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Using Behavioral Mapping to Examine the Validity of the IPIP-IPC

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Abstract

Behavioral mapping, a method designed to relate behaviors to circumplex models, was used to examine the predictive validity of the International Personality Item Pool–Interpersonal Circumplex (IPIP-IPC). In this study, 96 participants first completed the IPIP-IPC and then were videotaped in a social interaction with a confederate. At the conclusion of this interaction, the Riverside Behavioral Q-Sort was used to code 64 different behaviors expressed by the participants. Results indicated that participants' Riverside Behavioral Q-Sort interpersonal behaviors occurred in a manner predicted by their IPIP-IPC scores. Such findings suggest that the IPIP-IPC can predict a multitude of interpersonal behaviors expressed during a dyadic interaction.

Keywords

behavior mapping, circumplex, interpersonal, IPIP-IPC

Researchers have often employed the Interpersonal Circumplex (IPC) to organize, conceptualize, and assess interpersonal behaviors, motives, and traits (e.g., Bartholomew, 1990; D'Antono, Ditto, Moskowitz, & Rios, 2001; Gurtman, 1992; Locke, 2000; Madison, 1997; Markey, Funder, & Ozer, 2003; Markey, Markey, & Tinsley, 2004; Matano & Locke, 1995; Moskowitz & Zuroff, 2004; Pincus, Gurtman, & Ruiz, 1998; Pincus & Wilson, 2001; Sadler & Woody, 2003; Tracey, 1997; Tracey, Ryan, & Jaschik-Herman, 2001; Wiggins, 2003; Wiggins & Pincus, 1989). The IPC asserts that interpersonal styles vary along a circular continuum and are orientated by the primary dimensions of dominant-submissive (i.e., dominance) and hostile-friendly (i.e., warmth). Although the IPC has gone through a number of slight revisions by various researchers (e.g., Kiesler, 1983; Strong et al., 1988; Wiggins, 1982), there tends to be agreement concerning its basic structure. Figure 1 displays the circular ordering of the eight-octant interpersonal styles presented by Wiggins (1995). In this ordering, interpersonal styles that fall close together are expected to be more positively related than styles that fall further apart, interpersonal styles at right angles are unrelated, and styles at the opposite poles of a diameter are negatively related (see Wiggins, 1996, for a comprehensive history of the IPC).

Perhaps the most widely used assessment of the IPC as a measurement of normal variations in interpersonal personality is the Interpersonal Adjective Scales (IAS; Wiggins, 1995). The IAS consists of 64 adjective items designed to assess the eight octants of the IPC presented in Figure 1. Although previous research shows strong support for the

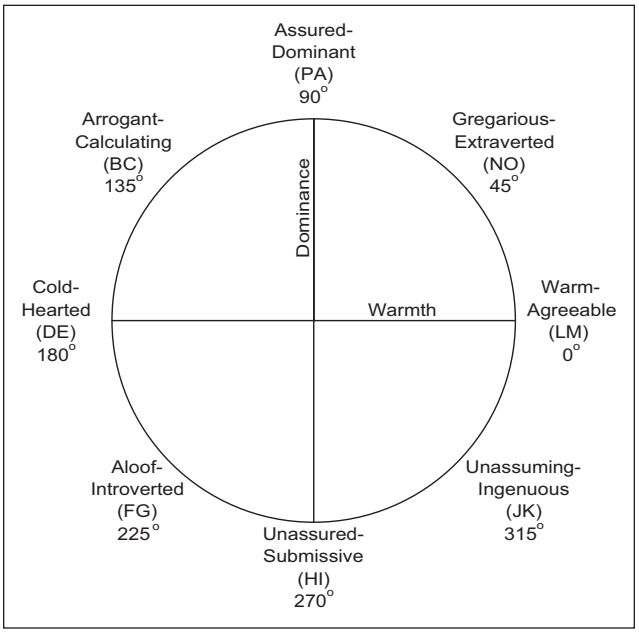

Figure 1. Wiggins (1995) interpersonal circumplex

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circumplex structure of the IAS octant scales (e.g., Gurtman & Pincus, 2000; Wiggins, 2003; Wiggins & Broughton, 1991) and the validity of these scales (e.g., Wiggins & Broughton, 1991; Wiggins & Trobst, 1997), many of the IAS adjective items are unfamiliar to participants (e.g., "iron-hearted," "boastless," etc.) and are negations of more familiar words (e.g., "unsly," "unsparkling," "unwily," etc.; Wiggins, 2003). Because of the difficulty associated with understanding some of the IAS adjectives, researchers often include a glossary, which provides definitions of each adjective. To overcome this issue, and create a briefer assessment of the IPC, the International Personality Item Pool–Interpersonal Circumplex (IPIP-IPC; Markey & Markey, 2009) was created.

The IPIP-IPC is a 32-item alternative measure of the IPC that researchers and clinicians can use at no cost. Instead of using adjectives that might be unfamiliar to some participants or that require a glossary, the IPIP-IPC consists of very short phrases (e.g., "Love large parties," "Think of others first," etc.). Past studies of the IPIP-IPC have confirmed that the eight octant scales occur in the predicted circular manner and that it has strong convergent validity with the IAS (Markey & Markey, 2009). Additionally, because of its shorter length, the IPIP-IPC provides a useful alternative measurement of the IAS when time is limited. Past research with the IPIP-IPC suggest it only takes about 2 minutes to complete (Markey & Markey, 2009). Although these initial studies of the IPIP-IPC are promising, to date no research has examined the actual link between the IPIP-IPC and observed interpersonal behaviors. The current research attempts to further examine the validity of the IPIP-IPC by relating it to a multitude of behaviors expressed by individuals during dyadic interactions.

In an early attempt to link the IAS to a large number of interpersonal behaviors, Gifford (1991, 1994; Gifford & O'Conner, 1987) described a process called *behavior mapping*. The basic concept of behavior mapping is that interpersonal behaviors relevant to the IAS should show a clear and predictable pattern of correlations around the octants of the IPC. Specifically, a behavior with interpersonal content should show a positive maximum correlation with one of the eight octants of the IPC with steadily declining correlations in both directions around the circumplex away from this octant. By using this approach, it is possible to calculate the angular location of a behavior in the two-dimensional space created by dominance and warmth. For example, Gifford (1991, 1994; Gifford & O'Conner, 1987) found that behaviors such as turning one's head town others, gesturing, and crossing one's legs tended be located in the gregarious-extraverted octant (NO) of the IPC. He also found that behaviors located in the assured-dominant octant (PA) included extending one's legs and leaning one's left leg toward a group of people.

Just as Gifford's studies used behavioral mapping to help demonstrate the validity of the IAS, the current research will examine the validity of the IPIP-IPC by creating a behavioral map of various interpersonal behaviors. To do this, the interpersonal behaviors that women express during a dyadic interaction will be coded using the Riverside Behavioral Q-Sort (RBQ; Funder, Furr, & Colvin, 2000). The RBQ provides ratings for a wide range of interpersonal (e.g., "expresses hostility") and intrapersonal (e.g., "expresses interest in fantasy or daydream") midlevel behaviors between narrowly defined motor activities and more abstract styles of behavior. RBQ codes have been successfully used in the past to examine behavioral manifestations of various psychological constructs (e.g., Creed & Funder, 1998; Funder & Colvin, 1991; Furr & Funder, 1998; Markey et al., 2004; Nave, Sherman, & Funder, 2008; Nave, Sherman, Funder, Hampson, & Goldberg, 2010). The current research will map the RBQ behaviors, expressed by participants during a dyadic interaction, onto a circumplex created using the IPIP-IPC. In addition to creating an empirical behavioral map using the IPIP-IPC, the current research will also use judges to create a hypothesized behavioral map of RBQ behaviors. Using this hypothesized behavioral map, it will be possible to examine the discriminant and convergent validity of the IPIP-IPC.

Method

Participants

One hundred female undergraduate students (mean age = 18.76 years) participated in the present research as part of a larger study examining the link between interpersonal behaviors and various personality constructs among women. Because of technical difficulties during the videotaped interaction (audio from the interaction was not recorded), scores from four participants were removed from the analyses (i.e., final $n = 96$). The participants were recruited from undergraduate general psychology classes and were given class credit for their participation in the experiment. Participants performed the study one at a time with the assistance of a confederate.

Measures

The International Personality Item Pool–Interpersonal Circumplex. The IPIP-IPC (Markey & Markey, 2009) consists of 32 items designed to assess the eight octants of the IPC. Participants indicate how accurately each IPIP-IPC item describes themselves using a scale of 1 to 5, with 1 indicating *very inaccurate* and 5 indicating *very accurate*.

Riverside Behavioral Q-Sort. The RBQ (Funder et al., 2000) is a 64-item Q-sort that judges use to rate the behaviors of participants during an interaction. The RBQ consists of items designed to measure behaviors at a level of generality between narrowly defined motor activities and more abstract styles of behaviors (e.g., "Expresses warmth," "Is talkative," "Behaves in a timid and fearful manner"). Each item of the RBQ is placed on a card and judges describe the behavior of

a target by ordering the cards into a nine-category, forced-choice, quasinormal distribution. Cards placed in Category 1 indicate behaviors that were extremely uncharacteristic of the participant, those placed in Category 5 were behaviors that were neither characteristic nor uncharacteristic of the participant, and behaviors placed in Category 9 indicate those behaviors that were extremely characteristic of the participant. Four trained research assistants were used to rate the behaviors of the participants. The four-judge composite reliability of each RBQ item was then computed by treating judges as items (i.e., $n = 4$) for each RBQ item. In the current study, the average reliability of the 64 RBQ items during the interaction was $\alpha = .76$ (range = .12-.90). This level of judge agreement is slightly higher than other research that has used the RBQ (cf., Funder et al., 2000). Because of the moderate interjudge agreement, judges' scores were averaged together.

Hypothesized behavioral map.Seven judges made predictions about how the RBQ behaviors relate to the primary dimensions of the IPIP-IPC: dominance and warmth. To make these predictions, judges were given a list of the RBQ behaviors and asked to predict how strongly each relates to dominance and warmth using a scale of −3 to 3. A score of −3 indicates the behavior is hypothesized to be performed by a person rated low on dominance or warmth (i.e., a submissive or cold individual); +3 indicates the behavior is hypothesized to be performed by a person rated high on dominance or warmth (i.e., a dominant or warm person); 0 implies the behavior is predicted to be unrelated to dominance or warmth. Across the 64 RBQ behaviors, interjudge agreement was high for both dominance ($\alpha = .90$) and warmth ($\alpha = .96$) ratings. Because of the high interjudge agreement, judges' scores were averaged together.

To create a hypothesized behavioral map, the predicted angular location of each RBQ behavior was computed. This was done by using the following formula:

$$\text{Predicted Angular Location} = \text{arctangent}\ \frac{\text{Mean Dominance Rating}}{\text{Mean Warmth Rating}}$$

For example, the judges predicted the RBQ behavior "Behaves in a timid and fearful manner" would likely be expressed by a person who is submissive (mean Dominance rating = −2.86) and somewhat neutral on warmth (mean Warmth rating = −.57). Applying these values to the formula above places this behavior's hypothesized location at 259° on the IPC (i.e., within the HI octant). In a similar manner, the hypothesized behavioral locations of all the remaining RBQ behaviors were computed.

In addition to computing the predicted angular location of each RBQ behavior, it is also possible to compute the vector length of this prediction using the formula:

$$\text{Predicted Vector Length} = [(\text{Mean Dominance Rating})^2 + (\text{Mean Warmth Rating})^2])^{1/2}$$

In this context, the predicted vector length is an indication of how much interpersonal content the judges expect a given RBQ behavior possesses. Such predictions are insightful because some of the RBQ behaviors are intrapersonal (e.g., "Expresses interest in fantasy or daydreams") and are expected to have little theoretical relationship to the IPC. RBQ behaviors with high predicted vector lengths are expected to show convergent validity with the IPC, whereas RBQ behaviors with low predicted vector lengths are expected to show divergent validity with the IPC. For example, by applying the mean ratings of the RBQ behavior "Behaves in a timid and fearful manner" to the formula above the predicted vector length of this behavior is 2.91. In contrast, the RBQ behavior "Expresses interest in fantasy or daydreams" (mean Dominance rating = .00; mean Warmth rating = .85) only produced a predicted vector length of .85. It is therefore expected that the behavior "Behaves in a timid and fearful manner" will possess more interpersonal content than the behavior "Expresses interest in fantasy or daydreams" and could be mapped onto the IPC.

Procedure

Experimental sessions were conducted with one participant at a time. After consenting to the study, each participant completed the IPIP-IPC. Next, the participant was introduced to a same-sex confederate posing as another research participant. In reality, the confederate was an undergraduate researcher who was unaware of the participant's actual IPIP-IPC scores and the reason for the current study. Confederates were instructed to act in as "blank slates" toward the participant by allowing the participant to lead the interaction, but to provide reasonable responses beyond "yes-or-on" and to ask short follow-up questions. Confederates were used instead of other participants as interaction partners because past research suggests that the behaviors of the IPC are often altered by the behaviors expressed by participants (i.e., interpersonal complementarity; cf., Ansell, Kurtz, & Markey, 2008; Locke & Sadler, 2007; Markey, Funder, & Ozer, 2003; Markey & Kurtz, 2006; Markey, Lowmaster, & Eichler, 2010; Sadler & Woody, 2003; Sadler, Ethier, Gunn, Duong, & Woody, 2009). By using confederates who act in a fairly neutral manner it reduces the likelihood that a participant's behavior is being driven by the behavior of the interaction partner (e.g., a partner who acts in a cold-hearted manner will likely influence the participants to also act in a cold-hearted manner; see Markey & Markey, 2009) and instead is more likely a result of the participant's own interpersonal disposition.

The participant and confederate then interacted with each other for 15 minutes. This was an unstructured interaction in which the two individuals were seated across from each other and allowed to talk about anything they liked. The interaction was videotaped with full knowledge and

consent from both the participant and the confederate. At the conclusion of the interaction, the participant was thanked for her time and debriefed about the study. At a later time, four research assistants, who were unaware of the participants' actual IPIP-IPC scores, coded the participants' behaviors during the interaction using the RBQ.

Results

Reliability of the IPIP-IPC and Circular Structure of the Octant Scales

The participants' scores on a given octant were computed by averaging together the four items for a given octant (assured-dominant [PA], $M = 2.67$, $SD = 0.62$; arrogant-calculating [BC], $M = 2.12$, $SD = 0.62$; cold-hearted [DE], $M = 2.26$, $SD = 0.50$; aloof-introverted [FG], $M = 2.57$, $SD = 0.65$; unassured-submissive [HI], $M = 3.10$, $SD = 0.46$; unassuming-ingenuous [JK], $M = 3.58$, $SD = 0.51$; warm-agreeable [LM], $M = 4.30$, $SD = 0.42$; gregarious-extraverted [NO], $M = 3.70$, $SD = 0.67$). Because four items were used to assess each octant, it was expected that the reliability of any single octant would be modest. As anticipated, and consistent with previous research (Markey & Markey, 2009), the average four-item composite reliability of the eight octant scales was .62. However, because the IPC suggests that these octant scales are ordered in a circular manner, these scales can be used in concert with each other to compute dimensional scores for warmth and dominance (see Nunnally & Bernstein, 1994; Equation 7-17, Markey & Markey, 2006, 2009). This is advantageous because it increases the overall reliability of these dimensional scores. In the current sample, the reliability of these dimensional scores was .82 for dominance and .84 for warmth.

To visually examine the circular nature of the IPIP-IPC octant scales, Figure 2 displays the loadings of the eight octant scales on the first two orthogonal components of a principle components analysis when these scales are rotated for maximum convergence with their theoretical locations on the IPC. Taken together, these two components accounted for 59% of the total variance among IPIP-IPC octant scales (32% and 27%, respectively). A more formal test of this circular structure is given by the computation of a Correspondence Index (CI; Hubert & Arabie, 1987; Rounds, Tracey, & Hubert, 1992). A CI is a fit index indicating how well the circular structure of octants implied in Figure 1 fits the obtained correlations among the IPIP-IPC octants. The CI can be interpreted in a manner similar to a Somers's *d* statistic (Somers, 1962), with a value of 1.00 indicating perfect fit. Randomization tests can also be computed to test the significance of the fit (Tracey, 1997). Results indicated that a circular structure strongly fit the correlations among the IPIP-IPC octant scales (CI = .89, $p < .001$).

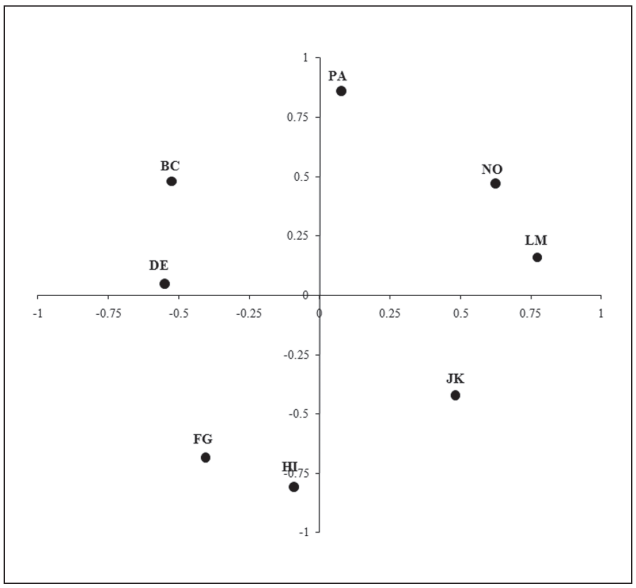

Figure 2. Circular structure of the IPIP–IPC octant scales

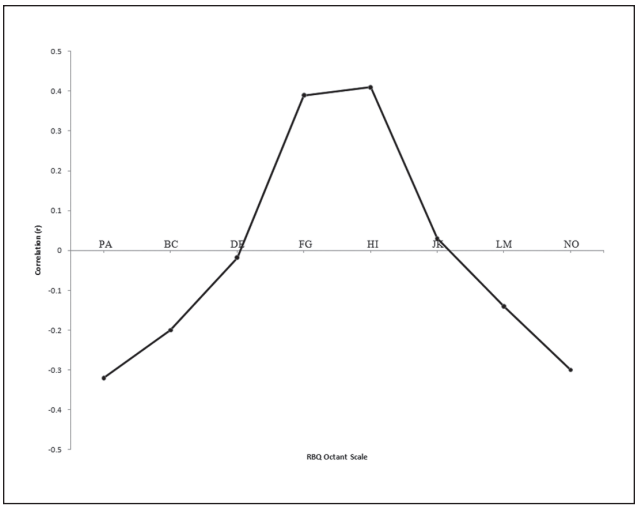

Figure 3. Correlations between the RBQ behavior "Behaves in a timid and fearful manner" and the eight octants of the IPIP-IPC

Behavior Mapping

To map the RBQ behaviors onto the circumplex created by the IPIP-IPC, each RBQ behavior was correlated to the eight octants of the IPIP-IPC. For example, Figure 3 displays the obtained correlations between each of the IPIP-IPC octants and the RBQ behavior "Behaves in a timid and fearful manner." As can be seen in this figure, this behavior was maximally and positively related to the unassured-submissive octant (HI) and was maximally and negatively related to the assured-dominant octant (PA).

To better define the behavioral pattern presented in this figure and create a behavioral map of each RBQ behavior, data were analyzed using the structural summary method (Gurtman, 1994; Gurtman & Balakrishnan, 1998; Gurtman & Pincus, 2000; Wright, Pincus, Conroy, & Hilsenroth, 2009). This methodology recognizes that, given the circumplex structure of the IPIP-IPC, the pattern of correlations presented in Figure 3 should exhibit a sinusoidal pattern. The pattern of a sinusoidal curve can be summarized using the formula (Gurtman, 1992):

$$r_i = e + a \times \cos(\theta_i - \delta) + d,$$

where r_i is the correlation for octant i, e is the elevation of the curve, a is the amplitude, θ_i is the angular location of octant i, δ is the angular displacement of the curve, and d is a deviation component.

The elevation of the curve represents a given RBQ behavior's average correlation with the octant scores. Because the IPIP-IPC has no general factor, this value should be close to zero. In the current example, the elevation for the RBQ item "Behaves in a timid and fearful manner" was −.01. The amplitude of the curve represents the predicted highest positive correlation of a given RBQ behavior with the eight octant scores minus the elevation of the curve. In the current example, amplitude was computed to be .36. The angular displacement of the curve is the point at which a given RBQ behavior has its highest estimated association with the IPC and represents the angular location of the RBQ behavior on the circumplex. For the behavior "Behaves in a timid and fearful manner" the angular location was 259°, corresponding to the Unassured-Submissive (HI) octant.

A goodness of fit statistic, R^2, can be computed to determine how well the profile presented in Figure 3 fits the predicted sinusoidal pattern (Gurtman & Balakrishnan, 1998). A high R^2 value indicates the angular displacement of a given RBQ behavior is interpretable, whereas a low value indicates the observed behavioral pattern of a RBQ behavior cannot be adequately summarized by a single angular displacement value. For the current study, R^2 values >.70 were regarded as sufficient to map a RBQ behavior onto the circumplex. The RBQ example item "Behaves in a timid and fearful manner" produced a R^2 value of .97.

In a similar manner, the structural parameters were computed for each of the 64 RBQ behaviors. Using this methodology, 40 (63%) of the RBQ behaviors produced R^2 values that obtained adequate fit (i.e., $R^2 > .70$) and can be mapped onto the IPC. Such a finding is not surprising considering many of the RBQ behaviors have little theoretical relationship to the IPC (e.g., "Expresses interest in fantasy or daydreams," $R^2 = .33$; "Expresses awareness of being on camera," $R^2 = .34$). To formally examine the discriminant validity of the IPIP-IPC, judges' predicted vector length scores of the 40 RBQ behaviors that map onto the IPC were compared with judges' predicted vector length scores of the 24 behaviors that did not map onto the IPC. As expected, the 40 RBQ behaviors that mapped onto the IPC ($M = 2.51$, $SD = 0.68$) were predicted by the judges to be more strongly related to the dimensions of IPC than the 24 RBQ behaviors that did not map onto the IPC, $M = 2.04$, $SD = .74$; $t(62) = 2.58$, $p < .05$, Cohen's $d = .65$. Table 1 displays the 40 RBQ behaviors that can be mapped onto the circumplex (i.e., $R^2 > .70$) within the octant each was located. Additionally, Figure 4 displays the behavioral map that was created by plotting each of these behaviors' angular locations onto a circumplex.

The Predictability of the Behavioral Map

To formally test the convergence between the obtained behavioral map presented in Figure 4 and the hypothesized behavioral map of these behaviors, the mean angular displacement (MAD; in degrees) was computed. As shown in Table 1, the MAD was 33.52°. To illustrate the strength of this overlap in terms familiar to most researchers, two variables that are perfectly assessed by the interpersonal circumplex, which are separated by only 33.52°, would be correlated with each other .83 (this is computed by taking the cosine of this angular difference; Wiggins & Broughton, 1991). To formally test the convergence between the obtained behavioral map and the hypothesized behavioral map, the MAD was tested as a chi-square using the following formula (Wagner, Kielser, & Schmidt, 1995):

$$\chi^2 = 4(n)[\cos(\text{MAD}/2)^2],$$

with n equal to the number of pairs of scales being compared. The results indicated significant, $\chi^2(40) = 146.69$, $p < .001$, convergence between the actual RBQ locations and their hypothesized locations. Even the MAD (49.44°) computed using all the RBQ behaviors (not just the 40 that could be mapped onto the IPC) revealed a significant, $\chi^2(64) = 211.23$, $p < .001$, convergence between the obtained RBQ locations and their hypothesized locations. In other words, the locations of the RBQ behaviors produced by the IPIP-IPC were similar to the hypothesized locations of these behaviors.

Discussion

The current study used behavioral mapping to examine the discriminant and convergent validity of the IPIP-IPC as a tool for assessing interpersonal styles. Results indicated that behaviors expressed during a dyadic interaction mapped onto self-reports of the IPIP-IPC in a reasonably

Table 1. Structural Summary of Riverside Behavioral Q-Sort Behaviors

	Amplitude	Elevation	R^2	Obtained angular location	Predicted angular location	Angular difference
Assured-Dominant (PA)						
Speaks in a loud voice	.32	.01	.95	77	86	9
Dominates the interaction	.31	.05	.89	70	98	28
Tries to control the interaction	.35	.00	.88	71	101	30
Shows high enthusiasm	.24	−.01	.88	76	34	42
Interviews her partner	.26	.00	.86	68	28	40
Volunteers a large amount of information about self	.13	−.03	.86	83	59	24
Initiates humor	.11	−.01	.81	89	47	42
Displays ambition	.11	.01	.77	108	70	38
Is expressive in face, voice, or gestures	.13	.01	.71	70	50	20
Arrogant-Calculating (BC)						
Exhibits condescending behavior	.22	.01	.86	115	147	32
Talks at rather than with partner	.14	.06	.78	126	130	4
Tries to undermine, sabotage, or obstruct	.15	.01	.76	148	152	4
Cold-Hearted (DE)						
Expresses hostility	.14	.00	.82	186	166	20
Acts irritated	.14	.04	.73	194	156	38
Aloof-Introverted (FG)						
Gives up when faced with obstacles	.25	.01	.94	225	249	24
Says negative things about self	.20	−.06	.91	224	248	24
Expresses insecurity	.26	−.05	.88	242	270	28
Shows physical signs of tension or anxiety	.23	−.03	.88	245	214	31
Behaves in a stereotypical feminine manner	.17	−.01	.87	238	34	156
Expresses self-pity or feelings of victimization	.22	−.01	.84	236	214	22
Keeps partner at a distance	.26	−.01	.84	226	180	46
Compares self to other(s)	.13	.04	.83	215	110	105
Unassured-Submissive (HI)						
Blames others	.22	.02	.93	251	148	103
Behaves in a fearful or timid manner	.36	−.01	.92	251	259	8
Is reserved and unexpressive	.23	−.01	.87	247	227	20
Seeks reassurance from partner	.20	−.02	.80	253	270	17
Unassuming-Ingenuous (JK)						
Seems to like partner	.12	−.03	.80	309	8	59
Seems to enjoy the interaction	.12	−.05	.76	323	355	32
Warm-Agreeable (LM)						
Expresses warmth	.20	.01	.76	355	354	1
Partner seeks advice from subject	.13	−.03	.74	340	0	20
Gregarious-Extraverted (NO)						
Is talkative	.35	.04	.95	45	58	13
Competes with partner	.15	.02	.89	57	124	67
Is physically animated	.12	.03	.83	45	50	5
Speaks fluently and expresses ideas well	.17	−.05	.82	31	56	25
Exhibits social skills	.19	.03	.78	40	27	13
Offers advice	.21	.00	.77	55	40	15
Appears to be relaxed and comfortable	.17	.02	.75	63	27	36
Makes or approaches physical contact	.12	.07	.70	47	22	25
Mean angular difference						33.52**

** $p < .001$.

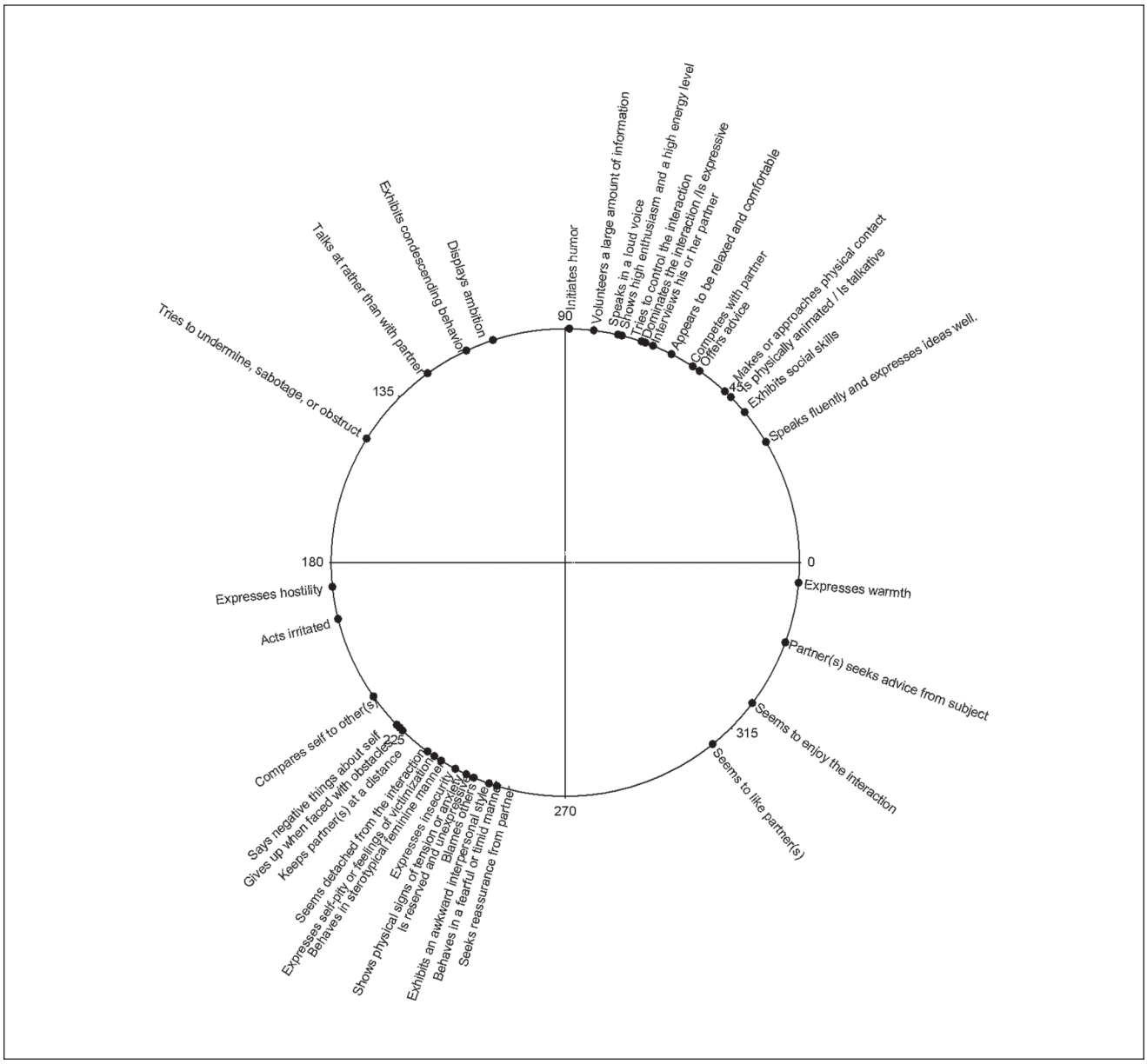

Figure 4. Behavioral map locating 40 of the 64 RBQ behaviors onto the circular space created by the IPIP-IPC

predictable manner. The RBQ behaviors "Is talkative" and "Is physically animated" were located in the gregarious-extraverted (NO) octant. Behaviors such as "Speaks in a loud voice" and "Dominates the interaction" were located in the assured-dominant (HI) octant. The behaviors "Exhibits condescending behavior" and "Talks at rather than with interaction partner" were located in the arrogant-calculating (BC) octant. Behaviors located in the cold-hearted (DE) octant included "Expresses hostility" and "Acts irritated." RBQ behaviors such as "Expresses insecurity" and "Keeps partner at a distance" were located in the aloof-introverted (FG) octant. Unassured-submissive (HI) behaviors included "Behaves in a fearful and timid manner" and "Seeks reassurance from partner." Finally, behaviors located in the warm-agreeable (LM) octant included "Expresses warmth" and "Partner seeks advice from subject."

It is important to note that the effect sizes (i.e., amplitude) linking specific behaviors to the IPIP-IPC ranged from moderate to small. Such effect sizes might have resulted because the current study assessed interpersonal traits and behaviors using two different methodologies (self-report and observer ratings). Of course, it also has to be remembered that the characteristics assessed by the IPIP-IPC and RBQ are fairly broad; in psychometric terms they exemplify extreme bandwidth and low fidelity. Therefore, it would be expected that measures of the IPC would predict

many diverse behaviors (bandwidth), but will not predict any single behavior especially well (fidelity). Consistent with this notion, although most of the effects sizes in this study relating a single behavior to the IPIP-IPC tended to be small or moderate, a large number of behaviors could be mapped onto the IPC in a meaningful manner.

In addition to the convergent validity of the IPIP-IPC to various interpersonal behaviors, results from the current study also demonstrate the discriminant validity of the IPIP-IPC. Judges' predictions of the RBQ behaviors that would be expressed by individuals well defined by the dimensions of the IPC were moderately strongly related (Cohen's*d* = .65) to the RBQ behaviors that could be empirically mapped onto the IPC using the IPIP-IPC. Such results suggest that although the IPIP-IPC can predict interpersonal behaviors (e.g., "Dominates the interaction," "Behaves in a timid and fearful manner," etc.), it is not highly related to behaviors that are more intrapersonal (e.g., Expresses interest in fantasy or daydreams," "Expresses awareness of being on camera," etc.).

Although the IPIP-IPC was able to map various interpersonal behaviors in a predictable manner, as seen in Figure 4, these behaviors were not evenly distributed around the circumplex. Specifically, 25 of the 40 behaviors that contained interpersonal content were located in three of the IPC octants (PA, FG, and NO). Because all eight of the IPIP-IPC scales were used to compute each behavior's location (regardless of its final angular displacement), the uneven distribution of behaviors does not likely reflect an inadequacy in the underrepresented IPIP-IPC scales. Instead, gaps in the behaviors presented in Figure 4 likely occurred because the RBQ assess behaviors related to the PA, FG, and NO octants more than the other octants. Consistent with this notion, judges predicted that 20 of the 40 behaviors mapped onto the IPC would fall in the overrepresented octants PA, FG, and NO (see Table 1). Taken together these results suggests that future researchers using the RBQ to examine interpersonal content contained within the IPC might consider supplementing its 64 items with additional behavioral items that are focused on the underrepresented octants.

The findings from this study, combined with earlier research examining the IPIP-IPC, suggest that the octants of the IPIP-IPC conform to the circular structure of the IPC, the IPIP-IPC has strong convergent validity with the IAS (Markey & Markey, 2009), and it can predict a multitude of interpersonal behaviors expressed during a dyadic interaction. In addition to helping establish the validity of the IPIP-IPC, the current study also underscores the usefulness of examining a broad spectrum of observable behaviors. Historically, personality research has focused on the construction and intercorrelation of self-report measures of personality. Because of this reliance on self-report data, personality psychology has ended up with an enormous amount of information about personality traits, but surprisingly little information concerning basic facts relating personality to behavior (Funder, 1999). To provide insight into behavior, some researchers have turned to methods such as peer reports, diary and beeper reports, life-outcomes (e.g., death, job performance, divorce, etc.), and observed behavior. Such research tends to be expensive and still remains more of the exception than the rule in personality research. Additionally, even when this research is conducted, it typically involves relating various personality dispositions to a limited number of behaviors or life outcomes. By only examining a select number of behaviors, it is difficult for any single study to detect any meaningful pattern of behaviors. This is unfortunate because a personality trait, by definition, is a relativity consistent *pattern* of behaviors. To increase our understanding of interpersonal behavior, and to remedy the disproportionate amount of knowledge we have about personality versus behavior, it is hoped that future researchers will continue to link interpersonal dispositions to as many observable, diverse, and intrinsically meaningful behaviors as possible.

The contributions of the IPIP-IPC and the current study need to be understood within the context of its limitations. In the current research, only female participants' interpersonal behaviors were examined. Although there is not a strong theoretical reason to expect the obtained behavioral map to differ between men and women, future research will need to examine the generalizablity of these findings to both genders. The interactions observed in the current study occurred in a laboratory setting, with a confederate, while being videotaped. Although such careful control of the interaction helps reduce potential confounds that might influence the results, it is unclear how well these results will generalize to more realistic interactions. Therefore, the natural extension of this research is to determine whether or not the results presented in this study generalize to more realistic interactions within a more natural, but less controlled, real-world environment.

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