Interpersonal Orientation in Context: Correlates and Effects of Interpersonal Complementarity on Subjective and Cardiovascular Experiences

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ABSTRACT Interpersonal orientation (IO) generally refers to individual differences in preference for social interaction. The influence of IO, however, likely depends on the nature of complementarity within the interpersonal context. Using the interpersonal circumplex and Five-Factor Model, we first selected a measure of IO characterized by affiliation and neuroticism. Second, we examined the influence of IO on subjective, physiological, and nonverbal experiences as a function of experimentally manipulated complementarity or noncomplementarity. We hypothesized that women in noncomplementarity conditions (i.e., women low in IO working with a friendly confederate, women high in IO working with an unfriendly confederate) would experience the interpersonal situation more negatively compared to women in complementarity conditions. Study results confirmed this prediction, with noncomplementarity in IO resulting in greater physiological reactivity, greater likelihood to attempt nonverbally to restore complementarity, more partner-related thoughts, and a reduced desire to seek out attention compared to women working in complementarity conditions. Implications for research on IO as a person variable are discussed.
Personality is the relatively enduring pattern of recurrent interpersonal situations which characterize a human life.

Harry Stack Sullivan (1953, pp. 110–111)

One person’s pleasure is another person’s pain. Imagine two young women, Nadia and Lisa, who are working on a project that requires a great deal of social interaction. In the course of the project, Nadia tries to engage Lisa with smiles and compliments. Although the interaction appears to have a positive tone overall, the two women have quite different experiences; Nadia enjoys the interaction and feels good about it, whereas Lisa does not. Why might these two women respond so differently to the same interpersonal interaction? Part of the answer may lie in their individual tendencies to value and to prefer certain types of social interactions (i.e., how “interpersonally oriented” they are; Swap & Rubin, 1983). Nadia’s preference for positive social interactions suggests she is probably high in interpersonal orientation, whereas Lisa’s experience suggests she is lower in interpersonal orientation. The aim of the current project was to understand more fully interpersonal orientation by testing the effects of complementarity and noncomplementarity on subjective and cardiovascular experiences.

The Interpersonal Nature of Interpersonal Orientation (IO)

We make the assumption that interpersonal orientation (IO, or interpersonal style) is a relatively enduring pattern of social interaction preferences over a wide range of situations (e.g., Bluhm, Widiger, & Miele, 1990; Kiesler, 1996). Research has demonstrated that IO is related to a wide range of important processes and outcomes including intrinsic motivation (Isaac, Sansone, & Smith, 1999), reproductive success (Brewer & Caporael, 1990), career choices (e.g., Cross & Vick, 2001), personality judgments (Vogt & Colvin, 2003), depression (Little & Garber, 2005), eating disorders (Geller, Cockell, Goldner, & Flett, 2000), and coping with stressful life events (Showers & Ryff, 1996). In addition, IO is associated with a number of social benefits including higher levels of social support (Hill, 1991) and better peer relationships (Buhrmester, Furman, Wittenberg, & Reis, 1988). Together, these findings suggest that high IO individuals experience better general well-being than their
low IO counterparts and also function more adaptively and benefit from social interactions.

The relationship between IO and social functioning has led to several characterizations of interpersonal orientation (e.g., Cross & Morris, 2003; Filsinger, 1981; Hill, 1987; Jack & Dill, 1992; Ryff, 1989; Swap & Rubin, 1983). For example, Jack and Dill (1992) emphasize the importance of securing intimate relationships; others see IO as having a “communion” or “friendly-association quality” (e.g., Helgeson, 1994; see also Vogt & Colvin, 2003), and still others characterize IO as those who have global needs and goals (e.g., to be supportive) that operate in long-term relationships (e.g., Showers & Ryff, 1996). By and large, the essence of IO is often characterized by two distinct personality dimensions: affiliation (friendly vs. hostile) and control (dominant vs. submissive) (e.g., Carson, 1969; Kiesler, 1996).

**Interpersonal Complementarity**

The direct influence of interpersonal orientation on social functioning is evident by both observer ratings and by self-report assessments (e.g., Blumberg & Hokanson, 1983; Nowicki & Manheim, 1991). Nonetheless, there are reasons to expect the effect of IO to be context dependent. Context becomes particularly important when considering the match or mismatch between an individual’s orientation and a given set of situational parameters. This matching hypothesis is based on the general “person-environment fit” theory articulated in the works of Lewin (1951) and subsumed in other stress and motivation theories (such as the transactional model by Lazarus & Folkman, 1984, and the self-regulation of motivation model by Sansone & Smith, 2000). The principle of this general “interactionist” model is that greater goodness of fit (i.e., match) between the context and the person is theorized to lead to more positive outcomes, whereas a mismatch is likely to lead to more negative outcomes.

The general interactionist model was first applied to interpersonal transactions in the writings of Harry Stack Sullivan (1953) who noted that interpersonal interactions are “security operations” and are thus purpose driven. These “purposes” were articulated in more detail by Carson (1969) and have since been revised many times over the past 50 years (e.g., Kiesler, 1983, 1996; Tracey, 2004). Although there are variations, interpersonal interactions are assumed to result
from a blend of two major axes of personality: seeking control (ranging from dominance to submission) and affiliation (ranging from hostile to friendly) such that individuals will choose situations that allow expression of their characteristic tendencies. Interactions that elicit reciprocal control (dominance invites submission and vice versa) but similar affiliation (friendly invites friendly, hostility invites hostility) have complementarity. For example, if Nadia’s IO is friendly-dominant and Lisa’s IO is friendly-submissive, complementarity exists. Interpersonal complementarity is said to be rewarding (Carson, 1969) and thus results in an approach orientation (Kiesler, 1996). Direct effects of IO on social functioning are often found in research, likely because people generally chose to interact with similar others (Kiesler, 1996), and when this is not possible, individuals anticipate and modify their behavior “plans” to try and achieve complementarity (Carson, 1969; Sullivan, 1953; see also Isaac et al., 1999). However, when two people have conflicting plans, the interaction is noncomplementarity (e.g., dyad is reciprocal on control and affiliation). For example, if Nadia’s IO is friendly-dominant and Lisa’s IO is hostile-submissive, noncomplementarity exists. At its extreme, the conflict may even be anticomplementarity (dyad is reciprocal on affiliation and similar on control), for example, if Nadia’s IO is friendly-dominant and Lisa’s IO is hostile-dominant. This imbalance (mismatch) can result in avoidance reactions that are unpleasant and are “at best nonrewarding and may (even) be costly” (Carson, 1969, p. 124).

Complementarity in social interactions has wide ranging implications, from optimal medical outcomes and decreased divorce rates (Kiesler & Auerbach, 2003; Tracey, Ryan, & Jaschik-Herman, 2001) to more mundane outcomes, such as improved jigsaw puzzle performance (Estroff & Nowicki, 1992). These positive outcomes, however, are often restricted to complementarity that includes similarity on only one end of the affiliation dimension, namely an interaction between two friendly persons (and not an interaction between two hostile persons) (Orford, 1986). Anticomplementarity is thought to be relatively rare (Orford, 1986) and results are inconsistent as to just how “costly” (if at all) anticomplementarity is, as evidenced by self-report and performance outcomes (e.g., Blumberg & Hokanson, 1983). Less research exists on noncomplementarity, despite its greater frequency than anticomplementarity in everyday encounters (Kiesler, 1996; see also Orford, 1986). Some evidence suggests
noncomplementarity has mixed effects (Orford, 1986) or no effect (Dryer & Horowitz, 1997) on interaction experiences, but this may be limited to self-report assessments.

Case in point: Dryer and Horowitz (1997) showed that although complementarity along the control dimension (dominance with submissive) produced satisfaction with an interpersonal interaction, noncomplementarity (dominance with dominance) did not significantly influence self-reports of interaction satisfaction. Part of this inconsistency may be due to the short nature of many laboratory interactions (Nowicki & Manheim, 1991). Moreover, it is likely that the heavy reliance on self-report is short-sighted because it may be difficult for individuals “to report publicly that they do not like another person . . . and may be susceptible to effects of social desirability. Regardless of how one might actually feel, there may be a tendency to report liking a stranger with whom you have just interacted for a time” (Nowicki & Manheim, p. 330).

Thus, to the extent that an individual’s IO has complementarity within the context of an interpersonal interaction, it is expected that the individual’s overall experience would be more positive, whereas noncomplementarity may lead to a less positive (or even negative) experience (e.g., Davis & Matthews, 1996), and this should be particularly evident on non-self-report assessments. Given the rarity of anticomplementarity, we opted to examine noncomplementarity with an eye towards circumventing potential self-report methodological shortcomings. The study of IO and noncomplementarity may be particularly important given the conceptual congruence between this individual difference and the basic affiliation motive of social functioning (Hill, 1987).

Because our research is among the first of its kind, we opted, for simplicity and clarity, to examine IO by focusing on its affiliation component, while experimentally holding the control dimension constant. The goal of our project was to test how IO interacts with the social environment to influence an individual’s experience. In the first phase of the project, we used the interpersonal circumplex and the Five-Factor Model to select a measure of IO that reflects differences in affiliation, independently from control, and to assess other possible interpersonal characterizations. In the second phase of the project, we manipulated the affiliative quality of the social environment to test the hypothesis that noncomplementarity in IO would produce a greater distress experience than complementarity.
conditions would produce. We measured both subjective as well as physiological (cardiovascular) responses in order to provide a multimodal assessment.

**PHASE ONE**

There are a number of measures of IO, and it was important that we first select an “optimal measure” (Tracey, 2004) that clearly isolated the affiliation dimension of IO. At the same time, we wanted to use a measure that had a reliable history in the literature and had utility in predicting direct outcomes. We heeded the suggestions of Gurtman (1991), who suggested that measure selection be based on a common conceptual framework that allows for comparison of measures as defined by their social referents. We projected scores on three psychological measures of interpersonal orientation into interpersonal circumplex space and calculated their association with five-factor traits (FFM). All three measures have a corresponding reliable and valid IO scale and were selected because of their status as leading, valid, IO measures in different psychological domains.

**Method**

A sample of 240 (42% males) volunteers from introductory psychology courses participated in exchange for extra class credit. Participants ranged in age from 17–52 with the majority (81%) self-identifying as Caucasian. Participants completed notebooks containing Hill’s (1987) interpersonal orientation measure (which assesses emotional support, social comparison, attention seeking, and positive stimulation; Cronbach’s alpha range for the subscales: .77 to .94); Ryff’s (1989) personal relations with others scale (Cronbach’s alpha = .87); Swap and Rubin’s (1983) interpersonal orientation measure (Cronbach’s alpha = .81); and the Revised Interpersonal Adjective Scales–Big Five survey (IASR-B5; Trapnell & Wiggins, 1990). All measures were presented in counterbalanced order.

**Results and Discussion**

Data were analyzed in accordance with the method outlined by Wiggins and Broughton (1991). In the first step, we characterized the relationship between IO with the two principal axes of the circumplex. Two Pearson product-moment correlations were derived, which served as $x$ and $y$ coordinates $(x, y)$ and allowed for locating the variable in the circumplex. The circumplex itself is based on an
Projection of three measures of interpersonal orientation into interpersonal circumplex space.

Note: Vector length for the Swap and Rubin measure is $V_{\text{Swap/Rubin}} = .373$. Vector length for Hill composite score is $V_{\text{Hill}} = .256$. Vector Lengths for Hill subscales are as follows: Emotional Support $V_{\text{ES}} = .556$, Social Comparison $V_{\text{SC}} = .043$, Positive Stimulation $V_{\text{PS}} = .043$, Positive Stimulation $V_{\text{PS}} = .366$, and Attention $V_{\text{ATT}} = .239$. Vector length for the Ryff measure is $V_{\text{Ryff}} = .680$.

origin of $r = 0$ with $r \pm 1$ delineating the positive and negative poles of the individual axes. The vector length (distance of the variable at $x, y$ from the circumplex origin) characterizes the strength of the interpersonal nature of the variable. This was calculated using the multiple correlations and ranges from a minimum of 0 (projecting from the origin) to a maximum of 1. Results for the projection of the three measures into the two-factor interpersonal circumplex are shown in Figure 1. The composite scores for all three measures
loaded highly on the affiliation factor. This finding suggests that high IO individuals are characterized by a preference for warm and friendly interpersonal interactions and that their behavioral style is consistent with this preference.

In the two-factor model, Swap and Rubin’s (1983) interpersonal orientation scores were significantly positively correlated with the affiliation factor, \( r (228) = .37, p < .001 \) but were unrelated to dominance (see Figure 1). There were no gender differences in the relationship between IO and each axis suggesting the pattern of results was similar for men and women. Because this measure met our criteria for capturing the affiliation dimension of IO orthogonal to control, we next used multiple regressions to examine the independent contributions of the two circumplex factors as well as the five-factor source traits of conscientiousness, neuroticism and openness (McCrae & Costa, 1987). Our goal in characterizing this measure using the FFM was to ensure a clear, common understanding of this IO measure (as suggested by Gurtman, 1991). All five predictors were entered simultaneously, and the overall model was significant for the total sample, \( F (5, 223) = 18.11, \ R^2 = .29 \). High affiliation \( (r = .37, p < .001) \) and high neuroticism \( (r = .34, p < .001) \) emerged as equally strong predictors of higher IO scores. According to Trapnell and Wiggins (1990), neuroticism reflects a measure of anxiety and tendency to experience or perceive negativity. From an interpersonal perspective, trait neuroticism may reflect a concern with perceptual accuracy or sensitivity in interpersonal interactions which are consequential to experiences of stress. Perhaps as a cause or consequence, trait neuroticism is often negatively linked to perceived physical and mental health (Williams & Wiebe, 2000). Hence, the association with neuroticism is particularly interesting as it suggests that high IO individuals are sensitive to negative social nuances such as subtle frustration or concern on the part of the person with whom they are interacting.

In contrast to Swap and Rubin’s (1983) interpersonal orientation measure, results showed that Hill’s (1987) measure was ill suited for our purposes because all of the subscales either failed to correlate with either axis (social comparison subscale) or demonstrated slight positive associations with the dominance factor, Emotional Support, \( r (229) = .12, p = .08 \); Positive Stimulation, \( r (225) = .14, p < .05 \); and Attention, \( r (228) = .13, p = .06 \). Results also showed the scores on the Ryff scale displayed the strongest representation in interpersonal
space (see Figure 1), however; scores correlated significantly with dominance, $r (227) = .36, p < .001$, rendering this measure inappropriate for our use (see Smith, Ruiz, & Isaac, 2002, for complete Phase One results).

In summary, Phase One of our study suggests that Swap and Rubin’s (1983) measure of IO reflects interpersonal affiliation and sensitivity to negative feedback. High IO individuals are characterized as interpersonally warm and responsive to others, whereas individuals lower in this measure of IO are not only more interpersonally cold but also less sensitive to negative social feedback. Using this characterization, the friendly or hostile nature of a social interaction could exert less influence on individuals lower in IO compared to individuals higher in IO because high IO individuals are more responsive to social situations. If this is the case, we would expect only individuals higher in IO to differentially react to the friendly and hostile nature of an interpersonal interaction. Alternatively, interpersonal complementarity theory (e.g., Kiesler, 1996) would predict that both high and low IO individuals are responsive to the friendly and hostile nature of an interaction when that interaction is unambiguous. If this is the case, the friendly and hostile nature of the interaction would differentially “match” individuals higher and lower in IO such that noncomplementarity conditions (i.e., low IO individual working in an overtly warm and friendly situation, high IO individual working in an overtly cold and hostile situation) would engender the most response compared to complementarity conditions (i.e., the matching hypothesis, Davis & Matthews, 1996; Engebretson, Matthews, & Scheier, 1989).

**PHASE TWO OVERVIEW**

We randomly placed individuals higher and lower in Swap and Rubin’s interpersonal orientation in an unambiguously friendly, hostile, or neutral interpersonal situation. To assess their experience we sought to include subjective measures of the experience (a measure of ruminative thoughts about the social interaction partner), physiological (cardiovascular) indexes of the experience, and ancillary indexes of body orientation during—as well as resulting affiliation needs following—the social interaction. Examining the individuals’ reports of partner-related ruminative thoughts served to
inform us of attempts to cope with an aversive event (e.g., Wolfradt & Engelmann, 2003). Physiological responses were also examined. Physiological responses are an important and complimentary modality for assessing task effectiveness and group differences (Cacioppo & Berntson, 1992). Psychophysiology is based on the assumption that perceptions, thoughts, and emotions are physiologically processed and that the study of these physiological responses sheds light on conscious and nonconscious mental processes (Cacioppo, Tassinary, & Berntson, 2000) as well as on potential health consequences (e.g., the development of essential hypertension and atherosclerosis, Obrist, 1981; and the clinical symptoms of coronary heart disease, Kamarck & Jennings, 1991). We examined four indicies of physiological reactivity: heart rate (HR); systolic blood pressure (SBP); diastolic blood pressure (DBP); and mean aterial pressure (MAP). During the systole phase, the heart contracts and blood is pumped out of the heart, whereas during diastole, the heart muscle relaxes and blood is taken into the heart. MAP is a general measure of vascular pressure necessary to perfuse blood through the coronary arteries, brain, kidneys, and the entirety of the circulatory system and is the “best indicator of overall tissue perfusion” (Cacioppo et al., 2000, p. 245). Acute changes in these physiological measures are associated with heightened states of stress (Schneiderman & McCabe, 1989).

Finally, we added two ancillary measures. First, drawing from interpersonal communication research (e.g., Hall, Harrigan, & Rosenthal, 1995), body orientation was used as an index to what response (friendly or hostile) the individual was attempting to elicit from the interaction partner (e.g., Kiesler, 1983, 1996; Markey, Funder, & Ozer, 2003; Nowicki & Manheim, 1991). Second, exploring the affiliation needs following the interpersonal task (emotional, attention seeking, stimulation, and social comparison) served to inform us whether and in what way the interaction may facilitate or repeal various future interpersonal seeking behaviors.

Predictions

Although hostility and friendliness often show direct effects on cardiovascular reactivity (e.g., Newton & Bane, 2001) even in research using only women (D’Antono, Moskowitz, Miners, & Archambault, 2005), if the complementarity hypothesis and our characterization of
interpersonal orientation are correct, then any direct effect of the interpersonal situation would be qualified by an interaction with IO as a function of complementarity conditions. Novel to this type of research, a neutral condition was included to assess the direction of effects: does complementarity have positive effects and/or does non-complementarity have negative effects? Comparing results to the neutral condition allows for this discovery.

It was predicted that noncomplementarity in IO would evoke larger changes in cardiovascular reactivity and would be associated with more partner-related thoughts compared to complementarity conditions. Because nonverbal indications of interaction goals and experiences are useful for providing direct or converging evidence (Carson, 1969), we also examined predominante body posture orientation (cf. Coulson, 2004) to assess if the individual was attempting to elicit friendly responses (forward lean) or hostile responses (backward lean) (e.g., Kiesler, 1996). It was unclear, however, whether and how affiliation needs may be affected as it is possible that noncomplementarity in IO could either enhance or suppress the desire to affiliate with individuals. Research by Hill (1991) suggests that individuals are selective about the interactions they seek and only pursue those likely to provide a desired reward (e.g., attention). Thus it may be useful to begin to understand the different future affiliation needs that may emerge as a function of complementarity in IO during an interpersonal interaction. To date, research is mixed on whether complementarity influences desire for future contact (with the same partner, e.g., Blumberg & Hokanson, 1983), and little is known about how complementarity affects individuals’ needs and wants for future interactions in general (Dryer & Horowitz, 1997). These future-affiliation needs were explored.

Method

Participants

A random sample of 60 healthy female volunteers from introductory psychology courses were recruited for participation in the study if they reported high (in the upper 66% tertile) or low (in the bottom 33% tertile) levels of IO as determined by the Swap and Rubin (1983) 29-item measure of IO in a mass-testing session (mass-testing IO median among women = 101.32, SD = 11.33, n = 397; example item: “The more I am with others, the more I tend to like them,” Cronbach’s alpha = .81). Potential
participants were randomly contacted by phone, screened for health conditions (e.g., taking a blood pressure prescription), and then asked to refrain from caffeinated beverages or smoking for at least 1 hour prior to participation. Participants ranged in age from 18 to 46 years with the majority (82%) self-identifying as Caucasian. Volunteers received class credit for their participation.

Study Design

Participants were blocked on IO and randomly assigned to complementarity conditions resulting in a 2 (high vs. low IO) × 3 (friendly, neutral, hostile context) between-participants design. Upon arrival at the laboratory, participants were met by another female student (confederate) and by a female experimenter. Because teacher-student interactions have well-defined dominance (teacher) and submissive (student) roles (e.g., Markey et al., 2003), participants were told that the purpose of the experiment was to examine teacher-student interactions. They were informed that the procedure would involve working with another person and that each person would be randomly assigned to the role of either the student or teacher. In reality, the participant was always assigned to the dominant teacher role, and the confederate always played the submissive role of the student; this remained constant throughout the study.

Procedure

Baseline period. After providing informed consent, the participant and confederate were introduced and assigned roles. At this point, the experimenter switched on a hidden video camera. A blood pressure cuff was then attached to the participant’s nondominant arm and tethered to their chair to restrict movement. The confederate and the participant were then separated, during which time the participant was given a 10-min baseline period. The baseline test involved a minimally demanding task (i.e., “vanilla baseline”; Jennings, Kamarck, Stewart, Eddy, & Johnson, 1992), in which participants were asked to examine and rate pairs of pictures at 1-min intervals. Blood pressure and heart rate were assessed once per minute during the last 3 minutes and were aggregated to create resting physiological values against which change could be assessed. Participants then completed a baseline affect measure.

Interaction task. Following the baseline period, the confederate was reunited with the participant, and instructions for the task were given. The task required the teacher (participant) to give verbal directions to the student (confederate) on how to reproduce three separate two-dimensional
figures for the duration of 2 minutes per figurine. The interpersonal context condition was manipulated by a script slipped into the confederate’s notebook of paper (used, ostensibly, to follow the teacher’s drawing directions). The confederate remained unaware of condition assignment until this point. We chose to manipulate the complementarity of IO by varying the nature of verbal feedback provided by the student (confederate). The scripted lines (modeled after Engebretson et al., 1989, and pilot tested on a different sample of participants) were either unambiguously friendly (e.g., “You’re really good at this”) unambiguously hostile (“My little sister could do this better than you”) or neutral (no lines were said, and the confederate remained silent; for similar methodologies, see also Bluhm et al., 1990; Blumberg & Hokanson, 1983; Dryer & Horowitz, 1997). The confederate delivered the scripted lines every 40 seconds (according to a clock that only the confederate could see) within each 2-minute trial period, for a total of six comments made overall in each scripted condition. Confederates were trained not to respond to any elicitations from the participant; therefore, we were able to test IO as a function of complementarity and noncomplementarity when the participant was unable to elicit his or her desired interpersonal preferences. Sessions were videotaped to ensure condition conformity, and a random 25% of video tapes were coded for adherence to the script by two independent research assistants unaware of study hypotheses. In no case did the coders find the confederate went off script. Intensive debriefing of participants confirmed that confederate feedback was perceived as realistic and believable.

During each of the three tasks, the experimenter timed each session and operated the blood pressure machine from an adjacent room via a one-way mirror. The experimenter started the pressure monitor at the onset of each task (Minute 0), and again at Minute 1 during each of the three tasks, and recorded the physiological values (Newton & Bane, 2001; Ruiz, Uchino, & Smith, in press; Smith, Ruiz, & Uchino, 2004). After each task, participants completed an affect measure before beginning the next drawing.

**Post-task.** Immediately following the task session, the participant and confederate were again separated, and the participant was asked to complete the Impact Message Inventory and a perceived competence measure as manipulation checks. Participants were then asked to relax for 5 minutes in order to assess physiological recovery. At the conclusion, participants completed a free-recall measure to assess ruminative thoughts during the recovery period as well as a measure of affiliation needs. Participants were then debriefed and reintroduced to the confederate at the close of the study. All participants gave permission for their videos to be examined for research purposes.
Manipulation Checks

The Impact Message Inventory. The IMI (Schmidt, Wagner, & Kiesler, 1993) is a well-validated instrument used to assess an individual’s perceptions of the social behaviors and the messages of a specific social other (Schmidt, Wagner, & Kiesler, 1999). Similar to other complementarity research (e.g., Bluhm et al., 1990; Blumberg & Hokanson, 1983) this measure was used to ensure that our friendly and hostile interaction manipulations were indeed, unambiguous (see Kiesler, 1996, for a review of the IMI in complementarity research). Using a 1 (not at all) to 4 (very much so) Likert scale, participants rated their perceptions of the confederate on 32 items, with stems such as “this person makes me feel like . . .” (e.g., I should tell them they are quite inconsiderate) and “based on the interaction I just had with this person, it appears that . . .” (e.g., they don’t want to be involved with me). The measure includes four items per octant that are combined to yield the two principal circumplex axes—control and affiliation (Cronbach’s alpha range = .72 to .82).

Perceived competence. Given the achievement-related nature of our social interaction manipulations (as task feedback), it was necessary to ensure that our results were not simply due to differences in feelings of task competence (but rather to the experience of match/mismatch). A measure of perceived competence was constructed based on Harackiewicz and Elliot (1993). This four-item measure asked participants to use a 7-point Likert scale to rate the extent to which they agreed with the items (e.g., “This task was easy to understand”) (Cronbach’s alpha = .80).

Baseline affect. Baseline affect was assessed following the relaxation period. Measuring baseline affect served to ensure that our participants did not vary prior to the task (from just the expectation with working with the stranger); thus our results would be due to the interpersonal interaction. Instructions asked respondents to indicate “how you are feeling right now at this moment” using a 1 (not at all) to 4 (very much so) scale. Items were drawn from the anxiety and anger subscales of the State-Trait Personality Inventory (STPI; Spielberger, Gorsuch, & Lushene, 1970). Mean scores on each subscale were computed, with higher scores indicating stronger endorsement.

Primary Dependent Measures

Physiological processes. A Dinamap Model 8100 monitor (Critikon Corporation, Tampa, Florida) was used to measure systolic blood pressure (SBP), diastolic BP (DBP), mean arterial pressure (MAP), and heart
rate (HR). The Dinamap uses the oscillometric method to estimate blood pressure. Blood pressure assessments were obtained via a properly sized occluding cuff positioned on the participant’s nondominant upper arm according to the manufacturer’s specifications. As described previously, physiological measures were sampled twice (at Minute 0 and at Minute 1) during each 2-minute task.

**Thought content.** In order to examine any post-task ruminations, participants were asked to list any thoughts they had during the resting period following the teaching task (Smith, Houston, & Zurawski, 1985). Although participants were given an entire lined page to write thoughts, no participant wrote more than five thoughts. Indeed, less than half of participants (48.3%) wrote more than three thoughts. These open-ended thoughts were coded as either performance-related thoughts or as partner (confederate)-related thoughts. For example, the thought “The figures were getting harder and harder, but I think I did OK” was coded as a performance-related thought, whereas the thought “What did the girl think of me?” was coded as a partner-related thought. Two independent raters unaware of condition assignment or IO levels coded the thoughts, with an interrater reliability of 86.4%. Any coding discrepancies were resolved by a third judge.

**Secondary Measures**

**Affiliation needs.** We employed Hill’s (1987) 26-item, multidimensional scale to assess four types of affiliation needs that index the type of interpersonal seeking behavior the experience may evoke: emotional support, social comparison, attention seeking, and positive (cognitive and affective) stimulation. Participants were asked to rate how true the items are “right now” using a 1 (not at all true) to 5 (completely true) Likert scale. Cronbach’s alpha range for the subscales: .77 to .86.

**Body orientation.** Using random 3-min segments of video footage from each participant, two independent video coders recorded predominate body orientation with a 91.7% agreement (the 5 participants for whom agreement could not be reached were dropped from analysis). Importantly, physical movement was discouraged by the experimenter and rendered unlikely by the tethering of the nondominant arm to the chair. However, body orientation changes could be observed by slight differences in forward lean or backward lean. Body orientation was the only nonverbal behavior participants could logistically engage in, as gaze was required to be on the figurines at all times, touch and movement were restricted by the blood pressure monitor, and closeness was limited by the fixed placement of the chairs.
Results and Discussion

Analytic Strategy and Baseline Equivalence

To examine the effects of complementarity and noncomplementarity in IO on cardiovascular responses, separate univariate ANOVAs were conducted on each dependent measure. Consistent with prior recommendations (Llabre, Spitzer, Saab, Ironson, & Schneiderman, 1991; see also Smith, Glazer, Ruiz, & Gallo, 2004), mean change values were calculated for each cardiovascular variable for each task. Because baseline levels can affect degree of change (Benjamin, 1967), baseline values were included as a covariate in repeated analyses of covariance (ANCOVAs). We computed three-way repeated ANCOVAs (i.e., High vs. Low IO × 3 Condition × 3 Tasks) for each cardiovascular measure. To follow up significant effects involving the trials factor, we calculated mean comparisons using pooled error terms (Bernhardson, 1975). There were no cardiovascular differences between groups or conditions at the baseline period. A marginal difference (albeit a medium effect size) was found for condition on MAP, $F(2,50) = 3.20, p = .05, \eta_p^2 = .11$ such that participants in the hostile condition ($M = 76.33, SD = 7.04$) displayed lower MAP compared to the other conditions (friendly condition $M = 81.20, SD = 5.23$; neutral condition $M = 80.25, SD = 6.16$). However, in light of our analytic strategy of controlling for baseline values in examining change, this effect is negligible.

Manipulation Checks

**IMI.** To test the perception of the confederate (the “student”) in each of the conditions, a multivariate analysis of variance using the IMI octant scores as the within variables and the three social conditions as the between variables was conducted. Results verified that the confederate was perceived as unambiguously warm and friendly in the friendly condition and hostile and unfriendly in the hostile condition, with participants in the neutral condition falling in between, Wilks $\Lambda = .21, F(8,49) = 7.22, p < .001, \eta_p^2 = .54$ (see Figure 2). No statistically significant difference emerged in perceptions of dominance ($p = .94$).

**Perceived competence.** We also examined participants’ perceived competence. Perceived competence was not significantly affected by
our conditions (all \( F_s < 1 \)), ruling out the possibility that our results were due to differences in feelings of task competence.

**Baseline affect.** Importantly, the low self-reported affect values [mean baseline anger = 1.20 (\( SD = .34 \)); mean baseline anxiety = 2.04 (\( SD = .32 \))] following the baseline suggest that participants were in a relatively relaxed state prior to the task (scores could theoretically range from 1 to 4). Importantly, no baseline condition differences in affect were found (all \( ps \ ns \)).

In addition, we also intended to examine change in affect between baseline and the social interaction task as a secondary manipulation check of condition efficacy (e.g., D’Antono et al., 2005; Engebretson et al., 1989). Unfortunately, however, our selected measure of affect was found to have very low internal validity (Cronbach’s alpha = .25). Because of this psychometric issue, self-reported affect was not considered in further analyses.

**Figure 2**
Perceptions of confederates’ behaviors in the IMI-derived interpersonal circumplex.

*Note:* \( FD = \) friendly dominant; \( FS = \) friendly submissive; \( HS = \) hostile submissive; \( HD = \) hostile dominant.
Primary Dependent Measures

Physiological processes. As expected, the interaction evoked significant increases from baseline on all four measures of cardiovascular reactivity, all ts (57) > 6.8, p < .001 (see Table 1). ANCOVAs revealed the expected interaction between condition and IO (as shown in Figure 3) for DBP ($F_{(2,48)} = 3.88$, $p = .03$, $\eta^2_p = .14$), MAP ($F_{(2,48)} = 4.48$, $p = .02$, $\eta^2_p = .16$) and HR ($F_{(2,48)} = 4.37$, $p = .02$, $\eta^2_p = .15$). A marginally significant effect (but medium in effect size) was also found for SBP ($F_{(2,48)} = 2.79$, $p = .07$, $\eta^2_p = .10$) (see Figure 3, Panels A–D). No main effects for IO or condition emerged, suggesting it was not just the IO attributes of the person that were important to physiological response but, rather, the complementarity and noncomplementarity of the social interaction.

Follow-up results yielded differences in physiological reactivity both within and across conditions. Within conditions, participants low in IO displayed significantly greater change in DBP, MAP, and HR than participants high in IO when the interaction was friendly, all ts (48) > 1.75, p < .05 (see Figure 3). Conversely, participants high

<table>
<thead>
<tr>
<th></th>
<th>Baseline Mean</th>
<th>Task df</th>
<th>t</th>
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</thead>
<tbody>
<tr>
<td>Systolic Blood Pressure (mm/Hg)</td>
<td>M: 107.14 (SD: 9.11)</td>
<td>116.33 (SD: 12.73)</td>
<td>57</td>
</tr>
<tr>
<td>Diastolic Blood Pressure (mm/Hg)</td>
<td>M: 59.30 (SD: 7.35)</td>
<td>69.64 (SD: 10.65)</td>
<td>57</td>
</tr>
<tr>
<td>Mean Arterial Pressure (mmHg)</td>
<td>M: 79.22 (SD: 6.12)</td>
<td>91.19 (SD: 9.72)</td>
<td>57</td>
</tr>
<tr>
<td>Heart Rate (bpm)</td>
<td>M: 73.86 (SD: 11.23)</td>
<td>81.33 (SD: 12.80)</td>
<td>57</td>
</tr>
</tbody>
</table>

***p < .001.
Physiological responses during the social interaction task. Panel A: Change in systolic blood pressure (SBP); Panel B: Change in diastolic blood pressure (DBP); Panel C: Change in mean arterial pressure (MAP); Panel D: Change in heart rate (HR).

in IO displayed significantly greater SBP, DBP, and MAP compared to individuals low in IO when the interaction was hostile, all $t$s (48) $> 1.86$, $p < .05$. Importantly, there were no differences between high and low IO individuals when the interaction was neutral.

Analyses also revealed important differences within groups across conditions (see Figure 3). Individuals high in IO displayed significantly greater MAP to the hostile interaction compared to the friendly interaction. Individuals low in IO displayed significantly larger changes in all four cardiovascular indices in the friendly condition compared to the hostile condition, all $t$s (48) $> 1.75$, $p < .05$. In addition, individuals low in IO displayed greater changes in MAP in the friendly condition as opposed to the neutral condition, $t$ (48) = 1.87, $p < .05$. Interestingly, individuals low in IO displayed significantly less SBP, MAP, and HR when in hostile, as opposed to neutral, conditions.
These objective physiological data further indicate that relative to conditions of complementarity, noncomplementarity in IO produces significantly greater physiological reactivity for both high and low IO individuals. In particular, although the task evoked physiological response from all participants, individuals low in IO displayed significantly less reactivity when matched with hostile conditions rather than friendly or neutral situations. These findings suggest that individuals low in IO display more physiological reactivity in friendly social interactions. This finding may appear counterintuitive because an aversive experience during a friendly interaction rubs up against the assumption that the “need to belong” and the need for “relatedness” are universal underlying needs of human beings that motivate individuals to restore social bonds when exclusion or social rejection occurs (e.g., Leary & Downs, 1995; Sansone & Smith, 2000). However, our results do not necessarily imply that individuals low in IO experience social interactions as aversive. This study did not have a work-alone condition; thus, the results only illustrate that individuals low in IO show a relative discomfort in warm interaction contexts. This is in line with complementarity research on self-verification showing people want others to view them as they see themselves, even if that self-view is negative (e.g., low self-esteem, depression; e.g., Kiesler, 1996; McNulty & Swann, 1991).

In short, our results showed physiological reactivity is influenced by whether IO is in match or mismatch within a dyad. However, it is less clear if complementarity in IO decreased physiological reactivity or if noncomplementarity in IO increased reactivity because the neutral condition data were not always consistently different from one condition’s mean (matching) or the other (mismatching).

**Thought content.** To examine the extent to which complementarity and noncomplementarity in IO affected participants’ likelihood of thinking about their partner (the confederate) and task performance, separate ANOVAs were conducted. Only participants who provided at least one thought were included in the analyses (missing data was equal across conditions). Results showed performance-related thoughts did not differ by conditions nor yield any significant interactions. A main effect of context did emerge for number of partner-related thoughts ($F(2,42) = 5.40, p < .01$), such that participants in the neutral context were least likely to be thinking about the
confederate. These results were qualified, however, by a significant interaction with IO \((F(2,42) = 3.15, p < .05)\). Examination of the means revealed participants were most likely to be thinking about the confederate in noncomplementarity conditions, such that low IO participants in the friendly (noncomplementarity) context reported more partner-related thoughts \((M = .67)\) compared to low IO participants in the neutral context \((M = .28)\) and the hostile (complementarity) context \((M = .43)\). Individuals high in IO reported more partner-related thoughts in the hostile (noncomplementarity) condition \((M = .83)\) compared to high IO participants in the neutral context \((M = .01)\) and the friendly (complementarity) condition \((M = .33)\) (all \(p < .05\)). Taken together, these results provide initial evidence that noncomplementarity may trigger something akin to rumination, which may be a source of motivational and physiological distress (e.g., Bermudez & Perez-Garcia, 1996; Lyubomirsky & Nolen-Hoeksema, 1993). The mismatch between IO personality styles may have important implications beyond the acute interaction including prolonged psychological and physiological response as well as expectations of future discord with the specific other. Future relationship discord is especially important when such noncomplementarity interpersonal interactions take place on a regular basis, such as in work settings or therapy sessions where the relationship affects some collective goal (e.g., Kiesler & Auerbach, 2003) over time (Tracey, Sherry, & Albright, 1999).

Secondary Measures

Affiliation needs. To explore future interpersonal-seeking desires following the social interaction, separate ANOVAs were run on each subscale of the Hill (1987) measure. Results revealed no statistically significant differences for emotional support seeking, social comparison needs, or positive stimulation. A significant interaction between condition and IO did emerge, however, for attention seeking, \(F(2, 48) = 4.46, p = .02\). Follow-up tests showed that attention seeking was highest in complementarity conditions (low IO/hostile \(M = 13.01\); high IO/friendly \(M = 15.71\)) and was lowest in noncomplementarity conditions (low IO/friendly \(M = 6.92\); high IO/hostile \(M = 9.92\)) \((p < .05)\), with no difference in the neutral condition (low IO/neutral \(M = 9.89\); high IO/neutral \(M = 10.65\)). These results offer preliminary evidence that, compared to complementarity conditions,
noncomplementarity in IO may suppress the need to strategically use other people to gain attention.

**Body orientation.** Data were analyzed using a chi-square to test whether the observed frequencies of forward lean and backward lean differed significantly from the expected frequencies across conditions. Results showed body orientation depended on the noncomplementarity condition ($\chi^2 (5) = 11.39, p < .05$). Participants high in IO in the hostile condition had the highest proportion of forward lean (83.3%), suggesting they were attempting to elicit friendliness from the confederate. In contrast, participants low in IO in the friendly condition had the highest proportion of backward lean (85.7%), suggesting they were attempting to elicit hostility from the confederate. The remaining conditions were statistically equal in forward and backward lean frequencies (high IO/friendly 62.5% forward lean, 37.5% backward lean; low IO/hostile 28.6% forward lean, 71.4% backward lean; with both neutral conditions resulting in approximately 50% forward/backward lean). These results are consistent with the physiological and thought measures which showed that noncomplementarity in IO generated the most reaction from participants.

**GENERAL DISCUSSION**

Our research highlights the importance of studying IO as a person variable. The current project sought to better understand interpersonal orientation by investigating the individual’s experience within complementarity and noncomplementarity interactions. First, we needed to select an optimal measure of IO and characterize it in common conceptual terms. To this end, interpersonal attributes of IO were projected into interpersonal space and were related to the FFM. Results showed Swap and Rubin’s (1983) measure of IO reflected affiliation (and not control), making it an ideal selection variable for our study. Importantly, the Swap and Rubin measure was also positively related to neuroticism. Thus, higher IO scores as measured by Swap and Rubin index greater interpersonal warmth and sensitivity to negative interpersonal feedback when engaging in short-term social interactions.
Employing the Swap and Rubin (1983) IO measure, we looked at how IO as a person factor affected an individual’s experience during a short-term social interaction with a stranger. We focused exclusively on how women experience a social interaction with another (unknown) woman. Research shows men and women differ in IO, with women reporting consistently higher levels compared to men. Yet it is possible to find men and women on both sides of the spectrum (e.g., Gardiner & Tiggermann, 1999; Smith, Morgan, & Sansone, 2001; Vogt & Colvin, 2003). What is interpersonally stressful to a woman may depend less on her absolute level of IO and more on the complementarity between her individual IO predilection and the (friendly or hostile) interaction she finds herself in. An unambiguously friendly situation may be unsettling for some people (cf. Leary & Downs, 1995; see also Fritz, Nagurney, & Helgeson, 2003). As predicted from interpersonal complementarity theory, results showed that noncomplementarity in IO yielded a greater tendency to report (potentially ruminative) thoughts about the partner and a greater tendency to display nonverbal attempts to elicit the desired complementarity response from the partner, as well as greater cardiovascular reactivity, suggesting more psychological discomfort with the situation. Although limited to women, the physiological findings also suggest that social mismatch may have important health implications, a possibility that warrants further investigation.

Secondary analyses revealed that noncomplementarity in IO also resulted in repelling participants from the need to seek out future interaction partners in order to draw attention to the self. Hill (1991) concluded that the intrinsic interest of engaging in an interpersonal behavior is moderated by the benefits that the individual prefers and expects. In this case, it appears that noncomplementarity in IO resulted in the perception that interpersonal interactions were not useful to meet attention-seeking needs. Notably, complementarity and noncomplementarity in IO did not significantly affect the other interpersonal seeking behaviors.

Our research also adds to the literature supporting the theory of complementarity. Although it might appear contrary that some individuals would experience a friendly situation negatively (Leary & Downs, 1995), our results are in line with other research showing that it is the match between factors that is more important for predicting processes and outcomes versus the valence of the factors (e.g., Christensen, 2000; Horgan & Smith, 2006).
Of course, more than one person factor may operate in a particular context. When more than one person factor pertains to a given situation, which matching person factor “fits” may depend on the hierarchical placement of the individual need (Emmons, 1992). For example, a relational schema fit is more important than an ethnic fit for predicting workgroup preferences (Sanchez-Burks, Nisbett, & Ybarra, 2000). Future research will benefit from identifying boundary conditions for when IO is an important complementarity variable and for when it is not.

Qualifications and Limitations

We sought to examine interpersonal orientation (an individual difference characterized by affiliation and neuroticism) by creating complementarity and noncomplementarity along the affiliation dimension. However, another (useful) approach would be to create an interaction that varied by both friendly/hostile and by control properties. Although most research suggests anticomplementarity interactions are relatively rare (Orford, 1986), to the extent that they do surface, future research would benefit from understanding how such interactions are physiologically experienced.

Self-reported affect was included, although hypotheses were tentative given the inconsistent evidence of past research. Notably, research examining complementarity and self-reported affect has a “checkered history” (Moskowitz & Cote, 1995, p. 922), such that evidence of a casual relationship between complementarity and affect is modest at best and nonexistent at worst, perhaps because of inherent problems with self-report measures (Nowicki & Manheim, 1991). Indeed, our employed measure of affect was found to have inadequate internal validity, rendering any analyses and interpretations circumspect. Nevertheless, self-perceptions are important, and future research to systematically tease apart the role of self-reported affect in interpersonal interactions is needed.

Generalizability is also limited by our sample which consisted of Caucasian, college-age women. Although the use of women was purposeful in order to control for basic physiological differences between men and women, as well as potential gender-role demands in the interaction (e.g., Bluhm et al., 1990; Kiesler, 1996; Newton & Bane, 2001), it leaves open the question of effects among men and mixed sex interactions (for complementarity research looking at
gender specifically see Estroff & Nowicki, 1992; Moskowitz, 1993). A review of complementarity research suggests that in regard to gender, “control and affiliation findings are contradictory and inconclusive” (Orford, 1986, p. 1710), albeit complementarity theory would not predict any gender differences (Tracey, 2004). Complementarity research very often uses only same-sex comparisons for experimental simplicity (e.g., Bluhm et al., 1990; Blumberg & Hokanson, 1983; D’Antono et al., 2005; Dryer & Horowitz, 1997; Nowicki & Manheim, 1991), and, for better or worse, we have followed suit.

It is also important to note that a conclusion of complementarity in IO as beneficial or noncomplementarity in IO as detrimental was not consistently determined by comparing means to the neutral condition. Although the neutral condition means often fell squarely in the middle, our conclusions should be interpreted with care. In addition, complementarity in IO may be more or less important for individuals working with partners with whom they have a longer history (vs. the stranger in our study; e.g., Moskowitz, 1993; Tracey et al., 1999).

In Closing

As Nadia and Lisa illustrated at the outset, and as our data suggest, women higher and lower in IO can experience the same interpersonal task differently as a function of complementarity and non-complementarity. As demonstrated here, social mismatches in interpersonal orientation may moderate experiences of stress and of associated physiological responses, which, over time, may have important consequences for an individual’s physical health. Continued research on what goes on “under the skin” of individuals in interpersonal interactions is key to theory advancement (Kiesler, 1983). Our findings build on existing research showing the utility of interpersonal orientation as a person variable and the potential implications of complementarity and noncomplementarity in IO for a variety of outcomes. Insofar as human life is characterized by interpersonal interactions (Sullivan, 1953), complementarity and noncomplementarity are ever-present phenomenon.

REFERENCES


