nurturant (.81), and Intrusive (.78). The IIP-C exhibits circumplexity, appropriate coverage of the interpersonal domain, and good internal consistency for octant scales (Alden et al., 1990) as well as considerable clinical and construct validity (Alden & Capreol, 1993; Alden & Phillips, 1990; Borkovec et al., 2002; Gurtman, 1996; Kachin, Newman, & Pincus, 2001; Ruiz et al., 2004).

Battery of Interpersonal Capabilities (BIC; Paulhus & Martin, 1987). The BIC was designed to operationalize "functional flexibility" as the inverse of the Learian concept of interpersonal rigidity. It assesses self-reported capabilities of enacting a variety of interpersonal behaviors located around the perimeter of the interpersonal circumplex. For each of these 16

behaviors, respondents endorse (a) their capability of performing the behavior if situationally required, (b) difficulty in and (c) anxiety when performing the behavior, and (d) tendency to avoid situations necessitating the behavior. Paulhus and Martin (1987) argue that any of these four scales may serve as an index of functional flexibility, based upon their loading on a single factor, as well as a sub-study using only capability and difficulty ratings. The present study employed the latter version of the BIC, which demonstrated good internal consistency: capability (α.= .80), difficulty (α = .90). Respondents rate items on 7-point Likert scales with anchors of *not at all (1)* and *very much (7)*. The BIC, as a measure of capabilities, appears to demonstrate a positive manifold structure (i.e., no negative correlations between capabilities) with two orthogonal dimensions: nurturance and hostility (Paulhus & Martin, 1987). However, Hofsess and Tracey (2005) suggest that the BIC behaves similar to other IPC measures by possessing a general factor and the two traditional dimensions. The BIC has demonstrated convergent and discriminant relations with other measures of flexibility, as well as positive associations with several self- and peer-reported indices of adjustment (Paulhus & Martin, 1988), though not consistently (Hofsess & Tracey, 2005).

Interpersonal Grid (IG; Moskowitz & Zuroff, 2005*).* Participants record interpersonal perceptions pertaining to each of the interpersonal stimuli on the IG, which was designed as a method of brief assessment of interpersonal perceptions, corresponding in structure to the interpersonal circumplex. It consists of a rectangular grid of squares (typically 9×9 or 11×11), with dimensions of quarrelsomeness versus agreeableness (horizontal) and dominance versus submissiveness (vertical). The IG functions as a one-item assessment of the extent to which another person's behavior is perceived as dominant and affiliative. Participants place an "x" or other mark in the square that they believe represents the appropriate combination of dominance

and affiliation. Nine descriptors based upon the Interpersonal Adjective Scales (Wiggins, 1995) serve as anchors (i.e., Assured-Dominant, Critical, Cold-Quarrelsome, Withdrawn, Unassured-Submissive, Deferring, Warm-Agreeable, and Engaging). Moskowitz and Zuroff (2005) provided initial validation by showing convergence in IG scores between perceivers and perceived individuals, as well as moderate levels of agreement across perceivers. Additionally, IG ratings were sensitive to manipulated variations in levels of experimental portrayals of the two central dimensions. Reliability was demonstrated by substantial similarity of persons' perception of specific others across situations. The present study employed the version of the IG with 9×9 squares.

Calculation of Variability Scores

The present study utilized two forms of variability in behavioral responses and social perceptions in response to interpersonal stimuli. Variability along the IPC dimensions of dominance and affiliation was calculated as standard deviation scores. Variability around the circumference of the interpersonal circle was permitted by calculating scores for circular variance (Gurtman & Pincus, 2003; Mardia, 1972). Utilizing these two types of variability, respectively termed flux and spin (Moskowitz & Zuroff, 2004), captured distinct forms of variability. "Pulse" or variability of vector length across interactions was not included, based both upon the focus of the present research on variability that covers the circle, rather than variation in extremity, as well as a desire to limit the overall number of statistical tests.

The calculation of dimensional flux in imagined social behavior required assigning dominance and affiliation values for each response option, due to the fact that respondents were not rating the response stems themselves. Given that each response option had previously been agreed upon as a reasonable marker for behavior of a certain octant and range of intensity,

dominance and affiliation values were assigned as if they represented the angular location at the center of each octant (e.g., 90˚ for dominance) at unit length (i.e., the dominant response stem for mild-moderate intensity was assumed to fall at Cartesian coordinates of [0, 1] on the unit circle). For this level of intensity, the following other values were assigned: hostile-dominant [-.71, .71], hostile [-1, 0], hostile-submissive [-.71, -.71], submissive [0, -1], friendly-submissive [.71, -.71], friendly [1, 0], and friendly-dominant [.71, .71]. Response options reflecting extreme intensity were assigned twice the distance from the circle origin as mild-moderate behaviors (e.g., the extreme dominant response stem was given an assumed placement of [0, 2] on the unit circle). Other values at this intensity level included the following: hostile-dominant [-1.41, 1.41], hostile [-2, 0], hostile-submissive [-1.41, -1.41], submissive [0, -2], friendly-submissive [1.41, -1.41], friendly [2, 0], and friendly-dominant [1.41, 1.41]. Dominance flux and affiliation flux were calculated separately as the standard deviation of levels of dominance or affiliation, respectively, across all response options chosen. These scores were created for imagined interactions with both a friend and an authority figure.

To calculate spin (circular variance) in imagined social behavior (separately for a friend and an authority figure), angular location values were first assigned to each response option as if located at the center of each octant. Presumed assigned angular location values for each response option were then used in the following formula, where θ_i = the angular location of each response (see Mardia, 1972, pp. 15-18):

$$\text{Circular variance} = 1 - \{[(\sum_{i=1}^{n} \cos \theta_i)^2 + (\sum_{i=1}^{n} \sin \theta_i)^2]^{1/2}\} / n$$

Dimensional flux for social perceptions (Interpersonal Grid) were calculated as standard deviation scores for levels of dominance and affiliation, separately, across all stimuli presented.

To calculate spin for social perceptions, the angular location for each perception was first derived based upon the following formula:

$$\text{Angular location} = \tan^{-1}(\text{affiliation} / \text{dominance}) * 180/\pi$$

Next, angular values were used to calculate circular variance based upon the aforementioned formula for perception related to both friend and authority figure behaviors.

Study 2

Overview

Whereas Study 1 utilized variability of imagined interpersonal behavior and social perceptions in response to standard stimuli as criterion variables, Study 2 examined variability of social behavior and perceptions occurring across naturally arising social interactions in a "diary" study. This was assumed to provide a more ecologically valid, naturalistic test of whether IPC indices predict meaningful cross-situational variability in interpersonal dynamics. The present study was modeled after elements of existing experience-sampling studies (e.g., Kafetzios & Nezlek, 2002; Moskowitz & Zuroff, 2004), though conducted with electronic diary records on the Internet rather than the pencil-and-paper variety. Participants were asked to log on to the study website daily for seven days to complete records of their social interactions, including both social behavior and perceptions of others during interactions. They were asked to complete a minimum of 5 records per day, in exchange for course credit or extra credit.

Participants

The same participant population was sampled in Studies 1 and 2; more specifically, participants in Study 1 received an opportunity to participate in Study 2 shortly thereafter. Many, but not all, participants in the former study elected to participate in the latter. A total of 231 participants were involved in the study. However, a substantial minority of participants was

excluded from analyses. Because of the goal of the present study to predict interpersonal variability, and because sufficient data points were required to sample cross-situational variability within a one-week period, an *a priori* cut-off of 30 interaction records was specified ($N = 175$). Participants received instructions to complete a minimum of 5 records per day for 7 days, so six days' worth of records was deemed a reasonable inclusion criterion. Such a strategy admittedly may incur a loss of information and possible biasing of results, limiting generalizability of results to participants who largely followed instructions. However, this predicament was viewed as preferable to the inclusion of participants with low or moderate numbers of completed interactions; the insufficient sampling and restriction of range in variability associated with a participant completing five records as opposed to 35, for example, appeared highly problematic and likely to wash out or diminish any effects present. Also, whereas procedures that allow for differing amounts of data across participants (i.e., multilevel or hierarchical linear modeling) serve as appropriate methods for analyzing the prediction of mean levels, these procedures do not allow for within-subject variability as a criterion variable, as in the present study. As a more empirical consideration, the fact that participants' total number of interaction records completed did not correlate with scores on any study variables after Bonferroni correction for experimentwise error suggested little reason to suspect that exclusion of non-adherent participants biased results related to key variables.

Average participant age deviated little from Study 1, $M = 20.47$, $SD = 3.32$ (range of 18 to 49). A total of 175 total participants met data retention criteria (118 women, 54 men, 3 not indicating gender). Ethnic composition included 77% Caucasian, 10% Asian-American, 5% African-American, 3% Latino/Latina, one American Indian, 3%"other" participants, and 2% non-responders.

Instructions to Participants/Procedure

Participants involved in Study 1 received instructions upon completion of that study to log onto another website if interested in participating in a study of social interaction and perceptions in day-to-day college life. Thus, participants from Study 1 completed all personality questionnaires temporally prior to commencing social interaction records. Participants received instructions (see Appendix B) to utilize one structured diary form on the study website per relevant interaction, defined as any encounter of five minutes or longer with another person in which the participants attend to one another and adjust their behavior in response to one another (based largely upon the instructions of Wheeler & Nezlek, 1977). Instructions emphasized recording at minimum five interactions daily, preferably distributed across the day. Participants were instructed to complete diary forms at a consistent daily time, at least one time per day (e.g., evening before going to sleep). They also were directed that, in the event that they failed to complete diaries for a given day, they should omit that day and resume their schedule of entries the following day. They were also informed of the possibility of research assistants checking the dates on which diaries are completed in order to determine level of compliance, though compensation was not described as contingent upon compliance.

Measures

Interpersonal circumplex variables. Because all participants in Study 2 had previously completed Study 1, they responded to a demographics questionnaire, the Interpersonal Adjective Scales, Inventory of Interpersonal Problems-Circumplex Scales, and Battery of Interpersonal Capabilities. Amplitude and elevation scores were calculated for the IAS and IIP-C.

Interpersonal perceptions. Participants recorded interpersonal perceptions pertaining to each of their interaction partners by way of the Interpersonal Grid.

Social Behavior. To assess interpersonal behavior for each interaction, participants completed checklist-format items previously developed and validated as brief behavior scales (Moskowitz, 1994), referred to as the Social Behavior Inventory (SBI) in this study. A total of 46 items measure the four cardinal interpersonal behaviors including dominant (e.g., "I made a suggestion"), submissive (e.g., "I avoided taking the lead or being responsible"), agreeable (e.g., "I smiled and laughed with others"), and quarrelsome items (e.g., "I confronted the other about something I did not like"). Twelve items measure each type of behavior, with the exception of one item measuring both dominant and quarrelsome behaviors ("I criticized the other"), as well as one item measuring both submissive and agreeable behaviors ("I went along with the other").

Based on previous research attesting to the utility of shortened versions of the behavior scales (i.e., 12 items, about 3 per scale; e.g., Moskowitz & Zuroff, 2004), the present research employed these briefer measures. Because use of identical items repeatedly has fostered problematic response sets in past research, four different 12-item scales with equally distributed behavior scale items were utilized, with versions of the scales automatically alternating on the study website. Scale scores were calculated by summing the number of items checked (0 to 3) for each behavior scale. Such scores, as in previous research with these items, were ipsatized to control for individual differences in overall rates of item endorsement. Ipsatizing entailed calculating the mean score across all behavior scales and subtracting this score from each situational behavior scale score.

Moskowitz (1994) demonstrated that the behavior scales are reliable, show circumplex structure, and exhibit convergent validity with existing interpersonal circumplex measures. Additionally, subsequent studies have used these scales to examine cross-situational behavior, finding theoretically meaningful covariation of behavior with other trait and situation variables

(e.g., Coté & Moskowitz, 1998; Fournier, Moskowitz, & Zuroff, 2002; Moskowitz & Zuroff, 2004).

Calculation of Variability Scores

For the SBI, flux scores for the scales of dominant, submissive, agreeable, and quarrelsome behaviors were calculated as standard deviation scores for each scale across all available interactions. SBI spin scores were calculating by first computing an affiliation score and dominance score for each interaction, subtracting quarrelsomeness from agreeableness (scales) and submissiveness from dominance, respectively. The formulas specified in Study 1 were utilized to obtain angular location for social behavior in each interaction, followed by calculation of circular variance of these angles across all interactions. For interpersonal perceptions (IG), flux and spin were calculated in the same fashion as Study 1, though across interaction records rather than across written stimuli.

Results

Preliminary Analyses

Assumptions for Multivariate Analyses

All variables were examined for univariate normality. None of the study variables exhibited levels of skewness or kurtosis necessitating transformation. Additionally, bivariate scatterplots were examined, providing no cause for concern about non-linear patterns or heteroscedasticity. Multivariate normality, an assumption required for analyses in the present study, was not directly tested due to both the impractical nature of testing numerous linear combinations of variables for normality, as well as the overly sensitive nature of existing tests (Tabachnick & Fidell, 2001). Nevertheless, multivariate normality is likely met when the foregoing univariate assumptions are met. Additionally, prescreening of the data suggested the existence of a few significant multivariate outliers for each analysis, but these were ultimately retained due to both the problems of discarding outliers without a clear rationale, as well as the fact that the number of outliers was in an acceptable range for studies of this sample size.

The present study dealt with missing data by imputing missing scores with maximum likelihood estimates. This method of handling missing data avoids the loss of data and unstable parameter estimates incurred by listwise and pairwise deletion. Furthermore, it requires less restrictive assumptions than other methods, serving as a highly recommended strategy for missing data (Schafer & Graham, 2002). Moreover, analyses conducted with maximum likelihood imputation provided similar results as with listwise deletion, though with greater power, buttressing the robustness of findings obtained.

Gender Differences

No substantive hypotheses specified gender differences. However, to test for the presence of pervasive gender differences on study variables, which might impact interpretation of primary findings, a series of univariate t-tests were conducted with gender as the between-groups variable. After experiment-wise Bonferroni correction for the number of individual tests, only one significant gender difference emerged: In Study 1, women demonstrated higher levels of affiliation dimension flux on imagined social behavior in interpersonal scenarios than men, $t(220.37) = -3.57$, $p < .001$. Accordingly, subsequent analyses were conducted without consideration of gender.

Validity (Content Coverage) Check for Interpersonal Stimuli in Study 1

Although interpersonal stimuli in Study 1 were assumed to provide reasonable markers for regions of circumplex space based upon past validation, mean levels of dominance and affiliation of participants' perceptions of these stimuli (Interpersonal Grid scores) were calculated to provide an indirect evaluation of this assumption in the present study. However, such data do not provide rigorous tests of the placement of stimuli in expected circumplex spaces for several reasons. First, simply providing means for "ocular analysis" (visual inspection) does not test circumplex structure as would other methods of structural analysis (e.g., confirmatory factor analysis). Second, these data are based upon participants' average perceptions of individual stimuli, as opposed to multiple responses to multi-item scales; in research on social perceptions with the Interpersonal Grid, participants tend to conflate dominance and hostility, as well as submission and affiliation (Moskowitz & Zuroff, 2005), suggesting caution in inferring orthogonal dimensions or circular structure from such ratings. Nonetheless, inspection of mean dimensional ratings (see Figures 4 and 5) suggest the participants tended to perceive most items

in expected IPC quadrants or hemispheres, though not always expected octant regions or at expected levels of intensity (i.e., distance from the origin). Overall, despite not conforming perfectly to expected locations, the IG ratings suggest broad content coverage of a range of perceived interpersonal behaviors, acceptable for examining variability of imaged social behavior and social perceptions.

Primary Analyses

Overview

The general purpose of the study was to test whether particular IPC personality indices (i.e., IAS and IIP-C amplitude and elevation, BIC) predict variability (i.e., dimensional "flux" and "spin") of interpersonal perceptions and behavior in imagined and actual social interactions. Given that the central hypotheses pertain to questions of statistical prediction, multiple regression was considered the appropriate data analytic strategy. However, structural equation modeling (SEM) was employed as the optimal analytic strategy for several reasons: 1) SEM comprises a broader framework, with multiple regression as a special case; 2) SEM allows for the simultaneous solution of a set of regression equations for postulated interrelationships, subsuming regression, correlation, and factor analysis; 3) SEM encourages explicit model building including assumptions about measurement that are normally hidden in multiple regression; and 4) SEM permits positing latent variables underlying observed variables, as well as estimation of error in their measurement (Bollen, 1989). In addition, the present study employed multiple (two) indicators for several constructs (e.g., dominance flux for Interpersonal Grid scores when rating a friend and an authority figure); it was determined that SEM would provide more parsimonious models and tests than simply conducting a large number of separate regression tests with individual construct indicators, as well as using all information available in

deriving parameter estimates. The present study utilized AMOS 5.0 (Arbuckle, 2003) to conduct SEM analyses.

All hypothesized structural equation models were constructed and diagrammed using standard notations, with circles or ovals representing latent, unmeasured variables and rectangles representing measured variables. Single-headed arrows between variables reflect hypothesized direct effects, whereas double-headed arrows imply covariance. The absence of a line connecting variables signifies a lack of hypothesized direct effects or covariance. Error terms for measured variables, indicated in this study by the letter "e," are conceptualized as unmeasurable variables comprised of measurement error as well as all other forms of unexplained variance. Disturbances, represented by the letter "d," reflect unexplained variance of latent variables, similar to residual terms in normal regression equations.

In SEM, the fit of models to sample data comprises the first general analytic step, after which interpretation of significant parameters (i.e., standardized regression or correlation coefficients) may be undertaken, assuming adequate overall model fit. Model fit may be judged, however subjectively, by a variety of existing indices generally falling into two categories, absolute and comparative fit indices. Absolute fit indices compare variances and covariances of observed data with those expected according to the model specified. The chi-square fit index tests whether model fit is perfect in the population, and is zero in cases of perfect fit. Although a significant chi-square may sometimes indicate problems in fit, the statistic's dependence upon sample size leads to rejection of acceptable models in large samples. Thus, though a standard fit statistic, the chi-square merits comparison with other fit indices. The root mean square error of approximation (RMSEA: Browne & Cudeck, 1993), another index of absolute fit, adjusts for model parsimony; scores below .08 are often interpreted as indicative of good fit. Both indices

were employed in the present study. Comparative fit indices compare a model's fit to a baseline model such as the independence model (assuming completely unrelated variables). The present study employed the comparative fit index (CFI; Bentler, 1990) and normed fit index (NFI; Bentler & Bonnett, 1980), both considered to reflect acceptable model if values exceed .90. Due to the somewhat subjective nature of fit index interpretation, the present study used multiple indices to facilitate examining of consistency across indices (Dilalla, 2000).

A series of structural equation models were tested. All models included dual indicators for predictor variables. Specifically, IAS amplitude and IIP-C amplitude were hypothesized to load on a common latent factor, as were IAS and IIP-C elevation, and BIC Capability and Difficulty ratings. Whereas the case for coalescing amplitude scores from both measures appears reasonable given that both have been used to index "rigidity," some readers might contest the assumption that IAS elevation and IIP-C elevation measure a shared construct. However, this assumption was maintained in the present study based on the aforementioned rationale. Furthermore, this allows a test of whether IPC structural model indexes (i.e., amplitude and elevation) load on the same factors, and it produces a model that is less saturated (i.e., permitting many variables to covary) than simply performing correlations between all variables. In addition, where possible, multiple criterion (Flux and Spin) variables were utilized to model latent variables in order to tap nonidentical forms of variability. Elevation and amplitude were allowed to covary freely in all models specified. Similarly, disturbance or error variables for Dominance Flux and Affiliation Flux were modeled to correlate in all relevant models; given that AMOS does not permit correlated endogenous or "downstream" variables (dependent variables, in this case), and persons high in flux on one dimension were expected to show high flux on other other dimension, this simply served as an acceptable way to model this covariance.

In summary, all models tested measurement questions about whether indicators (observed variables) load on hypothesized latent factors, as well as the more substantive hypotheses about relationships between personality indices and variability of perceptions and behavior.

Problems With the BIC

During the initial run of analyses, model testing and parameter estimation were hindered by unexpected problems related to BIC scores. Most importantly, the BIC Capability and Difficulty ratings failed to significantly load on a joint factor, precluding the use of the two indicators for the construct. Furthermore, nearly all models including BIC variables were unable to be tested due to failure to reach acceptable solutions within iteration limits. Inspection of study variable variances showed markedly higher variances for BIC ratings than other variables, which is typically addressed by rescaling the variances of offending variables to a range commensurate with other variables. Nonetheless, following such rescaling, many models remained unsolvable due to multiple negative variance estimates. Thus, because BIC Capability and Difficulty scores effectively prohibited analysis of substantive hypotheses, they were eliminated from all models, leaving amplitude and elevation as the predictor variables.

Despite lack of a sufficient explanation for problems estimating models with BIC scores, alternative analyses were conducted to address the substantive hypotheses relevant to the BIC. Given that Capability ratings have been conceptualized as the primary indicator of the construct (Hofsess & Tracey, 2005; Paulhus & Martin, 1987, 1988), analyses included these rather than Difficulty scores. A series of simple linear regression equations were estimated to test the prediction of variability indices by BIC Capability ratings. In Study 1, BIC Capability provided only meager, marginally significant prediction of Affiliation Flux ($r = .12$, $p = .05$) and Spin ($r = -.11$, $p = .07$) on social perceptions of a friend, as well as Affiliation Flux on imagined social

behavior with an authority figure (r = -.12, p = .058). BIC Capability ratings did not significantly predict variability in social behavior or perceptions in Study 2. Thus, self-reported interpersonal capabilities do not appear to correspond to a widened range of interpersonal perceptions or actions.

Study 1

Study 1 focused on the question of whether the personality indexes in question (excluding the BIC) predict variability in interpersonal perceptions and behavior in response to written experimental stimuli. See Table 1 for means and standard deviations of study variables.

Flux of interpersonal perception. The first model for Study 1 examined the interrelationships between four latent variables: Amplitude (with scores on IIP-C amplitude and IAS amplitude as indicators), Elevation (with scores on IIP-C elevation and IAS elevation as indicators), and Dominance Flux and Affiliation Flux on social perceptions (Interpersonal Grid scores) in response to interpersonal stimuli adapted for the study. For Flux variables, scores from imagined interactions with both a friend and an authority figure served as indicators. This model tested whether amplitude would inversely predict variability in Flux, whereas elevation would positively predict flux. As noted above, amplitude and elevation were assumed to covary. Additionally, dominance flux and affiliation flux were assumed to share positive covariance, so this relationship (i.e., double-headed arrow) was specified between the disturbances of these two latent variables. The analysis was conducted with 309 participants. For covariance matrices for all SEM analyses, see Appendix C.

Absolute fit indices for the model suggested a marginal fit, χ^2 (14, N = 309) = 47.91, p < .001; RMSEA = .089. Despite a significant discrepancy between the data and predicted model, sometimes indicative of poor fit, the reader should recall that relatively less weight is often

placed on the chi-square than other fit indices given its tendency to over-reject models in large samples. Comparative fit indices suggested good fit: CFI = .95, NFI = .93. Figure 6 shows the hypothesized model and associated parameter estimates. All indicators loaded significantly on hypothesized factors ($p < .001$). Contrary to hypotheses, Amplitude demonstrated moderate positive relationships with Dominance Flux and Affiliation Flux ($p < .01$), and Elevation showed relatively strong negative relationships with Dominance and Affiliation Flux ($p < .005$). Amplitude and Elevation, as well as the disturbances between Flux factors, correlated significantly ($p < .005$).

Spin of interpersonal perceptions. A separate model tested whether Amplitude and Elevation predict Spin of interpersonal perceptions of others' imagined behaviors, a form of variability distinct from Flux. This model tested for relationships between (correlated) latent Amplitude and Elevation variables and a latent Spin variable with two indicators (Spin calculated for imagined interactions with both a friend and an authority figure).

The hypothesized model showed excellent absolute fit, χ^2 (6, $N = 309$) = 4.90, $p = .55$, RMSEA = .00, as well as comparative fit: CFI = 1.00, NFI = .96. Figure 7 shows the hypothesized model and associated parameter estimates. All measured variables loaded significantly on hypothesized latent factors at $p < .001$ except for a marginally significant factor loading for Spin for imagined interactions with an authority figure, $p = .056$. Inconsistent with substantive hypotheses, Amplitude inversely did not predict Spin; Elevation inversely predicted Spin with marginal significance ($p = .06$). Amplitude and Elevation correlated positively ($p < .001$).

Flux of imagined behavioral responses to interpersonal stimuli. The third model for Study 1 tested a model identical to the first (with Dominance and Affiliation Flux of interpersonal perceptions), with the exception that latent Dominance and Affiliation Flux variables instead employed imagined likely behavioral responses to interpersonal scenarios (stimuli) as indicators. This model tested the measurement model as well as the substantive hypotheses of Amplitude and Elevation both inversely predicting Dominance Flux and Affiliation Flux for interpersonal perceptions across all interpersonal scenarios. Again, Amplitude and Elevation were assumed to covary, as were disturbance terms for Flux factors.

During the initial model estimation, one latent error variable (e5) produced a negative variance; the expected variance of this variable was therefore set to zero and the model re-estimated. The hypothesized model showed an acceptable absolute fit, χ^2 (15, N = 309) = 26.70, $p < .05$. Though this chi-square was also significant as in model 1, the ratio of the χ^2 to degrees of freedom is less than 2, a heuristic suggesting acceptable absolute fit (Ullman, 2001). Another index of absolute fit, RMSEA = .05, suggested good model fit. Comparative fit indices suggested good fit as well: CFI = .96, NFI = .91. Figure 8 depicts the model and parameter estimates.

With regard to the measurement model (i.e., relationship of measured variables to latent factors), all indicators loaded significantly on the hypothesized factors at $p < .001$. As for the substantive hypotheses in the model, Amplitude did not significantly predict Dominance Flux or Affiliation Flux, contrary to hypotheses. Consistent with hypotheses, Elevation positively predicted both Dominance Flux ($p < .001$) and Affiliation Flux ($p < .005$). Covariance between Amplitude and Elevation, as well as between disturbances of flux latent variables, was significant ($p < .001$).

Spin of imagined behavioral responses to interpersonal stimuli. Parallel to analyses for imagined behavior, a model tested whether Amplitude and Elevation predict Spin of imagined behavioral responses. The model examined interrelationships between latent Amplitude and Elevation variables, as well as a latent Spin variable with two indicators (i.e., Spin calculated for imagined interactions with both a friend and an authority figure). The model tested whether Amplitude and Elevation would predict Spin, with the former two assumed to covary.

The hypothesized model showed acceptable absolute fit, χ^2 (6, N = 309) = 13.01, $p < .05$, RMSEA = .062. Comparative fit indices suggested good fit: CFI = .96, NFI = .93. Figure 9 shows the hypothesized model and associated parameter estimates. All measured variables loaded significantly on hypothesized latent factors at $p < .001$ except for a marginally significant factor loading of spin for imagined interactions with an authority figure on the latent Spin variable, $p = .051$. Consistent with substantive hypotheses, Amplitude inversely predicted Spin, $p < .05$; in contrast, the path from Elevation to Spin was non-significant. Amplitude and Elevation correlated positively ($p < .001$).

Study 2

Study 2 focused on the question of whether personality indexes in question predict variability in interpersonal perceptions and behavior in actual social interactions recorded as web-based "diary entries" over the course of a week. In the total sample, participants completed an average of 29.60 interaction records (SD = 12.19) with a range between 0 and 50. For the sample meeting inclusion criteria for analysis, participants completed a mean of 35.91 records (SD = 4.23), ranging between 30 and 50. Consult Table 2 for means and standard deviations of Study 2 variables.

Flux for interpersonal perceptions. The first model for Study 2 examined the interrelationships between latent predictor variables (Amplitude and Elevation) and single-indicator (measured) Dominance Flux and Affiliation Flux for social perceptions of others' behavior during social interactions, as recorded on the Interpersonal Grid for each diary entry. This tested the substantive question of whether latent Amplitude and Elevation factors inversely and positively predict Flux, respectively. Latent predictor variables, as well as errors of Dominance Flux and Affiliation Flux, were assumed to correlate.

Absolute fit indices for the model suggested less than optimal absolute fit, χ^2 (5, N = 175) = 12.64, p <.05, RMSEA = .094, but acceptable comparative fit, CFI = .95, NFI = .93. The hypothesized model and associated parameter estimates are shown in Figure 10. All indicators loaded significantly on hypothesized factors (p < .005). Contrary to hypotheses, neither Amplitude nor Elevation showed significant paths to Flux variables. Amplitude and Elevation, as well as the disturbances between Flux factors, correlated significantly (p < .001).

Spin of interpersonal perceptions. An additional model tested whether latent Amplitude and Elevation predicted Spin of interpersonal perceptions across social interactions, with Spin calculated on Interpersonal Grid scores as the single exogenous or downstream variable. Latent Amplitude and Elevation were assumed to covary.

The hypothesized model showed good absolute fit, χ^2 (3, N = 175) = 5.29, p = .15, RMSEA = .066, and good comparative fit: CFI = .97, NFI = .94 (see Figure 11 for model diagram and parameter estimates). All measured variables loaded significantly on hypothesized latent factors at p < .001. Against hypotheses, latent Amplitude and Elevation did not significantly predict Spin, though parameters were in the expected direction. Amplitude and Elevation correlated positively (p < .001).

Flux of social behavior. The next model for Study 2 examined the interrelationships between four latent variables: Amplitude (with scores on IIP-C amplitude and IAS amplitude as indicators), Elevation (with scores on IIP-C elevation and IAS elevation as indicators), Dominance Flux (with scores on flux for SBI Dominant and Submissive scales), and Affiliation Flux (with scores on flux for SBI Agreeable and Quarrelsome scales). This model tested the measurement model (i.e., whether respective SBI scales load on hypothesized latent factors), as well as substantive predictions of negative direct effects of Amplitude, and positive direct effects of Elevation, on Dominance Flux and Affiliation Flux. As in similar models from Study 1, latent predictor variables, as well as disturbances for latent Flux variables, were assumed to covary.

Absolute fit indices for the model suggested good fit, χ^2 (15, N = 175) = 19.65, p = .14, RMSEA = .048, as did comparative fit indices, CFI = .98, NFI = .94. Figure 12 shows the hypothesized model and associated parameter estimates. All indicators loaded significantly on hypothesized factors ($p < .005$). Contrary to hypotheses, Amplitude demonstrated no significant direct effects on latent Flux variables. As predicted, Elevation showed significant positive direct effects on Dominance Flux and Affiliation Flux ($p < .05$). Amplitude and Elevation, as well as the disturbances between Flux factors, correlated significantly ($p < .001$).

Spin for social behavior. A final model tested whether Amplitude and Elevation predicted Spin of interpersonal behavior measured by SBI diary entries across aggregated social interactions. The model tested for relationships between latent predictor variables (Amplitude and Elevation) and a single indicator, Spin calculated across SBI diary entries, with latent Amplitude and Elevation assumed to covary.

The hypothesized model exhibited good absolute fit to the data, χ^2 (3, N = 175) = 4.97, p = .17, RMSEA = .061, as well as comparative fit: CFI = .98, NFI = .95 (see Figure 13 for model

and parameters). All measured variables loaded significantly on hypothesized latent factors at $p < .001$. In contrast to hypotheses, neither latent Amplitude nor Elevation significantly predicted Spin, though parameters were in the expected direction and Elevation suggested a trend ($p = .10$). Amplitude and Elevation correlated positively ($p < .001$).

Table 1

Means and Standard Deviations for Study 1 Variables

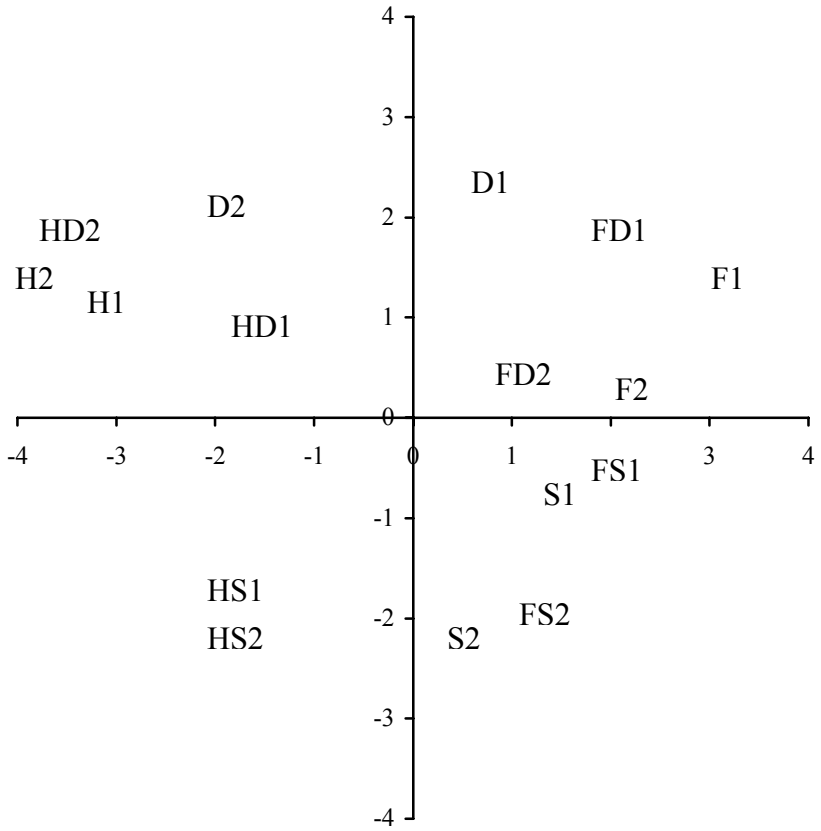
Variable	*M*	*SD*	*M*	*SD*
Personality indices				
BIC-capabilities	80.74	12.74		
BIC-difficulty (reverse-scored)	71.96	19.96		
IAS amplitude	1.01	0.54		
IAS elevation	0.03	0.40		
IIP-C amplitude	0.70	0.39		
IIP-C elevation	-0.02	0.73		
	With a friend		With an authority figure	
Variability indices				
Social perceptions (Interpersonal Grid)				
Dominance flux	3.03	0.74	2.98	0.79
Affiliation flux	3.30	0.67	3.07	0.81
Spin	0.73	0.15	0.72	0.16
Imagined social behavior				
Dominance Flux	0.84	0.18	0.91	0.20
Affiliation flux	0.98	0.18	0.95	0.20
Spin	0.67	0.18	0.63	0.20

Table 2

Means and Standard Deviations for Study 2 Variables

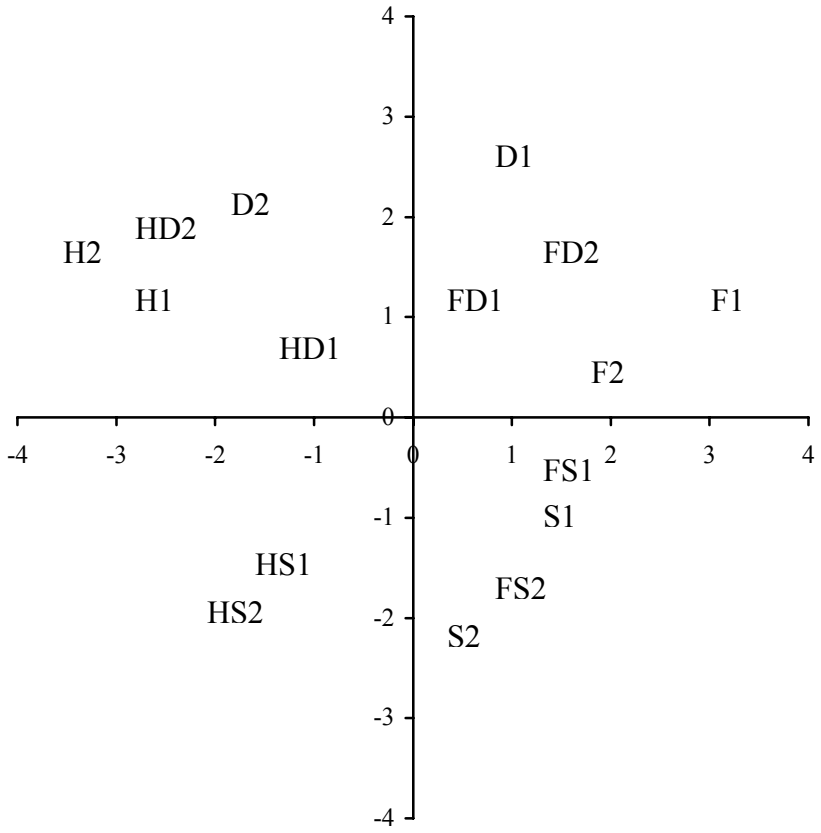
Variable	*M*	*SD*
Personality indices		
BIC-capabilities	81.36	11.21
BIC-difficulty (reverse-scored)	69.19	18.75
IAS amplitude	1.05	0.56
IAS elevation	0.07	0.33
IIP-C amplitude	0.71	0.41
IIP-C elevation	-0.09	0.68
Variability indices		
Social perceptions (Interpersonal Grid)		
Dominance flux	1.87	0.62
Affiliation flux	1.90	0.74
Spin	0.51	0.16
Social behavior		
Dominant flux	0.62	0.11
Submissive flux	0.64	0.15
Agreeable flux	0.63	0.11
Quarrelsome flux	0.57	0.14
Spin	0.36	0.13

Figure 4. Mean Interpersonal Grid Ratings of Interpersonal Stimuli on IPC Axes (With Friend)



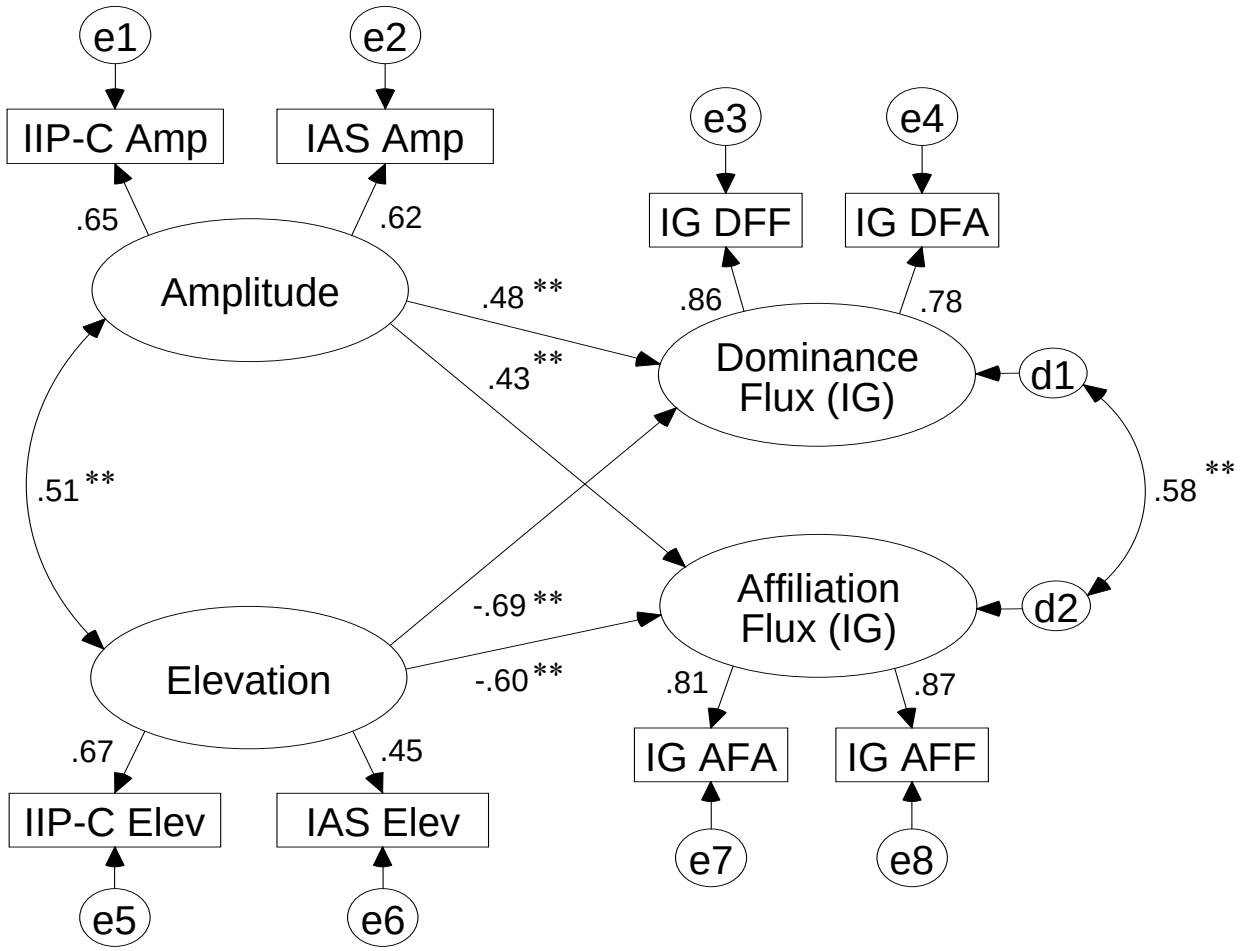
Note. D = dominant; HD = hostile-dominant; H = hostile; HS = hostile-submissive; S = submissive; FS = friendly-submissive; F = friendly; FD = friendly dominant; 1 = mild behavioral intensity; 2 = moderate/extreme behavioral intensity.

Figure 5. Mean Interpersonal Grid ratings of Interpersonal Stimuli on IPC Axes (With Authority Figure)



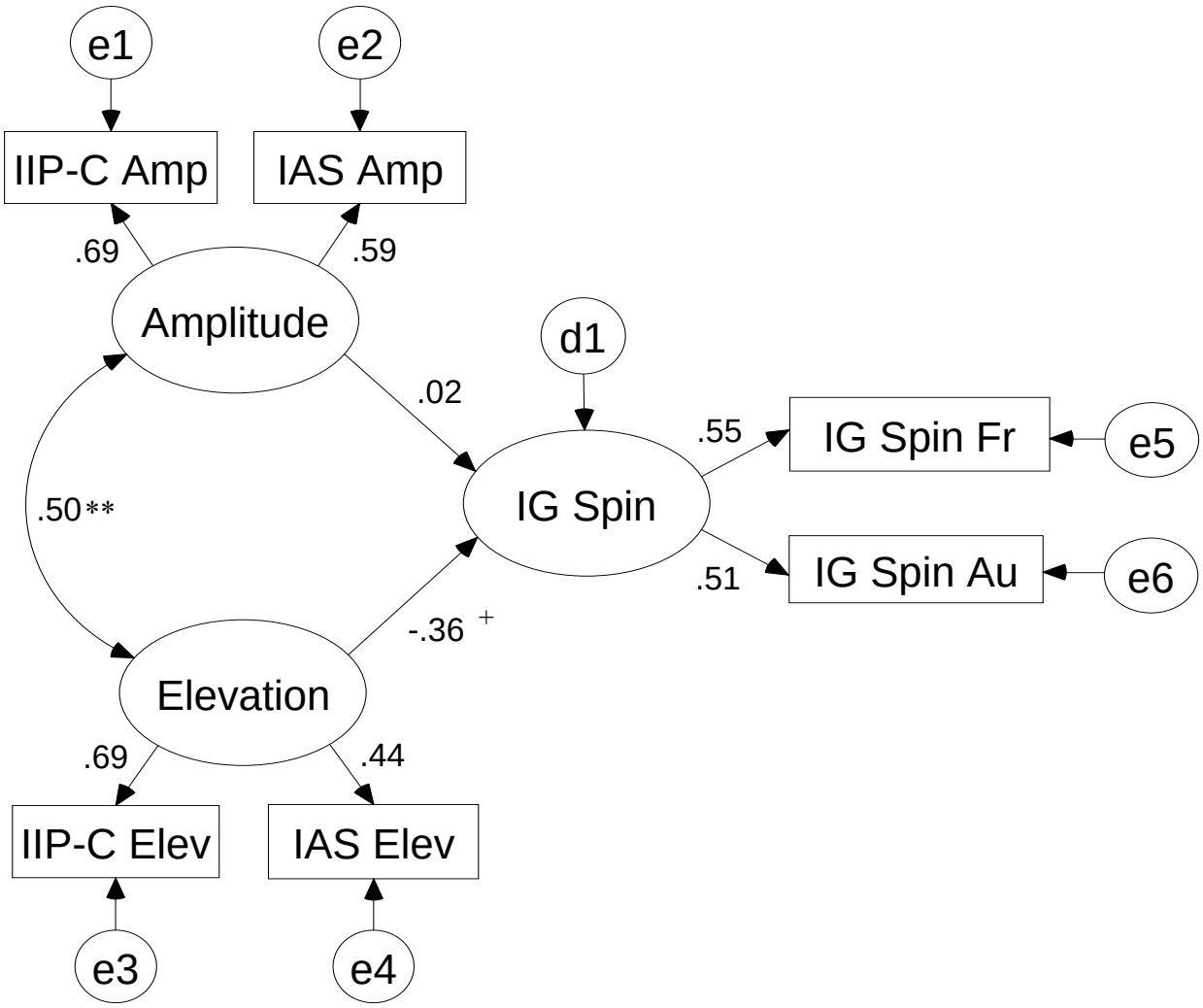
Note. D = dominant; HD = hostile-dominant; H = hostile; HS = hostile-submissive; S = submissive; FS = friendly-submissive; F = friendly; FD = friendly dominant; 1 = mild behavioral intensity; 2 = moderate/extreme behavioral intensity.

Figure 6. Model for Personality Indices and Flux of Interpersonal Perceptions of Stimuli



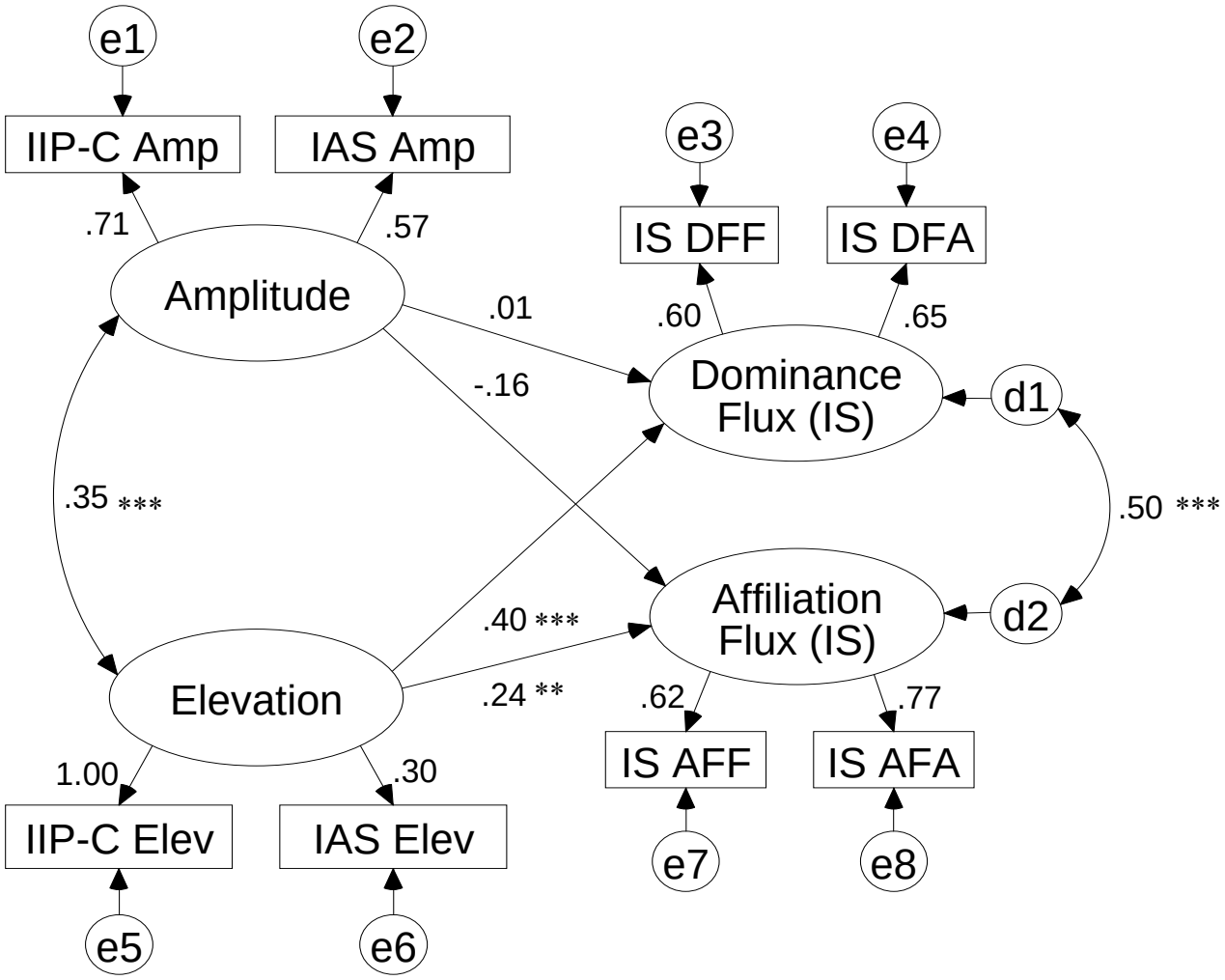
Note. All observed variables loaded on expected factors at $p < .001$. ** $p < .005$. IIP-C = Inventory of Interpersonal Problems-Circumplex; IAS = Interpersonal Adjective Scales; IG = Interpersonal Grid; Amp = amplitude; Elev = elevation; DFA = dominance flux with authority figure; DFF = dominance flux with friend; AFA = affiliation flux with authority figure; AFF = affiliation flux with friend.

Figure 7. Model for Personality Indices and Spin of Interpersonal Perceptions of Stimuli



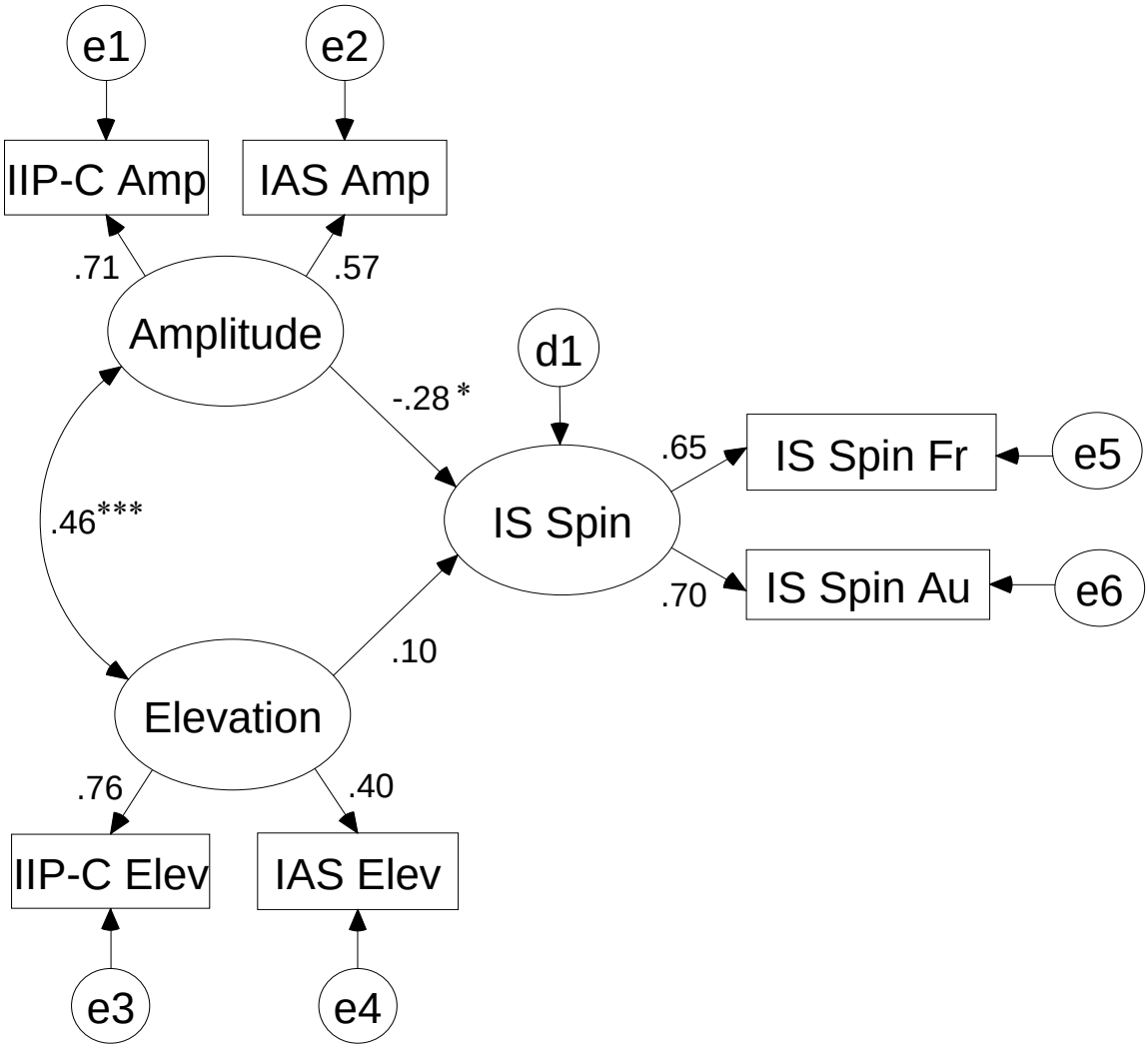
Note. All observed variables loaded on expected factors at $p < .001$, with the exception of IG Spin Au, $p = .056$. ** $p < .005$; $^{+}$ $p = .06$. IIP-C = Inventory of Interpersonal Problems-Circumplex; IAS = Interpersonal Adjective Scales; IG = Interpersonal Grid; Amp = amplitude; Elev = elevation; Fr = with a friend; Au = with an authority figure.

Figure 8. Model of Personality Indices and Flux of Imagined Social Behavior



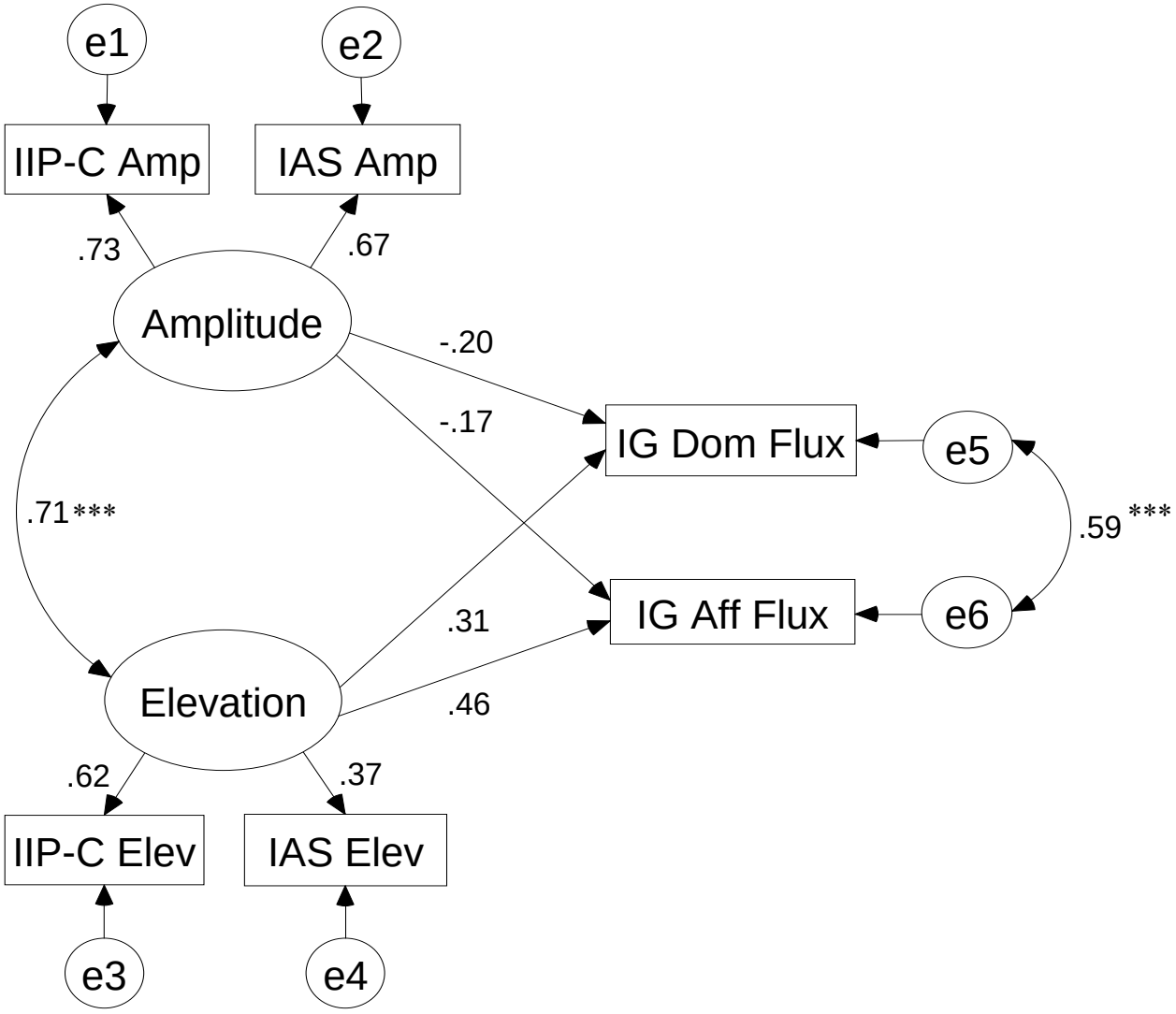
Note. All observed variables loaded on expected factors at $p < .001$. ** $p < .01$; *** $p < .001$. IIP-C = Inventory of Interpersonal Problems-Circumplex; IAS = Interpersonal Adjective Scales; IS = interpersonal stimuli; Amp = amplitude; Elev = elevation; DFA = dominance flux with authority figure; DFF = dominance flux with friend; AFA = affiliation flux with authority figure; AFF = affiliation flux with friend.

Figure 9. Model of Personality Indices and Spin of Imagined Social Behavior



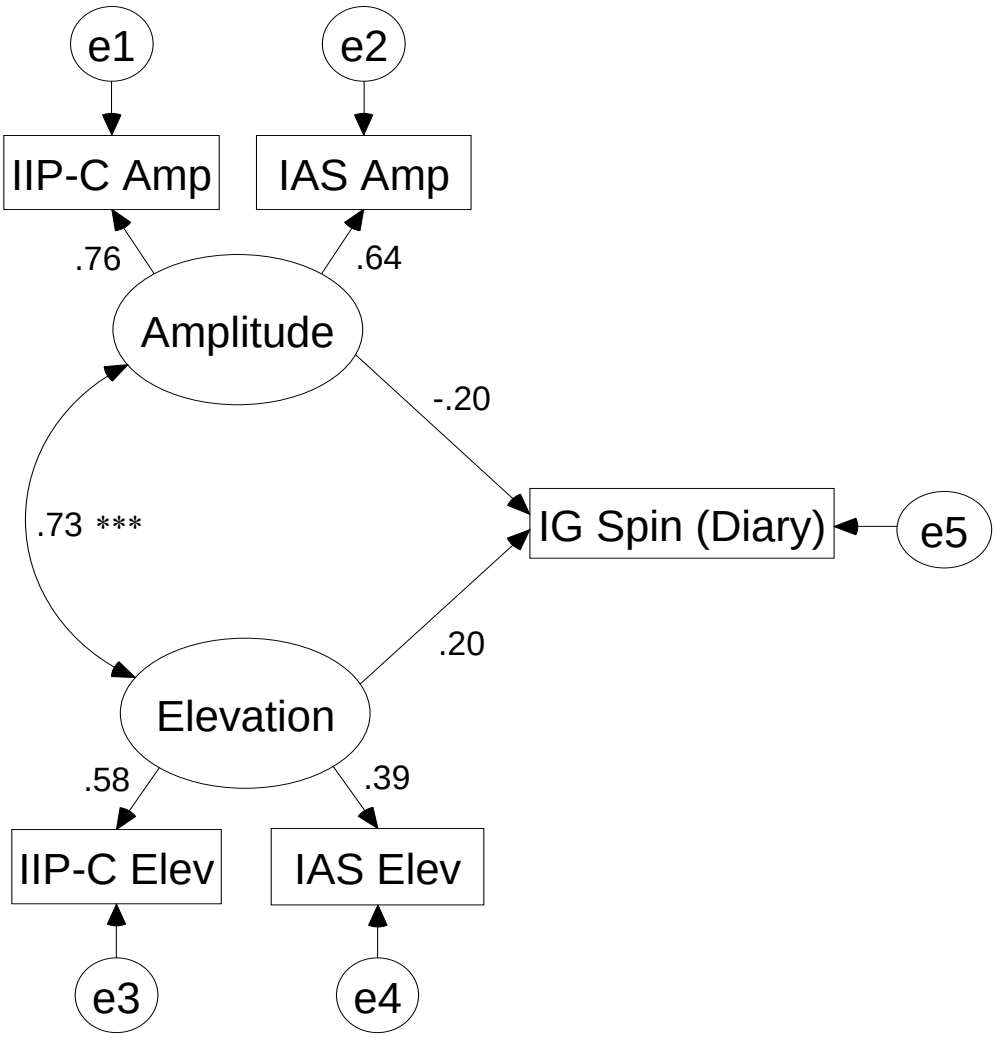
Note. All observed variables loaded on expected factors at $p < .001$ except for IS Spin AU, $p = .051$. *$p < .05$; ***$p < .001$. IIP-C = Inventory of Interpersonal Problems-Circumplex; IAS = Interpersonal Adjective Scales; IS = interpersonal stimuli; Amp = amplitude; Elev = elevation; Fr = with a friend; Au = with an authority figure.

Figure 10. Model of Personality Indices and Flux of Interpersonal Perceptions During Interactions



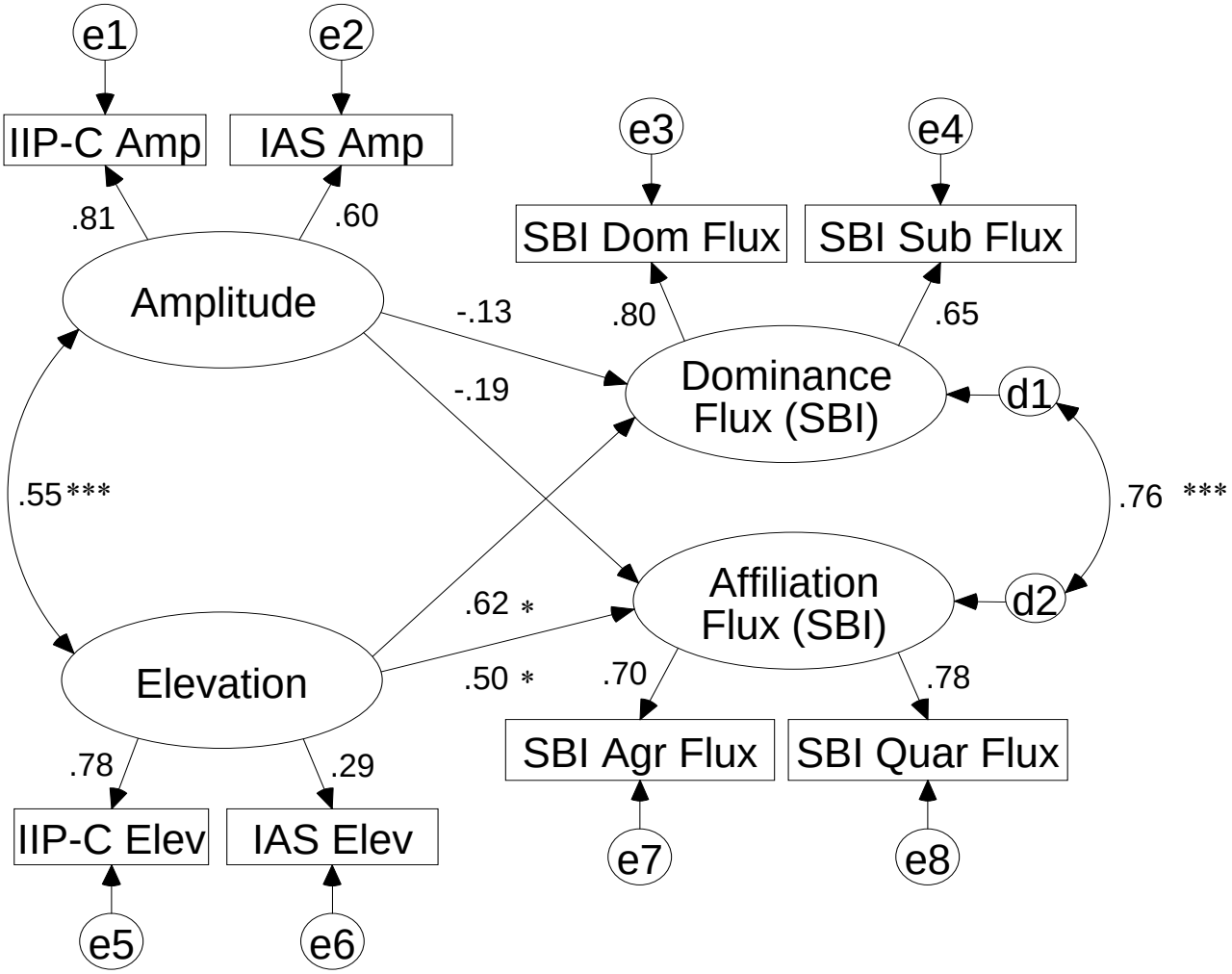
Note. All observed variables loaded on expected factors at $p < .005$. *** $p < .001$. IIP-C = Inventory of Interpersonal Problems-Circumplex; IAS = Interpersonal Adjective Scales; IS = interpersonal stimuli; Amp = amplitude; Elev = elevation; Fr = with a friend; Au = with an authority figure.

Figure 11. Model of Personality Indices and Spin of Interpersonal Perceptions During Interactions



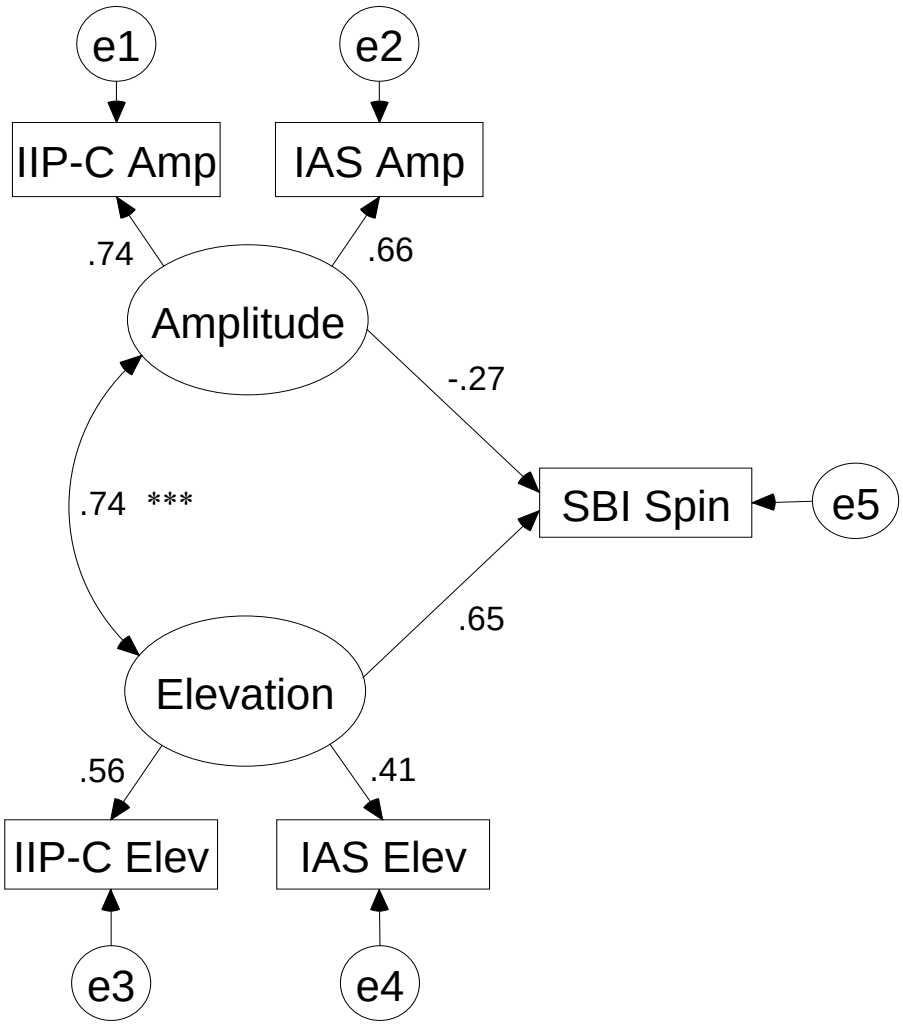
Note. All observed variables loaded on expected factors at $p < .001$. *** $p < .001$. IIP-C = Inventory of Interpersonal Problems-Circumplex; IAS = Interpersonal Adjective Scales; IG = Interpersonal Grid.

Figure 12. Model of Personality Indices and Flux of Social Behavior During Interactions



Note. All observed variables loaded on expected factors at $p < .005$. * $p < .05$; *** $p < .001$. IIP-C = Inventory of Interpersonal Problems-Circumplex; IAS = Interpersonal Adjective Scales; SBI = Social Behavior Inventory; Dom = dominant; Sub = submissive; Agr = agreeable; Quar = quarrelsome.

Figure 13. Model of Personality Indices and Spin of Social Behavior During Interactions



Note. All observed variables loaded on expected factors at $p < .001$. *** $p <$. 001. IIP-C = Inventory of Interpersonal Problems-Circumplex; IAS = Interpersonal Adjective Scales; SBI = Social Behavior Inventory.

Discussion

Measurement Model Issues

Before comparing the present findings concerning "structural models" (substantive relations between variables) with hypotheses, brief discussion of "measurement models" is fitting (to use a pun). First, it remains unclear why BIC Capability and Difficulty ratings did not load on a joint factor significantly. Ad hoc principal components analyses of items for each scale produced the expected three-factor solution, with a general factor followed by dominance and affiliation factors. Attempts to rescale the BIC scales to levels of variance comparable to other variables did not improve the ability of the AMOS program to achieve solutions in acceptable numbers of iterations. Relatively scant research has utilized the BIC, and the present study adds to recent evidence challenging the original factor structure and meaning of the measure (Hofsess & Tracey, 2005). Thus, the construct validity and utility of capability ratings for the interpersonal domain remain in need of clarification.

It bears noting that, once BIC scores were excluded, all measured variables, including both predictor and criterion variables, loaded on appropriate hypothesized latent factors. Significant and substantial factor loadings (with minor exceptions of marginal loadings at or around $p = .05$) and model fit collectively attest to acceptability of the measurement models specified. Specifically, each pair of measured criterion variables measuring variability in social perceptions and behavior shared enough common variance to provide evidence of an underlying latent variable. In Study 1, variability in imagined social behavior with a friend and an authority figure loaded on the same factor for Dominance Flux, Affiliation Flux, and Spin; similarly, variability in social perceptions of experimental stimuli related to a friend and an authority figure jointly measured Dominance and Affiliation Flux, as well as Spin. Thus, these latent variables

provided estimates of variability incorporating relationships of two levels of social status. For Study 2, Flux of Dominant and Submissive behavior, as well as Agreeable and Quarrelsome behavior, respectively loaded on factors interpreted as variability in Dominance and Affiliation.

With regard to predictor variables, both IAS amplitude and IIP-C amplitude shared substantial common variance, as did IAS elevation and IIP-C elevation. In essence, the measurement model with these sets of variables involved a relatively simple confirmatory factor analysis, in that models with amplitude and elevation observed variables loaded on hypothesized factors with "simple structure" (i.e., much larger associations between like variables than between unlike variables) demonstrated acceptable fit. These findings confirm the sensibility, at least empirically, of assuming common latent factors for these personality indices derived from popular interpersonal circumplex measures. However, although all indicators of amplitude and elevation loaded significantly on presumed factors with acceptable model fit, interpretation of a latent amplitude factor remains more transparent than for elevation. IAS and IIP-C amplitude tended to exhibit relatively comparable contributions to latent amplitude, though with somewhat higher loadings for IIP-C. In contrast, whereas factor loadings for IIP-C elevation on a latent elevation factor consistently fell in the range of .56-.78, loadings for IAS elevation hovered between .29-.45. Such figures suggest that, despite notable shared variance between the two elevation scores on the two measures, substantive findings for the present study apply more strongly to IIP-C elevation than IAS elevation. This finding is not entirely surprising, given that IIP-C elevation has enjoyed much attention as a substantive variable (i.e., a highly sensitive indicator of interpersonal dysfunction), whereas IAS elevation has typically been discarded as mere response bias or a "nuisance factor." Nevertheless, IAS elevation jointly captures variance with IIP-C elevation in hypothesized predictive relationships (to be discussed below), implying

the potential for consideration of IAS elevation as a meaningful variable. Such consideration is consonant with findings elsewhere of meaningful variance captured by response bias that had often been previously controlled (e.g., Paulhus & John, 1998; McCrae & Costa, 1983).

Admittedly, the measurement models described in the present study would be strengthened by additional indicators for each latent variable. More indicators often make for both greater reliability and greater coverage of underlying constructs. Moreover, although all models tested achieved identifiability (i.e., possessed surplus degrees of freedom to permit multiple solutions and facilitate hypothesis testing), it should be noted that each two-indicator latent variable was only "just-identified" (having only one solution) at the local level (i.e., in itself). Nonetheless, the use of double indicators remains superior to single indicators in that it facilitates estimation of measurement error as opposed to assuming single variables to be measured without error, as in standard multiple regression. It also provided greater construct coverage in the present study than single indicators; for instance, incorporating ratings related to interactions with both a friend and authority figure in Study 1 created a criterion variable of cross-situational variability across both these relationship types and the range of interpersonal behaviors. An additional concern about using 2-indicator constructs is the possibility of biased standard error estimates. One solution, collapsing each pair of related variables into a composite variable (e.g., Hagtvet, 2004), was not practicable in the present study because it rendered the overall models "just-identified" with zero degrees of freedom, thereby prohibiting hypothesis testing. Thus, despite drawbacks of 2-indicator constructs, their use appeared to be the most defensible strategy with the present data. Lastly, it bears noting that substantial precedent exists for the use of 2-indicator constructs in SEM (Bollen, 1989; Pedhazur & Schmelkin, 1991; Ullman, 2001).

Though part of the structural model more than the measurement model, the correlations between amplitude and elevation, as well as between criterion flux variables in individual models, merit mention. Latent amplitude and elevation factors exhibited moderate to strong correlations in models specified without exception. Thus, despite the fact that these indices are mathematically and conceptually distinct (according to the "structural summary" method; Gurtman, 1994), the two consistently covaried for participants. Additionally, latent Dominance and Affiliation factors within each model dependably intercorrelated with moderate-to-strong magnitude of association. Such a finding, consistent with expectations, attests to the conceptualization of variability in interpersonal behavior or perception as global phenomena across the circumplex. Persons high in variability on one IPC dimension tend to show high fluctuation on the other, whether on imagined social behavior and interpersonal perceptions based on experimental stimuli (Study 1) or social behavior and perceptions in daily life (Study 2).

Substantive Findings

In contrast to the measurement models related to assessing constructs of interest in the present study, the core hypotheses pertained to the structural models or relationships between these constructs. Prior to examining these, discussion of BIC results is in order. As noted, the BIC was excluded from SEM analyses due the fact that it impeded analysis with other central variables. Nonetheless, regression analyses provided a simpler test of the hypotheses that BIC Capability ratings would positively predict social perceptions and imagined and real social behavior, implying that high scorers may truly be capable of utilizing a wide range of acts and interpersonal stances. Results provided little support for this conceptualization, with the BIC positively predicting only minor and statistically marginal variability along the affiliation

dimension for social perceptions of "friend" interpersonal stimuli in Study 1 (and a trend for slight negative prediction of circular variance of these perceptions). The only other finding was a trend for a small, inverse prediction of variability along the affiliation dimension for imagined social behavior. Therefore, findings failed to support BIC as a predictor of exhibiting a wide range of interpersonal behaviors and perceptions across situations, questioning the construct validity of the measure as an indicator of any dynamic sort of "functional flexibility."

Returning to SEM findings after excluding the BIC, Study 1 investigated the extent to which amplitude and elevation predict variability in social perceptions and imagined behavior in response to written interpersonal scenarios depicting a range of others' social behavior around the circumplex. These scenarios were designed to provide examples of representative behavior from each octant of the interpersonal circumplex, at varying levels of intensity, thereby facilitating quantification of variability of perception and imagined behavior in the context of a broad range of interpersonal stimuli.

Amplitude and social perception variability in Study 1

Intriguing results were obtained for variability of interpersonal perceptions in response to written interpersonal stimuli. Counter to hypotheses, amplitude did not predict restricted spin (circular variability) of interpersonal perceptions. Results for the prediction of dominance and affiliation flux (dimensional variability) in perceptions contradicted hypotheses as well, in reverse of the expected direction; amplitude demonstrated moderate positive prediction of variability along these dimensions. Essentially, this finding suggests that high scorers on amplitude perceived a broader range of interpersonal content presented in the stimuli. As opposed to demonstrating a perceptual bias indicative of rigidity, individuals scoring high on

amplitude appeared to demonstrate enhanced attention to and encoding of the semantic meaning of stimuli, with regard to shades of dominance and affiliation.

This finding deserves further consideration, given its consistency (i.e., on both dimensions) and counter-hypothetical nature. One the one hand, high amplitude may be considered a form of restricted variability in that it represents respondents' scores pulled into a particular octant of the interpersonal circumplex (e.g., endorsing only friendly-submissive traits or problems); thus "extremity" and "rigidity" of profiles are seen as indivisible (O'Connor & Dyce, 1997). Such a perspective comports with the past rationale for viewing amplitude/vector length as an index of rigidity. On the other hand, from a mathematical standpoint, amplitude represents profile "variability moderated by goodness of fit to the circular model (i.e., cosine function)" (Gurtman & Balakrishnan, 1998, p. 351). As viewed according to a rectangular plot of IPC scores (see Figure 3), amplitude captures positive variability across circumplex scales, though a type of variability admittedly different from cross-situational variation. Low amplitude indicates a "flat" profile with no peaks or valleys. Because amplitude is not assessed across situations, it may simply reflect subjective crystallization, articulation, or differentiation of a respondent's traits or problems (Gurtman & Pincus, 2003). Individuals with high amplitude on the IAS or IIP-C necessarily possess a relatively clear notion of which self-descriptive adjectives or problem descriptions describe them or do not apply.

If accurate, such a conceptualization may aid in the interpretation of the positive relationship between amplitude and flux of perceptions. In persons with positive mental self-representations, for example, coherent views of the self (Campbell, 1990) and of significant others (Bartholomew & Horowitz, 1991) are both present; similarly, individuals with complex "if-then" self-views tend to show complex representations of others (e.g., Mendoza-Denton et

al., 2001). Perhaps high scorers on amplitude, who similarly possess articulated theories of self and others, possess higher levels of a superordinate social-cognitive perception ability related to discriminative processing of social behavior. Positing such a "third variable" does not seem altogether unreasonable given that high scorers apparently have a differentiated theory of their interpersonal traits and problems, as well as the present finding that they discriminate a relatively full range of behaviors along the continua of dominance and affiliation. This notion might account for the finding of increased treatment length among high-amplitude (IIP-C) patients in a naturalistic treatment study (Ruiz et al., 2004): Having a clear sense of one's problems (and perhaps awareness of one's problems *with others* by attendance to others) provide more "grist" for the psychotherapeutic mill than do diffuse complaints. On the other, hand such a view does not explain the inconsistent effect of IIP-C amplitude on treatment outcome (Gurtman & Balakrishnan, 1998; Ruiz et al., 2004). Perhaps amplitude is a "double-edged sword" as relates to one's personal theory of social dynamics; like any well-articulate theory, it may either facilitate discovery or blind one to theory-inconsistent observations (Feyerabend, 1988). Nevertheless, such speculations await further research. Study designs used to study "accuracy" in person perception (e.g., Kenny, 1994; Funder & Colvin, 1997), self-perceived clarity of the self (Campbell, 1990), or ability to provide complex and coherent descriptions of oneself (Bers, Blatt, Sayward, & Johnston, 1993; Donahue, Robins, Roberts, & John, 1993; Linville, 1985) or others (Horowitz et al., 1992) might provide further elucidation.

Elevation and variability of social perception in Study 1

Results for elevation as a predictor of variability in social perceptions diverged markedly from those of amplitude. Contrary to predictions, elevation inversely predicted variability in social perceptions. Elevation exhibited relatively strong negative relationships with dominance

flux and affiliation flux, as well as a small-to-moderate negative relationship with spin. Thus, high scorers on elevation did exhibit what might be considered a perceptual bias. When presented with a range of stimuli varying along the dimensions of dominance and affiliation, their perceptions were limited to particular portions of circumplex space. Such findings are notable for several reasons. First, the distinctness of results for elevation from those for amplitude and elevation is striking given that these two latent variables were intercorrelated in the moderate-to-high range across all models tested. Clearly, although many high scorers on amplitude also tend to score highly on elevation, these two components are not fully overlapping constructs and demonstrate different correlates. Second, the present results seemingly contrast the finding of Horowitz et al. (1992) that IIP-C elevation predicted ability to describe significant others with clarity and specifity. However, this apparent contradiction may be resolved by the consideration that one may exhibit a restricted range of social perceptions, but describe clearly those within that range.

Also noteworthy is that the present findings for social perception variability in Study 1 provide a novel means of assessing perceptual bias. Whereas studies of cognitive bias tend to render bias equivalent with differences in individual or mean scores on a particular dimension in relation to a benchmark criterion score on the same dimension, the present study demonstrated that variability also indexes bias in relation to a range of stimuli. Such variability is arguably an important form of information left uncaptured by analysis of mean levels. Indeed, unreported analyses indicated the robustness of the present results, even with mean levels of social behavior or perceptions statistically controlled. For instance, individuals high in negative affectivity (e.g., anxiety, depression) are likely to show biased social-cognitive processing along a valence dimension (i.e., more negative) than are merited by comparison with a standard (e.g., Ellwart,

Rinck, & Becker, 2003; Erickson & Pincus, 2005; Eysenck, Mogg, May, Richards, & Mathews, 1991; Mogg, Millar, & Bradley, 2000). However, such mean levels do not indicate whether such individuals demonstrate solely more negative perceptions independent of, or along with restricted variability in perceptions. Information about variability vis-à-vis "objective" standards is meaningful according to concepts such as stimulus discrimination, the ability to differentiate characteristics of stimuli to which to respond; Langer (1989) has argued for the benefits of learning to attend fully to external stimuli, which may precipitate the construction of new mental categories of experience. Arguably, perception of the full range of interpersonal content appears to be a prerequisite for negotiating interactions and relationship in a socially skilled fashion. Inability to do so may indicate social-cognitive biases commensurate with Sullivan's notion of "parataxic distortions" (1953b): rigidly forcing perceptions of new interactions into the Procrustean bed of overlearned social perceptions from formative past relationships.

The aforementioned restricted variability predicted by elevation seems conceptually lucid in terms of IIP-C elevation, a form of generalized interpersonal distress. Although this is the first demonstration linking IIP-C elevation to perceptual bias, it accords with findings elsewhere of links between other forms of psychosocial distress and cognitive bias. However, the contribution of IAS elevation to restricted variability of social perceptions seems less intuitive, given a tendency in past research to ignore these scores as uninterpretable. However, as noted in the introduction, the present study opted to include, rather than discard, IAS elevation as a substantive variable for several reasons: mathematical and structural similarity to IIP-C elevation, past demonstrations of the meaningful correlates of "over-reporting" response biases, and research linking endorsement of contradictory traits to maladjustment. One possible interpretation of the link between IAS elevation and restricted variability of perceptions is that

the index provides a partial measure of conceptual confusion or inconsistency about the self (e.g., "I'm both highly dominant and highly submissive in general"), which tends to cluster with negative emotional correlates such as low self-esteem (Campbell, 1990), which in turn relate consistently to biased information processing (e.g., Eysenck, Mogg, May, Richards, & Mathews, 1991). Such an interpretation, and admittedly circuitous logic, remains speculative, though provocative and consistent with past research. The present formulation would receive considerable support by the future finding of a positive relationship between IAS elevation (and IIP-C elevation) and indices of self-concept conflict or ambivalence (e.g. Sincoff, 1990). For now, the present study simply establishes that IAS shares common variance with IIP-C elevation in predicting restricted variability of perceptions, and to an extent less than IIP-C elevation.

Prediction of variable imagined social behavior in Study 1

Study 1 also tested hypotheses about differential prediction of variability of imagined interpersonal behavior in response to written interpersonal stimuli. Amplitude failed to significantly predict flux on dominance or affiliation axes, contrary to predictions. However, amplitude inversely predicted spin as predicted. Thus, high scorers on amplitude demonstrated slightly diminished variability in the range of behaviors that they believed they would emit in response to the full range of others' (a friend and an authority figure) behavior. This finding remains difficult to evaluate given its modest size and lack of robustness across forms of variability.

A patently different pattern of prediction arose for elevation. Whereas elevation did not significantly predict spin as hypothesized, it was found to positively predict fluctuation of imaged social behavior on dominance and affiliation axes, across interpersonal contexts. In line with predictions, high scorers on elevation showed relatively greater variability in how they

thought they would respond to the spectrum of others' behavior. Such a finding is noteworthy in that it occurred for both dimensions, suggesting a systematic pattern, though not circular variability. The present findings also establish that psychosocial distress predicts not only variability in actual social behavior over time (cf. Moskowitz & Zuroff, 2004; 2005), but also variability of imagined social behavior. Also, results link conscious distress about interpersonal relationships to an apparent form of "oscillation" in consciously accessible mental schemata that relies on self-report for measurement, but is likely less vulnerable to bias that any self-report of lability.

Predictors of variability of social perceptions in Study 2

Study 2 tested the predictive function of amplitude and elevation in a more naturalistic context than Study 1. Whereas the former entailed reactions to controlled, verbally-mediated interpersonal stimuli, the latter required recording responses to actual daily social encounters over the course of a week.

In primary analyses, no significant relationships were obtained between personality indices (amplitude and elevation) and variability in interpersonal perceptions in response to daily social interactions. Failing to support the hypothesis of predicting restricted variability in social perceptions across a week's worth of social interactions, amplitude did not significantly predict flux or spin in Study 2. Similarly, elevation did not positively predict variability in social perceptions, whether for flux or spin, contrary to predictions. As with any results entailing failure to reject the null hypothesis, few certain conclusions may be drawn from these findings. Inspection of variables' range suggested the presence of variation in social perceptions in Study 2, reducing the likelihood of range restriction as an explanation. Given that some personality disorders characterized by interpersonal distress (e.g., borderline personality disorder) are also

noted for chronic variability in social perceptions (i.e., "splitting"; see *DSM-IV*), it is somewhat surprising not to find associations between elevation and variability of perceptions. However, several factors may account for not uncovering such a relation: the limited range of social experiences likely to occur in the average week of a college student (i.e., relatively low base rates of hostile behavior; Tracey, 1994), the use of a non-clinical population, and the possibility of self-selection in terms of chosen interaction partners (e.g., electing to interact with persons known to reinforce existing, stable social expectations; Carson, 1982). Measuring levels of variability in social perceptions using repeated Interpersonal Grid assessments in a clinical population may provide a more likely context to unearth evidence of chaotic, fluctuating social perceptions. Alternatively, there may simply be no consequential relationship between variability of social perceptions and the personality indices utilized in this study.

Predictors of variability of social behavior in Study 2

Lastly, the present study examined the capacity of the personality indices under study to predict variability in actual social behavior reported over the course of a week. Amplitude demonstrated no significant prediction of behavioral variability, against expectations. On the other hand, elevation evidenced the hypothesized positive prediction of dominance flux and affiliation flux. Although elevation did not significantly predict spin, a trend in the positive direction was present. Thus, high scorers on elevation tended to engage in a relatively wider range of interpersonal behaviors. Such variability, given the nature of elevation (particularly IIP-C elevation) as an index of distress, appears best conceptualized as behavioral lability or dysregulation (i.e., Learian "oscillation"). This finding complements the past finding that Neuroticism positively predicts variability of social behavior (Moskowitz & Zuroff, 2004, 2005), extending it by both the use of a distinctly interpersonal measure of distress (elevation) and

showing that the relation of distress with behavioral variability is present and measurable in a period of a week or less (versus three weeks).

As with Study 1, the question of elucidating the meaning of a positive relationship between IAS elevation and interpersonal variability (in this case variability of social behavior) remains. If IAS elevation does, in fact, partially tap conflicted self-representations, its prediction of apparent behavioral lability parallels the finding that persons low in perceived clarity about their traits exhibited relatively high variability of self-esteem over time (Kernis et al., 2000).

Higher-Order Discussion of Findings

After having reviewed the basic results of the present study, higher-order integration of findings is in order. One chief goal of the present study was to test the construct validity of existing IPC personality assessment indices that have received attention as operationalizations of the construct of interpersonal rigidity (or its converse, interpersonal flexibility): namely, the BIC and amplitude scores on the IIP-C and IAS. By using multiple criterion variables assessing variability in interpersonal phenomena, the present study provides a test of whether these indices predict the restricted range of behaviors (or cognitions) thought to comprise a mechanism linking social behavior to maladjustment. However, analyses yielded little evidence of such relationships. Functional flexibility (BIC) scores demonstrated no consistent relationship to measures of variability. A small-to-moderate inverse relationship between amplitude and spin of imagined behavior in response to written stimuli provides the only evidence consistent with the view of amplitude as assessing interpersonal rigidity in the Learian (1957) sense of cross-situational restriction of behavioral range. Interestingly, amplitude not only did not inversely predict “rigid” or restricted social perceptions in Study 1, but bore moderately-sized positive

relations with both dominance and affiliation flux. Thus, amplitude gave no evidence of the sort of covert rigidity described by Pincus (1994).

At any rate, the present study brings into question the construct validity of amplitude on IPC measures and the BIC as operational definitions of the theoretical concept of interpersonal rigidity. These indices may provide meaningful measurement of personality variables, but not of the sort previously supposed. This leaves open the question of whether better operationalizations of the construct are feasible. One strategy might include the development of a self-report questionnaire that incorporates an "if-then" format (e.g., Mendoza-Denton et al., 2001) to capture variability in response to a range of interpersonal situations; much like was used as a criterion variable in Study 1. Interestingly, variability on the dominance axis for imagined social behavior in Study 1 predicted variability of social behavior on the dominance axis ($\beta = .47$, $p < .001$) and affiliation axis ($\beta = .35$, $p < .05$) in Study 2. Though such associations are hardly remarkable in magnitude, they imply the possibility of designing a self-report measure that may predict cross-situational "rigidity" for substantive theory-based tests of interpersonal rigidity. However, it simply may be that the problems inherent in self-report methodology limit the utility of such a measure asymptotically. Instead, studies employing observer ratings of behavior across various situations and constraints might provide more externally valid operationalizations of behavioral rigidity. For instance, one might design a lab-based experiment in which participants are randomly assigned to a series of interactions with trained confederates; confederates might exhibit particular classes of interpersonal behavior pulling for a range of behaviors "appropriate" to each situation (e.g., dominance, submission, affiliation, hostility, etc.), with the order of these "conditions" counterbalanced or controlled by design. Trained observers of such videotaped interactions could then provide objective behavior ratings, which might be transformed into

indexes of restricted behavioral range to correlate with particular forms of maladjustment. Of course, while such a design would provide the benefits of observer ratings and experimental control, order effects for types of confederate behavior and order by participant personality interactions would likely pose problems, not to mention the fact that controlling confederate behavior precludes the bidirectional influences in real interactions. As of yet, the intuitively appealing construct of interpersonal rigidity has yet to find a reasonable vehicle for importation into rigorous tests of this theory linking a restricted range of behavior to psychopathology.

Although the present study did not buoy the construct validity of purported measures of interpersonal rigidity, it does provide some fodder for discussion relevant to the theory linking psychopathology to behavioral range restriction. Traditional formulations in interpersonal theory (e.g., Brokaw & McLemore, 1991; Carson, 1969; Leary, 1957) postulate that well-adjusted individuals utilize the full range of interpersonal behaviors when situationally appropriate. Whereas this conceptualization explicitly references overt social behavior, other interpersonalists (Pincus, 1994) have proffered the notion that rigidity qua range restriction may apply to social cognition as well, which may even account for the former. Consistent with this notion, in Study 1, elevation consistently predicted restricted variability of social perceptions across the written interpersonal stimuli sampling interpersonal content representative of the IPC. Such predictions were borne out for both dimensions of flux as well as spin, attesting to the robustness of the finding across variability indices. Whereas this finding has already been discussed as a form of perceptual bias, it applies specifically to interpersonal theory in that such bias occurred in relation to IPC content, which contrasts with the atheoretical assortments of positive or negative lexical cues often used in traditional cognitive bias paradigms. Also, this form of bias as constricted variability maps directly onto the notion of rigidity as constriction of covert

responses to interpersonal behavior; because interpersonal stimuli were held constant across participants, restricted variability of perceptions of stimuli is clearly interpretable as restricted covert responses. That similar findings were not detected in Study 2 may reflect the fact that real social interactions are obviously *not* constant across individuals. Indeed, the notions of bidirectional social influence and interpersonal impacts or force fields that influence the social environment in "participant-observer" fashion are central to most accounts of interpersonal theory (Kiesler, 1996). Lastly, the reader should note that in Study 2, additional analyses not reported in the present paper found significant relationships between dimensional flux of social perceptions and flux of behavior on both dominance ($r = .40$, $p < .05$) and affiliation ($r = .45$, $p < .01$), providing additional confirmation of the notion that overt and covert variability are intimately related. In any event, one can easily imagine how the restricted social perception in high-elevation respondents might lead to a restricted range of social behaviors or interaction styles, in line with the notion of interpersonal transaction cycles (Strupp & Binder, 1984, Kiesler, 1996; Wachtel, 1994).

Findings discussed thus far may be partitioned into those pertaining to what amount to adaptive and maladaptive forms of variability of social perception and behavior. The greater variability of social perceptions in Study 1 seems a psychological asset related to stimulus discrimination ability, whereas high variability of imagined and real social behavior (as correlating with elevation) in both studies seems to reflect Leary's notion of oscillation or otherwise chaotic fluctuation in social behavior. In both cases, the interpretation of such variability as adaptive or not was made, in part, based upon correlations with elevation, of which the clearly maladaptive IIP-C elevation tended to garner the lion's share of variance in the latent elevation variable. Such conclusions parallel Moskowitz and Zuroff's (2004, 2005) judgments of

variable social behavior correlating with Extraversion as adaptive (flexibility), in contrast to variability correlating with Neuroticism as a form of lability. As already noted, the restricted variability of social perceptions related to amplitude in Study 1 received an interpretation as beneficial, not due to its correlates, but in relation to the objective standard of controlled stimuli chosen to provide markers of a wide range of interpersonal behaviors.

Such acknowledgments merit further deliberation about how to conceptually and empirically distinguish negative versus positive variability of social behavior and perceptions in general. As noted by Kiesler (1996), Leary did not equate cross-situational variability, or lack thereof, with pathology, but interpreted the meaning of variability based upon contextual information about an individual's personality. He provided no formulas for demarcating healthy flexibility from unstable oscillation, or adaptive personality consistency from rigidity, though these concepts figured prominently in his theories of personality pathology. Paulhus and Martin (1988) make an analogous pronouncement: "…one cannot predict from an individual's behavioral variability whether that individual is well-adjusted." (p. 98). In the absence of a desideratum for determining the adaptive level of a particular form of variability, assigning adaptive or maladaptive value based on empirical correlates seems a reasonable initial strategy. Alternatively, one might replicate an experience-sampling design such as Study 2, but include participant ratings of interpersonal locus of control (Paulhus, 1983) for each social interaction. As noted by Paulhus & Martin (1988), the defining feature of pathological variability of social behavior ("situationality") might be an accompanying sense of being overwhelmed by situational pressures, in contrast to adapting behavior to the situation with a concomitant sense of the self as originating agent of the behavior. Inclusion of locus of control variables may shed additional light on the phenomenology associated with particular forms of variability, though less so for

ego-syntonic behavior (i.e., one may exhibit rigidity or oscillation but not perceive it as problematic).

Additionally, future research on interpersonal rigidity and/or problematic oscillation, as well as their assessment using IPC technologies, must make strides at explicating the nature of the "situational appropriateness" of social behavior. Nearly all theoretical formulations of interpersonal rigidity, for instance, refer to this as a criterion for well-adjusted behavior, though providing no further elaboration. Specifically, interpersonal rigidity typically has been defined as over-emitting particular behaviors without regard to their fittingness in the particular context (Carson, 1969; Leary, 1957). Consideration of the "appropriateness criterion" leads to the logical conclusion of the necessity of discussing values in understanding maladjustment. Such values may pertain to cultural context, social mores, parochial norms, etc., but they must share in common an evaluative component relative to behavioral standards, whether explicit or tacit. Humans are strongly attuned to norm or value violations related to social behavior, and the interpersonal theory of personality essentially recognizes this in its insistence on interpersonal behavior as the most sensitive marker of psychopathology.

Though discussion of values in social behavior may appear slippery, it seems no more slippery than endeavoring to understand "problematic" social behavior without reference to values. For instance, previous interpersonal theorists have tended to assume the complementarity of interpersonal behavior as normal. However, though well-adjusted individuals should possess the capacity to respond in complementary fashion to others' behavior, and thus possess a full repertoire of interpersonal stances, they should also demonstrate the ability *not* to complement behavior. For instance, most models of interpersonal psychotherapy assume that the therapist cannot help but be pulled into interactions typical of the client's primary maladaptive transaction

patterns; these models, however, also emphasize the necessity of the therapist "unhooking" from such patterns and providing noncomplementary responses (e.g., Kiesler, 1996; Safran & Segal, 1990). Some interpersonal theorists explicitly address value assumptions about particular classes of interpersonal behavior (Benjamin, 2003) or the relationship between behavior and values (Locke, 2000), but further research must examine the mismatch of values between the individual, relational partners, and societal contexts to better operationally define "situational appropriateness" of interpersonal acts. One provocative possibility derives from research on a dimension of perceived moral purity/impurity that appears to be a universal "third dimension of social cognition" after dominance and love (Haidt, 2003); perhaps the two interpersonal dimensions interact with this third dimension such that more extreme, problematic interpersonal behaviors also constitute violations of tacit purity belief structures.

Despite the problems and complexities associated with working toward greater understanding of the role of variability in interpersonal dynamics, such a task remains worthwhile for many reasons. First, the quest retains value in itself as an interesting question about how to best interpret the paradox of normal human personality as simultaneously coherent and differentiated, consistent and changeable. Second, failures of this sort of integration and adaptation constitute clinical problems. The most obvious application is personality disorder; some forms of personality pathology are portrayed in the *DSM-IV* by a rigid narrowing of perceptions and behavior (e.g., avoidant, schizoid), whereas others are epitomized by dysregulation and fluctuation of self- and social dynamics (e.g., borderline, histrionic, narcissistic).

In summary, the present study provides no immediate practical application, but provides "basic" contribution in several ways to the fields of IPC assessment, personality psychology broadly construed, and the interpersonal theory of personality more specifically.
It provides the first rigorous test of whether key indices on important IPC measures truly operationalize the construct of interpersonal rigidity as cross-situational restricted variability. The study essentially provides a *coup de grace* of these measures as such. Other central contributions include grounds for the amplitude index as a form of social-cognitive differentiation ability, additional construct validity for the elevation index on the IIP-C, and provocative use of the elevation index on the IAS. The present study also adds a new form of cognitive bias to the personality lexicon (viz., restricted range rather than discrepant mean levels) and adds to the burgeoning research aimed at understanding the dynamic nature of everyday social processes. Lastly, this study provides initial empirical corroboration of the role of constriction of covert perceptual processes as part of interpersonal rigidity.

Despite significant contributions of the present study, a number of methodological limitations warrant mention. Many apply to measurement issues. For instance, the "interpersonal scenarios" stimuli adapted for Study 1 do not provide exhaustive content coverage of the full interpersonal domain; they utilized only two items per octant and apparently did not serve as equally-spaced markers around the circle, according to participant perception ratings. Although employing items at two levels of intensity arguably affords the benefit of explicitly addressing the theorized distinction between mild and moderate-extreme behaviors, the reliance on a single representative scenario per intensity level per octant sacrifices reliability and constrains coverage of the universe of IPC content. In Study 2, the behavior checklists utilized required retrospective reporting about interactions during the recent day(s). While this provides less of a temporal delay

in reporting than retrospective reporting that condenses longer time periods, it hardly provides an error-free assessment of behavior. Moreover, the self-report nature of such "diaries" is prone to the response biases common to any self-report format (e.g., Gosling, John, Craik, & Robins, 1998). Additionally, the present study sampled only one week of social behavior, a time frame not uncommon in the literature (e.g., Kafetzios & Nezlek, 2002), though longer time periods (e.g., Moskowitz, 1994) may provide a wider net, so to speak, for low base-rate behaviors such as hostility. Other measurement issues concern the fact that research has not yet assessed the reliability of variability of social perceptions (i.e., IG scores) as stable individual scores, as well as the fact that the present study did not employ the full (four-subscale) BIC, which may have provided fuller data with which to understand the problems inherent in the BIC scores in this study. A final concern related to measurement is the use of a web-based data collection mechanism. While it reduces human data entry error, its ease, convenience, and lack of immediate supervision by research personnel may conceivably lead to diminished attention to items, motivation, and response rates.

Other methodological limitations deserve mention. In Study 1, participants were instructed to imagine interactions only with same-sex targets, limiting cross-gender generalizability. Also, the decision to exclude from analysis Study 2 participants who did not complete a preset number of interaction records potentially limits generalization of findings to "completers," which may mean more conscientious or motivated students with co-occurring personality traits. However, it should be noted that a reanalysis of Study 2 models with the total sample (including participants who provided few or no interaction records) yielded the following results: Whereas similar factor loadings emerged for predictor variables, parameters reflecting the effects of amplitude and elevation on variability were consistently diminished (with many

clustering near zero) and none statistically significant. Such findings appear consistent with the expectation that inclusion of low-response participants would attenuate results, perhaps due to loss in reliability. Lastly, although statistical prediction requires no assumptions or tests related to causality, it deserves noting that the design of the present study prohibits a strict interpretation of personality indices as causative of variability in social perceptions and behavior. The former may have temporally preceded the latter, particularly in Study 2, but the specter of "third variables" nonetheless looms, in the absence of experimental controls or more sophisticated longitudinal designs.

Future studies must continue to clarify the meaning of IPC indices (amplitude in particular), as well as interpersonal capabilities (BIC). As noted, rigorous tests of the theory of interpersonal rigidity await theoretically consistent means of operationalizing the construct. Future research on cross-situational variability in social perceptions and behavior must transcend the present study's largely descriptive purpose to examine the complex interactions between situational characteristics, perceptions, affect, and behavior, as well as their temporal sequences. Such work, both correlational and experimental, may shed further light on the dynamics accounting for phenomena such as unstable behavior oscillation. Additionally, the use of clinical samples will surpass the predominant use of nonclinical samples in extant research on interpersonal variability. Whereas the present study did not examine moderator variables, future work must probe for interactions between individuals' standing on interpersonal traits/problems (or "interpersonal diagnosis" via IPC octant classification) and indices such as elevation, when examining impact on outcome variables representing variability. Also, the use of more real-time technologies such as palmtop computers may minimize retrospective reporting to a greater extent than in the present study. Lastly, future work must clarify the meaning of different mathematical

indices of variability of social perceptions and behavior (i.e., flux, pulse, and spin), clarifying what high-flux or high-spin individuals "look like." It would seem that persons could exhibit high spin of mild-intensity, adaptive social behavior, but score in a low or moderate range of flux. In contrast, persons with both high spin and high flux would seemingly use behaviors from many octants of the interpersonal circle, but do so at extreme levels of intensity. Such descriptions and their clinical relevance await testing.

In conclusion, the present research provides new grist for the reexamination of the role of variability and its extremes in IPC assessment, consistent with the concepts advanced convincingly by Leary (1957). Variability of phenomena demonstrates important relationships to pathology and well-being in the physiological domain: heart-rate variability, brain waves, circadian rhythms, etc. As with these biological forms of variability, personality may become problematic under conditions of marked over- or under-regulation. Continued elucidation of the nature of "…the double threats of rigidity and chaotic flexibility" (Leary, 1957, p. 121) will further realize the goal of transcending standard psychiatric classification, providing assessment and understanding of the individual's inner and outer interpersonal worlds.

References

Adams, H. B. (1964). 'Mental illness' or interpersonal behavior? *American Psychologist, 19,* 191-197.

Alden, L. E., & Capreol, M. J. (1993). Avoidant personality disorder: Interpersonal problems as predictors of treatment response. *Behavior Therapy, 24,* 357-376.

Alden, L. E., & Phillips, N. (1990). An interpersonal analysis of social anxiety and depression. *Cognitive Therapy and Research, 14,* 499-513.

Alden, L. E., Wiggins, J. S., & Pincus, A. L. (1990). Construction of circumplex scales for the Inventory of Interpersonal Problems. *Journal of Personality Assessment, 55,* 521-536.

Alpher, V. S. (1996). Identity and introject in dissociative disorders. *Journal of Consulting and Clinical Psychology, 64,* 1238-1244.

Andersen, S. M., & Baum. A. (1994). Transference in interpersonal relations: Inferences and affect based on significant-other representations.

Andersen, S. M., & Chen. S. (2002). The relational self: An interpersonal social-cognitive theory. *Psychological Review, 109,* 619-645.

Andrews, J. D. W. (1988). Self-confirmation theory: A paradigm for psychotherapy integration: Part I. Content analysis of therapeutic styles. *Journal of Integrative and Eclectic Psychotherapy, 7,* 359-384.

Andrews, J. D. W. (1991). Integrative psychotherapy of depression: A self-confirmation approach. *Psychotherapy, 28,* 232-250.

Arbuckle, J. L. (2003). Amos 5.0 [Computer software]. Chicago, IL: SPSS.

Bakan, D. (1966). *The duality of human existence: An essay on psychology and religion*. Chicago: Rand McNally.

Baldwin, M. W. (1997). Relational schemas as a source of if-then self-inference procedures. *Review of General Psychology, 1,* 326-335.

Baldwin, M. W., Baccus, J. R., & Fitzsimons, G. M. (2004). Self-esteem and the dual processing of interpersonal contingencies. *Self and Identity, 3,* 81-93.

Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61,* 226-244.

Benjamin, L. S. (1974). Structural analysis of social behavior. *Psychological Review, 81,* 392-425.

Benjamin, L. S. (1986). Adding social and intrapsychic descriptors to Axis I of DSM-III. In T. Millon & G. L. Klerman (Eds), *Contemporary directions in psychopathology: Toward the DSM-IV* (pp. 599-638). New York: Guilford.

Benjamin, L. S. (1994). SASB: A bridge between personality theory and clinical psychology. *Psychological Inquiry, 5,* 273-316.

Benjamin, L. S. (1996). A clinician-friendly version of the interpersonal circumplex: Structural Analysis of Social Behavior (SASB). *Journal of Personality Assessment, 66,* 248-266.

Benjamin, L. S. (1996). *Interpersonal diagnosis and treatment of personality disorders*. New York: Guilford.

Benjamin, L. S. (2000). *The Intrex user's manual*. Salt Lake City, UT: Department of Psychology.

Benjamin, L. S. (2003). *Interpersonal reconstructive therapy: Promoting change in nonresponders.* New York: Guilford.

Benjamin, L. S., & Wonderlich, S. A. (1994). Social perceptions and borderline personality disorder: The relation to mood disorders. *Journal of Abnormal Psychology, 103,* 610-624.

Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin, 107,* 238-246.

Bentler, P. M., & Bonnett, D. G. (1980). Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin, 88,* 588-606.

Bers, S. A., Blatt, S. J., Sayward, H., & Johnston, R. (1993). Normal and pathological aspects of self descriptions and their change over long-term treatment. *Psychoanalytic Psychology, 10,* 17-37.

Blatt, S. J., Auerbach, J. S., & Levy, K. N. (1997). Mental representations in personality development, psychopathology, and the therapeutic process. *Review of General Psychology, 4,* 351-374.

Bollen, K. A. (1989). *Structural equations with latent variables.* Oxford, England: Wiley.

Bonnano, G. A., Notarius, C. I., Gunzerath, L., Keltner, D., & Horowitz, M. J. (1998). Interpersonal ambivalence, perceived relationship adjustment, and conjugal loss. *Journal of Consulting and Clinical Psychology, 6,* 1012-1022.

Borkovec, T. D., Newman, M. G., Pincus, A., & Lytle, R. (2002). A component analysis of cognitive-behavioral therapy for generalized anxiety disorder and the role of interpersonal problems. *Journal of Consulting and Clinical Psychology, 70,* 288-298.

Brokaw, D. W., & McLemore, C. W. (1991). Interpersonal models of personality and psychopathology. In D. G. Gilbert & J. J. Connoly (Eds.), *Personality, social skills, and psychopathology: An individual differences approach* (pp. 49-83). New York: Plenum.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural models*. Newbury Park: Sage Publications.

Campbell, J. D. (1990). Self-esteem and clarity of the self-concept. *Journal of Personality and Social Psychology, 59,* 538-549.

Carson, R. C. (1969). *Interaction concepts of personality.* Chicago, Aldine.

Carson, R. C. (1982). Self-fulfilling prophecy, maladaptive behavior, and psychotherapy. In J. C. Anchin & D. J. Kiesler (Eds.), *Handbook of interpersonal psychotherapy* (pp. 64-77). New York: Pergamon.

Cervone, D., & Shoda, Y. (1999). *The coherence of personality: Social-cognitive bases of consistency, variability, and organization*. New York: Guilford.

Coté, S., & Moskowitz, D. S. (1998). On the dynamic covariation between interpersonal behavior and affect: Prediction from neuroticism, extraversion, and agreeableness. *Journal of Personality and Social Psychology, 75,* 1032-1046.

Coyne, J. C. (1976). Depression and the response of others. *Journal of Abnormal Psychology, 2*, 186-193.

Creed, A. T., & Funder, D. C. (1998). Social anxiety: From the inside and outside. *Personality and Individual Differences, 25*, 19-33.

Davies-Osterkamp, S., Strauss, B. M., Schmitz, N. (1996). Interpersonal problems as predictors of symptom related treatment outcome in longterm psychotherapy. *Psychotherapy Research, 6,* 164-176.

Dilalla, L. F. (2000). Structural equation modeling: Uses and issues. In H. E. A. Tinsley & S. D. Brown (Eds.), *Handbook of applied multivariate statistics and mathematical modeling* (pp. 37-64). San Diego: Academic Press.

Donahue, E. M., Robins, R. W., Roberts, B. W., & John, O. P. (1993). The divided self: Concurrent and longitudinal effects of psychological adjustment and social roles on self-concept differentiation. *Journal of Personality and Social Psychology, 64,* 834-846.

Dweck, C. S., Hong, Y., & Chiu, C. (1993). Implicit theories: Individual differences in the likelihood and meaning of dispositional inference. *Personality and Social Psychology Bulletin, 19,* 644-656.

Eid, M., & Diener, E. (1999). Intraindividual variability in affect: Reliability, validity, and personality correlates. *Journal of Personality and Social Psychology, 76,* 662-676.

Ellwart, T., Rinck, M., & Becker, E. S. (2003). Selective memory and memory deficits in depressed inpatients. *Depression and Anxiety, 17,* 197-206.

Endler, N. S., & Magnusson, D. (Eds.). (1976). *Interactional psychology and personality*. Washington, D. C.: Hemisphere.

Erickson, T. M. (2002). [IIP-C indices in selected college student groups]. Unpublished raw data.

Erickson, T. M. (2003, November). *Interpersonal differences among generally anxious, socially phobic, and panic disordered analogues*. Poster session presented at the annual meeting of the Association for Advancement of Behavior Therapy, Boston, MA.

Erickson, T. M., & Newman, M. G. (2002, August). *Interpersonal impact of generalized anxiety disorder analogues*. Paper presented at the American Psychological Association convention, Chicago, IL.

Erickson, T. M., & Pincus, A. L. (2005). Using Structural Analysis of Social Behavior (SASB) measures of social perception to give interpersonal meaning to symptoms: Anxiety as an exemplar. *Assessment, 12,* 243-254.

Essex, M. J., Klein, M. H., Lohr, M. J., & Benjamin, L. S. (1985). Intimacy and depression in older women. *Psychiatry: Journal for the Study of Interpersonal Processes, 48,* 159-178.

Eysenck, M. W., Mogg, K., May, J., Richards, A., & Mathews, A. (1991). Bias in interpretation of ambiguous sentences related to threat in anxiety. *Journal of Abnormal Psychology 100,* 144-150.

Feyerabend, P. (1988). *Against method* (Rev. ed.). London: Verso.

Foa, U. G., & Foa, E. B. (1974). *Societal structures of the mind.* Springfield, IL: Charles C. Thomas.

Fournier, M. A., Moskowitz, D. S., & Zuroff, D. C. (2000). Social rank strategies in hierarchical relationships. *Journal of Personality and Social Psychology, 83,* 425-433.

Funder, D. C., & Colvin, C. R. (1997). Congruence of others' and self-judgments of personality. In R. Hogan, J. A. Johnson, & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 617-647). San Diego, CA: Academic Press.

Giesler, R. B., Josephs, R. A., & Swann, W. B., Jr. (1996). Self-verification in clinical depression: The desire for negative evaluation. *Journal of Abnormal Psychology, 105,* 358-368.

Gosling, S. D., John, O. P., Craik, K. H., & Robins, R. W. (1998). Do people know how they behave? Self-reported act frequencies compared with on-line codings by observers. *Journal of Personality and Social Psychology, 74,* 1337-1349.

Gosling, S. D., Vazire, S., Srivastava, S., & John, O. P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about internet questionnaires. *American Psychologist, 59,* 93-104.

Gotlib, I. H., & Robinson, L. A. (1982). Responses to depressed individuals: Discrepancies between self-report and observer-rated behavior. *Journal of Abnormal Psychology, 91*, 231-240.

Greenier, K. D., Kernis, M. H., McNamara, C. W., Waschullm, S. B., Berry, A. J., Herlocker, C. E., Abend, T. (1999). Individual differences in reactivity to daily events: Examining the roles of stability and level of self-esteem. *Journal of Personality, 67,* 185-208

Griffin, D., & Bartholomew, K. (1994). Models of self and other: Fundamental dimensions underlying adult attachment. *Journal of Personality and Social Psychology, 67,* 430-445.

Gurtman, M. B. (1987). Depressive affect and disclosures as factors in interpersonal rejection. *Cognitive Therapy and Research, 11,* 87-100.

Gurtman, M. B. (1992). Construct validity of interpersonal personality measures: The interpersonal circumplex as a nomological net. *Journal of Personality and Social Psychology, 63,* 105-118.

Gurtman, M. B. (1994). The circumplex as a tool for studying normal and abnormal personality: A methodological primer. In S. Strack & M. Lorr (Eds.), *Differentiating normal and abnormal personality*. (pp. 243-263). New York: Springer.

Gurtman, M. B. (1996). Interpersonal problems and the psychotherapy context: The construct validity of the inventory of interpersonal problems. *Psychological Assessment, 8,* 241-255.

Gurtman, M. B., & Balakrishnan, J. D. (1998). Circular measurement redux: The analysis and interpretation of interpersonal circle profiles. *Clinical Psychology: Science and Practice, 5,* 344-360.

Gurtman, M. B., & Pincus, A. L. (2000). Interpersonal circumplex scales: Confirmation of circumplex structure from multiple perspectives. *Personality and Social Psychology Bulletin, 26,* 374-384.

Gurtman, M. B., & Pincus, A. L. (2003). The circumplex model: Methods and research applications. In W. F. Velicer & J. A. Schinka (Eds.), *Handbook of psychology: Research methods in psychology: Vol. 2* (pp. 407-428). New York: Wiley.

Gurtman, M. B., & Pincus, A. L. (2005, January). Where interpersonal traits meet interpersonal problems: Conjunction and disjunction in the circumplex space. Poster session presented at the annual meeting of the Association for Research in Personality, New Orleans, LA.

Guttman, L. (1954). A new approach to factor analysis: The radix. In P. R. Lazarsfeld (Ed.), *Mathematical thinking in the social sciences* (pp. 258-348). Glencoe, IL: Free Press.

Hagtvet, K. A. (2004). How well do item parcels represent conceptually defined latent constructs: A two-facet approach. *Structural Equation Modeling, 11,* 168-193.

Haidt, J. (2003). Elevation and the positive psychology of morality. In L. M. Keyes J. & Haidt (Eds.), *Fluorishing: Positive Psychology and the Life Well-Lived* (pp. 275 -289). Washington, D. C.: American Psychological Association.

Haslam, N., & Gurtman, M. B. (1999). Detecting complex patterns in interpersonal profiles. *British Journal of Medical Psychology, 72,* 23-32.

Henry, W. P. (1994). Differentiating normal and abnormal personality: An interpersonal approach based on the Structural Analysis of Social Behavior. In S. Strack & L. Maurice (Eds.), *Differentiating normal and abnormal personality* (pp. 316-340). New York: Springer.

Hoffsess, C. D., & Tracey, T. J. G. (2005). The interpersonal circumplex as a model of interpersonal capabilities. *Journal of Personality Assessment, 84,* 137-147.

Horowitz, L. M. (2004). *Interpersonal foundations of psychopathology*. Washington, D.C.: American Psychological Association.

Horowitz, L. M., Alden, L. E., Wiggins, J. S., & Pincus, A. L. (2000). *IIP: Inventory of Interpersonal Problems manual*. San Antonio, TX: Psychological Corporation.

Horowitz, L. M., Rosenberg, S. E., Baer, B. A., Ureño, G., & Villaseñor, V. S. (1988). Inventory of interpersonal problems: Psychometric properties and clinical applications. *Journal of Consulting and Clinical Psyschology, 56,* 885-892.

Horowitz, L. M., Rosenberg, S. E., & Kalehzan, B. M. (1992). The capacity to describe other people clearly: A predictor of interpersonal problems in brief dynamic psychotherapy. *Psychotherapy Research, 2,* 37-51.

Horowitz, L. M., & Vitkus, J. (1986). The interpersonal basis of psychiatric symptoms. *Clinical Psychology Review, 6,* 443-469.

Horowitz, L. M., Wilson, K. R., Turan, B., Zolotsev, P. Constantino, M. J., & Henderson, L. (2006). How interpersonal motives clarify the meaning of interpersonal behavior: A revised circumplex model. *Personality and Social Psychology Review, 10,* 67-86.

Humes, D. L., & Humphrey, L. L. (1994). A multimethod analysis of families with a polydrug-dependent or normal adolescent daughter. *Journal of Abnormal Psychology, 103,* 676-685.

Ichiyama, M. A., Zucker, R. A., Fitzgerald, H. E., & Bingham, C. R. (1996). Articulating subtype differences in self and relational experience among alcoholic men using Structural Analysis of Social Behavior. *Journal of Consulting and Clinical Psychology, 64,* 1245-1254.

Fournier, M. A., Moskowitz, D. S., & Zuroff, D. C. (2002). Social rank strategies in hierarchical relationships. *Journal of Personality and Social Psychology, 83,* 425-433.

Joiner, T. E., Jr., Metalsky, G. I., Katz, J., & Beach, S. R. H. (1999). Depression and excessive reassurance-seeking. *Psychological Inquiry, 10,* 269-278.

Kafetsios, K., & Nezlek, J. B. (2002). Attachment styles in everyday social interaction. *European Journal of Social Psychology, 32,* 719-735.

Kachin, K. E., Newman, M. G., & Pincus, A. L. (2001). An interpersonal approach to the classification of social phobia subtypes. *Behavior Therapy, 32*, 479-501.

Kenny, D. A. (1994). *Interpersonal perception: A social relations analysis*. New York: Guilford.

Kernis, M. H., Paradise, A. W., Whitaker, D. J., Wheatman, S. R., & Goldman, B. N. (2000). Master of one's psychological domain? Not likely if one's self-esteem is unstable. *Personality and Social Psychological Bulletin, 26,* 1297-1305.

Kiesler, D. J. (1982). Interpersonal theory for personality and psychotherapy. In J. C. Anchin & D. J. Kiesler (Eds.), *Hnadbook of interpersonal psychotherapy* (pp. 3-24). New York: Pergamon.

Kiesler, D. J. (1983). The 1982 Interpersonal Circle: A taxonomy for complementarity in human transactions. *Psychological Review, 90,* 185-214.

Kiesler, D. J. (1985). The 1982 Interpersonal Circle: Acts version. Unpublished manuscript, Virginia Commonwealth University, Richmond, VA.

Kiesler, D. J. (1984). *Check List of Psychotherapy Transactions (CLOPT) and Check List of Interpersonal Transactions (CLOIT)*. Richmond: Virginia Commonwealth University.

Kiesler, D. J. (1986). The 1982 interpersonal circle: An analysis of DSM-III personality disorders. In T. Millon & G. Klerman (Eds.), *Contemporary directions in psychopathology: Toward DSM-IV* (pp. 571-597). New York: Guilford.

Kiesler, D. J. (1987). *Check List of Psychotherapy Transactions-Revised (CLOPT-R) and Check List of Interpersonal Transactions-Revised (CLOIT-R)*. Richmond: Virginia Commonwealth University.

Kiesler, D. J. (1991). Interpersonal methods of assessment and diagnosis. In C. R. Snyder & D. R. Forsyth (Eds.), *Handbook of social and clinical psychology* (pp. 438-468). Elmsford, New York: Pergamon.

Kiesler, D. J. (1996). *Contemporary interpersonal theory and research: Personality, Psychopathology, and Psychotherapy*. New York: Wiley.

Kiesler, D. J., & Schmidt, J. A. (1993). *The Impact Message Inventory: Form IIA Octant Scale Version*. Palo Alto, CA: Mind Garden.

Kiesler, D. J., Van Denburg, T. F., Sikes-Nova, V. E., Larus, J. P., & Goldston, C. S. (1990). Interpersonal behavior profiles of eight cases of DSM-III personality disorder. *Journal of Clinical Psychology, 46,* 440-453.

LaForge, R., Leary, T. F., Naboisek, H., Coffey, H. S., & Freedman, M. B. (1954). The interpersonal dimension of personality: II. An objective study of repression. *Journal of research in personality, 23,* 129-153.

Langer, E. J. (1989). *Mindfulness*. Cambridge: Perseus Publishing.

Leary, T. (1957). *Interpersonal diagnosis of personality: A functional theory and methodology for personality evaluation.* New York: Ronald Press.

Leary, T., & Coffey, H. S. (1954). The prediction of interpersonal behavior in group psychotherapy. *Group Psychotherapy, 7,* 7-51.

Leary, T., & Coffey, H. S. (1955). Interpersonal diagnosis: Some problems of methodology and validation. *Journal of Abnormal & Social Psychology, 50,* 110-124.

Levy, K. N., Blatt, S. J., & Shaver, P. R. (1998). Attachment styles and parental representations. *Journal of Personality and Social Psychology, 74,* 407-419.

Linville, P. W. (1985). Self-complexity and affective extremity: Don't put all of your eggs in one cognitive basket. *Social Cognition, 3,* 94-120.

Linville, P. W. (1987). Self-complexity as a cognitive buffer against stress-related illness and depression. *Journal of Personality and Social Psychology, 52,* 663-676.

Lorr, M., & McNair, D. M. (1965). Expansion of the interpersonal behavior circle. *Journal of Personality and Social Psychology, 2,* 823-830.

Maling, M. S., Gurtman, M .B., & Howard, K. I. (1995). The response of interpersonal problems to varying doses of psychotherapy. *Psychotherapy Research, 5,* 63-75.

Mardia, K. V. (1972). *Statistics of directional data*. New York: Academic Press.

Markey, P. M., Funder, D. C., & Ozer, D. J. (2003). Complementarity of interpersonal behaviors in dyadic interactions. *Personality and Social Psychology Bulletin, 29,* 1082-1090.

Mathews, A., & MacLeod, C. (1994). Cognitive approaches to emotion and emotional disorders. *Annual Review of Psychology, 45,* 25-50.

McCrae, R. R., & Costa, P. T., Jr. (1983). Social desirability scales: More substance than style. *Journal of Consulting and Clinical Psychology, 51,* 822-838.

McLemore, C. W., & Benjamin, L. S. (1979). Whatever happened to interpersonal diagnosis? A psychosocial alternative to DSM-III. *American Psychologist, 34,* 17-34.

McLemore, C., & Brokaw, D. (1987). Personality disorders as dysfunctional interpersonal behavior. *Journal of Personality Disorders, 1,* 270-295.

McMullen, L. M., & Conway, J. B. (1997). Dominance and nurturance in the narratives told by clients in psychotherapy. *Psychotherapy Research, 7,* 83-99.

Mendoza-Denton, R., Ayduk, O., Mischel, W., Shoda, Y., & Testa, A. (2001). Person × situation interactionism in self-encoding (*I am…when…*): Implications for affect regulation and social information processing. *Journal of Personality and Social Psychology, 80,* 533-544.

Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review, 102,* 246-268.

Mogg, K., Millar, N., & Bradley, B. P. (2000). Biases in eye movements to threatening facial expressions in generalized anxiety disorder and depressive disorder. *Journal of Abnormal Psychology, 109*, 695-704.

Mohr, D. C., Beutler, L. E., Engle, E., Shoham-Salomon, V., Bergan, J., Kaszniak, A. W., & Yost, E. B. (1990). Identification of patients at risk for nonresponse and negative outcome in psychotherapy. *Journal of Consulting and Clinical Psychology, 58,* 622-628.

Moskowitz, D. S. (1994). Cross-situational generality and the interpersonal circumplex. *Journal of Personality and Social Psychology, 66,* 921-933.

Moskowitz, D. S., & Coté, S. (1995). Do interpersonal traits predict affect? A comparison of three models. *Journal of Personality and Social Psychology, 69,* 915-924.

Moskowitz, D. S., & Zuroff, D. C. (2004). Flux, pulse, and spin: Dynamic additions to the personality lexicon. *Journal of Personality and Social Psychology, 86,* 880-893.

Moskowitz, D. S., & Zuroff, D. C. (2005). Assessing interpersonal perceptions using the interpersonal grid. *Psychological Assessment, 17,* 218-230.

Moskowitz, D. S., & Zuroff, D. C. (2005). Robust predictors of flux, pulse, and spin. *Journal of Research in Personality, 39,* 130-147.

Murray, H. A. (1938). *Explorations in personality*. New York: Oxford University Press.

Nezlek, J. B., Hampton, C. P., & Shean, G. D. (2000). Clinical depression and day-to-day social interaction in a community sample. *Journal of Abnormal Psychology, 109,* 11-19.

Noyes, R., Jr., Stuart, S. P., Langbehn, D. R., Happel, R. L., Longley, S. L., Muller, B. A., & Yagla, S. J. (2003). Test of an interpersonal model of hypochondriasis. *Psychosomatic Medicine, 65,* 292-300.

O'Connor, B. P., & Dyce, J. (1997). Interpersonal rigidity, hostility, and complementarity in musical bands. *Journal of Personality and Social Psychology, 72,* 362-372.

Orford, J. (1986). The rules of interpersonal complementarity: Does hostility beget hostility and dominance, submission? Psychological Review, 93, 365-377.

Papsdorf, M., & Alden, L. (1998). Mediators of social rejection in social anxiety: Similarity, self-disclosure, and overt signs of anxiety. *Journal of Research in Personality, 32,* 352-369.

Paulhus, D. L. (1983). Sphere-specific measures of perceived control. *Journal of Personality and Social Psychology, 46,* 598-609.

Paulhus, D. L., & John, O. P. (1998). Egoistic and moralistic biases in self-perception: The interplay of self-deceptive styles with basic traits and motives. *Journal of Personality, 66,* 1025-1060.

Paulhus, D. L., & Martin, C. L. (1987). The structure of personality capabilities. *Journal of Personality and Social Psychology, 52,* 354-365.

Paulhus, D. L., & Martin, C. L. (1988). Functional flexibility: A new conception of interpersonal flexibility. *Journal of Personality and Social Psychology, 55,* 88-101.

Pedhazur, E. J., & Schmelkin, L. P. (1991). *Measurement, design, and analysis: An integrated approach*. Hillsdale, NJ: Lawrence Erlbaum.

Pincus, A. L. (1994). The interpersonal circumplex and the interpersonal theory: Perspectives on personality and its pathology. In S. Strack & M. Lorr (Eds.), *Differentiating normal and abnormal personality*. (pp. 114-136). New York: Springer.

Pincus, A. L., & Ansell, E. B. (2003). Interpersonal theory of personality. In T. Millon & M. J. Lerner (Eds.), *Comprehensive handbook of psychology: Vol. 5. Personality and social* (pp. 209-228). New York: Wiley.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1,* 385-401.

Ruiz, M. A., Pincus, A. L., & Bedics, J. B. (1999). Using the Structural Analysis of Social Behavior (SASB) to differentiate young adults with borderline personality disorder features. *Journal of Personality Disorders, 13,* 187-198.

Ruiz, M. A., Pincus, A. L., Borkovec, T. D., Echemendia, R. J., Castonguay, L. G., & Ragusea, S. A. (2004). Validity of the Inventory of Interpersonal Problems for predicting treatment outcome: An investigation with the Pennsylvania Practice Research Network. *Journal of Personality Assessment, 83,* 213-222.

Sadler, P., & Woody, E. (2003). Is who you are who you're talking to? Interpersonal complementarity in mixed-sex interactions. *Journal of Personality and Social Psychology, 84,* 80-96.

Safran, J. D. (1984). Assessing the cognitive-interpersonal cycle. *Cognitive Therapy and Research, 8,* 333-348.

Safran, J. D. (1990a). Towards a refinement of cognitive therapy in light of interpersonal theory: I. Theory. *Clinical Psychology Review, 10,* 87-105.

Safran, J. D. (1990b). Towards a refinement of cognitive therapy in light of interpersonal theory: II. Practice. *Clinical Psychology Review, 10,* 107-121.

Safran, J. D., & Segal, Z. V. (1990). *Interpersonal process in cognitive therapy*. New York: Basic Books.

Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods, 7,* 147-177.

Secord, P. F., & Backman, C. W. (1961). Personality theory and the problem of stability change in individual behavior: An interpersonal approach. *Psychological Review, 68,* 21-32.

Sincoff, J. B. (1990). The psychological characteristics of ambivalent people. *Clinical Psychology Review, 10,* 43-68.

Soyguet, G., Nelson, L., & Safran, J. D. (2001). The relationship between interpersonal schemas and personality characteristics. *Journal of Cognitive Psychotherapy, 15,* 99-108.

Soyguet, G., & Savasir, I. (2001). The relationship between interpersonal schemas and depressive symptomatology. *Journal of Counseling Psychology, 48,* 359-364.

Strack, S., & Coyne, J. C. (1983). Social confirmation of dysphoria: Shared and private reactions to depression. *Journal of Personality and Clinical Studies, 44*, 798-806.

Strong, S. R., Hills, H. I., Kilmartin, C. T., DeVries, H., Lanier, K., Nelson, B. N., Strickland, D., & Meyer, C. W., III. (1988). The dynamic relations among interpersonal behaviors: A test of complementarity and anticomplementarity. *Journal of Personality and Social Psychology, 54,* 798-810.

Strupp, H. H., & Binder, J. L. (1984). *Psychotherapy in a new key: A guide to time-limited dynamic psychotherapy*. New York: Basic Books.

Sullivan, H. S. (1953a). *Conceptions of modern psychiatry.* New York: Norton.
Sullivan, H. S. (1953b). *Interpersonal theory of psychiatry*. New York: Norton.
Swann, W. B., Wenzlaff, R. M., Krull, D. S., & Pelham, B. W. (1992). Allure of negative feedback: Self-verification strivings among depressed persons. *Journal of Abnormal Psychology, 101,* 293-306.
Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Neednam Heights, MA: Allyn & Bacon.
Tracey, T. J. (1994). An examination of the complementarity of interpersonal behavior. *Journal of Personality and Social Psychology, 67,* 864-878.
Tracey, T. J. G., & Schneider, P. L. (1995). An evaluation of the circular structure of the Checklist of Interpersonal Transactions and the Checklist of Psychotherapy Transactions. *Journal of Counseling Psychology, 42,* 496-507.
Ullman, J. B. (2001). Structural equation modeling. In B. G. Tabachnick, B. G., & L. S. Fidell, L. S. (Eds.), *Using multivariate statistics* (4th ed.). Neednam Heights, MA: Allyn & Bacon.
Van Denburg, T. F., Schmidt, J. A., & Kiesler, D. J. (1992). Interpersonal assessment in counseling and psychotherapy. *Journal of Counseling & Development, 71,* 84-90.
Vittengl, J. R., Clark, L. A., & Jarrett, R. B. (2003). Interpersonal problems, personality pathology, and social adjustment after cognitive therapy for depression. *Psychological Assessment, 15,* 29-40.
Wachtel, P. L. (1994). Cyclical processes in personality and psychopathology. *Journal of Abnormal Psychology, 103,* 51-54.
Wheeler, L., & Nezlek, J. (1977). Sex differences in social participation. *Journal of Personality and Social Psychology, 35,* 742-754.
Wiggins, J. S. (1979). A psychological taxonomy of trait-descriptive terms: The interpersonal domain. *Journal of Personality and Social Psychology, 37,* 395-321.
Wiggins, J. S. (1991). Agency and communion as conceptual coordinates for the understanding and measurement of interpersonal behavior. In W. M. Grove & D. Cicchetti (Eds.), *Thinking clearly about psychology: Personality and psychopathology* (pp. 89-113). Minneapolis: University of Minnesota Press.
Wiggins, J. S. (1995). *Interpersonal Adjective Scales: Professional Manual.* Odessa, FL: Psychological Assessment Resources.
Wiggins, J. S., & Broughton, R. (1991). A geometric taxonomy of personality scales. *European Journal of Personality, 5,* 343-365.
Wiggins, J. S., & Holzmuller, A. (1978). Psychological androgyny and interpersonal behavior. *Journal of Consulting and Clinical Psycyhology, 46,* 40-52.
Wiggins, J. S., & Holzmuller, A. (1981). Further evidence on androgyny and interpersonal flexibility. *Journal of Research in Personality, 15,* 67-80.
Wiggins, J. S., Phillips, N., & Trapnell, P. (1989). Circular reasoning about interpersonal behavior: Evidence concerning some untested assumptions underlying diagnostic classification. *Journal of Personality and Social Psychology, 56,* 296-305.
Wiggins, J. S., Trapnell, P., & Phillips, N. (1988). Psychometric and geometric characteristics of the revised Interpersonal Adjective Scales (IAS-R). *Multivariate Behavioral Research, 23,* 517-530.

Appendix A: Interpersonal Stimuli

IPC Octant	Intensity Level	Interpersonal stimulus item stems
Dominant	1	Is quick to take charge of the conversation, or to offer suggestions about what needs to be done
	2	Overwhelms or "steamrolls" you by his/her preferences or actions
Hostile-Dominant	1	Claims that you misjudge or misinterpret his/her actions or thoughts
	2	Expresses harsh judgment, or no forgiveness for your mistakes
Hostile	1	Complains about you or is inconsiderate of your feelings
	2	Swears at you, or makes abusing or damaging comments
Hostile-Submissive	1	Is careful to not to let his/her feelings show clearly, or remains aloof or stand-offish
	2	Seems constantly uncomfortable with you, or endlessly avoids commitment to a position
Submissive	1	Waits for or follows your lead regarding issues to discuss or actions to pursue
	2	Finds it almost impossible to take the lead, or change the topic of discussion
Friendly-Submissive	1	Shows a desire to do "whatever you want," or gazes at you in a trusting manner
	2	Believes almost anything you say, or seems as if desperately wanting to avoid any disagreement
Friendly	1	Is considerate of your feelings, or quick to express acceptance of you
	2	Is unwaveringly lenient regarding your conduct, or inconveniences him/herself to help you
Friendly-Dominant	1	Inquires into your personal life or opinions, or makes comments energetically
	2	Seems totally engrossed in you, or exaggerates expression of his/her feelings

Note. 1 = Mild, 2 = Moderate/Extreme

IPC Octant	Intensity Level	Response options to interpersonal stimuli
Dominant	1	Express firm personal preferences
	2	Boss him/her around or refuse to yield
Hostile-Dominant	1	Act resentful or mistrusting
	2	Be extremely suspicious or denounce him/her
Hostile	1	Be irritable or quarrelsome
	2	Coldly refuse all cooperation
Hostile-Submissive	1	Act unsociable or emotionally inhibited
	2	Remain fearfully distant or totally detached
Submissive	1	Go along with his/her preferences or directions
	2	Act subservient or be very apologetic
Friendly-Submissive	1	Show trust or confide in him/her
	2	Be over-trusting, flattering, or all-forgiving
Friendly	1	Be warm or cooperative
	2	Be unconditionally supportive or super-polite
Friendly-Dominant	1	Sociably disclose your views
	2	Be highly disclosing or dramatically expressive

Note. 1 = Mild, 2 = Moderate/Extreme

Appendix B: Diary Study Instructions

INSTRUCTIONS:

In this part of the study:
For SEVEN DAYS straight, you are asked to complete brief daily records of your significant social interactions with other people. A SOCIAL INTERACTION is defined as any encounter of FIVE MINUTES or longer with another person(s) in which the participants attend to one another and adjust their behavior in response to one another.

A conversation is the clearest example of an interaction. Person A says something, Person B responds to that response, and so forth. Dancing and lovemaking are also interactions. Sitting side by side and watching television is NOT an interaction. Listening to a lecture is NOT an interaction, even if you occasionally ask a question.

Let's take a more difficult example. Suppose you are dining with a group of people. You are listening to their conversation but seldom saying anything yourself. Do you record this as a social interaction? We think that it is a social interaction if you are following the conversation AND if you could enter into it if you wished. If you are not following the conversation OR if it would be inappropriate for you to enter it, it would NOT be counted as a social interaction.

PLEASE log onto this website AT LEAST ONCE PER DAY at a consistent time (such as before going to sleep) to record your significant social interactions for each day. If you forget or miss one day, skip recording those interactions and please resume the following day.

PLEASE fill out a separate form for EACH interaction.

PLEASE record AT LEAST ***FIVE*** INTERACTIONS PER DAY (can be all reported at one time). This should take you about 10-15 minutes per day.

Note that research assistants will be able to check what time you record your interactions (via the web), so please do not attempt to put off recording them until late in the week.

Every time you log onto this website, you will see this same form. You may skip reading the instructions once you understand them.

Appendix C: Covariance Matrices

Covariance Matrix for Study 1 Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1.	159.385	48.490	-.138	1.152	-.043	-1.196	.874	.988	.606	.431	-.002	-.112	.043	-.286	-.203	-.050	-.013	-.104
2.	48.490	377.310	-1.297	-.823	-.523	-3.412	-.288	.515	.273	.975	-.219	-.540	-.301	-.418	-.141	.351	-.306	-.154
3.	-.138	-1.297	.297	.034	.085	.078	.031	.040	.043	.003	.002	.002	.007	-.007	-.005	.000	-.008	-.006
4.	1.152	-.823	.034	.156	.018	.089	-.064	-.028	-.045	-.043	.000	-.001	.003	-.013	-.004	-.008	-.010	-.001
5.	-.043	-.523	.085	.018	.147	-.070	.014	.025	.010	.002	.007	.001	.004	-.005	-.006	.000	-.005	-.010
6.	-1.196	-3.412	.078	.089	-.070	.540	-.130	-.097	-.127	-.155	.033	.015	.038	.022	-.012	-.013	.007	-.001
7.	.874	-.288	.031	-.064	.014	-.130	.548	.276	.387	.266	-.012	.004	-.003	-.014	.023	.029	.000	-.005
8.	.988	.515	.040	-.028	.025	-.097	.276	.446	.226	.383	-.016	.021	-.003	-.015	.025	.025	.011	.005
9.	.606	.273	.043	-.045	.010	-.127	.387	.226	.619	.337	-.012	.003	-.004	-.010	.018	.044	.003	.007
10.	.431	.975	.003	-.043	.002	-.155	.266	.383	.337	.662	-.010	.021	-.003	-.003	.028	.043	.019	.023
11.	-.002	-.219	.002	.000	.007	.033	-.012	-.016	-.012	-.010	-.033	.006	.014	.009	.000	.000	.007	.004
12.	-.112	-.540	.002	-.001	.001	.015	.004	.021	.003	.021	.006	.033	.009	.017	.004	.001	.001	.009
13.	.043	-.301	.007	.003	.004	.038	-.003	-.003	-.004	-.003	.014	.009	.040	.010	.002	.003	.005	.011
14.	-.286	-.418	-.007	-.013	-.005	.022	-.014	-.015	-.010	-.003	.009	.017	.010	.040	.002	.004	.013	.018
15.	-.203	-.141	-.005	-.004	-.006	-.012	.023	.025	.018	.028	.000	.004	.002	.002	.022	.005	.003	.002
16.	-.050	.351	.000	-.008	.000	-.013	.029	.025	.044	.043	.000	.001	.003	.004	.005	.024	.003	.007
17.	-.013	-.306	-.008	-.010	-.005	.007	.000	.011	.003	.019	.007	.016	.005	.013	.003	.003	.033	.015
18.	-.104	-.154	-.006	-.001	-.010	-.001	-.005	.005	.007	.023	.004	.009	.011	.018	.002	.007	.015	.041

Note. 1 = BIC Capability; 2 = BIC Difficulty; 3 = IAS amplitude; 4 = IAS elevation; 5 = IIP-C amplitude; 6 = IIP-C elevation; 7 = IG dominance flux (friend); 8 = IG affiliation flux (friend); 9 = IG dominance flux (authority); 10 = affiliation flux (authority); 11 = interpersonal stimuli dominance flux (friend); 12 = interpersonal stimuli affiliation flux (friend); 13 = interpersonal stimuli dominance flux (authority); 14 = interpersonal stimuli affiliation flux (authority); 15 = IG spin (friend); 16 = IG spin (authority); 17 = interpersonal stimuli spin (friend); 18 = interpersonal stimuli spin (authority).

Covariance Matrix for Study 2 Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1.	125.726	27.257	.593	.599	-.128	-1.228	.561	.916	-.056	.032	.045	-.044	.047	.102
2.	27.257	351.377	-.699	-.112	-.382	-2.066	.097	-.052	-.287	.094	-.098	.132	-.133	.126
3.	.593	-.699	.316	.049	.112	.089	-.001	.066	-.001	-.003	.007	.003	.010	.012
4.	.599	-.112	.049	.109	.022	.051	-.012	.016	.002	.000	.005	.000	.004	.008
5.	-.128	-.382	.112	.022	.166	.095	.006	.019	-.004	.002	.004	.006	.010	.008
6.	-1.228	-2.066	.089	.051	.095	.456	.059	.110	.002	.012	.027	.024	.034	.022
7.	.561	.097	-.001	-.012	.006	.059	.388	.282	.044	.011	.022	.021	.032	.017
8.	.916	-.052	.066	.016	.019	.110	.282	.544	.038	.027	.045	.030	.043	.040
9.	-.056	-.287	-.001	.002	-.004	.002	.044	.038	.026	.003	.002	.003	.003	.002
10.	.032	.094	-.003	.000	.002	.012	.011	.027	.003	.012	.008	.006	.005	.008
11.	.045	-.098	.007	.005	.004	.027	.022	.045	.002	.008	.018	.007	.008	.014
12.	-.044	.132	.003	.000	.006	.024	.021	.030	.003	.006	.007	.012	.008	.007
13.	.047	-.133	.010	.004	.010	.034	.032	.043	.003	.005	.008	.008	.022	.006
14.	.102	.126	.012	.008	.008	.022	.017	.040	.002	.008	.014	.007	.006	.016

Note. 1 = BIC Capability; 2 = BIC Difficulty; 3 = IAS amplitude; 4 = IAS elevation; 5 = IIP-C amplitude; 6 = IIP-C elevation; 7 = IG dominance flux (diary); 8 = IG affiliation flux (diary); 9 = IG spin (diary); 10 = SBI agreeable flux; 11 = SBI quarrelsome flux; 12 = SBI dominance flux; 13 = SBI submission flux; 14 = SBI spin.

VITA
Thane M. Erickson
August, 2006

EDUCATION

2003-2006	Ph.D. Candidate in Clinical Psychology (Adult track), Penn State University
2000 – 2003	M.S., Clinical Psychology (Adult track), Penn State University
1995 – 1999	B.A., Therapeutic and Community Psychology (Major), Philosophy (Minor) Point Loma Nazarene University (PLNU), San Diego, CA (*Summa Cum Laude*)

CLINICAL EXPERIENCE

2005-2006	Psychology Intern, VA Puget Sound H.C.S.-American Lake Div., Tacoma, WA
2001-2005	Psychotherapy Practicum, PSU Psychological Clinic
2003-2005	Assessment Practicum, PSU Psychological Clinic
2001	Clinical Assessor, FAST (Families and Schools Together) Track Project, PSU

TEACHING EXPERIENCE

2004	Course Instructor, Abnormal Psychology, PSU
2003-2004	Graduate Lecturer/Lab Instructor, Psychological Research Methods
2002-2004	Teaching Asst., Research Methods/History of Psych./Psych. of Adjustment, PSU

PUBLICATIONS

Startup, H. M., & Erickson, T. M. (2006). The Penn State Worry Questionnaire: Psychometric Properties and Associated Characteristics. In G. C. L. Davey & A. Wells (Eds.), *Worry and psychological disorders: Theory, assessment, and treatment*. Chichester, UK: Wiley.

Newman, M. G., Crits-Cristoph, P., Connolly Gibbons, M. B., & Erickson, T. M. (2006). Participant factors in treating anxiety disorders. In L. G. Castonguay & L. E. Beutler (Eds.), *Principles of therapeutic change that work* (pp. 121-153). New York: Oxford University Press.

Erickson, T. M., & Pincus, A. L. (2005). Using Structural Analysis of Social Behavior (SASB) measures of social perception to give interpersonal meaning to symptoms: Anxiety as an exemplar. *Assessment, 12,* 243-254.

Erickson, T. M., & Newman, M. G. (2005). Cognitive-behavioral psychotherapy for generalized anxiety disorder: A primer. *Expert Review of Neurotherapeutics, 5,* 247-257.

Newman, M. G., Erickson, T. M., Przeworski, A., & Dzus, E. (2003). Self-help and minimal contact therapies for anxiety disorders: Is human contact necessary for therapeutic efficacy? *Journal of Clinical Psychology, 59,* 251-274.

Newman, M. G., Zuellig, A. R., Kachin, K. E., Constantino, M. J., Przeworski, A., Erickson, T., & Cashman-McGrath, L. (2002). Preliminary reliability and validity of the GADQ-IV: A revised self-report diagnostic measure of generalized anxiety disorder. *Behavior Therapy, 33,* 215-233.