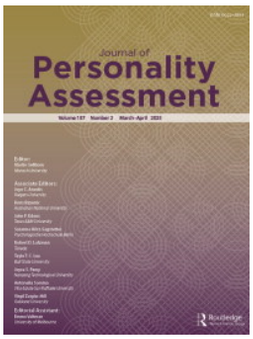

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Assessing Affective Dimensions of the Interpersonal Circumplex: Development and Validation of the Interpersonal Emotion Inventory

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ABSTRACT

Interpersonal emotions are feelings distinctively associated with real or imagined interpersonal situations. We propose that interpersonal emotions can be organized within the same circumplex used by contemporary integrative interpersonal theory to organize other aspects of interpersonal functioning. Our research explores the affective dimensions underpinning the interpersonal circumplex (IPC) and maps distinct emotional dispositions using coordinates for agentic and communal affect. Our aim is to provide a better differentiated and more comprehensive taxonomy of interpersonal emotions consistent with the IPC framework. In an initial development study ($N = 1223$ undergraduates) we used circumplex and psychometric criteria to create a 64-item Interpersonal Emotion Inventory (IEI), a novel self-report measure of interpersonal emotions reflecting each IPC octant. We then tested the structural properties and utility of the IEI in a preregistered validation study ($N = 278$ community participants). Across both studies, the IEI scales exhibited good fit to a two-dimensional circular model. The IEI demonstrated robust convergent, discriminant, and incremental validity in relation to measures of interpersonal values and problems, positive and negative affect, adult attachment, self-conscious emotions, self-esteem, and facets of narcissism. By complementing existing measures of affect and interpersonal phenomena, the IEI should prove useful in both research and clinical contexts.

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For over 70 years interpersonal psychology and its distinguishing interpersonal circumplex (IPC) model have offered a compelling framework for understanding and assessing interpersonal functioning (Leary, 1957; Strack & Horowitz, 2011; Sullivan, 1953). The IPC—as depicted in Figure 1—is a circular space underpinned by a vertical dimension of Agency (e.g., dominance, status, control) and a horizontal dimension of Communion (e.g., warmth, solidarity, engagement). The IPC framework has been used to assess many aspects of interpersonal life, including interpersonal traits and behaviors (Sadler et al., 2020; Wiggins, 1979), interpersonal motives, values, and goals (Horowitz et al., 2006; Locke, 2000; Trucco et al., 2013), interpersonal self-efficacy and self-talk (Lefebvre et al., 2022; Locke & Sadler, 2007), interpersonal problems (Boudreaux et al., 2018; Horowitz et al., 2003), and interpersonal sensitivities (Hopwood et al., 2011). The IPC has been applied to psychiatric syndromes as well (Girard et al., 2017; Wilson et al., 2017). Curiously, one fundamental aspect of interpersonal life yet to be well-integrated into the IPC model is interpersonal *emotions*.

Interpersonal emotions are emotional experiences that are distinctively associated with interpersonal situations (i.e., situations involving another person or persons, who may be either real or imagined). Interpersonal emotions imbue interpersonal situations with meaning, signaling to oneself and others satisfaction and frustration in strivings for agency and communion. Interpersonal emotion *states* provide moment-to-moment feedback during social interactions, whereas interpersonal emotional *dispositions* are more enduring features of personality. In what follows, we aim to provide a finer and more comprehensive taxonomy of interpersonal emotions than is currently available.

We believe that interpersonal emotions can be organized within the same circumplex that organizes other aspects of interpersonal functioning. We make this argument explicit and investigate it empirically by developing and validating a circumplex inventory of interpersonal emotions. A measure of interpersonal emotions that aligns with the IPC will advance assessment by providing more precise characterizations of emotional dispositions and anchor points for ecological momentary assessment and experience sampling.

Our proposed structure of interpersonal emotion offers an alternative but complementary approach to the prevailing theory of affect in interpersonal situations articulated by Contemporary Integrative Interpersonal Theory (CIIT; Wright, Pincus, & Hopwood, 2023). According to CIIT, components of the interpersonal situation include an affect system structured by arousal and valence in dynamic relation with a self-system structured by agentic and communal motives. CIIT researchers present evidence supporting links between interpersonal complementarity and affective reactions in the interpersonal situation, using experience

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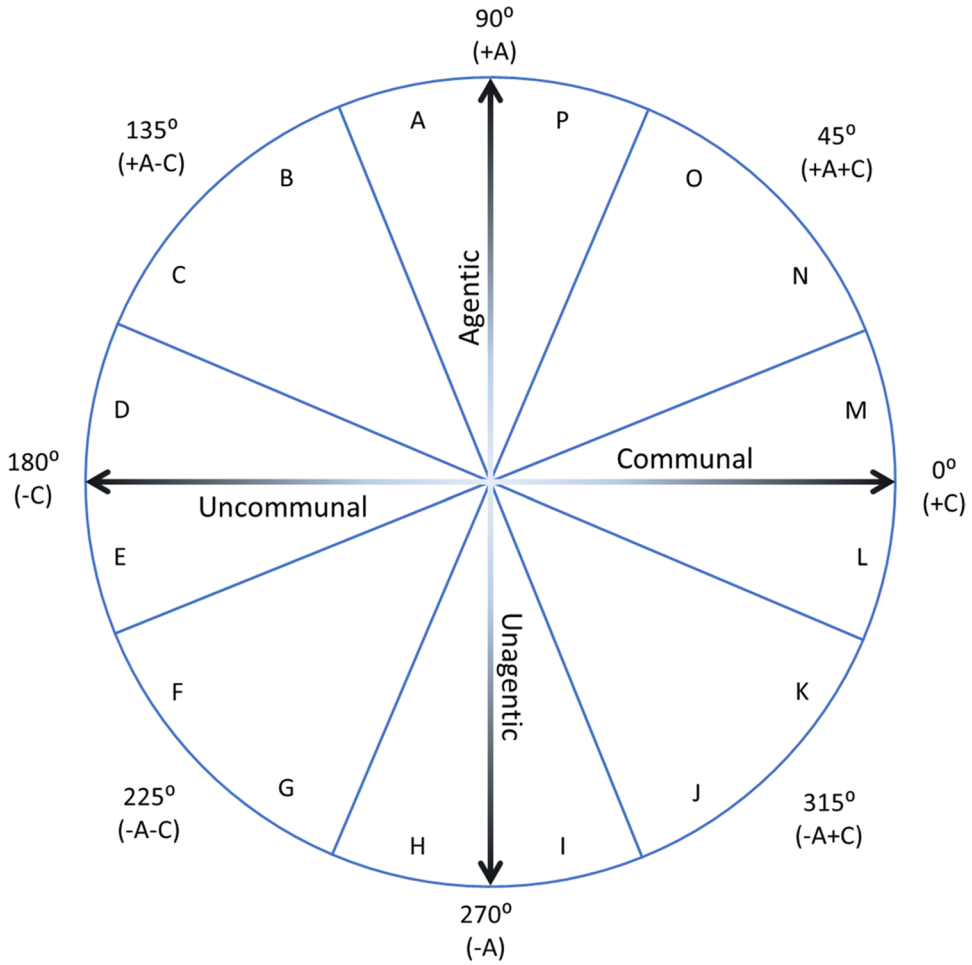

Figure 1. Interpersonal circumplex. +C = Communal; +A + C = Agentic & Communal; +A = Agentic; +A-C = Agentic & Uncommunal; -C = Uncommunal; -A-C = Unagentic & Uncommunal; -A = Unagentic; -A + C = Unagentic & Communal.

sampling and ecological momentary assessment to demonstrate the impact of satisfaction versus frustration of interpersonal motives on affective valence and arousal (Halberstadt et al., 2023).

While these results are compelling, measures of affective valence and arousal are only obliquely related to the IPC and are far removed from the vernacular for describing emotions. Both factors limit their utility in characterizing emotional experience. More generally, no existing measures for operationalizing affect in the interpersonal situation are optimally aligned with the IPC framework, and none offer precise assessment of distinct interpersonal emotions corresponding to specific IPC segments. Our work aims to address this gap by creating an inventory of interpersonal emotions that is isomorphic with the IPC and employs commonly used emotion descriptors.

Circumplex models of affect versus interpersonal emotions

There are both theoretical and empirical reasons why an inventory of interpersonal emotions might provide improved operationalization of affect in interpersonal situations. Our model of interpersonal emotions is distinct from other circular models of affective states and traits (Plutchik, 1997; Scherer, 2005; Watson et al., 1999) such as the influential "circumplex model of affect" (Posner et al., 2005; Russell, 1980), which CIIT incorporates. As noted above, the circumplex model of affect organizes affective experiences around a circular space structured by *valence* and *arousal* dimensions. These dimensions, however, were derived from studies that included few if any *interpersonal* emotions. Instead, the studies focused on emotions that are not specifically tied to interpersonal situations. Although a handful of studies deliberately included some social emotions (Bliss-Moreau et al., 2020), they intermingled the social emotions (e.g., ashamed, grateful, vengeful) with an even greater number of *intra*personal emotions (e.g., nervous, relaxed, sleepy, surprised).

Since CIIT currently incorporates different circumplex structures for affect (oriented around valence and arousal) and the self-system (oriented around agency and communion), it perpetuates a schism between emotional experience and other interpersonal variables. If the emotions of interest are specifically those that arise in interpersonal situations, then it seems more parsimonious to dispense with disparate circumplexes and integrate those interpersonal emotions directly into the IPC model.

The theoretical framework guiding our integration of emotions into the IPC conceptualizes emotions arising in interpersonal situations as reflecting the satisfaction or

frustration of agentic self-esteem motives and communal security motives (Hopwood et al., 2013). Interpersonal emotions are affective manifestations of mental representations of relationships between self and other(s). The degree to which the self—when relating to others—is represented positively (e.g., capable, attractive) or negatively (e.g., helpless, unappealing) roughly aligns with the vertical agentic IPC axis. The degree to which others—when relating to the self—are represented positively (e.g., caring, welcoming) or negatively (e.g., uncaring, rejecting) roughly aligns with the horizontal communal IPC axis. Defining the cardinal affective dimensions within the matrix of positive and negative representations of self and other allows for identification of a comprehensive range of interpersonal emotions that correspond to existing IPC segments. Accordingly, our emotion descriptors represent blends of agentic and communal affect determining their location within the continuous circular space of an *interpersonal emotion circumplex* isomorphic to the IPC.

Adult attachment and interpersonal emotions

Another relational model that converges with and can potentially enrich the IPC model is adult attachment theory (e.g., Bartholomew & Horowitz, 1991; Shaver & Mikulincer, 2011). Attachment researchers have identified *attachment anxiety* and *attachment avoidance* as key dimensions of internal working models of attachment relationships (Fraley et al., 2015; Shaver & Mikulincer, 2011). Attachment anxiety (i.e., fearing rejection and craving reassurance) indicates a negative model of the self while attachment avoidance (i.e., avoiding interdependence and intimacy) signals a negative model of others. Attachment security (i.e., being neither anxious nor avoidant) indicates a positive model of both the self and others.

Our theoretical model integrates adult attachment with the IPC by (1) hypothesizing that interpersonal emotions are shaped by internal relational models of self and significant others; and (2) roughly aligning the *attachment anxiety* and *attachment avoidance* dimensions with IPC *agentic* and *communal* dimensions, respectively. We further maintain that emotional dispositions reflect the affective intersection of *core beliefs about the self and others.* An internal relational model of the self as *good* (admirable, effective, self-confident) is associated with *agency and autonomy*, whereas a model of self as *bad* (disappointing, ineffective, self-doubting) is associated with *inadequacy and attachment anxiety.* An internal relational model of others as *good* (nurturing, available, trustworthy) is associated with *communion and attachment-seeking*, whereas a model of others as *bad* (attacking, unavailable, untrustworthy) is associated with *hostility and attachment avoidance*.

Our theory of interpersonal emotions links secure attachment with the development of capacities for agency and communion, where agency reflects confidence in one's ability to explore and master the world independently and communion reflects confidence in others' dependability for co-regulation and support. Attachment security, then, is built on an emotional foundation of self-confidence, pride in successes, and high self-esteem, rooted in an abiding trust that one is loved, valued, and respected by others who are reliably available. Conversely, insecure attachment signals failures in both agency and communion. Attachment insecurity belies an emotional core of inadequacy, shame, and low self-esteem, linked with mistrust and alienation from others experienced as hostile, rejecting, or unavailable.

Current research

In the current research, we developed and then evaluated the *Interpersonal Emotion Inventory (IEI)*—a novel circumplex measure of interpersonal emotions. Mirroring the structure of most other IPC inventories, we divided the circumplex into eight octants (as shown in Figure 2). The top "PA" octant reflects unequivocally agentic (+A) feelings (e.g., confident, triumphant). The opposite "HI" pole reflects unequivocally *un*agentic (-A) feelings (e.g., anxious, insecure). The rightmost "LM" octant reflects unequivocally communal (+C) feelings (e.g., warm, trusting). The opposite "DE" pole reflects unequivocally *un*communal (-C) feelings (e.g., suspicious, disgusted).

Equally essential in a circumplex model are the emotions anchoring the diagonal octants. The "NO" octant between the agentic and communal poles should reflect simultaneously agentic-and-communal (+A + C) feelings (e.g., proud, included). The opposite "FG" octant should reflect unagentic-and-uncommunal (-A-C) feelings (e.g., ashamed, alienated). The "BC" octant between the agentic and uncommunal poles should reflect agentic-and-uncommunal (+A-C) feelings (e.g., superior, contemptuous). And the opposite "JK" octant should reflect unagentic-and-communal (-A + C) feelings (e.g., deferential, compassionate).

In Study 1 we conducted an initial exploration of reliability, circumplex properties, and convergent and discriminant validity of the IEI in two undergraduate samples. In preregistered Study 2 we evaluated the properties and convergent and discriminant validity of the IEI in a gender-balanced community sample. We also tested our expectation that the IEI would show incremental validity in predicting variance in psychological constructs (e.g., self-esteem, narcissism) that was not predicted by positive and negative affect.

Study 1 – Development samples

Item generation and study aims

The first author generated a large pool of interpersonal emotion descriptors based on a content analysis of existing IPC inventories. In order to produce a clinically relevant measure, items reflecting emotions associated with commonly occurring clinical themes (e.g., abandonment) were also included. The first and second authors then repeatedly independently reviewed the pool—and added, removed, and revised items—in order to ensure that the items were easily understood and evenly sampled the entire IPC. Crucially, throughout the process interpersonal emotions were

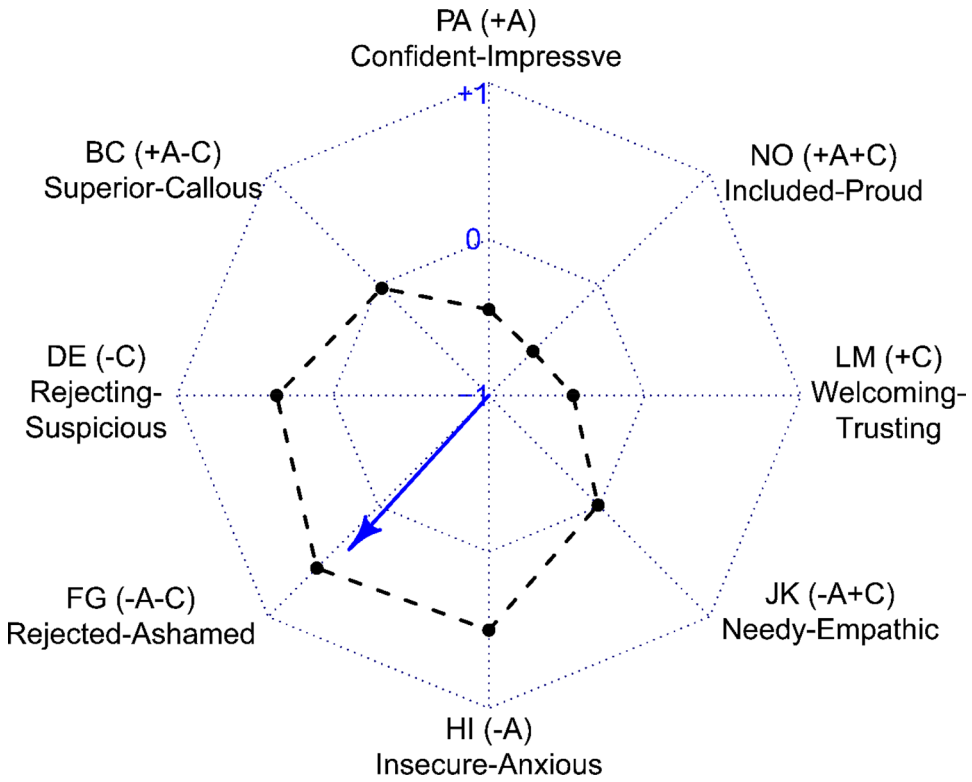

Figure 2. The eight points show the correlations between attachment insecurity and each IEI octant scale. Within each octant, correlations could range from a minimum of -1 (at the circle's midpoint) to a maximum of +1 (at the circumference). The arrow shows the vector sum of the eight points.

operationally defined as items that sensibly completed the following sentence: "When I interact with others or think about myself in relation to others, I tend to feel…". Items judged to complete the sentence in ways that were nonsensical or odd were revised or replaced. After many iterations, the authors agreed on an initial set of 296 items that were judged to be distributed evenly around the IPC (i.e., 37 items per octant).[1]

Study 1 had three aims: (1) to select from the initial pool of 296 items a subset for inclusion in a 64-item IEI; (2) to examine the psychometric and circumplex properties of the IEI; and, (3) to explore the convergent and discriminant validity of the IEI by examining the associations of the IEI scales with existing scales that measure constructs related to interpersonal emotions.

Given the congruence between interpersonal theory and attachment theory, it is reasonable to expect associations between anxiety and weaker agentic feelings, and between avoidance and weaker communal feelings (and thus associations between attachment *security* and both stronger agentic *and* communal feelings). Accordingly, we administered a measure of attachment anxiety and attachment avoidance.

As noted earlier, there are IPC inventories designed to measure a variety of interpersonal dispositions. An individual's dispositions across these different IPC "surfaces" or "levels" tend to be somewhat consistent. Thus, when introducing a new IPC inventory, researchers often evaluate its congruence with existing IPC inventories (e.g., Boudreaux et al., 2018; Locke & Sadler, 2007). For example, it is reasonable to expect positive associations between the communal emotion of *feeling connected* to others, the communal goal of *wanting connection* with others, and the communal problem of *being overly trusting* of others. Therefore, in Study 1, we administered the IEI along with previously validated IPC inventories of interpersonal values and interpersonal problems.

Finally, we administered a measure of self-conscious affect, which includes measures of shame-proneness, guilt-proneness, unconcerned detachment, blaming others, and two forms of pride. To the degree the IEI agency dimension reflects attitudes toward the self, we expected agentic feelings to be negatively associated with shame and guilt and positively associated with pride. To the degree the communal dimension reflects attitudes toward others, we expected uncommunal feelings to be associated with detachment and deflecting blame onto others.

Participants

Sample 1. Undergraduates ($n = 510$) attending the University of Tennessee volunteered to complete an online survey in return for credit toward a research requirement in undergraduate psychology courses. Participants were excluded as likely careless responders if they (a) finished in less than 12 min ($n = 43$) or (b) gave the same answer to 100% of the ECR items or to greater than 90% of the items on the IPC inventories (i.e., the IEI, IIP, or CSIV) ($n = 29$). Excluding those participants, the final sample consisted of 438 participants (322 women, 111 men, 5 missing/other; *M* age =

[1]The original item pool is available upon request.

18.9 years, *SD* = 1.7). Their self-reported ethnicities were: 82.6% White, 5.0% Black, 4.1% Hispanic/Latino, 3.7% Asian, 3.4% Mixed, and 1.1% Other/Missing.

Sample 2. Undergraduates attending the University of Tennessee (*n* = 621) or University of Idaho (*n* = 268) volunteered to complete an online survey in return for extra credit in psychology and communication courses. As a validity check, participants were excluded if they either discontinued the survey before completing the IEI or incorrectly answered more than one of five attention-check questions embedded within the survey. After removing 104 participants who failed the attention check, the final sample size was 785 (540 U-Tennessee, 245 U-Idaho; 530 women, 199 men, 56 missing/other; *M* age = 20.2 years, *SD* = 3.7). Their self-reported ethnicities were: 76.4% White, 5.7% Black, 6.1% Hispanic/Latino, 5.7% Asian, 3.2% Mixed, and 6.4% Other/Missing.

Measures

Descriptive statistics (Ms, SDs, and McDonald's ωs) for all measures except the IEI are reported in Supplemental Table S1.

Interpersonal Emotion Inventory (IEI). Guided by interpersonal theory, our initial pool of 296 items was created to capture interpersonal emotions reflecting each octant of the IPC. As explained below, Sample 1 participants responded to all 296 items whereas Sample 2 participants responded to a reduced set of 170 items. In accord with the definition of interpersonal situations as "direct in-person interactions as well as mental representations of interactions" (Wright et al., 2023, p. 264), the instructions asked participants to "describe how you tend to feel when interacting with others or thinking about yourself in relation to others." Each item began with "When I interact with or think about myself in relation to others, I feel…" followed by a particular feeling such as "loved" or "rejected." Participants indicated how often they experienced that feeling around others on the following rating scale: 0 - *Never feel that way*; 1 - *Seldom feel that way*; 2 - *Sometimes feel that way*; 3 - *Often feel that way*; 4 - *Almost always feel that way*.

***Circumplex Scales of Interpersonal Values* (CSIV; Locke, 2000).** Interpersonal goals or motives reflecting each IPC octant were assessed using the 32-item (four-items per octant) version of the CSIV. The 32-item version has been successfully used in multiple studies (e.g., Fournier et al., 2022; Locke & Heller, 2017). Respondents rated the importance of acting, appearing, or being treated in particular ways in interpersonal situations on scales ranging from *not important to me* (0) to *extremely important to me* (4). Example items include how important is it that "I appear confident" (+A), "I do what they want me to do" (-A), "I feel connected to them" (+C), and "they keep their distance from me" (-C).

***Inventory of Interpersonal Problems-32* (IIP-32; Horowitz et al., 2003).** Interpersonal problems reflecting each IPC octant were assessed using the 32-item (four-items per octant) version of the IIP. Respondents rated how distressed they were by each problem on scales ranging from *not at all* (0) to *extremely* (4). Example items include "It is hard for me to join in on groups" (-A-C) and "I open up to people too much" (+A + C).

***Experiences in Close Relationships Questionnaire-Revised* (ECR-R; Fraley, Waller, & Brennan, 2000).** The ECR-R assesses adult attachment insecurity in the context of intimate relationships. Respondents indicate how much they agree or disagree with each of 36 statements on scales ranging from *strongly disagree* (1) to *strongly agree* (7). The average rating across all 36 statements reflects overall attachment insecurity (ω = .91). Two 18-item subscales assess Anxiety and Avoidance dimensions of attachment insecurity (ωs = .90 and .91, respectively). Sample items are "I'm afraid that I will lose my partner's love" (attachment anxiety) and "I prefer not to show a partner how I feel deep down" (attachment avoidance).

***Test of Self Conscious Affect, Version 3* (TOSCA-3;** Tangney et al. 2000**).** The TOSCA-3 is a scenario-based self-report measure of six self-conscious emotion traits: shame proneness (negative evaluation of the self), guilt proneness (negative evaluation of behaviors that evokes reparative action), externalization (externalizing blame), detachment (minimizing concern or harms caused), alpha pride (pride about self), and beta pride (pride about accomplishments). Respondents rate the extent to which they are likely to feel each emotion in response to each of 16 scenarios on scales ranging from *not likely* (1) to *likely* (5) scales.

Procedure

Participants completed all online questionnaires *via* a FERPA-compliant online platform. Sample 1 participants completed the measures in the following order: TOSCA-3, IIP-32, IEI, ECR-R, CSIV-32. Sample 2 participants completed measures in the following order: IEI, CSIV-32, IIP-32, TOSCA-3, ECR-R. Sample 2 differed from Sample 1 in three additional ways: (1) Sample 2 participants received 170 instead of 296 IEI items, (2) the order of the items within each measure (except the TOSCA) was randomized, and (3) five attention-check items were embedded within the questionnaire.

Study 1 results and discussion

The data and analysis scripts for both Study 1 and Study 2 are posted at https://osf.io/ur3ek/?view_only=87d4d0aaea6340a09fd32cccbae8c0cc. Descriptive statistics (*M*s, *SD*s, and McDonald's ωs) for the ECR, TOSCA, CSIV, and IIP scales are reported in Supplemental Table S1. Descriptive statistics for the IEI scales are reported below.

IEI item selection

To be consistent with other IPC inventories (see Locke, 2011) we aimed for the IEI to comprise eight "octant" scales, each reflecting a distinct 45^0 segment of the interpersonal space shown in Figure 1. To select items for the final 64-item IEI, we used the classical test theory procedures that have

Table 1. Interpersonal emotion inventory example items and descriptive statistics – studies 1 and 2.

			Study 1			Study 2		
Octant	Scale Name	Example Items: *I feel…*	M	*SD*	ω	M	*SD*	ω
(PA) +A	Confident-Impressive	*…self-confident*	2.00	*.71*	.85	1.82	*.79*	.90
(BC) +A-C	Superior-Callous	*…superior*	1.21	*.61*	.74	1.22	*.53*	.64
(DE) -C	Rejecting-Suspicious	*…rejecting of others*	0.91	*.68*	.86	1.08	*.66*	.87
(FG) -A-C	Rejected-Ashamed	*…unwanted*	1.18	*.84*	.91	1.30	*.89*	.94
(HI) -A	Insecure-Anxious	*…self-doubt*	2.03	*.86*	.89	1.83	*.90*	.92
(JK) -A+C	Needy-Empathic	*…like I want to console and comfort others*	2.63	*.60*	.73	2.37	*.51*	.62
(LM) +C	Welcoming-Trusting	*…grateful for others' love and support*	2.70	*.66*	.85	2.43	*.68*	.89
(NO) +A+C	Included-Proud	*…valued*	2.41	*.73*	.89	2.20	*.79*	.93

Note. Study 1 $N = 1223$. Study 2 $N = 278$. Ratings were on 0-to-4 scales. ω = McDonald's omega. The example items are the items with the highest item-total correlation from each octant scale.

been used successfully to create other circumplex inventories (e.g., Boudreaux et al., 2018; Hopwood et al., 2011; Horowitz et al., 2003; Locke, 2000, 2019; Locke & Sadler, 2007; Wiggins et al., 1988). First, to control for individual differences in tendencies to make high or low ratings, responses to the IEI items were ipsatized (by subtracting from each response a participant's mean response across all items). We then conducted a series of iterative principal components analyses (*PCA*) on Sample 1's responses to the initial set of 296 items. We extracted the first two principal components from each PCA and computed item communalities (i.e., each item's squared loadings on those two components). After each PCA we removed an item with the weakest communality within a particular segment of the plane defined by the two components. We repeated this process until the initial set of 296 items was reduced to 170 items that were somewhat evenly spaced around the circumference of the two-dimensional space.[2]

To further refine our inventory, we used the responses from sample 2 participants to the remaining 170 items to conduct a new series of iterative PCAs. By examining item communalities, item-scale correlations, angular dispersion (to maximize breadth of octant coverage and minimize item redundancy), and conformity of the resulting octant scales to a circumplex structure, we eliminated poor-performing items until we obtained the final set of 64 items organized into eight 8-item octant scales detailed in Supplemental Table S2. Table 1 shows an example item from each scale. We named the octant scales based on the general feeling reflected by the items that the PCA located in each half of each octant; for example, we named the "FG" octant *Rejected-Ashamed* because items on the "F" side generally reflected feeling rejected and items on the "G" side generally reflected feeling ashamed.

Table 1 also shows the descriptive statistics and reliabilities for each IEI scale (using the data from both samples). Two patterns are worth noting. First, the mean ratings show that people reported experiencing communal (+C) interpersonal emotions more frequently than uncommunal (-C) interpersonal emotions (i.e., the JK, LM, and NO octant means were above the scale midpoint of "2", while the BC, DE, and FG octant means were below the midpoint). Though this pattern was true of both men and women, there were gender differences. Compared to women, men reported + A-C emotions (BC and surrounding regions) more frequently and -A + C (JK and surrounding regions) emotions less frequently than women (see Supplemental Table S3 for details). Also, while all of the internal consistencies were adequate (ranging from .73 to .91), they were highest in the agentic-and-communal and unagentic-and-uncommunal segments and lowest in the agentic-and-uncommunal and communal-and-unagentic segments.

IEI circular/circumplex structure

We tested how well the IEI fit a circular or circumplex structure using the three-step approach summarized by Richardson et al. (2020, p. 418). Specifically, we tested the degree to which IEI octants (a) shared relatively high communality on a two-component PCA solution, (b) showed a circular ordering (with stronger correlations between closer versus more distant octants), and (c) fit confirmatory circumplex models that specify the distances among octants.

When using IPC inventories, individual differences in response elevation (i.e., an individual's mean rating across *all* items) are typically removed or analyzed separately because they are difficult to interpret and can obscure the stylistic patterns that are the focus of IPC inventories. For example, IEI response elevation could reflect being *more aware of* interpersonal emotions, being *more willing to report* interpersonal emotions, having a *more acquiescent response style*, or some mixture of these and other factors[3]. Accordingly,

[2]IPC inventory development has always relied on PCA (e.g., Boudreaux et al., 2018; Hopwood et al., 2011; Wiggins, 1979) because (a) the aim is to produce octant scales from which two orthogonal components can be computed as weighted sums and (b) circumplex models are indeterminate as to whether those two components are simply useful summaries of the octant scores versus latent constructs that determine the octant scores. We were encouraged to test the robustness of the PCA approach by comparing it with the factor analysis approach often used in developing other types of measures. Subjecting the final set of 64 IEI items to both PCAs (using ipsatized scores) and Principal Axis Factoring (using un-ipsatized scores and oblimin rotation) showed that both approaches yielded very similar item loadings: The Tucker's Congruence Coefficients were rcs = .95 and .98 in Study 1 and rcs = .99 and .98 in Study 2. (Complete tables of loadings and details of the analyses are reported in the "Reviewer Requested Supplemental Analyses" file at this project's abovementioned OSF site).

[3]To provide some basis for interpreting IEI response elevations, we checked the associations between IEI response elevation and response elevations on each of the other measures (prior to reverse-scoring any items). In Study 1, an individual's IEI elevation (mean rating) was positively correlated with response elevation on the ECR (r = .34), TOSCA (r =.29), CSIV (r = .35), and IIP (r = .18), all $ps < .001$. IEI response elevation was also positively correlated with response elevations on the measures

Table 2. Ipsatized IEI scales' loadings on communal and agentic principal components – studies 1 and 2.

	Study 1			Study 2		
Octant	X	Y	h^2	X	Y	h^2
(PA) +A	.18	.91	.86	.26	.90	.94
(BC) +A-C	−0.63	.64	.81	−0.56	.72	.91
(DE) -C	−0.90	−0.08	.82	−0.90	−0.23	.93
(FG) -A-C	−0.63	−0.68	.86	−0.62	−0.71	.94
(HI) -A	−0.19	−0.90	.85	−0.30	−0.88	.93
(JK) -A+C	.72	−0.55	.82	.72	−0.56	.91
(LM) +C	.92	.15	.87	.90	.30	.95
(NO) +A+C	.67	.65	.87	.70	.66	.96

Note. Study 1 $N = 1223$. Study 2 $N = 278$. The loadings reflect Procrustean rotation aligning the first two principal components with the theoretical orientations of the communal (X) and agentic (Y) dimensions; the h^2 (communality) is the sum of the squared loadings on the two components.

before performing the analyses (other than the confirmatory circumplex analyses) reported below, we ipsatized the IEI, CSIV, and IIP scale scores by subtracting response elevation from each octant scale score.

First, we conducted a PCA on the IEI scale intercorrelations reported in Supplemental Table S4. The first two components explained 84.4% of the variance (following Procrustes rotation, communal axis: 43.6%; agentic axis: 40.8%). The octant loadings on these principal components revealed the expected sinusoidal pattern (see Table 2): On the communal dimension, LM and (to a lesser degree) adjacent octants had positive loadings, whereas DE and (to a lesser degree) adjacent octants had negative loadings. On the agentic dimension, PA and (to a lesser degree) adjacent octants had positive loadings, whereas HI and (to a lesser degree) adjacent octants had negative loadings. The plot of these loadings in Supplemental Figure S1 shows that the IEI scales conformed to an approximately circular pattern. (A PCA on the un-ipsatized octant scores yielded similar results; see Supplemental Table S5 for details).

Next, we formally tested whether the octant scales fit a circular model by conducting randomization tests of hypothesized order relations using the program RANDALL (Tracey, 2000). A circular model makes 288 predictions about the relative magnitudes of correlations among octant scales. Correlations between adjacent octants should exceed correlations between orthogonal octants, which in turn should exceed correlations between octants separated by two octants, which exceed correlations between opposite octants. The proportion of predictions met minus the proportion violated yields a correspondence index (*CI*) that can be interpreted as a rank-order correlation coefficient ranging from −1.0 (all predictions violated) to 1.0 (perfect fit). When evaluating circumplex measures, *CI*s > .8 (indicating 90% of predictions were met) are considered to indicate very good fit and *CI*s > .9 (indicating 95% of predictions were met) are considered to indicate excellent fit. In the current data, all (100%) of the 288 predictions were met, *CI* = 1.0, indicating perfect fit. (The correlations among un-ipsatized octant scores also showed extremely good fit, with 284 (99%) of predictions met, *CI* = .972, $p < .0001$).

Finally, we tested whether the octant scales fit a strict *circumplex* model by testing how well the observed scale intercorrelations conform to the ideal sinusoidal pattern of correlations expected if the scales were equally spaced around the circle's circumference and equally distant (i.e., equal communalities) from the circle's center (Fabrigar, Visser, & Browne, 1997). The tests were performed *via* confirmatory covariance structural modeling (Browne, 1992) using the R package CircE (Grassi, Luccio, & Di Blas, 2010). Such tests cannot be conducted on ipsatized scores; instead, they were conducted on the intercorrelations among the *raw* octant scores shown in Supplemental Table S5.

When fitting restrictive circumplex models, a *root mean square error of approximation* (*RMSEA*) ≤ 0.13 along with a *comparative fit index* (*CFI*) ≥ 0.90 or *adjusted goodness-of-fit index* (AGFI) ≥ .85 are considered to indicate adequate fit (Gurtman & Pincus, 2003; Rogoza et al., 2021). The current data showed acceptable fit to a model which assumes equal communalities (*RMSEA* = 0.087, 90% confidence interval = [0.076, 0.099], *CFI* = 0.978, *AGFI* = 0.934), a model which assumes equal spacings (*RMSEA* = 0.101 [0.090, 0.113], *CFI* = 0.970, *AGFI* = 0.913), and the most restrictive "circulant" model which assumes both equal communalities and equal spacings (*RMSEA* = 0.090 [0.080, 0.100], *CFI* = 0.967, *AGFI* = 0.931). In sum, the IEI scales met the criteria for a circulant circumplex model.

Convergent and discriminant validity of the IEI

Having established the IEI's circumplex properties, we investigated its convergent and discriminant validity by examining its associations with the ECR, TOSCA, CSIV, and IIP.

Attachment (ECR-R)

Table 3 (first row, left side) shows the correlations between the IEI scales and attachment insecurity (the average of a person's avoidant and anxious attachment scores). Insecurity correlated positively with -A-C (FG and adjacent) emotions and negatively correlated with +A+C (NO and adjacent) emotions. Figure 2 displays these correlations on the IPC. Within each octant, more negative correlations appear closer to the midpoint of the circle and more positive correlations appear closer to the circumference. Thus, the correlations for attachment insecurity are closer to the center (i.e., more negative) in the agentic and communal regions and closer to the circumference (i.e., more positive) in the unagentic and uncommunal regions.

Moreover, as we circumnavigate the circle, the correlations follow a sinusoidal wave pattern, with the correlations progressively increasing as they approach a particular octant (e.g., FG) and progressively decreasing as they near the antipodal octant (e.g., NO). To the degree that a profile of correlations fits this pattern, those correlations can be

administered in Study 2—i.e., the Rosenberg Self-Esteem Scale (r = .27), Positive and Negative Affect Schedule (r =.51), Authentic and Hubristic Pride Scales (r = .23), and Five-Factor Narcissism Inventory (r = .31), all $ps < .001$. These positive associations with every measure (including those containing positive/desirable and negative/undesirable items in approximately equal proportions) suggests that IEI response elevation to some degree reflects a general response style whose scope exceeds any specific dispositions.

Table 3. Correlations and summary parameters for relations of the IEI with the ECR-R and TOSCA-3 scales.

	Correlations with IEI Scales								Summary Vector Parameters							
Scale	(PA) +A	(BC) A-C	(DE) -C	(FG) -A-C	(HI) -A	(JK) -A+C	(LM) +C	(NO) +A+C	Communal Vector *[CI]*		Agentic Vector *[CI]*		Vector Angle *[CI]*		Vector Length *[CI]*		R^2
ECR-R Scales																	
Insecure	−0.45	−0.03	.36	.56	.50	−0.01	−0.46	−0.60	−0.41	*[−0.45, −0.37]*	−0.45	*[−0.48, −0.40]*	227.7°	*[223.7°, 231.5°]*	.60	*[.56, .64]*	.994
Avoidant	−0.11	.22	.39	.30	.13	−0.21	−0.41	−0.35	−0.39	*[−0.44, −0.35]*	−0.10	*[−0.15, −0.04]*	194.1°	*[186.5°, 201.6°]*	.41	*[.36, .45]*	.995
Anxious	−0.43	−0.24	.06	.39	.48	.19	−0.16	−0.39	−0.12	*[−0.17, −0.06]*	−0.44	*[−0.48, −0.39]*	255.3°	*[248.7°, 261.6°]*	.45	*[.41, .50]*	.992
TOSCA Scales																	
Externalization	.02	.23	.22	.17	.01	−0.24	−0.27	−0.16	−0.26	*[−0.32, −0.21]*	.03	*[−0.03, .08]*	173.9°	*[162.5°, 185.5°]*	.26	*[.21, .32]*	.981
Guilt	−0.20	−0.42	−0.31	−0.04	.22	.45	.30	.02	.32	*[.27, .37]*	−0.25	*[−0.29, −0.20]*	322.4°	*[315.0°, 329.8°]*	.40	*[.36, .44]*	.989
Shame	−0.41	−0.27	−0.05	.28	.43	.28	−0.06	−0.27	.00	*[−0.05, .05]*	−0.40	*[−0.45, −0.36]*	269.6°	*[262.5°, 277.4°]*	.40	*[.36, .45]*	.990
Detachment	.22	.25	.10	−0.05	−0.19	−0.25	−0.11	.04	−0.13	*[−0.18, −0.07]*	.21	*[.16, .26]*	121.1°	*[108.5°, 134.8°]*	.24	*[.20, .29]*	.989
Alpha Pride	.17	.04	−0.13	−0.14	−0.09	.00	.08	.10	.09	*[.03, .14]*	.11	*[.06, .16]*	52.3°	*[32.4°, 72.6°]*	.14	*[.08, .20]*	.909
Beta Pride	.11	−0.04	−0.12	−0.10	−0.02	.04	.07	.07	.09	*[.04, .15]*	.05	*[−0.00, .10]*	28.6°	*[357.5°, 56.2°]*	.10	*[.05, .16]*	.863

Note. *Ns* = 1183 for the ECR scales and 1192 for the TOSCA scales. Correlations > .10 are significant at $p < .001$. *CI* = Confidence intervals computed using resampling procedures implemented by the *circumplex* package for R (Girard, Zimmermann, & Wright, 2018).

summarized by a single vector (Gurtman & Pincus, 2003). We can quantify how well a profile of correlations conforms to a wave function *via* a goodness-of-fit index, R^2, that ranges from 0 to 1, with adequate fit defined as R^2s > .7 and good fit as R^2s > .8 (Zimmermann & Wright, 2017). Interested readers can find formulas for computing R^2 (plus the other "summary vector parameters" reported in Table 3) in the footnote below.[4] As Table 3 (rightmost column) shows, the correlations between insecure attachment and the IEI octant scales fit a wave function almost perfectly (R^2 > .99), which means they can be described almost entirely by one vector. The arrow in Figure 2 shows that vector projected onto the IEI circumplex, and the righthand side of Table 3 shows the vector's size and angle.

The vector's *angle* (or *angular displacement*) shows the general *direction* of the association between attachment insecurity and interpersonal emotions. It also indicates that greater attachment insecurity was associated with weaker agentic-and-communal (+A+C) emotions and stronger unagentic-and-uncommunal (-A-C) emotions. The vector's *length* (or *amplitude*) indicates how *intensely and unequivocally* the construct being measured is tied to relatively high scores (i.e., relatively frequent emotions) in one circumplex region and relatively low scores (i.e., relatively infrequent emotions) in the opposite region. For example, if attachment insecurity had only weak associations with interpersonal emotions or had comparably positive associations with every type of interpersonal emotion, then its summary vector would have been much shorter. Finally, Table 3 also shows how far the summary vector projects along the horizontal communal axis and the vertical agentic axis. Breaking the summary vector into its communal and agentic components facilitates its interpretation, especially when comparing and contrasting results across different measures and studies.

The ECR-R comprises two subscales measuring two types of attachment insecurity: anxious and avoidant. Since the avoidance and anxiety scales were positively correlated ($r[1181] = 0.25$), associations between IEI scales and one attachment dimension may reflect variance shared with the other attachment dimension. In order to isolate the distinctive correlates of avoidance or anxiety, we computed residual avoidance controlling for variance shared with anxiety and residual anxiety controlling for variance shared with avoidance (see Chopik, Edelstein, & Fraley, 2013). Table 3 (rows 2-3, left side) shows the correlations between residual anxiety or avoidance and each of the IEI scales.

Attachment avoidance correlated positively with uncommunal (DE and adjacent) emotions and negatively with communal (LM and adjacent) emotions, while attachment anxiety correlated positively with unagentic (HI and adjacent) emotions and negatively with agentic (PA and adjacent) emotions. Figure 3 summarizes the results by plotting the endpoints of the summary vectors for avoidant, anxious, and overall insecure attachment. The figure highlights that, while general insecure attachment is associated with both less agentic and less communal emotions, avoidant attachment is particularly associated with weaker communal feelings and anxious attachment is particularly associated with weaker agentic feelings. Other studies that administered attachment measures alongside IPC measures of traits and values have produced analogous findings (e.g., Gallo et al., 2003; van Geel & Houtmans, 2022).

Self-conscious emotions (TOSCA)

Table 3 (lower left) shows the correlations between each of the TOSCA scales and the IEI scales. Table 3 (lower right) shows the communal, agentic, and overall vectors for each TOSCA scale. Figure 3 plots the endpoints of the overall vectors on the interpersonal emotions circumplex. As Figure 3 highlights, shame-proneness was associated with "-A" emotions, guilt-proneness was associated with "-A+C" emotions, externalization was associated with "-C" emotions, detachment was associated with "+A-C" emotions, and pride was associated with "+A+C" emotions.

The placements of TOSCA scales on the emotions circumplex made theoretical sense. However, the strength of the associations (i.e., the vector lengths) varied, with shame and guilt showing the strongest associations with

[4]Communal Summary Vector = (.25(LM − DE + .707(JK + NO − BC − FG))), and Agentic Summary Vector = (.25(PA − HI + .707(BC + NO − JK − FG))), where PA is the variable's correlation with the PA octant, BC the correlation with the BC octant, etc. Vector Length = $SQRT(X^2 + Y^2)$, where X is the communal summary vector and Y and the agentic summary vector. $R^2 = (4/7 \times (VL/SD)^2)$, where *VL* is the vector length and *SD* is the standard deviation of the eight correlations (e.g., for insecure attachment, the *SD* of the first eight numbers in the first row of Table 3).

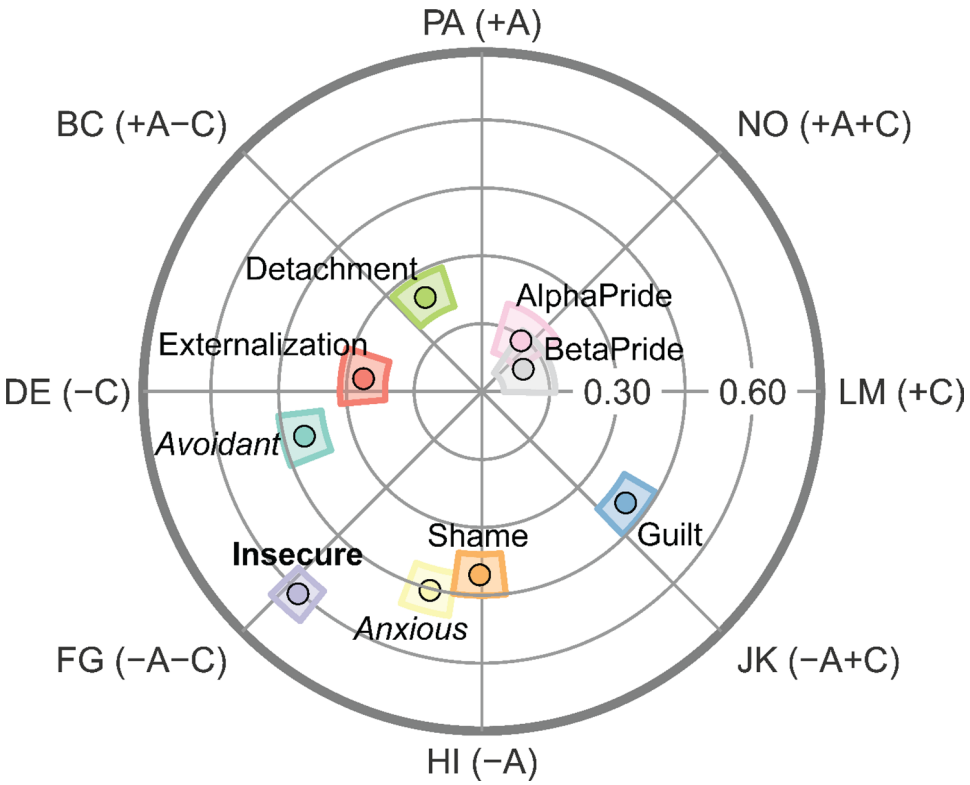

Figure 3. Associations of interpersonal emotions with the attachment dimensions measured by the *Experiences in Close Relationships* scale and dispositions measured by the *Test of Self-Conscious Affect*. The scale ranges from $r = 0$ (at the center) to $r = 0.75$ (at the circumference). Dots represent correlations averaged across segments and tinted regions represent bootstrapped 95% confidence intervals (computed/plotted using circumplex package for R; Girard et al., 2018).

interpersonal emotions and the pride scales showing the weakest. One reason the TOSCA scales had different vector lengths was because the TOSCA scales had different internal reliabilities. As shown in Supplemental Table S1, the shame and guilt scales had good reliabilities (ωs = .82 and .81), the externalization and detachment scales had adequate reliabilities (ωs = .76 and .72), and the alpha-pride and beta-pride scales had weak reliabilities (ωs = .57 and .50).

Interpersonal values (CSIV)

The CSIV and IIP are circumplex inventories whose structures mirror that of the IEI. Checking the convergence of the IEI with another circumplex inventory is a compelling way to investigate validity because it enables us to evaluate the convergent and divergent validity of each scale simultaneously. Specifically, agentic and communal interpersonal dispositions should tend to (averaging across individuals) converge across "IPC surfaces" (Hopwood et al., 2011).

Supplemental Table S6 shows the correlations of the CSIV octant scales with the IEI octant scales.[5] Correlations between scales from the same IPC octant (for example, between CSIV "+A" and IEI "+A") ranged from +.34 to +.55. Correlations between CSIV octants and their antipodal IEI octant scales (for example, between CSIV "+A" and IEI "-A") ranged from −0.31 to −0.50. Moreover, as one moves along each row the correlations fit the sinusoidal pattern expected of circumplex profiles, with weak associations between orthogonal scales (e.g., between CSIV "+A" and either IEI "+C" or IEI "-C"). The positive correlations between scales from the same octant and negative correlations between scales from opposing octants provide evidence of convergent validity. The weak associations between orthogonal scales provide evidence of discriminant validity.

Supplemental Table S6 shows the agentic and communal summary vectors for each CSIV scale, and Figure 4 plots the endpoints of the summary vectors on the interpersonal emotions circumplex. If there was perfect convergence between inventories, then each CSIV scale summary vector would align with the midpoint of the corresponding IEI octant (as is the case for the CSIV DE scale in Figure 4). The convergence (albeit imperfect) was very high, with the average divergence between the observed vector angle and the octant midpoint being 11.6 degrees (i.e., approximately 1/4 of an octant).

Interpersonal problems (IIP)

Supplemental Table S7 shows the correlations between the IIP and IEI octant scales. Correlations between scales from the same IPC octant ranged from +.21 to +.50. Correlations between IIP octants and the antipodal IEI octant scale ranged from −0.17 to −0.54. The correlations within each row follow the sinusoidal pattern expected of circumplex profiles (e.g., with orthogonal scales showing weak

[5]For illustrative purposes the correlations and summary vectors for the ECR-R and TOSCA were reported in the main manuscript, but for brevity that information is reported in supplemental tables for the other validation measures.

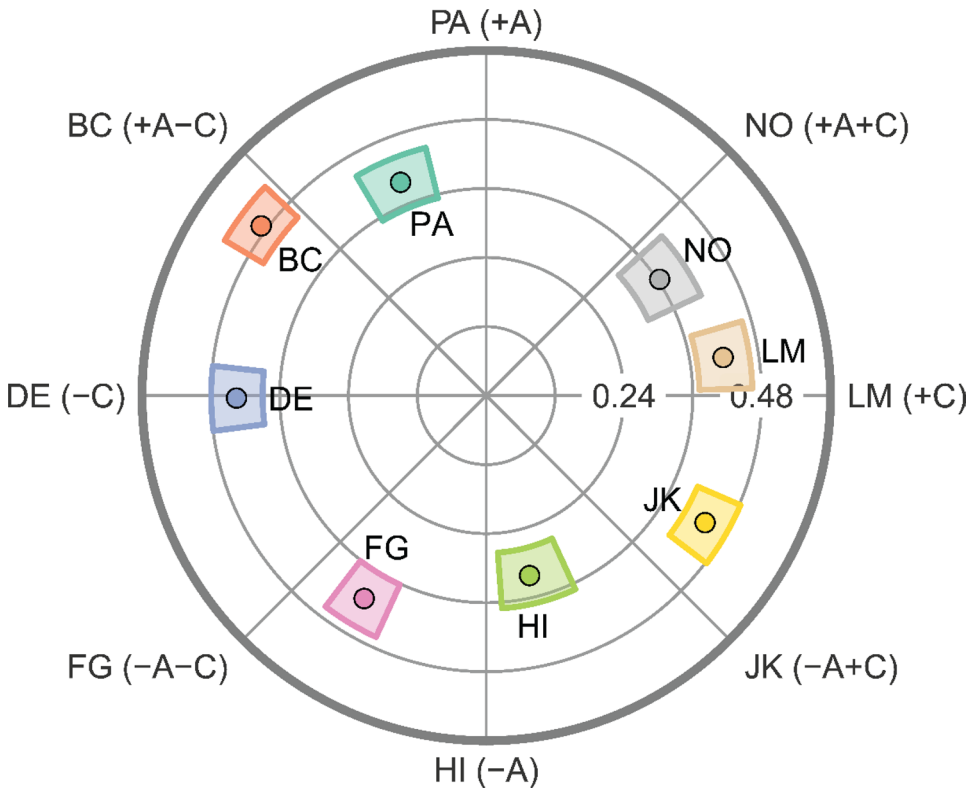

Figure 4. Associations between interpersonal emotions and interpersonal values. The scale ranges from $r = 0$ (at the center) to $r = 0.6$ (at the circumference). Dots represent correlations averaged across segments and tinted regions represent bootstrapped 95% confidence intervals.

correlations, $|r|s \leq .17$). The positive correlations between scales from the same octants and negative correlations from opposing octants provide evidence of convergent validity. The weak associations between orthogonal scales provide evidence of discriminant validity.

Supplemental Table S7 shows the agentic and communal summary vector parameters for each IIP scale. Figure 5 plots the endpoints of the summary vectors on the interpersonal emotions circumplex. The IIP and IEI were not as closely aligned as the CSIV and IEI, but still showed good alignment. The divergence between the observed vector angle and the octant midpoint was 14.7 degrees (i.e., approximately 1/3 of an octant), with the IIP's -A scale showing the poorest alignment. The weaker alignment may reflect the psychometric limitations of the IIP in this sample, where it showed relatively poor fit to the "equal spacing equal communality" circumplex (*RMSEA* = .143, *AGFI* = .837). By comparison the CSIV's fit was *RMSEA* = .093, *AGFI* = .926; and as noted earlier, the IEI's fit was *RMSEA* = .089, *AGFI* =.932.

In any case, imperfect convergence across IPC "surfaces" is expected because each IPC inventory assesses a different construct. For example, the IEI assesses the *frequency* of each feeling, the CSIV assesses the *importance* of each stance, and the IIP assesses the *distress* each behavior causes. Indeed, one reason to use "multisurface" assessment (i.e., administer multiple IPC inventories) is that divergences in profiles across different inventories can themselves be informative, as shown in both nomothetic research (Kehl et al., 2021) and clinical case studies (Dawood & Pincus, 2016).

Study 2: Validation sample

The aim of Study 2 was to evaluate the reliability, circular structure, and validity of the IEI-64 using a non-university sample and a different set of validation measures. All materials, hypotheses, data collection procedures, and analyses were preregistered at https://osf.io/ur3ek/?view_only=87d4d0aaea6340a09fd32cccbae8c0cc. The validation measures included measures of self-esteem, authentic and hubristic pride, positive and negative affect, and various facets of narcissism.

First, we assessed basic positive and negative affects. Previous studies that mapped the basic affects onto the interpersonal circumplex of behavioral traits consistently found positive affect was associated with the agentic and moderately communal "OP" segment of the IPC and negative affect was associated with the unagentic and moderately uncommunal "GH" segment of the IPC (Gurtman, 1991; Yik & Russell, 2004). Accordingly, we expected similar associations between basic positive and negative affect and the circumplex of interpersonal emotions.

Second, we assessed self-esteem because self-esteem has been defined as the relative balance of positive versus negative feelings about the self, including the relative prominence of dispositional pride versus shame (Scheff, 1988). Previous research found various measures of self-esteem to be associated with the agentic (+A) and agentic-and-communal (+A + C) octants of an IPC measure of interpersonal traits (Zeigler-Hill, 2010), and in particular found the measure we will use in Study 2 to be most associated with the + A + C (NO) octant. We expected to find similar associations between self-esteem and the agentic (confident-impressive)

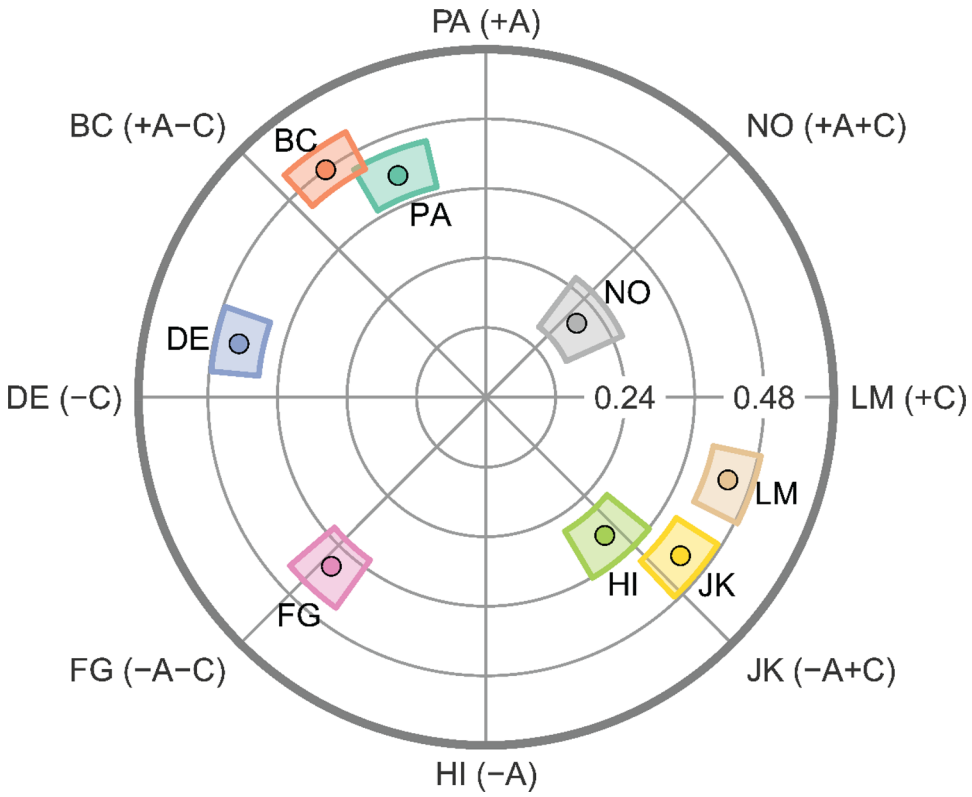

Figure 5. Associations between interpersonal emotions and interpersonal problems. The scale ranges from $r = 0$ (at the center) to $r = 0.6$ (at the circumference). Dots represent correlations averaged across segments and tinted regions represent bootstrapped 95% confidence intervals.

and agentic-and-communal (included-proud) regions of the IEI.

Third, we assessed authentic and hubristic pride, which are associated with the status-maintaining strategies of prestige and dominance, respectively. Previous research has shown that both facets of pride are positively associated with IPC agency, but whereas IPC communion is positively associated with authentic pride, it is negatively associated with hubristic pride (Cheng, Tracy, & Henrich, 2010; Körner, Heydasch & Schütz, 2023). As such, we expected authentic pride to be associated with agentic-and-communal IEI emotions, and hubristic pride to be associated with agentic-and-uncommunal IEI emotions.

Fourth, we assessed narcissistic personality traits because they are closely linked with the dynamics of pride and shame in both clinical theory and empirical research. Over the decades the numerous studies that have investigated the IPC correlates of narcissism have suggested that *on average* narcissism is associated with the high-agency low-communion quadrant of the IPC. However, the precise locations have varied across studies, in part because of the different ways narcissism has been conceptualized and measured. Therefore, we will specifically focus on narcissism as it is conceptualized and operationalized by the five-factor narcissism inventory (FFNI; Packer West et al., 2021) employed in Study 2.

The FFNI assesses the grandiose and vulnerable presentations of narcissism along with three empiricially-derived factors—antagonism, extraversion, and neuroticism (Crowe et al., 2019). Narcissistic antagonism is characterized by entitled, exploitative, antisocial, aggressive attitudes and behaviors. Narcissistic/agentic extraversion is characterized by grandiosity, social dominance, and craving attention and veneration. Narcissistic neuroticism is characterized by sensitivity to social approval and disapproval. The grandiose and vulnerable narcissistic dimensions are both characterized by antagonistic features, but the grandiose presentation also encompasses agentic extraversion (e.g., being socially dominating) while the vulnerable presentation also encompasses neuroticism (e.g., being hypersensitive). In a previous study that correlated the FFNI scales with an IPC measure of interpersonal traits (see Weiss et al., 2019), antagonism was associated with uncommunal traits, extraversion was associated with agentic traits, neuroticism was associated with unagentic traits, grandiose narcissism was associated with uncommunal-and-agentic traits, and vulnerable narcissism was associated with uncommunal-and-unagentic traits. We expected to find similar associations with the IEI.

Hypotheses

We preregistered the following 10 hypotheses. Each hypothesis predicts the specific 67.5 degree ($3/16^{th}$) arc of the IPC within which will be located the endpoint of the vector summarizing the associations between that measure and the IEI.

H1: Self-Esteem vector endpoint will be within the 45.0—112.5 degree (O-P-A) segment.

H2a: Authentic Pride vector endpoint will be within the 45.0—112.5 degree (N-O-P) segment.

H2b: Hubristic Pride vector endpoint will be within the 90—157.5 degree (A-B-C) segment.

H3a: PANAS Positive vector endpoint will be within the 45.0—112.5 degree (O-P-A) segment.

H3b: PANAS Negative vector endpoint will be within the 202.5—270 degree (F-G-H) segment.

H4a: FFNI Grandiose Narcissism vector endpoint will be within the 90—157.5 degree (A-B-C) segment.

H4b: FFNI Vulnerable Narcissism vector endpoint will be within the 180—247.5 degree (E-F-G) segment.

H4c: FFNI Agentic vector endpoint will be within the 67.5—135 degree (P-A-B) segment.

H4d: FFNI Antagonism vector endpoint will be within the 112.5—180 degree (B-C-D) segment.

H4e: FFNI Neuroticism vector endpoint will be within the 225—292.5 degree (G-H-I) segment.

Participants

Participants who were at least 18 years old, English-speaking, and residing in the United States were recruited and compensated *via* the prolific.com platform. Data collection continued until 150 men and 150 women had completed the survey. Following Prolific guidelines, participants were paid for their participation. Participants were excluded if they incorrectly answered any of three attention-check questions embedded within the survey.[6] After removing 22 participants who failed the attention check, the final sample size was 278 (144 women, 134 men; *M* age = 37.8 years, *SD* = 12.0, *range* = 18 - 79). Their self-reported ethnicities were: 70.5% White, 9.4% Asian, 8.6% Black, 6.5% Hispanic/Latino, 4.7% Mixed, and 0.4% Native American.

Measures

***Interpersonal Emotion Inventory* (IEI).** The IEI developed in Study 1 comprises eight 8-item octant scales. Respondents indicated how often they experienced each of 64 feelings on scales ranging from *never feel that way* (0) to *almost always feel that way* (4).

***Rosenberg Self-Esteem Scale* (RSES;** Rosenberg, 1965**).** The 10-item RSES is the most widely used measure of global self-esteem. Respondents indicated how much they agreed with each statement on scales ranging from *strongly disagree* (0) to *strongly agree* (3).

***Positive and Negative Affect Schedule* (PANAS;** Watson et al., 1988**).** The 20-item PANAS comprises a 10-item positive affect scale (PANAS-P) and a 10-item negative affect subscale (PANAS-N). Respondents indicated how much they felt each of the 20 emotions over the past week on scales ranging from *not at all* (0) to *extremely* (4).

Authentic and Hubristic Pride Scales (AHPS; Tracy & Robins, 2007). The 14-item AHPS comprises a 7-item Authentic pride subscale (e.g., successful) and a 7-item Hubristic Pride subscale (e.g., egotistical). Respondents indicated how much they generally felt that way on scales ranging from *not at all* (0) to *extremely* (4).

***Five-Factor Narcissism Inventory "super-short form"* (FFNI-SSF;** Packer West et al., 2021**).** The 15-item FFNI-SSF measures grandiose and vulnerable narcissism and three empirically derived lower order factors: Agentic Extraversion, Antagonism, and Neuroticism. Respondents indicated how much they agreed with each statement on scales ranging from *disagree strongly* (0) to *agree strongly* (4).

Procedure

Participants completed an online questionnaire. The order of the items *within* each measure was randomized. First, participants completed the IEI. Second, they completed in random order the other four measures (the RSES, PANAS, AHPS, and FFNI-SSF). Finally, participants reported their age, gender, and ethnicity.

Results and discussion

Since the survey required participants to answer every item before moving to the next page of the survey, there was no missing data within measures. We did not remove data outliers.

Descriptive statistics (*M*s, *SD*s, and ωs) for the validation scales are reported in Supplemental Table S8. Table 1 shows the descriptive statistics and reliabilities for each IEI scale. Three patterns are worth noting. First, six of the octant scales showed excellent internal consistencies (ωs ranging from .87 to .93), but the internal consistencies of the BC and JK scales were poorer (ωs = .64 and .62). Second, as in Study 1, both men and women reported experiencing communal (+C) interpersonal emotions more frequently than uncommunal (-C) interpersonal emotions. Third, there were gender differences similar to those observed in Study 1. Compared to women, men reported uncommunal-and-agentic (BC) emotions more frequently and communal-and-unagentic (JK and neighboring octants) emotions less frequently (see Supplemental Table S9). Interestingly, other IPC inventories have produced this same pattern of gender differences (Gurtman & Lee, 2009; Lippa, 2001).

IEI circumplex structure

We tested circumplex fit using the same procedures as in Study 1. Before performing these and other analyses reported below (except the confirmatory covariance modeling), we ipsatized the IEI octant scale scores by subtracting an individual's overall response elevation from each octant scale score.

Supplemental Table S4 reports the correlations between the IEI ipsatized octant scale scores. A PCA on these correlations showed the first two components explained 87.2% of the variance (following Procrustes rotation, communal axis: 43.6%; agentic axis: 43.7%). Loadings on these principal components revealed the expected sinusoidal pattern (see Table 2). On the communal dimension, LM and (to a lesser

[6]The attention-check questions are highlighted in the materials posted with the preregistration. None of the participants who passed the attention checks failed the other preregistered exclusion criteria.

degree) adjacent octants had positive loadings, whereas DE and (to a lesser degree) adjacent octants had negative loadings. On the agentic dimension, PA and (to a lesser degree) adjacent octants had positive loadings, whereas HI and (to a lesser degree) adjacent octants had negative loadings. The plot of these loadings in Supplemental Figure S2 shows that the IEI scales conformed to a generally circular pattern. Of note, however, the scales were unequally spaced, with especially wide gaps around the BC and JK octants. The BC and JK octants also showed the weakest communalities. A PCA on the un-ipsatized octant scores yielded similar results; see Supplemental Table S10 for details.

Next, we tested whether the octant scales fit a circular model by conducting randomization tests of hypothesized order relations using the program RANDALL (Tracey, 2000). In the current data, 271 (94%) of the 288 predictions were met, *Correspondence Index* = .882, $p < .001$, indicating very good fit. Un-ipsatized octant scores produced similar results: 267 (93%) of predictions met, *CI* = .854, $p < .001$.

Finally, we subjected the un-ipsatized octant scores' intercorrelations to confirmatory covariance structural modeling. If adequate fit as an *RMSEA* ≤ 0.13 and a *CFI* ≥ 0.90 or AGFI ≥ .85, then in the current data the IEI showed inadequate or barely adequate fit to a model which assumes equal communalities (*RMSEA* = .153, 90% CI = [.129,.179], *CFI* = 0.943, *AGFI* = 0.809), a model which assumes equal spacings (*RMSEA* = .173 [.149, .198], *CFI* = 0.927, *AGFI* = 0.761), or a model which assumes both equal communalities and equal spacings (*RMSEA* = 0.151 [0.130, 0.172], *CFI* = 0.922, *AGFI* = 0.820). Fit was poorest to models requiring equal spacing.

In summary, the IEI showed very good fit to a two-dimensional PCA and to a circular ordering model, but poorer fit to the more restrictive circumplex or circulant models that require the scales to be equally distant from each other and from the model "midpoint." One reason was that the JK and BC octants had relatively weak communalities and were relatively distant from adjacent octants. Similar patterns were evident but less pronounced in Study 1.

Convergent and discriminant validity of the IEI

Supplemental Table S11 shows the correlations between the IEI octant scales and each of the other measures. The rightmost column shows the goodness-of-fit index, R^2, for each profile of correlations. The R^2s ranged from .933 to .992, meaning that all of the profiles showed an excellent fit to a circumplex wave function and thus could be effectively summarized by a single vector. Supplemental Table S11 also shows the communal, agentic, and overall summary vectors for each validation scale. Crucially, comparing the observed locations of the vectors with the expected locations of the summary vectors showed that all of the preregistered hypotheses were supported.

Figure 6 plots the endpoints of the overall vectors on the interpersonal emotions circumplex. The results for self-esteem and authentic pride were indistinguishable, which is

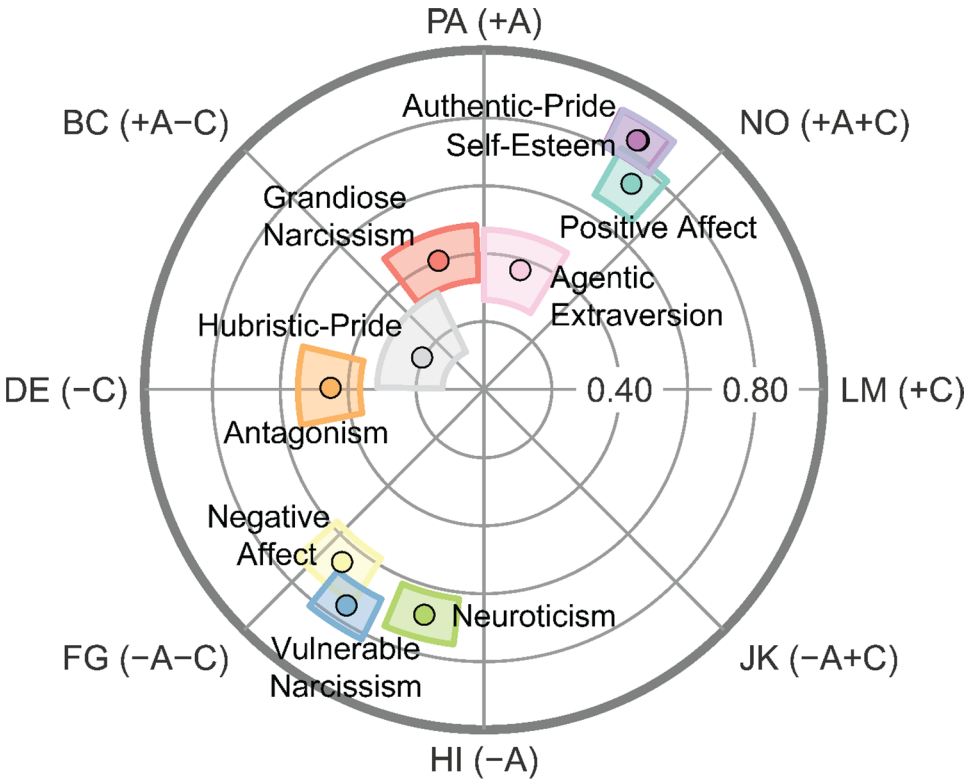

Figure 6. Associations between interpersonal emotions and self-esteem, affect, authentic and hubristic pride, and components or subtypes of narcissism. The scale ranges from $r = 0$ (at the center) to $r = 1$ (at the circumference). Dots represent correlations averaged across segments and tinted regions represent bootstrapped 95% confidence intervals.

unsurprising given that the correlation between the two measures was +0.85. Both of their summary vectors pointed to the middle of the "O" (agentic and somewhat communal feelings) segment of the circumplex. By contrast, hubristic pride's vector pointed to the "C" segment (uncommunal and somewhat agentic feelings) segment. The positive affect vector pointed to approximately the same "O" segment as the self-esteem and authentic pride scales. The negative affect vector pointed to the center of the opposite "G" (unagentic and somewhat uncommunal feelings) segment. Supplemental Table S12 reports the results for each individual PANAS item and showed that the items clustered in the same regions as the aggregated scales.

Turning to the FFNI results, Figure 6 shows whereas the grandiose narcissism vector pointed to the "A" (highly agentic and slightly uncommunal feelings) segment, the vulnerable narcissism vector pointed to the center of the "G" (unagentic and somewhat uncommunal feelings) segment. Regarding the three factors of the "trifurcated model of narcissism", the agentic extraversion vector pointed to the "P" (highly agentic and slightly communal feelings) segment, the antagonism vector pointed toward the "DE" (very uncommunal feelings) segment, and the neuroticism vector pointed toward the middle of the "H" (highly unagentic and slightly uncommunal feelings) segment. Interestingly, there was a subtle but statistically significant difference in the hypothesized direction between the locations of the "Negative Affect" and "Neuroticism," with "Negative Affect" pointing to the "G" segment and "Neuroticism" pointing to the slightly more unagentic and less uncommunal "H" segment.

IEI incremental validity

In order to provide preliminary evidence regarding the incremental validity of the IEI relative to another affect measure, the PANAS, we added the following unregistered analyses. Specifically, we ran hierarchical multiple regressions on each validity scale (i.e., the self-esteem, pride, and narcissism scales), including only the PANAS-P and PANAS-N scales in Step 1, and then adding the IEI Communal and Agentic summary vectors in Step 2. Table 4 reports the results. After controlling for variance explained by the PANAS, the IEI explained significant additional unique variance in each of the validity scales (average ΔR2 = 15%, range = 6% – 26%). Thus, the agentic and communal emotions assessed by the IEI exhibited incremental validity relative to the PANAS. However, because the PANAS only assesses affective valence, future research should evaluate the incremental validity of the IEI while controlling for both valence and arousal.

General discussion

This article describes the development and psychometric properties of the Interpersonal Emotion Inventory, a self-report measure of interpersonal emotions associated with each segment of the IPC. The IEI was designed to complement existing affect measures that primarily assess *intrapersonal* emotions and IPC measures that assess *non*-emotional dispositions such as motives, behaviors, and problems.

IEI psychometrics and structure

Across both studies, the IEI octant scales showed good fit to a two-dimensional circular model. However, in the validation study the IEI scales showed poorer fit to the more restrictive circumplex models that require the scales to be equidistant from the circle's center and equally spaced apart around the circle's circumference. Examining the *unrotated* PCA helps elucidate the reasons. The larger first component—anchored by the "+A + C: Included-Proud" and "-A-C: Rejected-Ashamed" octants—accounted for 57% of the variance. The smaller second component—anchored by the "+A-C: Superior-Callous" and "-A + C: Needy-Empathic" octants—accounted for 30% of the variance. Accordingly, the + A + C and -A-C scales were farthest from the circle's center (i.e., had the largest communalities) and the + A-C and -A + C scales were closest to the circle's center (i.e., had the smallest communalities). The remaining scales (i.e., the + A and + C scales and the -A and -C scales) clustered closer to the endpoints of the first component than to the endpoints of the second component.

Table 4. Hierarchical regression of PANAS and IEI on measures of self-esteem, pride, and narcissism.

	Model 1					Model 2									
	PANAS-P		PANAS-N			PANAS-P		PANAS-N		IEI-Communal		IEI-Agentic			
Outcome Variable	*β*	*t*	*β*	*t*	R^2	*β*	*t*	*β*	*t*	*β*	*t*	*β*	*t*	R^2	ΔR^2
Self-Esteem	.58	14.68***	−0.38	−9.60***	.63	.27	6.18***	−0.16	−4.04***	.08	2.08*	.49	10.23***	.74	.11
AHPS Scales															
Authentic	.73	20.79***	−0.23	−6.66***	.71	.46	11.68***	−0.04	−1.19	.06	1.75	.45	10.36***	.80	.09
Hubristic	.25	4.08***	.30	4.79***	.10	.25	3.12**	.27	3.78**	−0.29	−3.96***	.21	2.45*	.16	.06
FFNI Scales															
Grandiose	.37	6.14***	.15	2.50*	.12	.23	3.21**	.21	3.33**	−0.40	−6.17***	.56	7.05***	.32	.20
Vulnerable	−0.28	−5.50***	.48	9.45***	.40	.10	1.69	.20	3.95***	−0.14	−2.68**	−0.58	−9.18***	.56	.16
Antagonism	.10	1.59	.34	5.46***	.10	.20	2.79**	.21	3.32**	−0.60	−9.32***	.26	3.28**	.33	.23
Neuroticism	−0.34	−6.09***	.29	5.14***	.27	.03	0.47	.05	0.88	.17	3.12**	−0.80	−12.11***	.53	.26
Agentic Extravers.	.45	7.74***	.15	2.61**	.18	.26	3.49***	.28	4.11***	−0.05	−0.78	.39	4.66***	.24	.06

Note. $N = 278$. $p < .05$; $^{**}p < .01$; $^{***}p < .001$. *PANAS* = Positive and Negative Affect Schedule. *AHPS* = Authentic and Hubristic Pride Scales. *FFNI* = Five-Factor Narcissism Inventory (super short form). *PANAS* scales were included in Step 1 of the hierarchical regression; IEI summary vectors were added in Step 2. β = standardized regression coefficient. ΔR^2 = increase in proportion of variance explained; all ΔR^2s are significant at $p < .0001$.

The scale reliabilities tell a similar story. The internal consistencies of the + A + C and -A-C scales and their immediate neighbors (+A, +C, -A, -C) were very good, in part because of the variance their items shared with the first component. The internal consistencies of the + A-C and -A + C scales were adequate but much lower. One way to interpret these findings is in terms of emotional valence. The feelings loading on the positive pole of the first component have a positive valence, differing primarily in whether that positivity is focused on the self (+A), other (+C), or both self and other (+A + C). Likewise, the feelings loading on the negative pole of the first component have a negative valence, differing primarily in whether that negativity is focused on the self (-A), other (-C), or both self and other (-A-C).

By contrast, the valence of feelings at the poles of the second component is mixed. The valence of "+A-C: Superior-Callous" feelings is positive toward the self but negative toward others. The valence of "-A + C: Needy-Empathic" feelings is positive toward others but negative toward the self. Further analyses of the + A-C and -A + C scales suggested that their lower reliability was because, within each scale, subsets of items were pulled away from each other and pulled toward either the positive or negative poles of the first component. Within the "-A + C: Needy-Empathic" scale, the more "Empathic" feeling items gravitated toward the positive (i.e., +C *positive-toward-others*) pole, while the more "Needy" feeling items gravitated toward the negative (i.e., -A *negative-toward-self*) pole. Likewise, within the "+A-C: Superior-Callous" scale, the more "Superior" feeling items gravitated toward the positive pole (i.e., +A *positive-toward-self*) pole, while the more "Callous" feeling items gravitated toward the negative (i.e., -C *negative-toward-others*) pole.

IEI construct validity

As expected, participants reported experiencing communal (e.g., caring, trusting, proud, grateful) interpersonal emotions more frequently than uncommunal (e.g., hostile, unforgiving, ashamed, resentful) emotions. More importantly, participants' profiles of interpersonal emotions across the eight octants assessed by the IEI tended to align with their profile of interpersonal values across the eight octants assessed by the CSIV and profile of interpersonal problems across the eight octants assessed by the IIP. Scales were positively correlated with scales from adjacent octants, negatively correlated with scales from opposing octants, and weakly correlated with scales from orthogonal octants, providing evidence of both convergent and discriminant validity.

The correlations between the IEI scales and the construct validity measures (except the TOSCA's unreliable pride scales) showed very good fit to a circumplex profile (e.g., each measure's strongest positive correlations and strongest negative correlations were on opposite ends of the circle). Moreover, the measures which previous studies had correlated with other IPC inventories (the PANAS, RSES, FFNI, and authentic/hubristic pride scales) showed similar profiles of correlations with the IEI in our study. Below we summarize the results by IEI dimensions, starting with the communal (LM-DE) axis.

- Participants prone to -C (DE: "Rejecting-Suspicious") emotions were *higher* in attachment avoidance, externalizing blame, and antagonistic traits. Conversely, participants prone to + C (LM: "Welcoming-Trusting") emotions were *lower* in attachment avoidance, externalizing blame, and antagonistic traits.
- On the BC-JK dimension, participants prone to + A-C "Superior-Callous" emotions were *higher* in hubristic pride, *higher* in attachment avoidance than anxiety, and *lower* in guilt-proneness and concern about causing harm to others (i.e., more detached). Conversely, participants prone to -A + C "Needy-Empathic" emotions were *lower* in hubristic pride, *higher* in attachment anxiety than avoidance, and *higher* in guilt-proneness and concern about causing harm to others.
- On the agentic (PA-HI) axis, participants prone to + A "Confident-Impressive" emotions were *higher* in grandiose and extraverted narcissism and *lower* in narcissistic neuroticism, attachment anxiety, and shame-proneness, whereas those prone to -A "Insecure-Anxious" emotions were *lower* in grandiose and extraverted narcissism and *higher* in narcissistic neuroticism, attachment anxiety, and shame-proneness.
- Finally, participants prone to + A+C (NO: "Included-Proud") emotions were *higher* in positive affect, self-esteem, and authentic pride and *lower* in attachment insecurity and vulnerable narcissism, whereas participants prone to -A-C (FG: "Rejected-Ashamed") emotions were *lower* in positive affect, self-esteem, and authentic pride, and *higher* in negative affect, attachment insecurity, and vulnerable narcissism.

In sum, the IEI scales' associations with each other and with other measures (e.g., interpersonal values and problems, attachment, narcissism, self-conscious emotions, and self-esteem) provided robust construct validity.

The theoretical construct the IEI measures is a continuous circular space—namely, an *interpersonal emotion circumplex*. The interpersonal emotional circumplex operationalized by the IEI comprises four bipolar dimensions: A horizontal axis representing *emotions related to others*, a vertical axis representing *emotions related to self*, and two diagonal axes representing *emotions related to self-and-others*. The horizontal LM-DE dimension reflects *communal feelings* in interpersonal situations, ranging from "+C" affection (e.g., *caring, trusting, grateful*) to "-C" hostility (e.g., *uncaring, rejecting, mistrusting*). The vertical PA-HI dimension reflects *agentic feelings* in interpersonal situations, ranging from "+A" self-confidence (e.g., *self-assured, self-important, self-congratulatory*) to "-A" self-doubt (e.g., *insecure, anxious, self-critical*).

The diagonal FG-NO dimension reflects interpersonal *esteem/inclusion feelings* ranging from "+A + C" pride/belonging (e.g., *loving, valued, loved*) to "-A-C" shame/alienation

(e.g., *rejected, attacked, ashamed*). As expected, these "+A + C" (esteem/inclusion) and "-A-C" (shame/alienation) emotional dispositions were robust correlates of attachment security and insecurity, respectively.

Finally, the diagonal BC-JK dimension reflects *feelings arising from contrasting esteem*, ranging from contrasting "+A-C" positive-self/negative-other contempt (e.g., *superior, impatient, unsympathetic*) to contrasting "-A + C" *negative-self/positive-other* deference (e.g., *accepting, others know better, anxious to please*). The poles of the BC-JK axis represent opposing strategies for managing interpersonal emotions and interactions, with the "+A-C" pole defined by *self-sufficient/devaluing* strategies (associated with greater attachment avoidance than anxiety; a dismissive attachment style) and the "-A + C" pole defined by *dependent/idealizing* strategies (associated with greater attachment anxiety than avoidance; a preoccupied attachment style). Since individuals with BC (+A-C) dispositions prioritize status (+A) over love (-C), if others deny them status (+A), then they may readily shift toward -C (angry, resentful) feelings. Since individuals with JK (-A + C) dispositions prioritize love (+C) over status (-A), if others deny them love (+C), then they may readily shift toward -A (anxious, worthless) feelings. Thus, the emotions of individuals whose needs for status and love are unbalanced may be contingent on feedback from others (and hence, more mercurial), which may be contributing to our difficulties assessing dispositional tendencies in the + A-C and -A + C regions of the interpersonal emotion circumplex.

Limitations and future directions

Despite relatively large sample sizes, our ratios of participants-to-items were below what is generally recommended. Moreover, the sample we used when developing the IEI in Study 1 consisted of mostly female undergraduates. Although we used a gender-balanced community sample when validating the IEI in Study 2, it was a smaller sample ($n = 278$). Therefore, our understanding of the properties of the IEI and confidence in the replicability of our findings would benefit from additional and larger community samples. Moreover, both studies used non-clinical U.S. samples; additional research is necessary to determine the degree to which the IEI demonstrates measurement invariance and usefulness across other cultural and clinical settings.

As discussed earlier, a potential weakness of the IEI itself is the low reliabilities of the BC (+A-C) and JK (-A + C) scales. Future research is necessary to determine the degree to which revising the scales can improve reliability or whether the nature of interpersonal emotions imposes an upper-limit on the reliability of any measure that evenly assesses the range of feelings contained within those "mixed valence" regions of the circumplex. Relatedly, our confirmatory analyses focused exclusively on the IEI's circumplex structure. Future research using confirmatory factor analytic approaches could help clarify the octant scales' internal structures and instances where modifications might help improve unidimensionality or decrease item redundancy. Lastly, the IEI in its current form was designed to assess emotional *traits*. Further research is needed to evaluate whether the same items are effective for assessing emotional *states*.

Conclusions

Guided by the IPC model and broader CIIT framework, the IEI seeks to capture a broad, balanced representation of emotions associated with interpersonal situations. In so doing, the IEI can help integrate our understanding of interpersonal and emotional phenomena. For instance, the IEI could offer more detailed assessment of emotions associated with attachment security and insecurity, as well as emotions underlying hubristic and antagonistic traits. As with other IPC inventories, if IEI octant scale scores conform to a circular profile, they can be summarized by just two dimensions or a single vector. If the scores do not fit a prototypical circular pattern—which often occurs when assessing individuals in clinical contexts—then examining the whole profile of octant scores can reveal key distinctive patterns (e.g., high scores in opposing octants, such as a person who often feels "confident-impressive" [+A] but also often flips into feeling "insecure-anxious" [-A]).

We believe that the IEI could prove useful in clinical research and treatment of psychopathology, including characterizing the interpersonal emotion profiles associated with clinical syndromes and evaluating changes in patterns of emotional dispositions over the course of psychotherapy. We envision adapted versions of the IEI for characterizing emotion *states* in specific relationships (e.g., with a spouse or therapist) and interactions (e.g., a relational dispute or psychotherapy session) that may be clinically useful for assessing affective tone, tolerance, range, and complementarity. Dispositional and state versions may be especially applicable to the study of psychotherapy process in emotion-focused, relational psychotherapies such as Interpersonal Psychotherapy for Depression (IPT-D; Weissman, Markowitz, & Klerman, 2017) and Transference-Focused Psychotherapy (TFP; Clarkin, Levy, & Schiavi, 2005). Moreover, because IEI items describe experiences with which respondents can readily identify, it may facilitate provision of assessment feedback in language that subjects can integrate non-defensively (even for socially "undesirable" emotions such as superior-callous "BC" feelings).

For these reasons, we believe the IEI advances our understanding and assessment of interpersonal emotions. While further research on refining, validating, and applying the IEI is needed, we hope the findings presented here inspire other scholars to join us in that endeavor.

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Declaration of interest

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Data availability statement

The data associated with this manuscript are openly available at the Open Science Framework: http://doi.org/10.17605/OSF.IO/W37DJ.

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Supplemental Table S1

Descriptive Statistics for the CSIV, IIP, TOSCA, and ECR Scales – Study 1

Scale	M	*SD*	ω
CSIV			
(PA) +A	2.01	0.75	.61
(BC) +A-C	1.02	0.76	.74
(DE) -C	1.30	0.73	.61
(FG) -A-C	1.74	0.86	.74
(HI) -A	1.91	0.82	.71
(JK) -A+C	2.77	0.71	.67
(LM) +C	2.60	0.78	.74
(NO) +A+C	2.62	0.74	.71
IIP			
(PA) +A	0.74	0.74	.76
(BC) +A-C	0.63	0.79	.84
(DE) -C	1.08	0.91	.78
(FG) -A-C	1.59	1.11	.87
(HI) -A	1.82	1.08	.87
(JK) -A+C	1.94	0.98	.74
(LM) +C	2.00	1.00	.80
(NO) +A+C	1.27	0.93	.78
TOSCA			
Externalization	2.24	0.55	.76
Guilt	4.05	0.54	.81
Shame	3.26	0.66	.82
Detachment	2.62	0.60	.72
Alpha-Pride	3.65	0.70	.57
Beta-Pride	3.72	0.65	.50
ECR			
Insecure	3.94	0.86	.91
Anxious	3.75	1.04	.90
Avoidant	4.12	1.15	.91

*Note. N*s = 1209 for CSIV, 1208 for the IIP, 1192 for the TOSCA, and 1183 for the ECR. CSIV and IIP items were rated on 0-to-4 scales. TOSCA items were rated on 1-to-5 scales. ECR items were rated on 1-to-7 scales. ω = McDonald's omega.

Supplemental Table S2

Interpersonal Emotions Inventory Items

IEI Octant	IEI Items: *I feel…*
(PA) +A	admirable / confident in my strengths / sure of myself / self-confident / attractive / confident that I am impressive / like a winner / unapologetic about winning
(BC) +A-C	unintimidated / fully in command / invincible / superior / unsympathetic to suckers / unconcerned about others' feelings / impatient with others' shortcomings / unforgiving
(DE) -C	like I just don't care about others / hostile / disapproving of others / rejecting of others / like I want to abandon others / like I want no part of any group / resentment / doubtful that I can rely on others
(FG) -A-C	alienated / under attack / distant from them / rejected / unwanted / ashamed of myself / worthless / like a loser
(HI) -A	like I am a disappointment / unsure of myself / self-doubt / insecure / worried that I will be annoying to others / worried I will disappoint others / like I need to appease others / careful not to disappoint others
(JK) -A+C	self-conscious / that others know better / anxious to please others / like I want to console and comfort others / empathic / like I want to help others / accepting of others / compassionate and caring toward others
(LM) +C	concerned about others' well-being / admiration for others / like I really care about others / gracious toward others / grateful for others' love and support / emotionally connected and attuned to others / trusting in others' kindness / supported by them
(NO) +A+C	loving kindness / close to them / loved / welcomed and cared about / important to others / valued / worthy / proud of myself

Note. Items were preceded by the stem: "*When I interact with or think about myself in relation to others, I feel…*".

Supplemental Table S3

Interpersonal Emotions Inventory Scores for Women and Men – Study 1

	Women		Men				
IEI Scale	*M*	*SD*	*M*	*SD*	*t*(1160)	*p*	*d*
(PA) +A	1.98	*.69*	2.08	*.77*	-2.26	.024	-0.15
(BC) +A-C	1.17	*.58*	1.34	*.64*	-4.19	.000	-0.28
(DE) -C	0.85	*.65*	1.05	*.72*	-4.51	.000	-0.30
(FG) -A-C	1.14	*.84*	1.23	*.81*	-1.65	.099	-0.11
(HI) -A	2.06	*.85*	1.86	*.89*	3.58	.000	0.24
(JK) -A+C	2.68	*.58*	2.45	*.65*	5.80	.000	0.39
(LM) +C	2.75	*.64*	2.54	*.71*	4.70	.000	0.31
(NO) +A+C	2.46	*.71*	2.28	*.73*	3.87	.000	0.26

*Note. N*s = 852 women, 310 men. *d* = Cohen's d effect size index.

Supplemental Table S4

Correlations between Ipsatized IEI Scales – Studies 1 and 2

	Study 1								Study 2							
Octant	PA	BC	DE	FG	HI	JK	LM	NO	PA	BC	DE	FG	HI	JK	LM	NO
(PA) +A	—								—							
(BC) +A-C	.40	—							.43	—						
(DE) -C	-.26	.42	—						-.45	.29	—					
(FG) -A-C	-.71	-.08	.57	—					-.77	-.21	.67	—				
(HI) -A	-.84	-.43	.17	.66	—				-.89	-.45	.41	.74	—			
(JK) -A+C	-.35	-.73	-.56	-.13	.28	—			-.31	-.71	-.50	-.07	.22	—		
(LM) +C	.24	-.46	-.80	-.67	-.35	.51	—		.46	-.30	-.84	-.76	-.55	.43	—	
(NO) +A+C	.65	-.05	-.63	-.87	-.69	.06	.68	—	.73	.07	-.76	-.91	-.77	.08	.81	—

Note. Study 1 *N* = 1223. Study 2 *N* = 278.

Supplemental Table S5

Raw (not ipsatized) IEI Scales' Intercorrelations and Loadings on Communal and Agentic Principal Components – Study 1

	Correlations								Loadings		
Octant	PA	BC	DE	FG	HI	JK	LM	NO	X	Y	h^2
(PA) +A	—								.19	.78	.64
(BC) +A-C	.49	—							-.53	.47	.50
(DE) -C	-.06	.55	—						-.76	-.16	.60
(FG) -A-C	-.44	.14	.66	—					-.54	-.68	.75
(HI) -A	-.51	-.10	.36	.74	—				-.14	-.86	.76
(JK) -A+C	-.08	-.27	-.14	.16	.48	—			.62	-.54	.68
(LM) +C	.35	-.18	-.44	-.34	-.05	.63	—		.86	.05	.74
(NO) +A+C	.68	.08	-.41	-.61	-.42	.22	.71	—	.67	.56	.76

Note. *N* = 1223. The loadings reflect Procrustean rotation aligning the first two principal components with the theoretical orientations of the communal (X) and agentic (Y) dimensions; the h^2 (communality) is the sum of the squared loadings on the two components.

Supplemental Table S6

Correlations and Summary Parameters for Relations between the IEI and CSIV scales

CSIV Scales	Correlations with IEI Scales								Summary Vector Parameters				
	(PA) +A	(BC) A-C	(DE) -C	(FG) -A-C	(HI) -A	(JK) -A+C	(LM) +C	(NO) +A+C	Communal Vector *[CI]*	Agentic Vector *[CI]*	Vector Angle *[CI]*	Vector Length *[CI]*	R^2
(PA) +A	**.38**	.39	.15	-.17	*-.35*	-.37	-.11	.12	-.15 *[-.20, -.09]*	.37 *[.32, .42]*	111.9° *[103.3°, 120.0°]*	.40 *[.35, .45]*	.994
(BC) +A-C	.24	**.55**	.39	.03	-.27	*-.50*	-.36	-.07	-.39 *[-.44, -.34]*	.29 *[.25, .34]*	143.1° *[136.7°, 149.2°]*	.49 *[.45, .53]*	.990
(DE) -C	-.04	.32	**.44**	.28	.02	-.32	*-.44*	-.30	-.44 *[-.48, -.39]*	.00 *[-.06, .04]*	180.6° *[174.1°, 187.2°]*	.44 *[.39, .48]*	.996
(FG) -A-C	-.37	-.10	.18	**.37**	.41	.05	-.25	*-.38*	-.21 *[-.26, -.16]*	-.35 *[-.40, -.30]*	238.9° *[232.3°, 245.5°]*	.41 *[.36, .46]*	.987
(HI) -A	*-.31*	-.27	-.10	.16	**.34**	.26	.05	-.16	.08 *[.02, .13]*	-.31 *[-.36, -.26]*	283.6° *[273.4°, 293.7°]*	.32 *[.27, .37]*	.995
(JK) -A+C	-.19	*-.46*	-.38	-.10	.21	**.44**	.36	.12	.38 *[.33, .43]*	-.22 *[-.27, -.17]*	329.9° *[322.6°, 336.7°]*	.44 *[.40, .48]*	.996
(LM) +C	.09	-.29	*-.38*	-.28	-.14	.28	**.43**	.35	.41 *[.36, .46]*	.07 *[.01, .12]*	9.1° *[1.8°, 16.0°]*	.42 *[.37, .46]*	.982
(NO) +A+C	.25	-.10	-.29	*-.30*	-.26	.11	.31	**.35**	.30 *[.25, .35]*	.20 *[.15, .26]*	33.8° *[25.3°, 41.9°]*	.36 *[.31, .41]*	.979

Note. N = 1209. Correlations > .10 are significant at $p < .001$. Correlations between scales from the same IPC octant (e.g., between CSIV "+A" and IEI "+A") appear in boldface; correlations between CSIV octants and their antipodal IEI octant scales (e.g., between CSIV "+A " and IEI "-A") appear in italics. *CI* = Confidence intervals computed using resampling procedures implemented by the *circumplex* package for R.

Supplemental Table S7

Correlations and Summary Parameters for Relations between the IEI and IIP scales

IIP Scales	Correlations with IEI Scales								Summary Vector Parameters				
	(PA) +A	(BC) A-C	(DE) -C	(FG) -A-C	(HI) -A	(JK) -A+C	(LM) +C	(NO) +A+C	Communal Vector *[CI]*	Agentic Vector *[CI]*	Vector Angle *[CI]*	Vector Length *[CI]*	R^2
(PA) +A	**.35**	.44	.14	-.18	*-.36*	-.40	-.10	.14	-.15 *[-.21, -.10]*	.38 *[.34, .43]*	111.7° *[103.3°, 12.3°]*	.41 *[.37, .46]*	.987
(BC) +A-C	.34	**.50**	.28	-.09	-.36	*-.54*	-.23	.11	-.28 *[-.33, -.22]*	.39 *[.34, .44]*	125.2° *[117.5°, 132.4°]*	.48 *[.45, .52]*	.987
(DE) -C	.07	.36	**.44**	.23	-.10	-.40	*-.40*	-.24	-.43 *[-.47, -.38]*	.09 *[.04, .14]*	167.8° *[16.5°, 174.9°]*	.44 *[.40, .48]*	.997
(FG) -A-C	-.31	-.05	.27	**.39**	.29	.00	-.29	*-.38*	-.27 *[-.31, -.22]*	-.29 *[-.34, -.24]*	227.5° *[22.8°, 234.4°]*	.40 *[.35, .44]*	.998
(HI) -A	*-.22*	-.36	-.19	.02	**.24**	.32	.17	.00	.21 *[.15, .26]*	-.24 *[-.29, -.19]*	31.8° *[30.2°, 321.1°]*	.31 *[.27, .36]*	.988
(JK) -A+C	-.23	*-.45*	-.33	-.06	.27	**.48**	.29	.04	.34 *[.28, .38]*	-.27 *[-.32, -.23]*	32.9° *[313.1°, 327.9°]*	.43 *[.39, .47]*	.991
(LM) +C	-.09	-.40	*-.41*	-.18	.09	.49	**.39**	.15	.42 *[.37, .47]*	-.14 *[-.19, -.09]*	341.2° *[334.1°, 348.5°]*	.44 *[.40, .48]*	.979
(NO) +A+C	.13	.00	-.19	*-.17*	-.12	.01	.16	**.21**	.16 *[.11, .21]*	.13 *[.07, .18]*	39.2° *[23.9°, 52.7°]*	.20 *[.15, .26]*	.987

Note. N = 1208. Correlations > .10 are significant at $p < .001$. Correlations between scales from the same IPC octant (for example, between IIP "+A" and IEI "+A") appear in boldface; correlations between IIP octants and their antipodal IEI octant scales (for example, between IIP "+A " and IEI "-A") appear in italics. *CI* = Confidence intervals computed using resampling procedures implemented by the *circumplex* package for R.

Supplemental Table S8

Descriptive Statistics for the RSES, AHPS, FFNI, and PANAS Scales – Study 2

Scale	M	*SD*	ω
RSES			
Overall Self-Esteem	1.85	0.74	.95
AHPS			
Authentic Pride	1.79	1.00	.94
Hubristic Pride	0.29	0.49	.90
FFNI			
Grandiose Narcissism	1.35	0.63	.73
Vulnerable Narcissism	1.77	0.93	.71
Antagonism	0.95	0.63	.71
Neuroticism	2.20	1.20	.83
Agentic Extraversion	2.06	0.95	.63
PANAS			
Positive Affect	1.99	0.86	.93
Negative Affect	0.85	0.78	.93

Note. N = 278. RSES = Rosenberg Self-Esteem Scale. AHPS = Authentic and Hubristic Pride Scales. FFNI = Five-Factor Narcissism Inventory (super short form). PANAS = Positive and Negative Affect Schedule. RSES items were rated on 0-to-3 scales; all other items on were rated on 0-to-4 scales. ω = McDonald's omega.

Supplemental Table S9

Interpersonal Emotions Inventory Scores for Women and Men – Study 2

	Women		Men				
IEI Scale	*M*	*SD*	*M*	*SD*	*t*(276)	*p*	*d*
(PA) +A	1.76	0.75	1.90	0.82	-1.52	.130	-0.18
(BC) +A-C	1.15	0.53	1.29	0.52	-2.25	.025	-0.27
(DE) -C	1.07	0.64	1.09	0.69	-0.21	.835	-0.03
(FG) -A-C	1.39	0.88	1.20	0.88	1.82	.071	0.22
(HI) -A	2.00	0.89	1.65	0.88	3.24	.001	0.39
(JK) -A+C	2.52	0.49	2.21	0.49	5.21	<.001	0.62
(LM) +C	2.53	0.64	2.32	0.70	2.62	.009	0.31
(NO) +A+C	2.20	0.79	2.21	0.79	-0.03	.975	0.00

*Note. N*s = 144 women, 134 men. *d* = Cohen's d effect size index.

Supplemental Table S10

Raw (not ipsatized) IEI Scales' Intercorrelations and Loadings on Communal and Agentic Principal Components – Study 2

	Correlations								Loadings		
Octant	PA	BC	DE	FG	HI	JK	LM	NO	X	Y	h^2
(PA) +A	—								.28	.84	.89
(BC) +A-C	.50	—							-.47	.62	.78
(DE) -C	-.28	.40	—						-.79	-.24	.83
(FG) -A-C	-.58	-.03	.72	—					-.55	-.69	.88
(HI) -A	-.69	-.24	.49	.77	—				-.25	-.86	.90
(JK) -A+C	-.07	-.30	-.17	.14	.36	—			.64	-.49	.81
(LM) +C	.52	-.09	-.57	-.51	-.34	.55	—		.86	.24	.89
(NO) +A+C	.75	.17	-.58	-.73	-.60	.22	.82	—	.70	.62	.94

Note. *N* = 278. The loadings reflect Procrustean rotation aligning the first two principal components with the theoretical orientations of the communal (X) and agentic (Y) dimensions; the h^2 (communality) is the sum of the squared loadings on the two components.

Supplemental Table S11

Correlations and Summary Parameters for Relations between the IEI and the RSES, AHPS, PANAS, and FFNI-SSF Scales – Study 2

Scale	Correlations with IEI Scales								Summary Vector Parameters				
	(PA) +A	(BC) A-C	(DE) -C	(FG) -A-C	(HI) -A	(JK) -A+C	(LM) +C	(NO) +A+C	Communal Vector *[CI]*	Agentic Vector *[CI]*	Vector Angle *[CI]*	Vector Length *[CI]*	R^2
Self-Esteem Scale													
Overall	.76	.30	-.48	-.78	-.76	-.13	.55	.78	.46 *[.37,.53]*	.73 *[.67,.79]*	58.1° *[52.7°,64.0°]*	.86 *[.80,.92]*	.991
Pride Scales													
Authentic	.79	.30	-.50	-.76	-.76	-.14	.54	.76	.45 *[.36,.53]*	.73 *[.67,.79]*	58.4° *[53.3°,64.3°]*	.86 *[.80,.91]*	.988
Hubristic	.13	.20	.16	.02	-.03	-.21	-.20	-.09	-.18 *[-.29,-.06]*	.09 *[.01,.18]*	152.8° *[116.1°,177.3°]*	.21 *[.12,.31]*	.953
Affect Scales													
Positive	.68	.20	-.50	-.65	-.64	-.06	.51	.64	.43 *[.35,.51]*	.61 *[.53,.67]*	54.4° *[48.7°,6.3°]*	.75 *[.66,.82]*	.983
Negative	-.48	-.15	.40	.63	.53	.03	-.50	-.63	-.42 *[-.50,-.34]*	-.51 *[-.59,-.40]*	230.5° *[220.9°,238.5°]*	.66 *[.58,.73]*	.992
Narcissism Scales													
Grandiose	.43	.45	.04	-.18	-.31	-.35	-.14	.11	-.13 *[-.24,-.02]*	.38 *[.28,.47]*	109.5° *[93.0°,126.2°]*	.40 *[.32,.49]*	.958
Vulnerable	-.64	-.27	.43	.64	.72	.11	-.55	-.65	-.41 *[-.49,-.32]*	-.63 *[-.69,-.57]*	237.4° *[231.4°,243.7°]*	.75 *[.68,.82]*	.977
Antagonism	.00	.34	.41	.23	.11	-.36	-.52	-.30	-.45 *[-.54,-.35]*	.00 *[-.09,.11]*	179.4° *[165.8°,191.3°]*	.45 *[.36,.54]*	.967
Neuroticism	-.67	-.44	.19	.52	.73	.28	-.29	-.51	-.18 *[-.27,-.07]*	-.66 *[-.72,-.59]*	255.1° *[247.6°,263.4°]*	.68 *[.61,.75]*	.979
Agentic Extrav.	.44	.25	-.21	-.27	-.35	-.12	.12	.23	.11 *[-.00,.21]*	.35 *[.26,.44]*	73.1° *[58.9°,9.1°]*	.37 *[.27,.48]*	.933

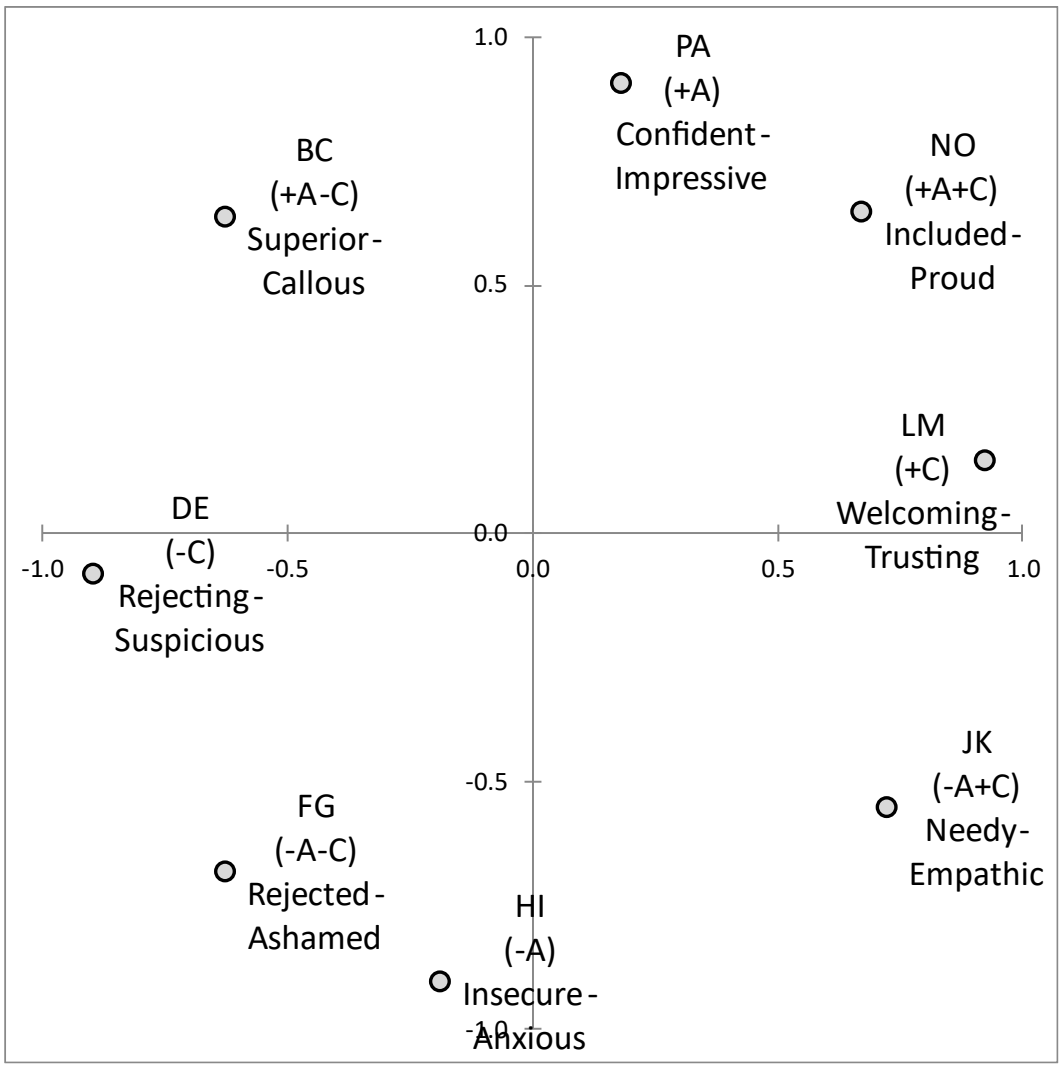
Note. N = 278. Correlations > .15 are significant at $p < .01$ (2-tailed, uncorrected for multiple comparisons). *CI* = Confidence intervals computed using resampling procedures implemented by the *circumplex* package for R. *RSES* = Rosenberg Self-Esteem Scale. *AHPS* = Authentic and Hubristic Pride Scales. *PANAS* = Positive and Negative Affect Schedule. *FFNI* = Five-Factor Narcissism Inventory (super short form).

Supplemental Table S12

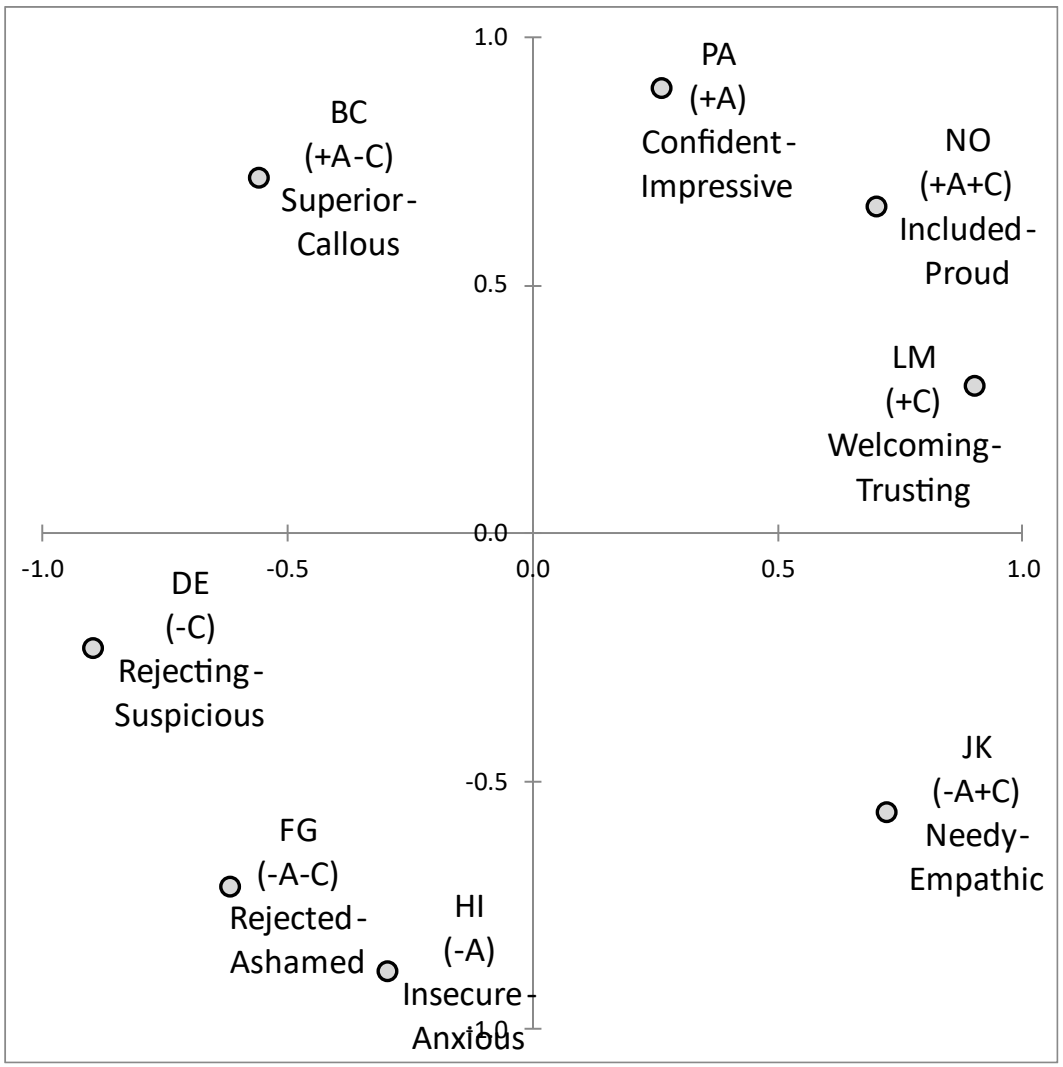
Correlations and Summary Parameters for Relations between the IEI and PANAS Items – Study 2

PANAS Item	Correlations with IEI Scales								Summary Vector Parameters				
	(PA) +A	(BC) A-C	(DE) -C	(FG) -A-C	(HI) -A	(JK) -A+C	(LM) +C	(NO) +A+C	Communal Vector *[CI]*	Agentic Vector *[CI]*	Vector Angle *[CI]*	Vector Length *[CI]*	R^2
Positive Affect Items													
Active	.53	.16	-.37	-.53	-.50	-.07	.40	.52	.34 *[.25,.43]*	.48 *[.40,.56]*	55.1° *[47.3°,63.4°]*	.59 *[.50,.68]*	.989
Alert	.29	.13	-.24	-.28	-.32	-.02	.24	.30	.19 *[.09,.30]*	.28 *[.18,.39]*	55.4° *[41.8°,70.6°]*	.34 *[.22,.47]*	.968
Attentive	.36	.07	-.33	-.39	-.39	.02	.37	.41	.31 *[.21,.40]*	.34 *[.24,.43]*	47.7° *[36.7°,57.9°]*	.46 *[.36,.57]*	.980
Determined	.57	.16	-.41	-.57	-.54	-.01	.46	.53	.38 *[.29,.47]*	.50 *[.41,.59]*	52.8° *[45.2°,60.7°]*	.63 *[.54,.72]*	.979
Enthusiastic	.62	.16	-.49	-.60	-.58	-.02	.48	.60	.42 *[.33,.50]*	.55 *[.46,.62]*	52.3° *[45.5°,59.4°]*	.69 *[.60,.77]*	.983
Excited	.52	.17	-.42	-.50	-.49	-.05	.39	.51	.34 *[.25,.43]*	.47 *[.38,.56]*	54.1° *[46.1°,62.6°]*	.58 *[.48,.68]*	.981
Inspired	.57	.12	-.40	-.48	-.50	-.04	.39	.48	.34 *[.24,.42]*	.47 *[.38,.55]*	54.2° *[46.4°,62.9°]*	.58 *[.48,.67]*	.973
Interested	.56	.14	-.45	-.56	-.52	.01	.44	.55	.40 *[.30,.49]*	.49 *[.40,.57]*	50.8° *[43.2°,59.1°]*	.63 *[.53,.72]*	.982
Proud	.62	.19	-.41	-.59	-.57	-.10	.44	.57	.37 *[.27,.46]*	.55 *[.47,.63]*	56.5° *[49.6°,64.3°]*	.66 *[.57,.75]*	.988
Strong	.64	.26	-.36	-.57	-.60	-.15	.39	.56	.31 *[.21,.41]*	.58 *[.51,.65]*	61.5° *[53.9°,70.1°]*	.66 *[.58,.74]*	.987
Negative Affect Items													
Afraid	-.35	-.13	.29	.51	.38	.04	-.38	-.50	-.31 *[-.40,-.22]*	-.39 *[-.49,-.29]*	231.4° *[219.8°,241.9°]*	.50 *[.41,.59]*	.991
Ashamed	-.47	-.22	.27	.57	.50	.08	-.39	-.53	-.31 *[-.39,-.22]*	-.49 *[-.58,-.39]*	237.8° *[227.8°,247.2°]*	.58 *[.49,.66]*	.988
Distressed	-.43	-.14	.35	.57	.46	.00	-.44	-.55	-.37 *[-.47,-.27]*	-.45 *[-.54,-.35]*	230.3° *[220.2°,240.2°]*	.58 *[.49,.68]*	.992
Guilty	-.36	-.16	.22	.44	.40	.13	-.33	-.44	-.24 *[-.33,-.15]*	-.40 *[-.50,-.30]*	238.3° *[226.4°,249.4°]*	.46 *[.38,.56]*	.987
Hostile	-.20	.10	.43	.37	.21	-.16	-.42	-.41	-.40 *[-.50,-.29]*	-.20 *[-.30,-.10]*	206.3° *[193.0°,221.6°]*	.44 *[.35,.54]*	.993
Irritable	-.44	-.07	.44	.52	.44	-.05	-.44	-.54	-.40 *[-.49,-.31]*	-.41 *[-.51,-.31]*	225.5° *[215.3°,236.1°]*	.58 *[.49,.65]*	.990
Jittery	-.27	-.09	.21	.34	.38	.01	-.33	-.38	-.25 *[-.33,-.16]*	-.31 *[-.41,-.20]*	231.1° *[217.7°,244.2°]*	.39 *[.29,.49]*	.971
Nervous	-.46	-.20	.24	.47	.53	.13	-.36	-.50	-.26 *[-.36,-.17]*	-.48 *[-.57,-.38]*	241.2° *[231.8°,250.7°]*	.55 *[.46,.64]*	.987
Scared	-.37	-.13	.33	.51	.38	.02	-.38	-.50	-.33 *[-.41,-.25]*	-.39 *[-.49,-.29]*	230.0° *[218.6°,240.4°]*	.51 *[.42,.60]*	.991
Upset	-.36	-.08	.37	.57	.38	-.04	-.43	-.56	-.39 *[-.49,-.30]*	-.39 *[-.49,-.29]*	225.0° *[213.5°,236.3°]*	.55 *[.46,.64]*	.993

Note. N = 278. Correlations > .15 are significant at $p < .01$ (2-tailed, uncorrected for multiple comparisons). *CI* = Confidence intervals computed using resampling procedures implemented by the *circumplex* package for R. *PANAS* = Positive and Negative Affect Schedule.



***Supplemental Figure S1*.** Plot of loadings of the eight IEI-64 octant scales on the first two principal components following Procrustean rotation aligning the components with the theoretical orientations of the communal and agentic dimensions (Study 1).



Supplemental Figure S2. Plot of loadings of the eight IEI-64 octant scales on the first two principal components following Procrustean rotation aligning the components with the theoretical orientations of the communal and agentic dimensions (Study 2).