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## Within-person Covariation of Agentic and Communal Perceptions: Implications for Interpersonal Theory and Assessment

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### Abstract

Interpersonal theory identifies agency and communion as uncorrelated (orthogonal) dimensions, largely evidenced by research examining between-person analyses of single-occasion measures. However, longitudinal studies of interpersonal behavior demonstrated the within-person association of agency and communion is not orthogonal for many individuals, and between-person differences in these associations relate to adjustment. We applied a similar approach to investigate the association of interpersonal perceptions. 184 university students completed a 7-day event-contingent study of their interpersonal experiences. Using multilevel regression models, we demonstrated that agentic and communal perceptions were positively associated, and the strength of this within-person association was moderated by between-person scores of dependency and narcissism. We discuss the benefits of incorporating within-person interpersonal associations (termed interpersonal covariation) into interpersonal theory and assessment.

### Keywords

Interpersonal Theory; Longitudinal; Personality traits; personality disorder; narcissism; dependency; EMA; ECR; multilevel model

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The interpersonal theory of personality (Pincus & Ansell, 2012; Fournier, Moskowitz, & Zuroff, 2011) recognizes that humans are social animals and inherently experience many of life's meaningful moments in the context of relating to other people. These interpersonal experiences refer to the observable behavioral exchanges between two (or more) individuals, as well as the internal interpersonal processes evoked through the capacity for perception, memory, fantasy, and mental representation (Lukowitsky & Pincus, 2011). Contemporary interpersonal theory posits a meta-theoretical structure based on the two broad dimensions of agency and communion to organize interpersonal experiences (Bakan, 1966; Wiggins, 2003). Consistent with this, Leising and Bleidorn (2011) found that agency and communion are dimensions people spontaneously used in describing others' overt interpersonal behavior.

Agency is the condition of mastery and assertion, a term that can be represented in interpersonal motivations (to be in control vs. to defer control), traits (assertive vs. passive), behaviors (to dominate vs. to submit), and perceptions (to perceive dominance vs.

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submissiveness). Communion is the condition of connectedness, involvement and sharing with others, a term that can be represented in interpersonal motivations (to be close vs. to disaffiliate), traits (warmth vs. coldness), behaviors (to be friendly vs. to be unfriendly), and perceptions (to perceive friendliness vs. to perceive unfriendliness). These constructs share considerable overlap with the interpersonal traits of the Five Factor Model, as the traits of extraversion (high agency, high communion) and agreeableness (low agency, high communion) are considered rotational variants of agency and communion, and vice versa (McCrae & Costa, 1989).

Importantly, the dimensions of agency and communion are thought to be orthogonal, that is, conceptually and empirically independent of one another (Leary, 1957; Wiggins, 1991). Agency and communion are represented conceptually (and often empirically) as axes of the interpersonal circle (IPC; see Figure 1), where agency is denoted along the Y-axis and communion along the X-axis. The space between these axes represents combinations of agency and communion. There is ample evidence to suggest the two-dimensional structure of agency and communion underlies individual differences in interpersonal functioning at the trait level (Wiggins, 1979), and dispositional (between-person) measures based on agency and communion are often constructed to meet this criterion (Gurtman, 1993; Locke, 2011).

Recently Fournier, Moskowitz, and Zuroff (2009) investigated whether this pattern would replicate for interpersonal behavior occurring in naturalistic settings. To examine this hypothesis, they asked 50 participants to record their interpersonal behaviors during five minute (or longer) social interactions across 20 days. Participants completed the Social Behavior Inventory (SBI; Moskowitz, 1994), which presents a list of behaviors (organized into scales of dominance, submissiveness, friendliness, and unfriendliness), and asks the participant to endorse the behaviors they enacted during that interaction. The authors calculated within-person correlations to obtain idiographic linkages or “covariations” between these four behavior scales.

As expected, the behaviors generally conformed to the circular structure, such that opposing sides of the circle were strongly negatively associated ( $r_{\text{dominance vs. submissiveness}} = -.69$ ;  $r_{\text{friendliness vs. unfriendliness}} = -.71$ ), and correlations between behavior scales at right angles on the circle were about half the size of the correlations obtained from opposing behavioral scales ( $r_{\text{dominance vs. friendliness}} = -.35$ ;  $r_{\text{dominance vs unfriendliness}} = -.19$ ;  $r_{\text{submissiveness vs friendliness}} = -.11$ ;  $r_{\text{submissiveness vs unfriendliness}} = -.39$ ). However, the authors also found that the within-subject covariation scores for agency and communion spanned virtually the entire length of the correlation continuum ( $-.99, .87$ ), indicating that behavior is not organized in strict adherence to the IPC (Fournier et al., 2009). For some individuals, behaving dominantly tended to covary with behaving in a friendly way, while for others dominant behaviors tended to covary with unfriendly behaviors. These behavioral covariation scores were not significantly associated with interpersonal traits assessed by the Interpersonal Adjectives Scales (Wiggins, 1995) or with the five-factor model traits of extraversion or agreeableness evaluated using the NEO-Five Factor Inventory (Costa & McCrae, 1992), suggesting these covariation scores were not isomorphic with (i.e. not a redundant description of) an individual’s IPC trait profile. Instead, these covariation scores quantify how an individual links agency and communion when behaving towards others in their natural world. The authors found the covariation of dominance and unfriendliness was negatively related to openness to experience, while the covariation of dominance and friendliness was positively associated with self-esteem, and negatively associated with depression and neuroticism. Thus, the covariation of agentic and communal behavior reflects a unique individual difference distinct from interpersonal style that is related to dispositional measures of socio-emotional adjustment.

An equally interesting line of investigation is the extent of covariation between interpersonal *perceptions* of agency and communion, and what contributes to this covariation. In fact, there is some preliminary evidence to suggest that interpersonal perception covariation does exist, and may play a role in social learning. Benjamin (1988, 1996) developed the Structural Analysis of Social Behavior (SASB), an alternative IPC model, to articulate how the dimensions of agency (differentiation vs. enmeshment) and communion (love vs. hate) are incorporated into interpersonal experiences of perceiving others, behaving towards others, and actions directed inwardly toward the self (i.e. introjection). Benjamin (1988) asked 105 college students (blind to the structure of SASB) to rate the similarity of SASB items on dimensions of agency and communion. Participants tended to rate SASB descriptors (Intrex Questionnaire items) of interpersonal warmth as simultaneously affirming and autonomy granting, and rated SASB descriptors of interpersonal coldness as simultaneously controlling, providing evidence for covariation within the structure of the SASB interpersonal surfaces. Also using the SASB, Benjamin (2000) demonstrated that college students who rated their mother to be friendly and dominant reported a greater agreement between what the mother expected of them, and how they behaved (i.e. introject). In a laboratory experiment, perceiving more warmth (high communion) and dominance (high agency) in parental figures was related to increased imitation of play behaviors among children (Hetherington & Frankie, 1967).

How a person comes to perceive their world has important implications across many fields of study. Social psychologists have emphasized agency (competence) and communion (warmth) as universal themes of social cognition, and have proposed how combinations of these dimensions could lead to distinct behaviors (Abele, Uchronski, Suitner, & Wojciszke, 2008; Fiske, Cuddy, & Glick, 2007). Within life-span literature, McAdams (1985) has emphasized how narrative themes of both agency and communion can impact Erikson's concept of generativity, while Hassan and Bar-Yam (1987) theorize how communion interacts with agency to promote psychosocial development across the lifespan. Research on leadership styles indicated the most effective leaders were perceived as high in agency (ambition) and communion (sociable) (Stogdill, 1974). Group dynamics and communications literature also highlight how perceiving communion in others can promote agentic goals such as productivity (Leonard, 1997; Turner, 1982). In short, examining the within-person patterning and covariation of interpersonal perception could have broad appeal to many fields already interested in understanding agentic and communal perception.

The current investigation focuses on how the extent of covariation of interpersonal perceptions relates to pathological personality dimensions. This application is particularly relevant as personality pathology is increasingly defined as a disorder of perceiving and relating to others (Skodol, 2012). The importance of how perceptions of others are organized (or perhaps distorted) and its impact on personality pathology is highlighted in several literatures including cognitive-behavioral (Beck, Freeman, David, & Associates, 2004), interpersonal (Leising & Borkenau, 2011; Pincus & Hopwood, 2012), psychodynamic (Bornstein, Denckla, & Chung, 2012), self-other agreement and person perception (Oltmanns & Turkheimer, 2006), and attachment (Shorey, 2010) theories of personality and psychopathology, as well as the integrative Cognitive-Affective Processing System (CAPS) approach to personality and adjustment (Eaton, South, & Kreuger, 2009; Kammrath, 2011). Examining the covariation of interpersonal perception in personality pathology could provide a useful new way to describe how such individuals organize their social experiences in the natural world.

## The present study

In the current study, participants reported on their perceptions of others' agency and communion during social interactions as they occurred in their natural environment. We examine the extent of the within-person association between these two dimensions. This was termed *perception covariation*, and refers to the tendency to simultaneously perceive similar relative levels of agency and communion in others. For example, if the perception covariation score is positive, it represents an internal linking of perceptions of dominance with warmth and perceptions of submissiveness with coldness. If it is negative, it represents an internal linking of perceptions of dominance with coldness and perceptions of submissiveness with warmth.

We selected measures of personality pathology that theoretically should exhibit opposing relationships with perception covariation of agency and communion in others. Interpersonal dependency is characterized by help seeking that may pull for others to assume the friendly dominant role. Furthermore, virtually all theoretical perspectives on dependency suggest that perceiving others as dominant meets a core need and would be experienced as supportive and thus communal (Bornstein, 1992, 2005). Therefore we hypothesized that higher levels of interpersonal dependency would be associated with a more positive perception covariation score.

Pathological narcissism is defined by an unyielding motivation to self-enhance and intense needs for admiration and recognition that are coupled with deficient regulatory ability to manage these motives and needs (Pincus & Roche, 2011; Roche, Pincus, Lukowitsky, Ménard, & Conroy, under review). The pursuit of this motivation is expressed through grandiosity (including maladaptive self-enhancement strategies and self-serving beliefs) and impaired regulation is expressed through vulnerability (affect dysregulation and social withdrawal in response to self-enhancement failures and need frustration). Pathological narcissism includes an agentic orientation (Campbell, Brunell, & Finkel, 2006; Foster & Brennan, 2011) where other people's dominance is experienced as a threat to self-enhancement and needs for admiration (e.g. Besser & Priel, 2010; Morf, Torchetti, Schürch, 2011; Morf & Rhodewalt, 2001; Roche, Pincus, Conroy, Hyde, & Ram, in press). Therefore we expected higher levels of grandiosity and vulnerability would be associated with a less positive perception covariation score.

## Method

We applied multilevel modeling to event-contingent social interaction data from the Achievement Motivation and Interpersonal Behavior (AMIB) Study. Comprehensive information about the larger, multiple time-scale study is reported elsewhere (Ram, Conroy, Pincus, Hyde, & Molloy, 2012). Details relevant to the present analysis are given below.

## Participants & Procedures

The present study makes use of reports provided by 184 (66% female) undergraduate students who participated in a 7-day experience sampling study for course credit. They were between 18 and 54 years of age ( $Mdn_{Age} = 19$ ,  $M_{Age} = 19.3$ ,  $SD_{Age} = 2.8$ ) and primarily in their first (61%) or second (25%) year of college. The majority indicated they were Caucasian (83%) with some representation of American Indian or Alaska Native (6%), Hispanic or Latino (5%), African American (3%), and Mixed or Other (3%) ethnicities. This sample can be considered representative of the emerging adult population residing at a typical university (Maher et al., in press).

At the outset of the study, participants attended a 1.5 hour session in which the study procedures were introduced, participants were provided with a set of diaries, and baseline measures were collected via a web survey. Care was taken that the definitions of terms, tasks, and our criteria constituting an interpersonal interaction (e.g. face-to-face interaction lasting five or more minutes) were clear and understood. Each of the diary booklets contained a set of 8 interaction rating forms to be filled out over the next week as they went about their daily lives. Participants were asked to complete a rating form each time they interacted with someone over the next seven days (event-contingent recording). At the conclusion of the session, participants completed a sample interaction report and baseline measures. Completed diaries were returned to the laboratory each day. In total, participants reported on 7,568 social interactions, with each participant providing between 10 and 56 interactions (Median= 43, Mean= 41.1, SD= 13.62). 87% of the sample provided data on 20 or more interactions over the 7 day intensive protocol.

## Measures

**Interpersonal Perceptions**—After each social interaction, participants indicated their perceptions of their interaction partner's *agency* and *communion* using the Interpersonal Grid (Moskowitz & Zuroff, 2005). Specifically, as shown in the right panel of Figure 1, participants were presented with a 9x9 grid that represented agency along the vertical axis (assured-dominant to unassured-submissive) and communion along the horizontal axis (warm-agreeable to cold-quarrelsome). Participants were asked to mark the single cell that indicated where their perceptions were located relative to the agentic axis (coded -4 to +4) and communal axis (-4 to +4). Higher scores indicated greater perceived agency and communion.

**Pathological Personality**—Individuals' level of *Dependency* was assessed using the 3-Vector Dependency Inventory (3VDI; Pincus & Wilson, 2001), a self-report measure assessing the facets of love dependency (e.g. "I would feel like I'd be losing an important part of myself if I lost a very close friend"), exploitable dependency (e.g. "I find it difficult to say "no" to people"), and submissive dependency (e.g. "I have a lot of trouble making decisions by myself"). Participants rated the 27 items using a 6 point scale from 1 (*not at all like me*) to 6 (*very much like me*). The scores from the three facets were averaged to obtain an overall dependency score ( $r = .87$ ), with higher scores reflecting higher levels of dependency.

Individuals' levels of *narcissistic grandiosity* and *narcissistic vulnerability* were assessed using the Pathological Narcissism Inventory (PNI; Pincus, 2013; Pincus et al., 2009), a self-report measure designed to assess the central aspects of narcissism identified in contemporary clinical theory and research, and to be consistent with how narcissism presents in clinical practice (Ronningstam, 2011; Wright, Lukowitsky, Pincus, & Conroy, 2010). Seven scales span aspects of narcissistic grandiosity (grandiose fantasy, exploitativeness, self-sacrificing self-enhancement) and narcissistic vulnerability (contingent self-esteem, entitlement rage, devaluing, hiding the self). Items for grandiosity include "I often fantasize about being admired and respected", "I find it easy to manipulate people", and "I feel important when others rely on me". Items for vulnerability include "When others don't notice me, I start to feel worthless", "I get mad when people don't notice all that I do for them", "Sometimes I avoid people because I'm concerned that they'll disappoint me", and "It's hard to show others the weaknesses I feel inside". Participants were asked to indicate the extent to which 52 such statements describe them using a 0 (*not at all like me*) to 5 (*very much like me*) scale. Narcissistic grandiosity ( $r = .83$ ) and narcissistic vulnerability ( $r = .94$ ) scores were calculated as averages of the relevant scale scores.

## Data Analysis

Intensive repeated measures designs like the one employed here provide opportunities to examine both within-person and between-person differences in change and covariation. However, such designs violate the independent and identically distributed (iid) assumptions employed in many correlation and regression analyses. Multilevel modeling emerged as an analytical method that can be used to accommodate such dependencies. It provides a statistically rigorous framework to simultaneously model within-person and between-person associations while accounting for dependencies in the repeated measures data to obtain proper standard errors (Bryk & Raudenbush, 1992; Snijders & Bosker, 1999)<sup>1</sup>. Here, a multilevel model was used to obtain estimates of within-person associations between perceptions of agency and communion and examine how pathological personality moderates those associations. Specifically,

$$\text{Agentic Perception}_{i_i} = \beta_{0i} + \beta_{1i} (\text{State Communal Perception}_{i_i}) + e_{i_i} \quad (1)$$

with person-specific intercepts and associations modeled as

$$\beta_{0i} = \gamma_{00} + \gamma_{01} (\text{Trait Communal Perception}_{i_i}) + \gamma_{02} (\text{Dependency}_{i_i}) + \gamma_{03} (\text{Grandiosity}_{i_i}) + \gamma_{04} (\text{Vulnerability}_{i_i}) + u_{0i} \quad (2)$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} (\text{Trait Communal Perception}_{i_i}) + \gamma_{12} (\text{Dependency}_{i_i}) + \gamma_{13} (\text{Grandiosity}_{i_i}) + \gamma_{14} (\text{Vulnerability}_{i_i}) + u_{1i} \quad (3)$$

where  $\gamma$ s are sample-level parameters,  $u_{0i}$  and  $u_{1i}$  are unexplained between-person differences in individuals' prototypical agentic perception,  $\beta_{0i}$ , and perception covariation,  $\beta_{1i}$ .  $e_{i_i}$  are unexplained time-specific errors (assumed homoscedastic). Following standard multilevel practice, the repeated measures of communal perception were separated into a between-person component (within-person means across the repeated measures) labeled *trait communal perception*, and a within-person component (interaction-to-interaction fluctuation around those averages) labeled *state communal perception* (see e.g., Schwartz & Stone, 1998; Hofmann & Gavin, 1998). For analysis, all between-person variables (e.g., dependency, Grandiosity) were sample-centered to facilitate interpretation of model parameters as representative to the prototypical participant. Of note, the *perception covariation* construct is conceptualized as the within-person association between agentic and communal perceptions. Operationalized as  $\beta_{1i}$  in a multilevel model, we made an arbitrary choice about which variable was the "outcome" variable to be consistent with the orientation of the ordinate and abscissa in Figure 1. A model with communal perception as the outcome revealed the same pattern of findings and lead to identical interpretation.

The model was fitted to the data using SAS 9.2 (proc mixed; Littell, Miliken, Stoup, & Wolfinger, 1996) with missing data treated as missing at random. The covariance structure of the residuals (i.e., among the repeated  $e_{i_i}$  residuals, and separately between  $u_{0i}$  and  $u_{1i}$ ) was obtained by comparing model fit ( $-2 \log$  likelihood function) within nested models. The within-person residuals ( $e_{i_i}$ ) were modeled as an autoregressive (lag of 1) structure since this structure provided a statistically better fit to the data ( $\chi^2, df[1] = 8.80, p < .05$ ). This structure treats observations that are closer together in time as more similar (e.g. more highly correlated) than observations further apart. The between-person residuals ( $u_{0i}, u_{1i}$ )

<sup>1</sup>Fournier and colleagues (2009) adopted a different approach by aggregating interpersonal behavior scores into the person level (i.e. calculating correlation coefficients among the behavior scales for each individual), and then correlating these aggregated scores with person-level variables. This approach discards potentially meaningful lower level variance and reduces power, thus it is not preferred. However we reanalyzed our data using this approach and found similar results to our multi-level model approach: Dependency results in higher perception covariation scores, grandiosity results in (marginally) lower perception covariation scores, vulnerability was not significant.

were modeled as an orthogonal (variance components) structure, since this added parsimony did not result in a significantly worse fitting model ( $\chi^2$ ,  $df[1] = .1$ ,  $p > .05$ ).

## Results

Descriptive statistics are shown in Table 1. As seen in the ICCs, the stable between-person variance in the repeated measures of agentic and communal perceptions was only 15% of the total variance, with the rest being within-person and thus, likely state-dependent, and suggested that examination of perception covariation was warranted. Results from our examination are shown in Table 2. Agentic perceptions were positively associated with dependency ( $\beta_{02} = .02$ ,  $p < .05$ ) and trait communion ( $\beta_{01} = .36$ ,  $p < .05$ ), indicating that agentic perceptions were higher for participants who endorsed higher scores of dependency, and for participants who perceived their interaction partners on average as more communal.

Of greater interest was the within-person (state) level association between agentic and communal perceptions (perception covariation). Perception covariation was, on average, moderate and positive ( $\beta_{10} = .29$ ,  $p < .05$ ), indicating that during interactions when the prototypical participant perceived their partner as more communal (compared to their person-specific average) they also tended to perceive them as more agentic.

Between-person differences in perception covariation were related to between-person differences in personality pathology. As hypothesized, dependency was (independent of other associations) significantly associated with extent of perception covariation ( $\beta_{12} = 0.01$ ,  $p < .05$ ), such that higher dependency scores were associated with a stronger positive within-person linkage between agentic and communal perceptions (see Figure 2). In contrast, higher narcissistic grandiosity was associated with significantly weaker within-person linkage between agentic and communal perceptions ( $\beta_{13} = -0.07$ ,  $p < .05$ ). Contrary to our expectations, narcissistic vulnerability was not associated with perception covariation ( $\beta_{14} = .01$ ,  $p > .05$ ). After accounting for these effects, substantial as yet unexplained between-person differences in perception covariation remained ( $\chi^2_{\text{unli}} = .07$ ,  $p < .05$ ), underscoring the extent of differences in how agency and communion are organized at the level of the individual.

## Discussion

The current study investigated whether interpersonal perceptions of agency and communion covaried in naturalistic settings, and how this covariation might relate to personality pathology. In this young adult sample perception covariation was found; in general, participants tended to perceive more dominance (compared to their person-specific average) as also more friendly, and more submissiveness as less friendly.

Interpersonal dependency was significantly positively related to perception covariation, consistent with our hypothesis. The tendency to perceive dominance as also friendly aligns with clinical literature that suggests a dependent person feels most comfortable when engaged with a friendly dominant other who is able to provide instrumental and emotional support (Bornstein, 2005; Gore & Pincus, 2013). Similarly, interacting with a submissive other may evoke anxiety around needing to function independently, causing them to feel unsupported and thus experience the interaction as less communal (Bornstein & Malka, 2009). This research provides ecologically valid evidence of how a dependent person may experience their interpersonal world. However, it remains to be determined if this covariation reflects a tendency to choose interaction partners who are naturally more friendly and dominant, to behave in ways that evoke friendly dominance in others, or to distort perception of others' behavior. One of the interpersonal difficulties involved in

dependency is the risk of being exploited by others (Pincus & Wilson, 2001), and perhaps an investment in seeing others' dominance as also friendly could lead to situations where one is unaware of others' true intentions and may increase the chance of being exploited (e.g., Lavan & Johnson, 2002; Rusbult & Martz, 1995; Watson et al., 1997). Although the present research cannot disentangle the cause of the observed perception covariation, the approach provides a mechanism (i.e. perception covariation examined in the natural world) with which to further investigate such a question.

Higher narcissistic grandiosity weakened the positive association between perceived agency and communion, perhaps indicating that dominance from others is experienced as a threat to self-enhancement and thus seen as less communal. This explanation is consistent with prior research that found narcissistic grandiosity was associated with greater negative affect following an achievement threat (Besser & Preil, 2010). However, it could also be that narcissists are less attentive to the communal content of interpersonal exchanges, thus driving down the association between agentic and communal perceptions. This is consistent with Morf and Rhodewalt (2001) who suggest narcissists care more about maintaining their grandiosity than they do about social feedback or social approval. Finally, narcissistic vulnerability did not moderate perception covariation, which did not support our original hypothesis.

Fournier and colleagues (2009) introduced the covariation of interpersonal behavior as a mechanism to understand how agency and communion combined in an individual's natural world and demonstrated that it was not reducible to one's interpersonal style and was associated with aspects of socio-emotional adjustment. The current research investigated the covariation of interpersonal perception, finding that pathological personality traits are meaningfully associated with individual differences in the perception covariation of others' agency and communion, consistent with what substantive theory would predict. This research provides a descriptive model of interpersonal experiences from which to investigate how such experiences came to be (e.g. choosing interpersonal partners, evoking behaviors in others, perception distortions, etc.). Thus we suggest interpersonal covariation of behavior and covariation of perception should be considered important domains of contemporary interpersonal assessment (Pincus, 2010), and we urge future researchers to consider how covariation can be meaningfully integrated into contemporary interpersonal theory (Pincus et al., in press) and psychological theories more broadly (e.g., Ram et al., 2012).

## Limitations

Although this study provides preliminary support for the importance of perception covariation, there were several limitations that should be noted. This sample of emerging adults in a college setting were almost entirely White, thus limiting generalization across age and race/ethnicity. As such, these findings should be considered preliminary, until samples with broader ranges of age and ethnicity are obtained. As with most event-contingent studies conducted without electronic devices, we were unable to independently verify that participants completed the interaction surveys just after the interaction ended. However, the rate and speed with which the reports were returned (daily) suggests that the protocol was not compromised. We had defined a social interaction as a face-to-face interaction of longer than five minutes. This did not allow for incorporating many everyday social interactions that use phone, text, email, and other technologies. Further, we have noted in this data that communal interactions are reported at a greater frequency than uncommunal interactions (Ram et al., 2012). It is possible that hostile social interactions may not last the five minutes required and are thus under-represented (Roche et al., in press). The 5-minute requirement is consistent with prior event-contingent studies of interpersonal behavior (e.g., Moskowitz, 2005), however this duration could be reduced, especially since there is evidence that perceptions of agency and communion can be reliably coded even on a second-to-second



time basis (Sadler, Ethier, & Woody, 2011a). Future studies are encouraged to consider both technology-mediated and shorter interactions in order to obtain a more robust representation of individuals' social lives.

The present results found some evidence that personality pathology moderated perception covariation, however these effect sizes were modest. We predict that these results will replicate and be more pronounced in clinical samples. But there are likely other important factors beyond personality that contribute to perception covariation (e.g. health, contextual factors, etc.), and future research should investigate what these factors might be.

There were some limitations in the measures used to capture each construct. By using two-dimensional grids to capture agentic and communal perceptions, it becomes impossible to tease apart whether the perception covariation resides in linking dominance with friendliness or submission with unfriendliness. If one presumes dominance is the opposite of submission then this question becomes irrelevant, however some evidence suggests that dominance and submissiveness may have separate underlying behavior systems (Moskowitz, 2005). Perhaps developing a measure that identifies dominant, submissive, friendly, and unfriendly perceptions using multiple indicators would add to the precision of such measurement (similar to the SBI which does this for interpersonal behavior). In addition, some argue that PNI-grandiosity appears to measure something different than other measures of grandiosity (Miller, Price, Gentile, Lynam, & Campbell, 2012). It will be important to replicate the findings of this study using other measures of narcissism.

As with other experience sampling studies, our study design, along with multilevel analysis, facilitated examination of within-person associations (perception covariation) and between-person differences in those associations. However, we rely on some strong assumptions, including homogeneity of processes across all individuals (i.e., ergodicity, Molenaar & Campbell, 2009) and that between-person differences organize into a multivariate normal distribution, in order to obtain estimates of within-person covariations with so few observations (Snijders & Bosker, 1999). Even though we borrowed across the between-person and within-person information, we found evidence of between-person differences in perception covariation. P-technique and other person-specific methods may be used to examine within-person (or dyad-level) structure and process, and the inter-individual differences therein, without relying on ergodicity assumptions (Brose & Ram, 2012; Molenaar et al, 2009). These methods will allow for even more evidence of between-person differences to emerge. For example, Borkenau and Ostendorf (1998) used 90-days of repeated measures to highlight that, while the Big 5 personality structure holds at the between-person level, it is rarely descriptive of within-person structure. Playing the tradeoff between persons and occasions, future studies are encouraged to obtain longer time-series for each person in order that more complex (beyond the bivariate association examined here) within-person associations can be examined.

### Future Directions

The findings of this study provide evidence that the concept of interpersonal covariation adds an important nuance to interpersonal theory and assessment. To move this construct forward, future research should consider exploring the potential causes of perception covariation, how covariation scores change among different time scales and in different samples, and how the assessment of interpersonal covariation can be usefully applied to the interpersonal assessment of a single individual. Each of these will be discussed in turn.

The current study cannot disentangle whether perception covariation represented interaction partner selection effects, a tendency to evoke certain behaviors in others, or biases in interpersonal perception. Unpacking this will be important to identify how this construct is

most usefully applied. To do this, ideally one could obtain ratings from each interaction partner for every interaction to evaluate the discrepancies. But this could be labor intensive and difficult to accomplish, since not every interaction partner will be able and willing to participate, although assessing specific (e.g., marital) dyads longitudinally (Laurenceau & Bolger, 2012) is also a possibility. Another option is to record interactions using Electronically Activated Recorders (e.g. Holtzman, Vazire, & Mehl, 2010), so that objective observers could rate levels of agency and communion for each interaction partner and compare them to the self-reported ratings of agency and communion covariation.

These covariation scores were based on the time-scale of a social interaction, forcing the participants to aggregate minutes of information into a single score of their partner's agency and communion. It is presently unknown if the second-to-second timescale would produce different kinds of results, however many studies of behavioral transaction have already collected and coded information about agentic and communal behavior to investigate other interpersonal topics (e.g., Sadler, et al., 2011a; Sadler, Ethier, & Woody, 2011b). Reanalysis of existing data would be a cost effective way to investigate interpersonal covariation on a transactional timescale. Substantively, one could investigate whether critical incidences in the social interaction led to changes in how the interaction partner was experienced (e.g. "I used to see their dominance as friendly, but after that comment, I now see their dominance as manipulative"). This would have obvious extensions into identifying alliance ruptures in recorded therapeutic interactions (see Thomas, Hopwood, Ethier, & Sadler, under review).

This unique data stream also gives clinicians an ability to examine how the dynamics of interpersonal dysfunction play out in the patient's natural world. For example, Roche, Pincus, Ram, Hyde and Conroy (2012) presented an interpersonal assessment of a clinical patient who completed event-contingent reports of his interpersonal experiences over 21 days. Simple correlation and regression analyses indicated that he tended to perceive others' dominance as unfriendly (a negative perception covariation score), and this covariation remained consistent across different types of interaction partners. During interactions where he endorsed a stronger negative perception covariation score he also tended to report greater sadness but not greater anger or lower self-esteem. This example demonstrates how perception covariation can help articulate how the patient organizes their interpersonal experiences, with whom that pattern deviates, and how deviations impact the patient's functioning (sadness, anger, self-esteem).

In sum, examining the covariation of interpersonal perception and behavior is an intriguing new approach to understanding interpersonal dynamics in naturally occurring social interactions. It has the potential to expand the usefulness of existing longitudinal data, and it provides a new way to consider how individuals organize their interpersonal experiences. We hope that the present research will encourage more interest in this topic, so that within-person perception and behavioral covariation can take its place alongside other important features of interpersonal theory and assessment.

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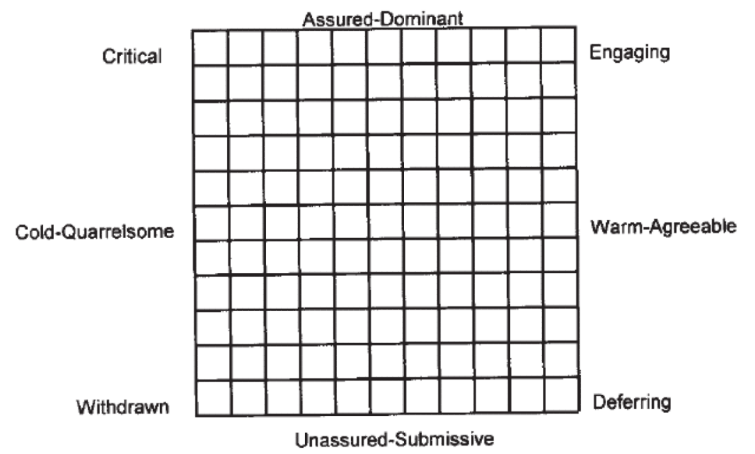
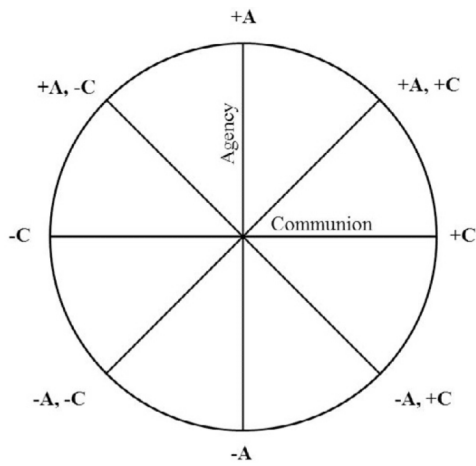
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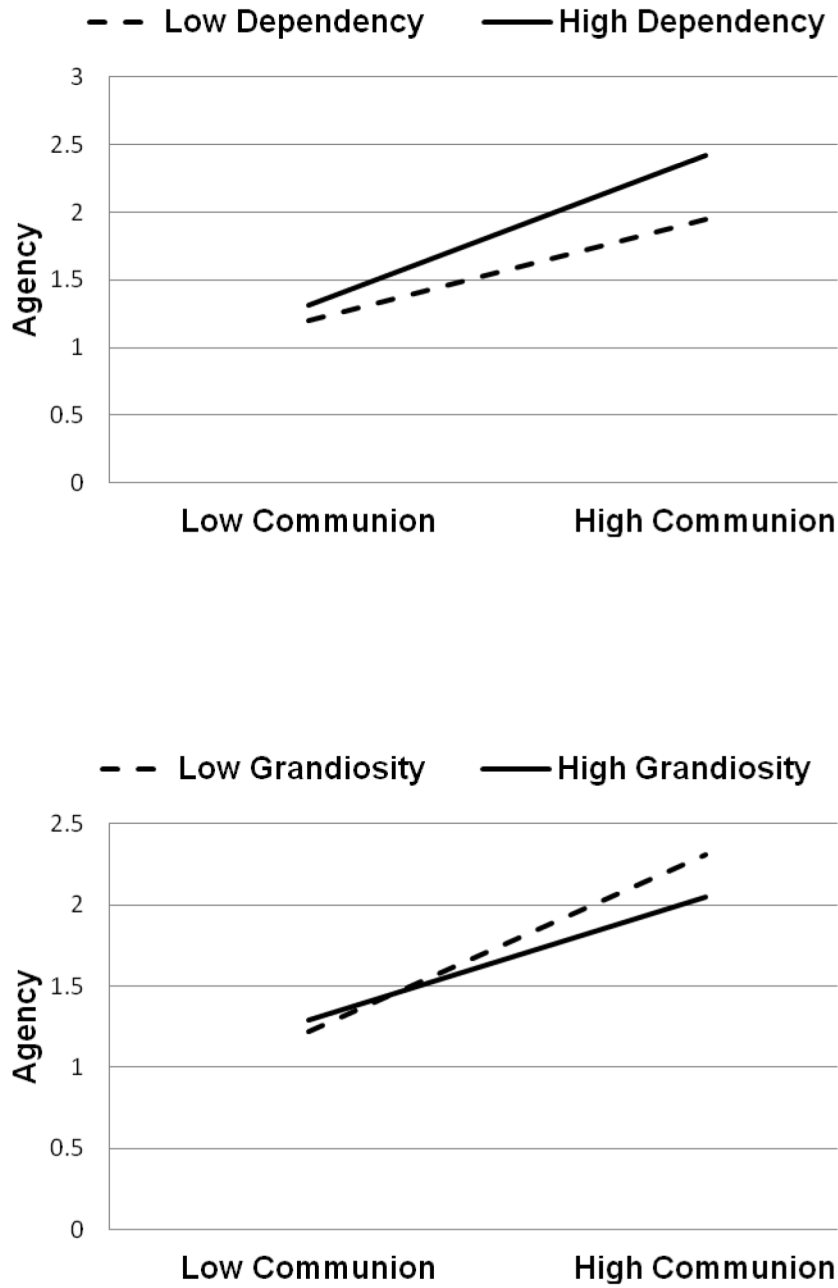
### Highlights

- We examined the association of agentic and communal interpersonal perceptions.
- Agentic and communal perceptions were positively associated in a 7-day diary study.
- Dependency moderated (strengthened) this association.
- Narcissistic grandiosity moderated (weakened) this association.
- We discuss how perception associations inform interpersonal theory/assessment.



**Figure 1.** The interpersonal circle and interpersonal grid. The interpersonal circle (left) is a conceptual model for orienting the interpersonal dimensions of agency and communion. The interpersonal grid (right) is an assessment tool used to measure the constructs.





**Figure 2.** Personality pathology moderators of perception covariation. Note. Low/High communion, dependency, and grandiosity calculated as  $-/+$  1 standard deviation from the sample centered average. Agentic perception ranges from  $-4$  to  $4$ . For the prototypical participant, perceiving higher communion (compared to their person-specific average) was associated with also perceiving higher agency. Higher dependency scores (compared to lower dependency scores) strengthened this association. Higher narcissistic grandiosity scores (compared to lower narcissistic grandiosity scores) weakened this association.

Table 1

Descriptives for Study Variables

	Mean	SD	ICC	1	2	3	4	5
Within-person variables								
1. State Agentic Perception	0.00	1.51	0.15 <sup>a</sup>	1				
2. State Communal Perception	0.00	1.60	0.15 <sup>a</sup>	0.28*				
Between-person variables								
1. Trait Agentic Perception	1.72	0.71	--	1				
2. Trait Communal Perception	2.06	0.73	--	0.37*	1			
3. Dependency	33.84	5.65	--	0.23*	0.09	1		
4. Narcissistic Grandiosity	2.86	0.67	--	-0.07	-0.03	0.15*	1	
5. Narcissistic Vulnerability	2.17	0.76	--	0.04	-0.17*	0.38*	0.42*	1

Note. Descriptives based on 7553 observations provided by 184 persons. State agentic and communal perceptions variables are person-centered repeated measures. Trait agentic and communal perception variables are within-person means.

SD= Standard Deviation. ICC= Intraclass correlation coefficient

<sup>a</sup> values indicate the proportion of between-person to total (= between + within) variance in the raw variables, as obtained from unconditional means models.

\* p<.05.

**Table 2**  
**Results from multilevel model examining associations between personality pathology and perception covariation**

Variables	Estimate	SE
Fixed Effects		
Intercept, $\gamma_{00}$	1.72 *	0.05
Trait Communion, $\gamma_{01}$	0.36 *	0.07
Dependency, $\gamma_{02}$	0.02 *	0.01
Narcissistic Grandiosity, $\gamma_{03}$	-0.13	0.08
Narcissistic Vulnerability, $\gamma_{04}$	0.08	0.08
State Communion, $\gamma_{10}$	0.29 *	0.02
State Communion * Trait Communion, $\gamma_{11}$	0.04	0.03
State Communion * Dependency, $\gamma_{12}$	0.01 *	<0.01
State Communion * Narcissistic Grandiosity, $\gamma_{13}$	-0.09 *	0.04
State Communion * Narcissistic Vulnerability, $\gamma_{14}$	0.01	0.04
Random Effects		
Variance Intercept, $\sigma^2_{u0i}$	0.35 *	0.04
Variance State Communal Perception, $\sigma^2_{u1i}$	0.07 *	0.01
First-order Autoregression, $\sigma^2_{\epsilon_{it}, \epsilon_{it+1}}$	0.05 *	0.01
Residual Variance, $\sigma^2_{\epsilon_{it}}$	1.98 *	0.03
-2 Log Likelihood	27220.3	
AICC	27228.3	

Note. Estimates based on multilevel model of 7553 observations from 184 participants.

SE= Standard Error. Outcome variable is agentic perception. State Communion= person centered communal perception. Trait Communion= average communal perception. Level-2 variables are sample centered.

\*  $p < .05$ .