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# PERSONALITY PATHOLOGY AND SPOUSES' MOMENT-TO-MOMENT INTERPERSONAL BEHAVIORS

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We assessed the association of personality pathology with romantic couples' observed interpersonal behaviors. Couples engaged in four discussion tasks, after which observers used the Continuous Assessment of Interpersonal Dynamics method to continuously rate each participant's dominance and warmth over the course of each discussion. Using these ratings, we derived indices of average behaviors and changes in behaviors over the course of discussions. Generally, results indicated that the more personality pathology either spouse reported, the colder husbands were on average, and the colder they became toward their wives over time. However, personality disorder symptoms and overall interpersonal problems were largely unassociated with wives' behaviors. Results also indicated that the more dominance-related problems husbands and wives reported, the more dominantly and coldly they behaved, the more submissive or withdrawn their partners were, and the colder wives became over time; and the more warmth problems wives reported, the more dominantly, they behaved.

*Keywords*: personality pathology, personality disorders, moment-tomoment behaviors, interpersonal circumplex, interpersonal problems, romantic relationships, continuous assessment of interpersonal dynamics, dynamic systems modeling

At its core, personality pathology entails maladaptive ways of interacting with and relating to others (Hopwood, Wright, Ansell, & Pincus, 2013; Krueger, Skodol, Livesley, Shrout, & Huang, 2007; South, 2014). More specifically, personality pathology is associated with poorer functioning in romantic relationships. People with more personality problems are less likely to get married (Whisman, Tolejko, & Chatav, 2007), have higher rates of divorce (Disney, Weinstein, & Oltmanns, 2012), and have lower levels of satisfaction, closeness, commitment, and quality of daily interactions within partners (South,

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2014). Personality pathology is often theorized to influence relationship functioning through affecting interpersonal behaviors (e.g., Donnellan, Assad, Robins, & Conger, 2007; Karney & Crown, 2007; Schneewind & Gerhard, 2002). However, associations between personality pathology and partners' ongoing behaviors remain understudied and somewhat nebulous.

Although personality pathology is generally characterized through personality disorders (PDs), it can also be characterized through problems with interpersonal interactions. Interpersonal problems are core symptoms of PDs and core to the DSM-5's definition of personality pathology (American Psychiatric Association, 2013). A large body of research further supports the association between personality disorders and interpersonal problems (e.g., Benjamin, 1996; Oltmanns, Melley, & Turkheimer, 2002; Pincus & Wiggins, 1990; Wilson & Durbin, 2012b; Wilson, Stroud, & Durbin, 2017). Thus, we assess personality pathology through both personality disorder symptoms and interpersonal problems.

#### PERSONALITY PATHOLOGY AND AVERAGE INTERPERSONAL BEHAVIORS

Personality pathology is broadly associated with interpersonal coldness (Ehrensaft, Cohen, & Johnson, 2006; Holtzworth-Munroe, Meehan, Herron, Rehman, & Stuart, 2000; Holtzworth-Munroe & Stuart, 1994; Ogrodniczuk, Piper, Joyce, Steinberg, & Duggal 2009; Soldz, Budman, Demby, & Merry, 1993; South, 2014; South, Turkheimer, & Oltmanns, 2008; Wiggins & Pincus, 1989; Wilson et al., 2017) and is conceptualized as such in the DSM-IV/5. However, there is a relative dearth of research examining how self-reported interpersonal problems relate to *observed* interpersonal behaviors. Studies on this topic suggest that people who report problems being too submissive and distant behave more anxiously, are silent for longer periods of time during conversational lulls, speak more quietly, and engage in less eye contact (Alden & Capreol, 1993); and people who report distress resulting from interpersonal interactions behave more vindictively toward their partners (Birditt & Fingerman, 2005). Overall, however, more research is needed regarding how self-reported personality pathology is associated with maladaptive interpersonal behaviors.

# ASSESSING MOMENT-TO-MOMENT INTERPERSONAL BEHAVIORS

Although findings robustly support associations among PDs, interpersonal problems, and maladaptive behaviors, research in this area has commonly relied on self-report methods, which are susceptible to various recall and favorability biases (e.g., Lemay, 2014; Shiffman, Stone, & Hufford, 2008). The proneness of self-report measures to these biases points to the value of observing partners' behaviors continuously using approaches such as

the Continuous Assessment of Interpersonal Dynamics (CAID), even when researchers are primarily interested in assessing average behaviors (Sadler, Ethier, Gunn, Duong, & Woody, 2009).

The CAID is founded on interpersonal theory and its associated measurement model, the Interpersonal Circumplex (IPC; Leary, 1957), which is organized around the two orthogonal dimensions of dominance and warmth (see Figure 1). The IPC provides a valuable framework for measuring partners' behaviors because it permits thorough coverage of interpersonal content using two orthogonal dimensions (Pincus & Gurtman, 2006; Wright, Pincus, Conroy, & Hilsenroth, 2009). For instance, assertive behaviors are high in dominance, aggressive behaviors are high in dominance and low in warmth, and trusting behaviors reflect a blend of low dominance and high warmth. The IPC also provides coverage of the variety of behaviors that have been assessed in the context of personality pathology, such as aggression, criticism, demands, withdrawals, trust, love, and so forth, indicating that it may be a valuable framework for studying ongoing interpersonal behaviors between partners. Furthermore, the IPC provides a framework through which to measure interpersonal *complementarity*, the principle that people's warmth invites warmth from their partner, whereas their dominance invites submission from their partner (Sadler, Ethier, & Woody, 2011).



FIGURE 1. The interpersonal circumplex (IPC).

## **STUDY AIMS**

The primary purpose of this study was to examine associations between personality pathology and romantic partners' continuously observed interpersonal behaviors. Our first aim was to examine associations between personality pathology (assessed using self-reported personality disorder symptoms and interpersonal problems) and average levels of dominance and warmth observed during spouses' conversations. Given research indicating that personality pathology is generally associated with self-reported cold behaviors, we expected that different indices of personality pathology would be associated with cold behaviors.<sup>1</sup> With regard to dominance, some forms of personality pathology are associated with submission (e.g., avoidant, schizoid, and dependent PDs), and some are associated with dominance (e.g., narcissistic, antisocial, and histrionic PDs; Soldz et al., 1993; Wiggins & Pincus, 1989; Wilson et al., 2017). Thus, on average, we expected different indices of personality pathology to be unassociated with dominant behaviors. We also expected that partners in the relationship would act in complementary ways. For example, because we expected overall personality pathology to be associated with meanlevel actors' coldness, we also expected overall personality pathology to be associated with their partners' mean-level coldness.

It is valuable to assess associations between personality pathology and average behaviors, particularly given the relative lack of research on this topic; however, interpersonal behaviors often change over the course of conversations. For example, a person may begin a conversation being warm, but get colder while discussing a conflict (Sadler et al., 2011). On the other hand, a person may start out being cold toward his or her partner while discussing a conflict but become friendlier as they begin to understand one another and resolve their disagreement. Average scores fail to capture these kinds of behavioral trends, which appear related to psychopathology. Recent research using the CAID characterized patterns of change using linear trends, finding that husbands with more depressive symptoms showed decreases in warmth throughout conversations, as did their wives (Lizdek, Woody, Sadler, & Rehman, 2016). In contrast, wives' depressive symptoms were associated with increases in dominance toward their husbands, who tended to display decreasing dominance during the conversation (Lizdek et al., 2016).

Lizdek and colleagues' (2016) study allowed the field to move one step closer to assessing the dynamic rhythms that have been conjectured to characterize interpersonal interactions for the past few decades (e.g., Gottman, 1979; Levenson & Gottman, 1983; MacIntyre, 2012; Nowak & Vallacher, 1998). In a similar vein to that of Lizdek and colleagues (2016), our second aim was to further the field's understanding of how personality pathology relates to dynamic changes in warmth and dominance over the course of conversations. Specifically, our second aim was to explore whether or not moment-tomoment dynamic patterns were detectable in our sample, the extent to which

<sup>1.</sup> Histrionic and dependent PDs symptoms were the only exceptions to this expectation because they have both been associated with warmth in prior studies (Soldz et al., 1993; Wiggins & Pincus, 1989; Wilson et al., 2017).

they were informed by one's own and one's partner's prior behavior, and the extent to which they differed as a function of one's own and one's partner's PD symptoms. Because of limited research on this topic, we did not make specific predictions.

The relation between personality pathology and gender remains somewhat unclear and potentially nuanced. For example, the association of personality pathology with divorce rates is stronger for women than men (Disney et al., 2012), as is the association between interpersonal problems and distress (Birditt & Fingerman, 2003). These findings may relate to women's tendency to display more demand strategies, such as voicing their complaints and criticizing partners during conflicts, than men, who tend to withdraw more than women during conflicts (Johnson, 2012; Markman, Silvern, Clements, & Kraft-Hanak, 1993). Furthermore, personality pathology is more associated with problems related to coldness and dominance for women than it is for men, and is more associated with problems related to warmth and submission for men than it is for women (Wilson et al., 2017). Other research indicates that, when distressed, women are less likely to express their anger than men (Timmers, Fischer, & Manstead, 1998), although the association between PDs and intimate partner aggression appears equal across genders (Ehrensaft et al., 2006). Thus, we aimed to clarify whether associations between personality pathology and interpersonal behaviors differed across husbands and wives, but we did not make specific hypotheses regarding these associations given mixed results in past research.

## METHOD

#### PARTICIPANTS

We used data collected from female–male couples (N = 137 dyads) recruited from the Chicago, Illinois, area for a study on family relationships, temperament, and psychopathology (see previous articles using this sample: Stroud, Durbin, Saigal, & Knobloch-Fedders, 2010; Stroud, Durbin, Wilson, & Mendelsohn, 2011; Wilson & Durbin, 2012a, 2012b). Recruitment took place in four ways: mailing lists, radio advertisements, print advertisements, and Internet advertisements. For reasons related to broader study goals, all couples cohabited and had at least one biological child between the ages of 3 and 6 years (M = 2.32 children; SD = 0.88). Participants were mostly (93%) married<sup>2</sup> (length of marriages: M = 8.81 years, SD = 3.96 years) and ranged in age from 23 to 57 years (women M = 36.91; SD = 5.17; men M = 38.27; SD = 5.79). Among participants who provided information on their race/ethnicity (90%), most described themselves as Caucasian/White (75.9% women, 75.5% men), followed by Hispanic/Latino (10.2% women, 11.3% men), African American/Black (9.3% women, 9.4% men), Asian (8.3% women, 4.7% men), Native American (2.8% women, 1.9% men), bi/multiracial (1.9% women, 3.8% men), and "other than listed" (1.9% women, 4.7% men), and within-couples spouses typically endorsed the same race/ethnicity (80.4%).

<sup>2.</sup> For ease of communication, we refer to participants as husbands and wives throughout the article.

Among couples who provided information on their family income (86.4%), 1.9% reported income below US\$10,000; 17.8% reported income between \$21,000 and \$40,000; 15.0% reported income between \$41,000 and \$60,000; 31.8% reported income between \$61,000 and \$100,000; and 33.6% reported income above \$100,000. All study procedures were approved by local Institutional Review Boards, and families were paid for their participation.

## PROCEDURE

We coded video-recorded interactions collected during the second laboratory visit of this study during which parents completed a variety of self-report measures assessing marital satisfaction and personality functioning and engaged in four distinct discussion tasks. As the "warm-up" discussion, couples were told to plan a real or imagined *vacation* (~5 minutes), discussing the location, length, and activities involved with their potential trip. For their "cool-down" discussion, couples were asked to discuss the best things about their relationship (~5 minutes). Between these tasks, couples engaged in two conflict discussions (~8 minutes each), one identified as the *wife's conflict* and the other identified as the *husband's conflict* (counterbalanced across couples), in which research assistants instructed participants to thoroughly discuss selected disagreements, chosen based on the couples' combined two most highly rated areas of disagreement on the Dyadic Adjustment Scale (DAS; Spanier, 1976), and to try to reach a solution. These tasks were designed to elicit common but specific emotional experiences that often occur between romantic partners (Foster, Caplan, & Howe, 1997).

## MEASURES

Self-Reported Personality Pathology. The International Personality Disorder Examination-Screener (IPDE-S; Loranger et al., 1994) is a 77-item true-false questionnaire with 10 subscales assessing each of the 10 PDs in the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition (*DSM-5*; American Psychiatric Association, 2013). Research indicates that the severity of overall personality pathology, indexed using total counts of PD symptoms, explains significant variance in related outcomes such as employment, suicidal gestures, and hospitalizations (Morey et al., 2007; Skodol et al., 2005). We therefore primarily focused on the total number of PD symptoms endorsed, which are operationalized as total IPDE-S scores. Consistent with prior PD research (e.g., South, 2014; Stroud et al., 2010), we also report the effects of individual PDs using the IPDE-S's individual PD scores, which ranged in their reliabilities (0.22 <  $\alpha$  < 0.73; Stroud et al., 2010). However, given that measures of individual PDs generally exhibit poor reliability (Widiger & Trull, 2007), we primarily concentrate on total personality pathology scores.

The Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988) is a 64-item scale that measures the kinds of difficulties people experience when interacting with others. It comprises eight subscales: vindictive, cold, domineering, intrusive, socially avoidant, nonassertive, exploitable, and overly nurturant; all of the subscale scores' Cronbach  $\alpha$ s were  $\geq 0.99$  (Stroud et al., 2010). We summed scores on all items to create a measure of total interpersonal problems (i.e., a measure of participants' tendencies to report distress). The IIP has good test–retest reliability, validity, and circular structure (Horowitz et al., 1988).

People's tendencies to report distress on the IIP vary, thus systematically affecting all of their subscale scores (Horowitz et al., 1988). Therefore, as is convention, we ipsatized people's subscale scores then used those personcentered scores to calculate an index of overall warmth problems and overall dominance problems. We calculated warmth and dominance problems indices using conventionally used trigonometric formulas that convert Cartesian coordinates to polar coordinates when measures are circumplex in nature (Wiggins & Broughton, 1991). Thus, we created the dominance problems index using the formula in Equation 1.

 $\begin{aligned} &Problems_{Dominance} = Problems_{Dominance} - Problems_{Submissiveness} + \\ &0.707*(Problems_{WarmDominance} + Problems_{WarmSubmissiveness} + \\ &Problems_{ColdDominance} + Problems_{ColdSubmissiveness}) \end{aligned}$ [1]

We similarly created the warmth problems index using the formula in Equation 2.

$$\begin{aligned} & \text{Problems}_{\text{Warmth}} = \text{Problems}_{\text{Warmth}} - \text{Problems}_{\text{Coldness}} + \\ & 0.707^*(\text{Problems}_{\text{WarmDominance}} + \text{Problems}_{\text{WarmSubmissiveness}} + \\ & \text{Problems}_{\text{ColdDominance}} + \text{Problems}_{\text{ColdSubmissiveness}}) \end{aligned}$$

$$\end{aligned}$$

$$\end{aligned}$$

*Observed Interpersonal Behaviors.* Trained raters assessed couples' momentto-moment warmth and dominance across conversations using the Continuous Assessment of Interpersonal Dynamics (CAID; Lizdek, Sadler, Woody, Ethier, & Malet, 2012; Sadler et al., 2009) method. To assess ongoing interpersonal behaviors, raters were trained to make continuous, behaviorally anchored ratings of each person's warmth and dominance during each discussion. Ratings were made by simultaneously viewing a discussion and using a computer joystick<sup>3</sup> to code each target's behaviors twice per second. Consistent with past research, CAID data were scaled from –1000 to 1000 on both dimensions, with 1000 on the y-axis representing extreme dominance and 1000 on the x-axis representing extreme warmth (see Figure 1).

Raters were instructed to code behaviors by moving the joystick in accord with all of the target's statements, nonverbal behaviors, fluctuations in tone, and so forth that constituted an increase or decrease in warmth and/or dominance. As such, raters moved the joystick in a relatively continuous manner in accord with their perceptions of changes in the target's interpersonal behavior. Example behaviors for each dimension are as follows: (a) dominant behaviors included directing the conversation, asserting authority, and speaking during conversational lulls; (b) submissive behaviors included following the other person's lead, adhering to requests, and not speaking during conversational

<sup>3.</sup> In this study, we used the Microsoft SideWinder Force Feedback 2, without force feedback applied.

lulls; (c) warm behaviors included physical gestures such as moving closer to the other person, eve contact, and affectionate touching, and verbal communications such as laughing, praising, supporting, or complimenting the other person; and (d) distant behaviors included physical gestures such as looking away or aggressive touch, verbal communications such as cruel or critical comments, and an absence of reciprocated warmth, such as not laughing when the other person used humor or withdrawing from physical affection. Because behaviors often reflect a blend of warmth and dominance (e.g., withdrawals are often cold and submissive), horizontal and vertical joystick movements often occur simultaneously to varying degrees, and raters were instructed to move the joystick in a manner that concurrently represented warmth and dominance. Raters were instructed to code even slight gestures such as eve contact, head nods, and changes in tone to ensure that we captured fine-grained variations in behavior. When no discernible changes in behavior were displayed, raters were instructed to maintain their most recent joystick position until the target displayed a meaningful interpersonal behavior.

A total of 10 raters, five men and five women, provided observational ratings for this study. At any given time, we had a team of eight raters, four men and four women; however, two male raters participated in this twosemester study for one semester each (providing approximately half of the codes relative to other raters), and the senior author (K.M.T.) rated 20% of the interactions as part of ongoing reliability checks. Raters were trained by the senior author using protocol outlined by Sadler and colleagues (2009; see also Lizdek et al., 2012) and only began coding study videos after achieving sufficient reliability on at least five training videos.<sup>4</sup>

Raters were assigned to code dyads using the following guidelines: (a) two men and two women coded every discussion, and (b) each rater coded either the vacation or the best things discussion and either the husband conflict or the wife conflict discussion for each couple. Raters assigned to a discussion coded both the husband and the wife (one man and one woman coded the wife first, and one man and one woman coded the husband first). This approach was taken to reduce the likelihood that observed differences between husbands' and wives' behaviors within an interaction were an artifact of raters' gender or ordering effects. Raters received four distinct coding assignments, completed by situation in the following order: (a) vacation, (b) husband conflict, (c) wife conflict, and (d) best things. Each rater was assigned to approximately half of the couples in each category. The order in which raters watched videos was randomized to reduce the influence of potential rater drift systematically affecting some couples more than others. When a rater demonstrated low reliability with other raters for a given participant interaction, that rater's data were removed when computing participants' final [composite] time series (this occurred in 23% of videos).

<sup>4.</sup> To train, raters coded several parent–adolescent conflict discussions (10 minutes), which were previously coded by seven trained raters whose averaged ratings provided a composite against which we assessed the reliability of new raters. In addition, the dyads in training videos also involved family members, which can present unique coding challenges (e.g., it is difficult to code "inside jokes"), who were also discussing and attempting to resolve a disagreement.

When multiple raters demonstrated poor reliability for a given participant's interaction, we reviewed the video together in biweekly team meetings, and raters then recoded the interaction.

We averaged joystick data across reliable raters at each time point to obtain the final time-series data for each participant's warmth and dominance during each of the four discussion tasks. This resulted in time-series data for warmth and dominance for each person across four discussion tasks. With regard to the number of data points within the time series for each of the four discussion tasks, the time series for the "vacation-planning" discussion tasks ranged from 44 to 890 data points (M = 487, SD = 103), the time series for the "husband conflict" discussion tasks ranged from 222 to 1,230 data points (M = 894, SD = 141), the time series for the "wife conflict" discussion tasks ranged from 260 to 1,163 data points (M = 889, SD = 162), and the time series for the "best things about the relationship" discussion tasks ranged from 109 to 965 data points (M = 586, SD = 109). In total, 274 person-level observations were included in subsequent mean-level analyses, whereas a total of 584,189 momentary ratings were analyzed across the 274 individuals, and four tasks within each individual, for the systems analyses.

We provide a visual example of the resultant warmth time-series data for a husband and wife instructed to discuss the best things about their relationship in Figure 2. The couple behaved in a neutral-to-warm manner toward



FIGURE 2. Time-series data of a dyad's warmth while they were instructed to discuss the best things about their relationship (see text description of this interaction in the Observed Interpersonal Behaviors section).

each other during the first minute, after which the husband's behavior toward the wife became increasingly cold over the course of the 5-min conversation. The wife maintained her somewhat warm behavior toward the husband for the first 2 min, after which she also became increasingly cold over the course of the conversation. These data communicate that even though the pair were behaving in an increasingly cold manner toward each other throughout their discussion, the wife was on average warmer toward her husband than her husband was toward her.

Given the multilevel structure of our data, we estimated the consistency across raters' observations of warmth and dominance using generalizability theory (Cronbach, 1972; Cronbach & Shavelson, 2004), an extension of classical test theory for multilevel data. Consistent with prior research using the CAID to measure interpersonal behaviors, our estimates of the between-person consistency of average ratings within each discussion suggest that raters provided sufficiently reliable estimates of average warmth and highly reliable estimates of average dominance for each task ( $\alpha_{warmth} = .70$ ;  $\alpha_{\text{dominance}} = .90)^5$ . There were no significant gender differences between husbands' and wives' mean warmth or dominance scores across any tasks with the exception that wives were more dominant discussing their own conflict (see Table 1 for descriptive data for the CAID). Within dyads, husbands' and wives' behaviors correlated positively for warmth and negatively for dominance, a pattern consistent with the theory of interpersonal complementarity. Consistent with expected situational differences across our discussion tasks, participants were warmer during more positive discussions (vacation and best things) compared to conflict discussions; however, rank-order behaviors were highly consistent across participants. Warmth and dominance ratings aggregated across all raters and discussions provided highly reliable estimates of participants' average behaviors ( $\alpha_{warmth} = .96$ ;  $\alpha_{dominance} = .99$ )<sup>6</sup> as well as reliable ratings of changes in participants' behaviors across discussion tasks  $(\alpha_{\text{warmth}} = .75; \alpha_{\text{dominance}} = .92).^7$ 

#### DATA ANALYSIS

Our overall aim was to assess associations between personality pathology and behavioral warmth and dominance. In the analyses we conducted to achieve our aims, we treated conversation ratings (ranging from -1000 to 1000) and personality pathology reports (*z*-scored) as continuous, and time (ranging from 0 to 615 seconds in .5-second increments) on a point-wise interval scale.

<sup>5.</sup> These numbers represent the consistency of raters' observations within a single discussion task and can be interpreted in the same way as Cronbach's alpha. We computed these values using the generalizability theory formula for  $R_{1F}$ -

<sup>6.</sup> These numbers represent the consistency of raters' observations across all discussion tasks and can be interpreted in the same way as Cronbach's alpha. We computed these values using the generalizability theory formula for  $R_{\rm KF}$ .

<sup>7.</sup> These numbers represent the within-person consistency of changes in raters' observations of mean behaviors across discussion tasks and can be interpreted in the same way as Cronbach's alpha. We computed these values using the generalizability theory formula for  $R_c$ .

	Mean Warmth <sup>a</sup>	SD of Warmth <sup>b</sup>	Mean Dominance <sup>a</sup>	SD of Dominance <sup>b</sup>
Vacation				
Husbands'	143.53 (137.74)	62.13 (33.61)	64.81 (167.26)	121.60 (36.14)
Wives'	172.01 (112.68)	62.06 (29.07)	65.95 (167.67)	119.00 (38.10)
Spouse Correlation	.52	.63	65	.48
Husband Conflict				
Husbands'	58.83 (156.08)	75.41 (40.44)	48.48 (179.63)	166.36 (52.31)
Wives'	65.44 (153.88)	83.41 (46.81)	36.00(176.03)	168.93 (53.50)
Spouse Correlation	.68	.63	63	.71
Wife Conflict				
Husbands'	56.74 (128.06)	58.57 (33.12)	25.79 (152.42)	155.80 (57.10)
Wives'	68.27 (125.41)	66.54 (35.73)	65.31 (132.80)	150.97 (58.36)
Spouse Correlation	.71	.55	42	.72
Best Things				
Husbands'	152.78 (108.44)	60.08 (28.64)	5.08 (155.21)	151.11 (47.43)
Wives'	162.76 (123.57)	61.92 (31.19)	-1.22 (151.21)	149.56 (49.62)
Spouse Correlation	.70	.60	49	.74
Total				
Husbands'	102.86 (109.65)	64.42 (24.98)	37.91 (126.14)	148.57 (30.40)
Wives'	116.16 (106.93)	68.57 (26.44)	40.57 (127.31)	147.42 (34.09)
Spouse Correlation	.69	.63	62	.71

TABLE 1. Means, SDs, and Bivariate Correlations of Spouses'	Raw Interpersonal
Behavior Scores Across Discussions	

Note. SD = standard deviation. All numbers in parentheses are SDs of the adjacent mean. <sup>a</sup>With the exception of reported correlations, the statistics in columns 2 and 4 of this table refer to the mean and SD of all the participant's individual index means within the specified task. For example, since each participant had hundreds of warmth ratings per interaction, and the mean of these ratings per person is the mean warmth per person, we averaged the means across all participants for each interaction. Thus, column 2 refers to the mean of all participants' warmth means within a specific task and the SD of that aggregated mean. Likewise, column 4 refers to the mean all of the participants' dominance means within a specific task and the SD of this table refer to the mean and SD of all the participants' individual index SDs within the specified task. For example, since each participant's mean warmth per interaction is associated with a standard deviation for that specific participants warmth SDs within a specific task and the SD of that aggregated SD. Likewise, column 3 refers to the mean of all participants for each interaction. Thus, column 3 refers to the mean of all participants' dominance SDs within a specific task and the SD of that aggregated SD. Likewise, column 5 refers to the mean of all participants' dominance SDs within a specific task and the SD of the aggregated SD. Likewise, column 5 refers to the mean of all participants' dominance SDs within a specific task and the SD of the aggregated SD. Likewise, column 5 refers to the mean of all participants' dominance SDs within a specific task and the SD of the aggregated SD. Likewise, column 5 refers to the mean of all participants' dominance SDs within a specific task and the SD of the aggregated SD. Likewise, column 5 refers to the mean of all participants' dominance SDs within a specific task and the SD of the aggregated SD. D is the specific task and the SD of the aggregated SD. Likewise, col

We did so because time is continuous, but the software captured data only every half a second.

We achieved our first aim through multilevel modeling (MLM) with a heterogeneous compound symmetry error structure within a maximum likelihood framework using SPSS Statistics for Mac, version 24.0 (IBM Corp., 2016). We used the Actor–Partner Interdependence Model (APIM) for distinguishable dyads (Kenny, Kashy, & Cook, 2006) because the APIM allows researchers to estimate the effect of people's personality pathology on their own measured behavior (an actor effect) and their partner's measured behavior (a partner effect). Therefore, we predicted each of the two outcome variables (mean warmth, mean dominance) using both the actor's and partner's index of personality pathology. We did so for the following 14 indices of personality pathology: total PD symptom scores, the 10 individual PD scores, interpersonal problem elevation, problem dominance, and problem warmth.<sup>8</sup> The  $\beta$ s (i.e., standardized regression coefficients) from the regressions are reported in Table 2. To correct for the multiple statistical comparisons we report, we use p = .01 as our threshold for significance for all analyses.

Examining linear change in dominance and warmth ratings over the course of individual discussions, as a function of PD symptoms, is useful for describing global trends in how dyadic conversations develop over time. However, importantly, it does not capture more nuanced moment-to-moment patterns, how partners might (asymmetrically) influence one another, or how that influence might change over time. Evidence of such patterns are clear in visualizations of raw data (Figure 3) and are theoretically meaningful for characterizing dynamic regulatory processes both within individuals (De Haan-Rietdijk, Gottman, Bergeman, & Hamaker, 2016) and between individuals within a couple (Gottman, Murray, Swanson, Tyson, & Swanson, 2002; Madhyastha, Hamaker, & Gottman, 2011).

To fulfill our second aim and explore whether such moment-to-moment patterns were detectable, changed as a function of time, were informed by one's own and one's partner's prior behavior, and differed as a function of one's own and one's partner's PD symptoms, we adopted a coupled threshold autoregressive multilevel framework to characterize couples' discussions as a dynamic system (Gottman et al., 2002; Madhyastha et al., 2011). Specifically, we fit separate models for dominance and warmth ratings corresponding to Equation 3 (using dominance as the reference).We used the MIXED procedure in SAS 9.4 (SAS Institute, 2014) with maximum likelihood estimation for the systems analyses.

$$Dom_{ijk} = H_{ijk} \cdot \begin{pmatrix} (b_{H0i} + b_{H0j}) \\ + (b_{H1} + b_{H1i}) \cdot ADom_{ijk-1} + (b_{H2} + b_{H2i} + b_{H2j}) \cdot PDom_{ijk-1} \\ + (b_{H3} + b_{H3i} + b_{H3j}) \cdot Time_{ijk} \\ + b_{H4} \cdot APD_i + b_{H5} \cdot PPD_i \\ + b_{H6} \cdot ADom_{ijk-1} \cdot Time_{ijk} + b_{H7} \cdot PDom_{ijk-1} \cdot Time_{ijk} \\ + b_{H8} \cdot ADom_{ijk-1} \cdot APD_i + b_{H9} \cdot PDom_{ijk-1} \cdot APD_i \\ + b_{H10} \cdot ADom_{ijk-1} \cdot PPD_i + b_{H11} \cdot PDom_{ijk-1} \cdot PPD_i \\ + b_{H12} \cdot Time_{ijk} \cdot APD_i + b_{H13} \cdot Time_{ijk} \cdot PPD_i \\ + b_{H14} \cdot ADom_{ijk-1} \cdot Time_{ijk} \cdot APD_i + b_{H15} \cdot PDom_{ijk-1} \cdot Time_{ijk} \cdot APD_i \\ + b_{H16} \cdot ADom_{ijk-1} \cdot Time_{ijk} \cdot PPD_i + b_{H17} \cdot PDom_{ijk-1} \cdot Time_{ijk} \cdot PPD_i \end{pmatrix}$$

<sup>8.</sup> For example, to obtain the effect of both husbands' and wives' total PD symptom scores (as both actors and partners) on average behavioral dominance, we regressed average dominance on six parameters: (1) a dummy variable for husbands, (2) a dummy variable for wives, (3) the interaction of total actor PD symptom scores and a dummy variable for husbands, (4) the interaction of total partner PD symptom scores and a dummy variable for husbands, (5) the interaction of total actor PD symptom scores and a dummy variable for husbands, (5) the interaction of total actor PD symptom scores and a dummy variable for wives, and (6) the interaction of total partner PD symptom scores and a dummy variable for wives. We did so while accounting for dyadic interdependence and assuming a compound symmetry error structure within a maximum likelihood framework.

#### PERSONALITY PATHOLOGY AND SPOUSES' BEHAVIORS

$$+W_{ijk} \cdot \begin{pmatrix} (b_{W0i} + b_{W0j}) \\ +(b_{W1} + b_{W1i} + b_{W1j}) \cdot ADom_{ijk-1} + (b_{W2} + b_{W2i} + b_{W2j}) \cdot PDom_{ijk-1} \\ +(b_{W3} + b_{W3i} + b_{W3j}) \cdot Time_{ijk} \\ +b_{W4} \cdot APD_i + b_{W5} \cdot PPD_i \\ +b_{W6} \cdot ADom_{ijk-1} \cdot Time_{ijk} + b_{W7} \cdot PDom_{ijk-1} \cdot Time_{ijk} \\ +b_{W8} \cdot ADom_{ijk-1} \cdot PPD_i + b_{W11} \cdot PDom_{ijk-1} \cdot APD_i \\ +b_{W10} \cdot ADom_{ijk-1} \cdot PPD_i + b_{W13} \cdot Time_{ijk} \cdot PPD_i \\ +b_{W14} \cdot ADom_{ijk-1} \cdot Time_{ijk} \cdot APD_i + b_{W15} \cdot PDom_{ijk-1} \cdot Time_{ijk} \cdot APD_i \\ +b_{W16} \cdot ADom_{ijk-1} \cdot Time_{ijk} \cdot PPD_i + b_{W17} \cdot PDom_{ijk-1} \cdot Time_{ijk} \cdot PPD_i \end{pmatrix}$$

$$(3)$$

In this equation,  $Dom_{iik}$  is the dominance rating for couple *i*, on task *j*, for time *k*, split by *Husbands* and *Wives*. Each partner is fit with random couple and task level random intercepts ( $b_{H0i}$ ,  $b_{W0i}$  and  $b_{H0i}$ ,  $b_{W0i}$ , respectively). Of primary interest are (a) the lagged actor  $(b_{H1}, b_{W1})$  and partner  $(b_{H2}, b_{W2})$ dominance ratings and the linear effect of time  $(b_{H3}, b_{W3}; each with corre$ sponding husband and wife random slopes by couple and task), (b) the twoway interactions between lagged actor/partner dominance and actor/partner PD symptoms  $(b_{H8-11}, b_{W8-11})$ , (c) the two-way interactions between the linear time effect for dominance and actor/partner PD symptoms ( $b_{H12-13}$ ,  $b_{W12-13}$ ), and (d) the three-way interactions between lagged actor/partner dominance, time, and actor/partner PD symptoms  $(b_{H14-17}, b_{W14-17})$ . Also included are residuals specific to each partner.  $H_{iik}$  is an indicator that takes a value of 1 when husbands' responses are being modeled and 0 when wives' responses are being modeled. Similarly,  $W_{iik}$  takes a value of 1 when wives' responses are being modeled and 0 when husbands' responses are being modeled. This allows each subequation to be estimated simultaneously, allowing for husband and wife parameters to be estimated independently, and statistically compared adjusting for shared covariance between husbands and wives within a couple.

Within this modeling framework, the lagged actor effects  $(b_{H1}, b_{W1})$  can be interpreted as autoregressive carryover from one moment to the next, similar to the concept of emotional inertia (e.g., Kuppens, Allen, & Sheeber, 2010), but with respect to dominance/warmth behaviors. Values close to 1 represent relative stability, whereas values greater than 1 indicate magnification and those less than 1 indicate attenuation. The lagged partner effects  $(b_{H2}, b_{W2})$ represent the autoregressive carryover from one's partner's previous state, also called coupling (Gottman et al., 2002), with zero values indicating no influence from one's partner, positive values suggesting convergence, and negative values suggesting divergence. Linear time effects  $(b_{H3}, b_{W3})$  indicate if, on average, individuals' warmth/dominance behaviors are increasing or decreasing at the beginning of the different conversations. Of interest in terms of dynamic process in the current analyses are the two-way interactions between lagged actor/partner effects and linear time  $(b_{H6-7}, b_{W6-7})$ . These interactions represent the degree to which initial trajectories amplify, stabilize, or reverse in their overall pattern of change as conversations advance in time as a function of one's own and one's partner's previous state. Substantively of interest are

Actor         Actor         Partner         Actor         Actor         Partner         Actor         Actor         Parand         Mite         Husband         Mite         St         St         St					War	mth	. /0			) Š			Domi	Jance			
HusbandWifeHusbandWifeHusbandWifeHusbandHusbandMifeHusband $\beta$ SF $\beta$ SF $\beta$ SF $\beta$ SF $\beta$ SF $\beta$ SF $\beta$ SFPD Symptom34*.09306.10133*.09804.096.01.107.14.09204.096Tolal PD37*.09729*.10133*.09807.110140920904096Tolal PD37*.09720*.10133*09814191409214010Tolal PD37*.0971311321*1011319141914 </th <th></th> <th></th> <th>A</th> <th>ctor</th> <th></th> <th></th> <th>Par</th> <th>tner</th> <th></th> <th></th> <th>Ac</th> <th>ctor</th> <th></th> <th></th> <th>Part</th> <th>tner</th> <th></th>			A	ctor			Par	tner			Ac	ctor			Part	tner	
$\mu$ SF $\mu$		Husb	and	Wi	fe	Husb	and	Ň	ife	Hush	band	8	ife	Husb	and	Ŵ	fe
PD Symptom         PD Symptom           Total PD $34$ **         093 $06$ $101$ $33$ ** $098$ $04$ $012$ $1.02$ $20$ $090$ Total PD $37$ ** $097$ $31$ * $101$ $17$ $099$ $0.1$ $117$ $1.02$ $20$ $090$ Paranoid $37$ ** $097$ $31$ * $101$ $17$ $099$ $0.1$ $117$ $1.02$ $24$ $096$ Schizoid $37$ ** $098$ $17$ $0.99$ $16$ $1.01$ $24$ $0.96$ Schizoid $23$ * $081$ $13$ $0.11$ $11$ $0.91$ $17$ $0.99$ $16$ $0.96$ $0.66$ $0.96$ $0.66$ $0.96$ $0.66$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ $0.96$ <		β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE
	PD Symptom																
Paranoid $37^*$ $097$ $29^*$ $103$ $31^*$ $101$ $17$ $090$ $0.4$ $115$ $1.2$ $098$ $24$ $096$ Schizolypal $25^*$ $090$ $07$ $1113$ $26^*$ $094$ $05$ $108$ $07$ $100$ $0.3$ $104$ $04$ $086$ Schizolypal $13$ $087$ $13$ $110$ $11$ $001$ $0.10$ $103$ $104$ $04$ $086$ Schizold $33^*$ $081$ $13$ $100$ $13$ $0.93$ $136^*$ $0.94$ $05$ $0.92$ $0.92$ $0.96$ $0.96$ $0.96$ Schizold $33^*$ $091$ $17$ $091$ $11$ $0.91$ $13$ $0.92$ $0.92$ $0.92$ $0.92$ $0.92$ $0.92$ $0.92$ Matisocial $33^*$ $094$ $06$ $0.92$ $12$ $0.91$ $0.11$ $0.10$ $0.11$ $0.10$ $0.11$ $0.10$ $0.11$ $0.10$ $0.11$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ Matisocial $33^*$ $0.94$ $02$ $0.91$ $0.12$ $0.12$ $0.10$ $0.11$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ Matisocial $33^*$ $0.94$ $101$ $0.10$ $0.12$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ $0.10$ Matisocial $121$ <	Total PD	34**	.093	06	.101	33**	.098	04	960.	.01	.107	.14	.092	20	060.	04	.110
Schizotypal $25*$ $.090$ $.07$ $.113$ $26*$ $.094$ $.06$ $.107$ $.100$ $.03$ $.104$ $04$ $.086$ Schizoid $13$ $.087$ $13$ $.087$ $13$ $.087$ $13$ $.087$ $13$ $.096$ $.06$ $.06$ $.08$ Schizoid $23*$ $.081$ $214*$ $.110$ $29**$ $.081$ $30*$ $.107$ $05$ $.092$ $.09$ $.06$ $.08$ Mattsocial $23*$ $.081$ $31*$ $.110$ $29**$ $.083$ $30*$ $.107$ $.05$ $.09$ $.106$ $.07$ $.09$ Mattsocial $33**$ $.094$ $017$ $.092$ $.091$ $.017$ $.092$ $.012$ $.016$ $.016$ $.016$ $.016$ Matcsistic $33**$ $.094$ $09$ $.012$ $.102$ $.012$ $.010$ $.01$ $.112$ $.010$ $.012$ $.026$ $.026$ $.06$ $.06$ $.06$ Narcisistic $.17$ $.100$ $11$ $.100$ $.011$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.021$ <td< td=""><td>Paranoid</td><td>37**</td><td>760.</td><td>29*</td><td>.103</td><td>31*</td><td>.101</td><td>17</td><td>660.</td><td>.04</td><td>.115</td><td>.12</td><td>.098</td><td>24</td><td>960.</td><td>08</td><td>.117</td></td<>	Paranoid	37**	760.	29*	.103	31*	.101	17	660.	.04	.115	.12	.098	24	960.	08	.117
Schrizoid $13$ $087$ $13$ $110$ $11$ $001$ $0.6$ $105$ $1.06$ $0.66$ $0.06$	Schizotypal	25*	060.	07	.113	26*	.094	05	.108	07	.100	.03	.104	04	.086	.12	.120
Antioocial $23*$ $.081$ $31*$ $.110$ $29*$ $.08$ $30*$ $.07$ $.06$ $.09$ $.106$ $15$ $.080$ Borderline $36*$ $.098$ $17$ $.096$ $17$ $.096$ $17$ $.095$ $29*$ $.107$ $.089$ $01$ $.113$ $.22*$ $.085$ $24*$ $.094$ Histrionic $33*$ $.094$ $08$ $.093$ $26*$ $.101$ $13$ $.086$ $.08$ $.106$ $.24*$ $.094$ Narcissistic $.17$ $.100$ $11$ $.105$ $.12$ $.106$ $.094$ $.111$ $.108$ $.023$ $.24*$ $.092$ Narcissistic $.17$ $.100$ $11$ $.105$ $.106$ $.094$ $19$ $.109$ $.092$ $13$ $.093$ Narcissistic $.14$ $.110$ $07$ $.098$ $.211$ $.107$ $.066$ $.094$ $19$ $.092$ $13$ $.092$ Avoidant $20$ $.102$ $.092$ $12$ $.107$ $.066$ $.094$ $19$ $.06$ $13$ $.092$ Dependent $14$ $.110$ $07$ $.092$ $12$ $.016$ $.092$ $13$ $.012$ $.012$ Dependent $14$ $.110$ $.072$ $.096$ $.094$ $19$ $.092$ $13$ $.092$ Dependent $14$ $.101$ $.002$ $.012$ $.092$ $.012$ $.012$ $.012$ $.012$ $.012$ $.0$	Schizoid	13	.087	13	.110	11	.091	90.	.105	13	.093	16	960.	90.	.080	60.	.113
Borderline $36^{**}$ $0.98$ $17$ $0.95$ $29^{*}$ $105$ $13$ $0.89$ $11$ $113$ $2.2^{*}$ $0.85$ $24^{*}$ $0.94$ Histrionic $33^{**}$ $0.94$ $08$ $0.93$ $26^{*}$ $101$ $13$ $0.82$ $24^{*}$ $0.92$ Narcissistic $.17$ $100$ $11$ $105$ $12$ $.106$ $13$ $.086$ $.08$ $15$ $.089$ Narcissistic $.17$ $.100$ $11$ $.105$ $.021$ $.106$ $.011$ $.022$ $.029$ $.13$ $.089$ $.012$ $.092$ $.013$ $.012$ $.092$ $.013$ $.019$ $.092$ $.013$ $.012$ $.092$ $.013$ $.012$ $.092$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$ $.012$	Antisocial	23*	.081	31*	.110	29**	.083	30*	.107	05	.095	60.	.106	15	.080	.04	.126
Histrionic $33^{**}$ $0.94$ $08$ $0.93$ $26^{*}$ $101$ $13$ $0.86$ $0.8$ $106$ $2.1$ $0.82$ $1.5$ $0.92$ $1.5$ $0.93$ Narcissistic $1.7$ $100$ $11$ $105$ $1.1$ $105$ $1.1$ $108$ $1.1$ $0.92$ $13$ $0.93$ Avoidant $20$ $110$ $0.16$ $0.94$ $19$ $110$ $0.92$ $13$ $0.93$ Avoidant $20$ $110$ $0.07$ $0.99$ $11$ $110$ $0.92$ $13$ $0.93$ Dependent $14$ $110$ $07$ $0.99$ $18$ $112$ $07$ $0.94$ $19$ $110$ $0.92$ $13$ $0.93$ Dependent $14$ $110$ $07$ $0.99$ $18$ $0.94$ $19$ $110$ $0.92$ $13$ $0.93$ Dependent $14$ $110$ $07$ $0.99$ $18$ $0.94$ $19$ $0.96$ $13$ $0.92$ Dependent $14$ $110$ $07$ $0.99$ $18$ $0.94$ $19$ $0.96$ $13$ $0.92$ Dependent $14$ $0.10$ $07$ $0.99$ $18$ $0.94$ $19$ $0.92$ $13$ $0.92$ Dependent $14$ $0.10$ $07$ $0.94$ $07$ $0.94$ $07$ $0.94$ $13$ $0.92$ $13$ $0.92$ Dependent $14$ $0.92$ $16$ $0.92$ $16$	Borderline	36**	.098	17	.095	29*	.105	13	.089	01	.113	.22*	.085	24*	.094	15	.103
Narcissitic         .17         .100        11         .105         .12         .106        15         .099         .11         .108         .10         .092        13         .093           Avoidant        20         .102         .05         .098        21         .107         .06         .094        19         .109        06         .088        03         .019           Dependent        14         .110        07         .090        18         .115        07         .086        03         .119         .06         .088        03         .010           Dependent        14         .110        07         .090        18         .115        07         .086        03         .119         .06         .088        03         .010           Dependent        14         .110        07         .090        18         .115         .06         .094         .03         .09         .03         .017         .08         .094         .01         .08         .04         .03         .04         .01         .08         .04         .03         .04         .04         .03         .04         .04	Histrionic	33**	.094	08	.093	26*	.101	13	.086	.08	.106	.21	.082	.15	.089	14	.098
Avoidant $20$ $.102$ $.05$ $.098$ $21$ $.107$ $.06$ $.094$ $19$ $.109$ $06$ $.088$ $03$ $.035$ Dependent $14$ $.110$ $07$ $.090$ $18$ $.115$ $07$ $.086$ $03$ $.119$ $.06$ $.080$ $13$ $.101$ Dependent $14$ $.110$ $07$ $.090$ $18$ $.115$ $07$ $.086$ $03$ $.119$ $.06$ $.080$ $13$ $.101$ Dependent $14$ $.110$ $07$ $.090$ $13$ $.110$ $.06$ $.080$ $13$ $.101$ Dependent $29*$ $.092$ $.09$ $25*$ $.099$ $25$ $.091$ $17$ $.087$ $17$ $.087$ Interpersonal Problem $29*$ $.085$ $16$ $.092$ $16$ $.087$ $03$ $.097$ $.09$ $17$ $.087$ Interpersonal Problem $29*$ $.081$ $16$ $.092$ $16$ $.087$ $03$ $.097$ $.09$ $14$ $.087$ Dominance $25*$ $.081$ $40*$ $.086$ $31*$ $.087$ $.097$ $.090$ $14$ $.010$ Namb $2.4*$ $.081$ $.03$ $.05$ $.01$ $.04$ $.01$ $.081$ $.06$ $.04$ $.01$	Narcissistic	.17	.100	11	.105	.12	.106	15	660.	.11	.108	.10	.092	13	.093	.03	.107
Dependent $14$ $.110$ $07$ $.090$ $18$ $.115$ $07$ $.086$ $03$ $.119$ $.06$ $.080$ $13$ $.101$ Obsessive-Compulsive $28*$ $.092$ $.093$ $25*$ $.093$ $.014$ $.23$ $.101$ $.08$ $.037$ $.087$ $.047$ $.087$ Interpersonal Problem         Elevation $29*$ $.085$ $16$ $.087$ $03$ $.101$ $.08$ $17$ $.087$ Interpersonal Problem $29*$ $.085$ $16$ $.087$ $03$ $.097$ $.09$ $.090$ $17$ $.087$ Elevation $29*$ $.085$ $16$ $.092$ $03$ $.097$ $.09$ $.090$ $14$ $.088$ $.07$ $.097$ $.09$ $.096$ $14$ $.088$ $.097$ $.091$ $.014$ $.081$ $.081$ $.06$ $.081$ $.06$ $.081$ $.04$ $.081$ $.0$	Avoidant	20	.102	.05	.098	21	.107	90.	.094	19	.109	06	.088	03	.095	.14	.100
Obsessive-Compulsive28*       .092       .25*       .098       .08       .07       .08       .088       .17       .087         Interpersonal Problem       Elevation      29**       .085      16       .093      17       .092      16       .087      03       .097       .09       .090      14       .088         Elevation      29**       .081      16       .092      16       .087      03       .097       .09       .090      14       .088         Dominance      25*       .081      40**       .086      31**       .083       .22       .090       .44*       .080         Warmh       24*       088       .03       .05       .046       .24*       .05       .066       .066       .086	Dependent	14	.110	07	060.	18	.115	07	.086	03	.119	90.	.080	13	.101	10	.093
Interpersonal Problem       Elevation    29** .085    16     .093    17     .092    16     .087    03     .097     .09     .090    14     .088       Dominance    25*     .081    40**     .087    10     .086    31**     .083     .22     .090     .090     .014     .088       Warmth     24*     .088     .03     .096     .01     .084     .01     .086	Obsessive-Compulsive	28*	.092	60.	660.	25*	.098	.08	.094	.23	.101	.08	.088	17	.087	08	.102
Elevation <b>29**</b> .08516 .09317 .09216 .08703 .097 .09 .09014 .088 Dominance <b>25*</b> .081 <b>40**</b> .08710 .086 <b>31**</b> .083 .22 .090 <b>.40**</b> .081 <b>24*</b> .080 Warmth <b>24*</b> 088 03 095 -01 094 -01 088 05 096 <b>24*</b> 243 06 086	Interpersonal Problem																
Dominance <b>25*</b> .081 <b>40</b> ** .08710 .086 <b>31</b> ** .083 .22 .090 <b>.40</b> ** .081 <b>24</b> * .080 Warmh <b>24</b> * .088 .03 .09501 .09401 .088 .05 .096 <b>24</b> * 243 .06 .086	Elevation	29**	.085	16	.093	17	.092	16	.087	03	760.	60.	060.	14	.088	.05	660.
Warmith <b>24</b> * 088 03 095 -01 094 -01 088 05 096 <b>24</b> * 243 06 086	Dominance	25*	.081	40**	.087	10	.086	31**	.083	.22	060.	.40**	.081	24*	.080	36**	.091
	Warmth	.24*	.088	.03	.095	01	.094	01	.088	.05	960.	.24*	.243	90.	.086	12	.097

100





the two-way interactions between PD symptoms and inertia ( $b_{H8,10}$ ,  $b_{W8,10}$ ), coupling ( $b_{H9,11}$ ,  $b_{W9,11}$ ), and linear change ( $b_{H12-13}$ ,  $b_{W12-13}$ ), which indicate how the moment-to-moment and overall trajectories are affected by one's own and one's partner's individual differences; also, the three-way interactions between PD symptoms, inertia/coupling, and linear change ( $b_{H14-17}$ ,  $b_{W14-17}$ ) show how nonlinear discussion patterns are affected by couple members' symptomatology.

## RESULTS

Descriptive and correlational statistics of PD and interpersonal problem scores are reported in Stroud and colleagues' (2010) study on personality pathology and marital satisfaction. Stroud and colleagues found that individuals reported the same amount of problems with warmth, coldness, dominance, and submission, none of which were significantly different from population means (Barkham, Hardy, & Startup, 1996). Descriptive and correlational statistics of behavioral observations in this study can all be found in Table 1. Across all participants, Stroud et al. found that people behaved slightly warmly and dominantly, and that moment-to-moment warmth and dominance behaviors were uncorrelated within persons, suggesting that warmth and dominance were orthogonal for the typical participant.

Models examined the association of personality pathology with average levels of behavioral dominance and warmth (Table 2), as well as linear and moment-to-moment changes in levels of warmth and dominance over the course of conversations (Table 3). When discussing the results, we will focus on the size of the effects more so than their significance; nonetheless, we report significance of effects in the tables.

#### PD SYMPTOMS AND MEAN-LEVEL BEHAVIORS

We predicted that total PD symptoms would generally be associated with cold behaviors and unassociated with dominant behaviors. Partially consistent with our hypotheses, the more total PD symptoms husbands endorsed, the more coldly they behaved toward their wives on average ( $\beta \bar{x}_{Warmth-Actor_Husband} =$ -.34). In contrast, and unexpectedly, total wives' PD symptoms were unrelated to how warmly or dominantly they behaved toward their husbands. Instead, the more total PD symptoms wives endorsed, the colder their husbands were on average ( $\beta \bar{x}_{Warmth_Partner_Husband} = -.33$ ). As discussed below, effects were equally strong for total PD symptom counts and individual PDs, which is surprising given the prior research indicating the superior predictive validity of total PD symptom counts (i.e., severity of pathology) relative to symptom counts for specific PDs (i.e., style of pathology; Hopwood et al., 2011).

Across specific PDs, antisocial and paranoid PDs showed several small but significant associations with behaviors. When wives reported higher levels of antisocial and paranoid PDs, they behaved more coldly toward their husbands ( $\beta \bar{x}_{Warmth Actor Wife ASPD} = -.31$ ;  $\beta \bar{x}_{Warmth Actor Wife PPD} = -.29$ ), and their

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	q	SE	<i>q</i>	SE	p	SE	q	SE
Effect								
Intercept	4.4126** <sup>w</sup>	0.2122	$5.8004^{**w}$	0.2729	0.7196** <sup>d</sup>	0.0719	0.9627** <sup>d</sup>	0.0744
Self Inertia	0.9750**w	0.0009	0.9705**w	0.0010	0.9962** <sup>d</sup>	0.0004	$0.9948^{**d}$	0.0004
Partner Inertia	-0.0004	0.0008	-0.0002	0.0010	-0.0033**	0.0004	$-0.0041^{**}$	0.0004
Time $(1 \text{ unit} = 60 \text{ sec})$	$-0.3313^{**w}$	0.0259	$-0.4280^{**w}$	0.0325	-0.1322**	0.0162	$-0.1210^{**}$	0.0171
Self PD	$-1.1168^{**w}$	0.2120	$-0.0194^{W}$	0.2865	-0.1221	0.0708	0.0485	0.0792
Partner PD	-0.0739w	0.2217	-1.4212** <sup>w</sup>	0.2746	$0.0654^{d}$	0.0767	-0.2092* <sup>d</sup>	0.0731
Self Inertia × Time	0.0004**	0.0001	0.0011**w	0.0001	-0.0001	0.0001	-0.0001	0.0001
Partner Inertia × Time	0.0007**	0.0001	0.0005**	0.0001	0.0005**	0.0001	0.0005**	0.0001
Self Inertia × Self PD	0.0037**	0.0009	-0.0002 <sup>w</sup>	0.0011	0.0013** <sup>d</sup>	0.0004	0.0001 <sup>d</sup>	0.0004
Partner Inertia × Self PD	0.0006	0.0007	0.0014	0.0011	0.0013**	0.0004	0.0001	0.0005
Self Inertia × Partner PD	0.0005 <sup>w</sup>	0.0009	0.0048** <sup>w</sup>	0.0010	-0.0007 <sup>d</sup>	0.0004	0.0011* <sup>d</sup>	0.0004
Partner Inertia × Partner PD	-0.0001	0.0008	0.0008	0.0010	-0.0007 <sup>d</sup>	0.0004	p6000.0	0.0004
Time × Self PD	0.0917**	0.0244	0.0171	0.0325	-0.0029	0.0165	0.0106	0.0186
Time × Partner PD	0.0227	0.0254	0.1088** <sup>w</sup>	0.0312	-0.0031	0.0176	-0.0185	0.0174
Self Inertia × Time × Self PD	-0.0000	0.0001	-0.0000	0.0001	-0.0001	0.0001	-0.0001	0.0001
Partner Inertia × Time × Self PD	-0.0003*	0.0001	-0.0003	0.0001	-0.0001	0.0001	-0.0001	0.0001
Self Inertia × Time × Partner PD	~0000 <sup>~</sup>	0.0001	-0.0006**w	0.0001	0.0001	0.0001	-0.0000	0.0001
Partner Inertia × Time × Partner PD	-0.0000	0.0001	-0.0000	0.0001	0.0000	0.0001	-0.0001	0.0001
<i>Note.</i> $SE$ = standard error. $r$ = effect siz husband and wife estimates differ sig wife. All reported effect sizes (b) are that one time unit corresponds to the	ze estimate using al inificantly ( $p \le .01$ ) unstandardized reg	oproximation fr for warmth and gression coeffici across 60 secon	om Rosenthal & DiN I dominance behavid ents from the system ds (i.e., 1 minute). *	Aatteo (2001). " ors, respectively is model descril $p \leq .01. **p \leq .0$	<sup>ed</sup> Effects within the s Partner effects ind bed by Equation 3; 1 001.	same row that sh icate effects for v nowever, time w	hare a superscript in when the partner is as rescaled by divid	dicate that he husband or ing by 60 such

husbands tended to behave more coldly toward those wives ( $\beta \bar{x}_{Warmth_Partner_Husband_ASPD} = -.29$ ;  $\beta \bar{x}_{Warmth_Partner_Husband_PPD} = -.31$ ). We observed similar partner effects: Husbands who reported higher levels of antisocial and paranoid PDs behaved more coldly ( $\beta \bar{x}_{Warmth_Actor_Husband_ASPD} = -.23$ ;  $\beta \bar{x}_{Warmth_Actor_Husband_PPD} = -.37$ ). For antisocial PD, these husbands were also with wives who behaved more coldly toward them ( $\beta \bar{x}_{Warmth_Partner_Wife} = -.30$ ).

Schizotypal, borderline, histrionic, and obsessive-compulsive PDs showed notable gender differences in that husbands' reports of these PDs were associated with their coldness ( $\beta \bar{x}_{Warmth\_Actor\_Husband\_STPD} = -.25$ ;  $\beta \bar{x}_{Warmth\_Actor\_Husband\_BPD} = -.36$ ;  $\beta \bar{x}_{Warmth\_Actor\_Husband\_HPD} = -.33$ ;  $\beta \bar{x}_{Warmth\_Actor\_Husband\_OCPD} = -.28$ ), whereas wives' reports of histrionic and borderline PDs were associated with their husbands' coldness ( $\beta \bar{x}_{Warmth\_Partner\_Husband\_STPD} = -.26$ ;  $\beta \bar{x}_{Warmth\_Partner\_Husband\_BPD} = -.29$ ;  $\beta \bar{x}_{Warmth\_Partner\_Husband\_HPD} = -.26$ ;  $\beta \bar{x}_{Warmth\_Partner\_Husband\_BPD} = -.26$ ;  $\beta \bar{x}_{Warmth\_Partner\_Husband\_BPD} = -.25$ ). Furthermore, wives' reports of borderline PD were associated with their dominance ( $\beta \bar{x}_{Dominance\_Partner\_Husband} = -.24$ ).

# INTERPERSONAL PROBLEMS AND MEAN-LEVEL BEHAVIORS

On average, we expected total problems to relate to cold, but not dominant, behaviors for actors and partners. Results generally failed to support these hypotheses, with the exception that husbands who reported more interpersonal problems behaved more coldly, on average ( $\beta \bar{x}_{Warmth\_Actor\_Husband} = -.29$ ).

We expected self-reported warmth-related problems to be associated with both spouses' warmth behaviors and unrelated to either spouses' dominance behaviors. Results generally failed to support these hypotheses, with the exception that husbands who reported more warmth problems behaved more warmly ( $\beta \bar{x}_{Warmth\_Actor\_Husband} = .24$ ). Interestingly, wives who reported more warmth-related problems did not behave more warmly, but rather more dominantly ( $\beta \bar{x}_{Dominance\_Actor\_Wife} = .24$ ). Neither spouse's warmth-related problems related to changes in their behavior over the course of discussions.

We expected self-reported dominance-related problems to be associated with actors' dominance and their partners' complementary submissiveness, and our results generally supported these hypotheses. Dominance-related problems were related to wives' behavioral dominance ( $\beta \bar{x}_{Dominance\_Actor\_Wife} = .40$ ) and both partners' submissiveness ( $\beta \bar{x}_{Dominance\_Partner\_Husband} = -.24$ ;  $\beta \bar{x}_{Dominance\_Partner\_Wife} = -.36$ ).

We also expected self-reported dominance-related problems to be unrelated to either spouses' warmth behaviors. However, dominance problems were also associated with actor coldness for both spouses ( $\beta \bar{x}_{Warmth\_Actor\_Husband} = -.25$ ;  $\beta \bar{x}_{Warmth\_Actor\_Wife} = -.40$ ), with wives' tendency to be, not just more submissive, but also more withdrawn when their husbands reported more dominance problems ( $\beta \bar{x}_{Warmth\_Partner\_Wife} = -.31$ ). In other words, self-reported dominance-related problems appear to be associated with aggressive (i.e., cold and dominant) behaviors for both husbands and wives, and when husbands behave aggressively, their wives are withdrawn, and when wives behave aggressively, their husbands behave more submissively.

# PERSONALITY PATHOLOGY AND CHANGES IN BEHAVIOR OVER TIME

Table 3 presents the results from the fitted coupled systems models for dominance and warmth in Equation 3. Consistent with the mean level results, higher levels of husbands' PD symptoms were associated with lower overall levels of warmth in themselves ( $b_{Husband} = -1.12$ ) and their wives ( $b_{Wife} = -1.42$ ; see Figure 3 dashed lines). Moreover, a parallel effect was also observed for dominance, such that husbands' PD symptoms were associated with lower levels of dominance in their wives ( $b_{Wife} = -.21$ ; Figure 3 solid lines).

In terms of global linear trajectories, there was evidence that both husbands and wives on average declined in their dominance ( $b_{Husband} = -.13$ ;  $b_{Wife} = -.12$ ) and warmth  $(b_{Husband} = -.33; b_{Wife} = -.43)$  behaviors over time (scaled such that one time unit equated to 60 sec), with wives showing a larger average decrease than husbands in warmth behaviors across discussions. There was also a high degree of autocorrelation, or stability, in dominance  $(b_{Husband} = .996; b_{Wife} = .995)$  and warmth  $(b_{Husband} = .975; b_{Wife} = .971)$ behaviors from one moment to the next (i.e., lagged effects), with husbands displaying larger levels of stability in both cases. Across time, this stability reversed the sign of the time slope early on in the conversations, which was associated with a particular increase in both partners' warmth behaviors  $(b_{Hushand} = .0005; b_{Wife} = .00011)$ , with the stabilization effect being over twice as strong for wives as it was for husbands. Partners' previous momentary dominance behaviors generally decreased one's own dominance at the subsequent observation ( $b_{Husband} = -.003$ ;  $b_{Wife} = -.004$ ), but there was no parallel lagged partner effect for warmth. That is, partners' dominance behaviors were initially negatively coupled, consistent with the idea of moment-to-moment complementarity. Over time, the reduction effect of partners' previous momentary dominance was magnified, such that partners' previous dominance increased one's own dominance time slope ( $b_{Husband} = .0005$ ;  $b_{Wife} = -.0005$ ), consistent with an interpretation of complementarity. Also, the initial null effect of a partner's previous warmth on one's own warmth increased over time, such that a partner's previous warmth increased one's own warmth ( $b_{Husband} = .0007$ ;  $b_{Wife} = -.0005$ ), again in a mutually reinforcing way.

How these average trajectory, stability, and coupling effects translate into predicted patterns in husbands' and wives' warmth/dominance behaviors over the course of individual discussions is unclear without visualizing the model predictions. This is particularly important when acknowledging that individuals' trajectories and states are continuously feeding into each other. Figure 3B depicts the predicted dominance and warmth trajectories for couples reporting sample-average levels of PD symptoms averaged across the four conversations using the sample-average levels of initial dominance and warmth behavior ratings.<sup>9</sup> Consistent with the model parameter estimates, wives are on average more dominant and warmer than husbands. However, the translation of the time and self/partner lagged effects is more nuanced.

<sup>9.</sup> Predicted trajectories will deviate given different dominance and warmth starting points.

Both dominance and warmth initially increase, particularly so for warmth. Warmth trajectories largely stabilize, and husbands and wives maintain a relatively consistent difference throughout the conversation after an initial divergence. In contrast, dominance trajectories diverge early on, with wives escalating faster than husbands; and they continue to diverge over the course of the conversation, whereby wives do decrease their dominance but do not return to initial levels whereas husbands decrease and eventually trend into submissive levels.

Most relevant to the current investigation were how one's own and one's partner's PD symptoms affected couple members' dominance and warmth trajectories. Husbands' PD symptoms increased the stability of their own warmth and dominance behaviors ( $b_{Husband\_Warmth} = .0037$ ;  $b_{Husband\_Dominance} = .0013$ ) and the stability of their wives' warmth and dominance behaviors ( $b_{Wife\_Warmth} = .0048$ ;  $b_{Wife\_Dominance} = .0011$ ). Wives' PD symptoms did not affect stability estimates. Similarly, only husbands' PD symptoms interacted with husband ( $b_{Husband\_Dominance} = .0013$ ) and wife ( $b_{Wife\_Dominance} = .0011$ ) lagged partner coupling effects. In terms of overall linear trajectories, again only husbands' PD symptoms affected global slopes, and only for warmth trajectories, such that higher husband PD symptoms attenuated their own ( $b_{Husband\_Warmth} = .0917$ ) and their wives' ( $b_{Wife\_Warmth} = .1088$ ) initially negative warmth trajectories.

There were also two statistically significant three-way interactions between husbands' PD symptoms, wives' inertia, and time on husbands' and wives' warmth trajectories. Specifically, husbands' PD symptoms attenuated the effect of their wives' inertia (i.e., coupling) on husbands' own warmth trajectories ( $b_{Husband}$ \_Warmth = -.0003). This can be observed in Figure 3 in that low PD husbands (Panel A) were more coupled to their wives' warmth trajectories and remained relatively flat (dashed lines), while high PD husbands (Panel C) were less coupled and displayed declining warmth over time (dashed lines). The complementary three-way interaction indicated that husbands' PD symptoms attenuated the effect of wives' inertia on wives' own warmth trajectories ( $b_{Warmth}$ \_Warmth = -.0006), such that low levels of husbands' PD symptoms allowed wives' warmth to drive the interaction toward high, stable warmth behavior (Figure 3, Panel A, dashed lines), but high levels of husbands' PD symptoms allowed husbands' declining warmth to drive the interaction toward increasingly less warmth behavior (Figure 3, Panel C, dashed lines).

Because wives' PD symptoms do not substantially affect both partners' dominance and warmth trajectories, Figure 3 illustrates the impact of husbands' low (3A), average (3B), and high (3C) PD symptom counts (while maintaining constant wives' average PD symptom counts) on predicted warmth and dominance behaviors for husbands and wives. Husbands' PD symptoms can be to alter trajectories. Specifically, contrasting graphs 3A and 3C, couples with a low PD husband (3A) reach higher peak levels of warmth and maintain those levels throughout the discussion, with wives maintaining consistently higher warmth, whereas couples with a high PD husband (3C) did not stabilize in warmth but declined over the course of the conversation, with husbands and wives converging on the lowest levels by the conclusion of the discussions. In terms of dominance, low PD husband couples (3A) display initial increases, with wives peaking and leveling off higher than husbands;

but high PD husband couples (3C) show strongly coupled initial increases in dominance and then a divergence in husband and wife trajectories, with husbands entering into submissive behaviors and wives returning to baseline by the end of the discussions.

# DISCUSSION

Past research assessing associations between personality pathology and behaviors has often relied on self-report measures of behaviors. The aim of our study was to better understand how personality pathology relates to continuously observed romantic couples' behaviors. Our results indicated that, when either spouse reported more personality pathology, husbands behaved more coldly on average and also became colder throughout the course of conversations. When husbands reported more interpersonal problems, they behaved more coldly on average, and when wives reported more problems, husbands became colder over the course of conversations. Husbands also tended to behave more submissively when their wives reported more personality pathology, and to increasingly withdraw from them throughout conversations. Unexpectedly, however, wives' warmth was unrelated to either spouses' report of personality pathology. Finally, we found that husbands who reported more warmthrelated problems behaved more warmly toward their wives, whereas wives who reported more warmth-related problems behaved more dominantly, not more warmly. We also found that both husbands and wives tended to decline in warmth and dominance over the course of their discussions, but that wives behaved more coldly toward husbands more quickly than husbands behaved coldly toward them. Within a dynamic systems framework, we found that the more dominant someone was, the more submissive their partner was in response. Furthermore, we found that wives maintained their warmth toward husbands for longer periods of time than husbands maintained their warmth toward wives, and that the more warmth someone exhibited, the more their partner responded with warmth.

Generally, we found that wives' personality pathology was unrelated to changes in their or their husbands' behaviors over the course of conversations, whereas husbands' personality pathology related to changes in their own and their wives' behaviors over time. Husbands who reported more personality pathology behaved more rigidly and increased in coldness over the course of discussions, supporting prior findings that personality pathology is related to increases in negative reciprocity cycles (Jeung, Schwieren, & Herpertz, 2016). In addition, husbands' personality pathology was associated with initial increases in dominance by both partners, followed by a divergence of behaviors whereby wives became more dominant while husbands became more submissive over the course of discussions. This finding paints a picture of both partners initially grasping for control followed by a demand-withdraw pattern whereby wives typically display more dominance as husbands display more submissiveness while discussing aspects of their relationship. This finding is consistent with demand-withdraw patterns frequently found between partners in conflict (Johnson, 2012; Markman et al., 1993).

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#### GENDER

Overall, our results indicate that total personality pathology may be more strongly related to husbands' behaviors than wives' behaviors and that husbands' personality pathology affects changes in behaviors over time more so than wives' personality pathology does. These findings are inconsistent with findings suggesting that personality pathology affects women's, more so than men's, levels of aggression, coldness, and divorce (Disney et al., 2012; Markman et al., 1993; Wilson et al., 2017).

The emergent gender differences could relate to associations among interpersonal behaviors, externalizing pathology, and gender. Externalizing pathology is characterized by "acting out" toward the external environment and is more likely to be manifested in overt interpersonal behaviors than internalizing pathology, which is characterized by "acting in" toward the self (Keiley, Bates, Dodge, & Pettit, 2000; Kramer, Krueger, & Hicks, 2008). Externalizing pathology is also more prevalent in men than in women (Kramer et al., 2008). This tendency to "act out" negative emotions is easier for raters to observe and may be more prevalent among men.

The association between coldness and personality pathology in husbands is consistent with findings that coldness and depressive symptoms are associated in husbands (Lizdek et al., 2016). Lizdek and colleagues (2016) argued that as boys grow up, they are socialized to internalize dominance-related skills to effectively interact with others; girls, on the other hand, are socialized to master understanding and to convey various nuances of warmth-related behaviors in order to effectively interact with others (Wiggins & Broughton, 1985). Thus, it may be that personality pathology more strongly affects behaviors in each gender's less socially normative interpersonal dimension. In general, our results highlight the value of examining potential gender influences in studies of partners' personality and/or psychopathology.

#### ASSESSMENT

Our results also broadly highlight the value of assessing personality and behaviors using multiple methods. We increase our confidence in findings when they replicate across different types/units of analyses, and differences in results across different assessment approaches can yield information about psychological processes and depend on a number of factors such as when and where assessments take place and who provides the data we analyze. We found that wives who reported greater problems with dominance tended to behave more dominantly, but not more warmly, than participants who reported fewer dominance-related problems. These findings could relate to a number of methodological factors, including distinctions in who rated the behaviors (selfreport vs. observational coding), the time span of our analyses (trait tendencies vs. situation-specific states), and the level at which we assessed dominance (as a problem vs. a behavior). However, the gender differences we observed are nonetheless consistent with theory and past research suggesting that women are more likely than men to pursue partners in an effort to satisfy attachment needs (Collins, Cooper, Albino, & Allard, 2002; Greenman & Johnson, 2012).

In other words, women who describe themselves as overly nurturing may also behave dominantly, potentially as an effort to stay connected to their partners in pursuit of their affection.

Our results were likely influenced by the fact that we assessed constructs not only using multiple methods, but also sometimes across different levels of analysis. For instance, we assessed dominance-related problems using the IIP, which asks participants how often they engage too much (or too little) in various behaviors. We assessed dominant behaviors between partners using moment-to-moment ratings of specific conversations, and we trained coders to rate aggressive behaviors as both dominant *and* cold, whereas IIP items involving aggression (e.g., "I am too aggressive toward other people") are scored as purely dominant. Of note, multiple studies have found that the IIP-dominance subscale actually falls on the cold half of the IPC (e.g., Acton & Revelle, 2002; Hopwood, Pincus, DeMoor, & Koonce, 2008; Monsen, Hagtvet, Havik, & Eilertsen, 2006). Thus, discrepancies between self-reported dominance problems and observed cold-dominant behaviors may, in part, be driven by differing definitions of the same construct (e.g., dominance) across assessment instruments.

## LIMITATIONS AND FUTURE DIRECTIONS

The generalizability of our findings is limited by certain methodological factors. Couples in our sample had been together for approximately 9 years and may have learned how to successfully navigate each other's problematic behaviors. Couples were also relatively healthy with respect to overall symptoms of psychopathology. Thus, these results may not extend to individuals with more severe personality pathology or those in new relationships. The results are also limited to male-female couples who are parents. Methodologically, many of the IPDE-S subscales had relatively low reliabilities, decreasing our confidence in their validity and their associations with observed behaviors. We focused more of our attention on our assessment of overall personality pathology, which was more internally consistent. Finally, because this study was observational, not experimental, in nature, directionality of associations cannot be directly claimed.

The causality of interpersonal behaviors remains ripe for exploration. For example, it is unclear whether husbands' dominance-related problems lead them to behave more aggressively, or whether wives' increasing coldness leads husbands to maintain their levels of aggression, and/or how reciprocal and interlocked these dynamics may be. Studies clarifying the causal nature of behaviors could lead to further progress in our understanding of how wellfunctioning couples can resist pulls toward cold behaviors.

Mediating mechanisms between personality pathology and interpersonal behaviors also remain nebulous. For instance, does personality pathology bias spouses' perceptions of their partners' behaviors and intentions, leading people with more pathology to react more coldly? To what extent might personality pathology increase emotional dysregulation, making it difficult for people with more pathology to respond warmly and calmly to partners' real and/ or observable behaviors? Understanding such mediating mechanisms would increase our ability to interrupt cycles of negative reciprocity between partners in order to potentially increase positive relationship behaviors.

Finally, it would be interesting to examine other statistical methods through which CAID time-series data could be considered. For example, our exploratory systems analyses coupled husbands' and wives' time-series data in a two-dimensional multivariate dynamic model, but this could be further expanded to also combine across dominance and warmth dimensions as well (e.g., using Euclidian distance modeling; Woods & Wright, in review). Such an approach would allow for more formal tests of the IPC model predictions with regard to whether synergistic warmth complementarity and antagonistic dominance complementarity occur simultaneously within couples during individual conversations. Figure 3 suggests that both forms of complementarity are observable, most so in couples in which husbands are low in personality pathology, but whether they are occurring in tandem, in real time, remains to be tested. We hope our results are a stepping-stone for other researchers to examine such novel analysis techniques.

# CONCLUSION

Findings from this study demonstrate the association of personality pathology with observed behaviors and underscore the value of assessing how gender may influence partners' problematic behavioral dynamics. Our findings also extend the current personality pathology literature by demonstrating the dynamic shifts in behavior that partners show over the course of conversations and how different behavioral dynamics relate to various types and combinations of husbands' and wives' personality pathology. Assessing associations between personality pathology and observable behaviors can aid in further understanding (a) the influence of psychopathology on interpersonal negative reciprocity patterns, (b) partners' behavioral reactions to each other over time, and, (c) with more research, appropriate ways to identify and address negative patterns.

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