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The Interpersonal Problems of the Socially Avoidant: Self and Peer Shared Variance

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Abstract

We demonstrate a means of conservatively combining self and peer data regarding personality pathology and interpersonal behavior through structural equation modeling, focusing on avoidant personality disorder traits, as well as that of two comparison personality disorders (dependent and narcissistic). Assessment of the relationship between personality disorder traits and interpersonal problems based on either self or peer data alone would result in counterintuitive findings regarding avoidant personality disorder. In contrast, analysis of the variance shared between self and peer leads to results that are more in keeping with hypothetical relationships between avoidant traits and interpersonal problems. Similar results were found for both dependent personality disorder traits and narcissistic personality disorder traits, exceeding our expectations for this method.

Keywords

Avoidant personality disorder; avoidance; interpersonal problems; structural equation modeling

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Chronic social avoidance has negative interpersonal consequences. Although many psychological disorders involve social isolation, active social avoidance relates most centrally to two disorders: social phobia and avoidant personality disorder (AVPD) (American Psychiatric Association [APA], 1994, 2000). Recent versions of the Diagnostic and Statistical Manual note that AVPD may represent an extreme version of generalized social phobia (APA, 1994, 2000). Several studies have provided support for this notion (e.g., Chambless, Fydrich, & Rodebaugh, 2008; Heimberg, Hope, Dodge, & Becker, 1990).[1] Thus, one would expect that most findings regarding generalized social phobia will probably apply to AVPD (and vice versa). Social phobia itself is clearly associated with interpersonal impairment (Rodebaugh, 2009; Schneier et al., 1994), and impairment in functioning increases with the number of social

[1]It should be noted that some authors have found evidence that AVPD is not merely an exacerbation of social phobia (e.g., Hummelen, Wilberg, Pedersen, & Karterud, 2007; Huppert, Strunk, Ledley, Davidson, & Foa, 2008). However, even in studies in which differences have been found, a strong relationship between AVPD and generalized social phobia is always noted.

fears reported (Ruscio et al., 2008). Thus, AVPD should lead to particularly severe interpersonal problems.

Although several studies have investigated the interpersonal problems of people diagnosed with AVPD, social phobia, or both, basic questions remain unanswered. The most consistent finding from these studies is that AVPD and social phobia are both related to problematic social avoidance and inhibition (e.g., Alden & Phillips, 1990). Multiple authors (Alden & Capreol, 1993; Kachin, Newman, & Pincus, 2001) have suggested that, whereas social inhibition is a constant in AVPD and social phobia, people with these disorders may be divided into groups that differ based on interpersonal problems: For example, one group of people might have more trouble due to cold behavior toward others, whereas a second group may have more trouble being exploited by others. Therefore, strong correlations would be expected between AVPD traits and certain interpersonal problems (e.g., social inhibition), whereas smaller, but still significant correlations might be expected with other interpersonal problems that are well-represented in people with higher AVPD traits (e.g., being cold or submissively exploitable). A test of such basic correlations between AVPD traits and interpersonal problems is absent in the literature and was our primary impetus for the current study.

Most studies concerning AVPD and interpersonal problems have relied on self-report data. This is a problem because it is clear that people with higher social anxiety generally believe they come across worse than observers believe they do (e.g., Heimberg et al., 1990). Indeed, one study found that people with higher social anxiety were more likely to believe that they were viewed as incompetent, unreliable, and unlikeable during a conversation, yet conversation partners did not perceive such features, instead perceiving participants with higher social anxiety primarily as nervous, quiet, and distant (Christensen, Stein, & Means-Christensen, 2003). This and other studies lead to the expectation that social anxiety will distort self-report of interpersonal problems. For example, Kachin et al.'s (2001) self-report data suggest that people with social phobia experience *more* difficulty due to dominant behavior than people without social phobia. Even the group Kachin et al. identified as *more submissive* had scores on self-reported dominance-related problems that were numerically higher than normal control participants. Perhaps this finding reflects interpersonal reality, but we suspect that people with social phobia *perceive* themselves as acting excessively dominant when, typically, they actually have fewer observable interpersonal problems in this arena than the average person. It would be necessary to move beyond self-report to clarify this issue.

Unfortunately, few studies have moved beyond self-report alone in this area. One study has demonstrated that peer-report of AVPD traits relate to peer-report of problems with nonassertiveness (Clifton, Turkheimer, & Oltmanns, 2005). However, the purpose of this study was to examine personality disorders as a group and interpersonal problems as a whole; information provided about AVPD in particular was limited. More details were reported by Clifton, Turkheimer, and Oltmanns (2009), who examined personality disorder traits as reported by self and peer, in relationship to social network variables among Air Force recruits completing basic training. AVPD traits, whether reported by self or peer, were correlated with being less central to the social network and lower strength of social network. Strength of social network and position within it can be interpreted, for our purposes, as indicators of interpersonal problems. Of particular interest is that the constructs implying interpersonal problems were *derived interpersonally*. An individual's position within and strength of social network depended upon both their own report and the report of all other members of their training group. However, AVPD symptoms themselves were not derived interpersonally, but were assessed separately based on peer- and self-report.

Although Clifton et al. (2009) derived their measure of interpersonal problems from an interpersonal source, we know of no example of deriving an interpersonal measure of AVPD

traits themselves. Because AVPD traits involve social avoidance, these traits should also be apparent in the interpersonal environment. We believe that, ideally, the method of deriving measures of constructs should match the nature of the construct. If AVPD and interpersonal problems are both present in an interpersonal environment, both would be ideally measured from interpersonal sources. Thus, fully exploring the relationship between AVPD traits and interpersonal problems requires a method of combining self-report with other-report data in regard to both interpersonal problems and AVPD traits. We therefore turn to the broader question of the use of data from multiple sources in the personality disorder literature.

Personality Data and Multiple Sources

Many personality disorders involve distortions of self-perception and an inability to accurately perceive the effects of one's own behavior on other people, making self-report alone an arguably insufficient way to assess related phenomena (Oltmanns, Turkheimer, & Strauss, 1998; Westen & Shedler, 1999). Researchers have investigated different ways to overcome such problems, such as using both self and peer data to predict outcomes of interest. For example, in a sample of military recruits, Fiedler, Oltmanns, and Turkheimer (2004) found that self-report measures were more useful for variables that were more highly accessible to the self (mood, emotion) whereas peer-reports were more useful for features that are more highly accessible to peers (behavior).

Although Fiedler et al. (2004), among others, have found peer-report to add to prediction, this does not mean that peer-report is purely reflective of objective reality. Peers may also be subject to biases and lack of information, perhaps particularly when evaluating more introverted people. Clifton, Turkheimer, and Oltmanns (2004) found that people who described themselves as paranoid were seen by their peers as being cold and aloof, rather than paranoid. In the same study, those described by *peers* as paranoid described themselves as being angry and hostile. These findings suggest that people who *feel* paranoid actually tend to *act* in cold and distant ways, whereas people who *act* paranoid tend to *feel* angry and hostile. Thus, relying only on peer-report may lead to inaccurate predictions about the way individuals typically feel, particularly for those individuals who are motivated to avoid people, such as people with higher AVPD traits.

We therefore sought a way to *combine* self and peer data in regard to AVPD, using a decomposition of variance method that could be used to isolate the aspects of data that are *shared* by both self and peer-report. The overall literature suggests that self and peer data typically share relatively little variance. The variance they do share, however, may be informative when both self and peer have access to important information.

Combining Self and Peer Data: Variance Decomposition

Variance decomposition models have typically been used in factor analysis and have been referred to as group factor models (Ward, 2006), orthogonal hierarchical models (Becker, 1996) and analysis of variance components models (McArdle, 1996). In our model, structural equation modeling (SEM) is used to estimate several factors. One factor is identified by all of the items, and, in the final model, represents only the variance shared by those items; we call this factor the *shared* factor because it captures variance that is present across all variables. In contrast, a second factor, uncorrelated with the first, is identified by only a subset of the items. The second factor, therefore, accounts for variance shared by the subset alone. Thus, the first factor is free of any variance that is shared only by those items that load on the second factor. More factors, in line with theoretical expectations, could also be estimated, such that the variance of the entire set of items is decomposed among a shared factor and set of secondary factors. Each second factor would represent, at least in part, method variance associated with the way those particular items were collected.

Figure 1 depicts the generic version of the model we used for this study. In the figure it is assumed that items A–D were completed by participants in regard to themselves, whereas items E–H were completed by peers of the participants in regard to the participants. Therefore, the shared factor captures variance that is (a) associated with all of the items but also (b) not accounted for by the uncorrelated factors that are estimated from the sets of items corresponding to each method of assessment. Such a model is complex, but estimation of a self-variance factor, peer-variance factor, and shared variance factor should be feasible, given a large sample size. It is important to note that the self-variance and peer-variance factors are uncorrelated factors estimated from the methods of assessment. They are expected to consist largely of bias associated with each method. Thus, our *self-variance* factors would be expected to relate more to self-bias than true self-report per se. Although raw self- and peer-report would be expected to correlate to some extent, in these models the *shared* factor accounts for this correlation and, conceptually, represents the interpersonal reality that accounts for this correlation.

The shared factor isolates the variance that is associated with all of the selected items and not due to variance strictly associated with self- or peer-report. Such variance is not due only to self-related biases, because peer data also share this variance; similarly, it is not due only to peer-related biases. Use of this variance is conservative in that it disregards potentially valid information that may only be available to the self or the peer. However, it should also minimize the presence of many types of bias. One type of bias that *should* be displayed by such variance is that *shared* by self and peer. Such a bias might be viable in a close dyad. However, when the peers surveyed represent a large group, it seems unlikely that many such shared erroneous beliefs could be maintained.

The primary bias that would affect the shared variance involves loss of important information. For example, if certain personality traits are associated with a systematically distorted perception of the effects of one's own behavior, then this shared variance could be misleading. We expect this may be the case for narcissistic traits. In a previous study, participants identified as narcissistic by peers tended to see themselves not as narcissistic, but as possessing positive qualities in general (Clifton et al., 2004). The variance *shared* between self-and peer-report in regard to narcissistic traits would focus on tendencies toward narcissism that self and peer could agree on, but these tendencies might be quite different from pathological narcissism.

For AVPD we would expect a different pattern. We do not expect people with more AVPD traits to lack insight into their avoidance; we also do not expect peers to be unable to report this behavioral avoidance. However, we expect that peers will only occasionally have correct attributions about this behavior. For example, peers might attribute avoidance to anxiety and low self-esteem in a given person, whereas paranoia may actually be more relevant for that person. Self-report should therefore add significantly to peer-report. We have similar expectations for dependent personality disorder traits. Both self and peers should be capable of recognizing dependent behavior with reasonable accuracy, but peers may have difficulty recognizing the anxiety underlying this behavior that is characteristic of the disorder.

Finally, in regard to reports of interpersonal problems, we expect shared variance to be especially useful. A focus on *problems* should lead to significant biases on the part of both self and peer. Self-report for participants who are more negativistic and self-critical should overestimate interpersonal problems in general. Similarly, peers seem likely to overestimate interpersonal problems (of all types) for people who are disliked. The shared variance between self and peer should help to isolate tendencies toward interpersonal problems from biases related to self-criticism and dislike. This feature of shared variance should be particularly useful for AVPD traits, given that these characteristics are likely to be associated with both self-criticism and at least some dislike from peers.

Current Study

We used an existing data set of 990 undergraduate students, which partially overlaps with the dataset used in Clifton et al. (2005).[2] Each student rated his or herself as well as peers on measures of AVPD traits and interpersonal problems. For each measure, a shared factor, as described above, was estimated via the entire range of self and peer ratings. Thus, the relationship between shared AVPD trait variance and shared interpersonal problem variance was tested, relatively free of self and peer bias.

To provide context and allow clearer interpretation of these relationships, we also considered two comparison personality disorders: Narcissistic Personality Disorder (NPD) and Dependent Personality Disorder (DPD). NPD was chosen because we expect shared variance regarding this disorder to be potentially misleading, or at least no better than peer report, because the disorder itself should be related to distorted perceptions of interpersonal reality. In comparison, AVPD and DPD traits should involve clear enough insight to allow meaningful extraction of shared variance. In addition, the relationship of AVPD and DPD traits to interpersonal problems should have many similarities. However, we would expect AVPD traits to be more related to social inhibition and DPD traits to be more related to being overly accommodating. Our full predictions, based on disorder criteria, previous studies, and the expert consensus findings of Lynam and Widiger (2001) are presented in Table 2 along with the results of analyses. Most of the labels for types of interpersonal problems are generally self-explanatory, with the exception of the Intrusive/Needy label. Although this label might appear to suggest neediness in the sense of asking for help from close others, it instead reflects a tendency toward affiliative attention seeking and help giving (i.e., *not* help seeking) that others might find intrusive despite generally warm intentions. Items include: *I want to be noticed too much* and *I tell personal things to other people too much.*

Our hypotheses were that more AVPD traits would relate most strongly to interpersonal problems in the direction of low dominance, with stronger relationships on the side of low warmth than high warmth; the strongest relationship should be with social inhibition. In addition, we expected people with AVPD to have more interpersonal problems in general, resulting in few negative associations with any of the subscales, with the exception being problems related to high dominance. For DPD, we expected a pattern of low dominance and relatively high warmth, with the strongest correlation with being overly accommodating. In contrast, for NPD traits we expected a pattern of high dominance and low warmth, with the strongest correlation with being domineering.

We should note that although the directional (positive, null, or negative) relationships we suggest are generally supported by the available literature, some of our hypotheses are debatable, particularly our specific hypotheses regarding the *strength* of the positive relationships. Alden and Capreol's (1993) findings, for example, might suggest that problems with being cold and nonassertive relate to AVPD traits as or more strongly than social inhibition. Kachin et al.'s (2001) findings might even be taken to suggest a positive relationship should be expected between AVPD traits and problems with dominance, although we hypothesize that any such correlation would be due only to biased reporting. Notably, nearly all of the available literature concerns self-report that was not directly derived from DSM-IV criteria, leading us to be somewhat tentative about hypotheses regarding the strength of the correlations.

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[2]We maintained this overlap, rather than rely only on participants not included in that study because (a) Clifton et al. (2005) did not investigate the issues investigated here and (b) it was desirable to have a large sample size.

Procedure

Participants

Participants included 990 first-year undergraduate students who had lived together in dormitory suites or a dormitory floor for approximately three months. Groups were not mixed across floors, and each group was under the aegis of a single Resident Advisor. Mean age was 18.62 (SD = .54), with one participant not providing age information. Most participants (n = 714, 71.5%) were female. A total of 48 participants indicated they were of Hispanic descent. Most participants identified as White (n = 754, 75.5%), with additional participants identifying as Asian (n = 85, 8.5%), Black (n = 75, 7.5%), Native American (n = 1, 0.1%) and Biracial (n = 27, 2.7%). An additional 47 participants (4.7%) indicated that their racial group was not listed, and one participant did not indicate a racial group.

Measures

The Multisource Assessment of Personality Pathology (MAPP), originally known as the Peer Inventory for Personality Disorder (Thomas, Turkheimer, & Oltmanns, 2003), consists of 106 items, 81 of which are based on the ten DSM-IV PD criteria. The PD items were constructed by translating the DSM-IV criterion sets for PDs into lay language then adapting the items based on input from expert consultants. Notably, for NPD, criterion 8 was split into two questions: one referencing belief about others being jealous (8a) and one referencing jealousy of others (8b). Thomas et al., (2003) reported a factor analysis of peer-report items that showed high correspondence with factor patterns of widely used self-report models of PDs, with congruence coefficients ranging from .87 to .97. Thomas et al. (2003) also reported that in that sample of college undergraduates, the median inter-rater reliability for peer scores on individual items was 0.54, with values ranging from 0.73 to 0.26. Although this level of reliability would not be considered acceptable for trained raters, two facts should be kept in mind when evaluating it: (a) even trained raters have difficulty judging personality disorder criteria with excellent reliability (e.g., Clark & Harrison, 2001); (b) the quoted statistics are in regard to items, not scores, which would be more reliable.

The Inventory of Interpersonal Problems-64 (IIP; Horowitz, Alden, Wiggins, & Pincus, 2000) is a measure of persistent interpersonal difficulties. The 64-item version of the IIP (Horowitz et al., 2000) is a subset of the larger number of IIP items that were selected based on a principal components analysis and the Interpersonal Circumplex Model (Wiggins, 1979), which comprises two theoretically orthogonal dimensions that describe the quality and intensity of interpersonal behavior. The horizontal axis represents nurturance, communion, love and affiliation whereas the vertical axis represents status, agency or dominance (Gurtman, 1993). The combination of these two dimensions leads to eight broad classes of interpersonal behavior called octants. Octants are abbreviated by two-letter indices (PA to NO) that are arranged in alphabetical order counterclockwise around the circumplex. The IIP-64 consists of eight scales, of 8 items each, corresponding to the eight regions of the interpersonal circumplex. The eight scales, the corresponding octants, and sample items of the IIP-64 are Domineering/Controlling (PA; *I argue with people too much*), Vindictive/Self-Centered (BC; *I am too suspicious of other people*), Cold/Distant (DE; *[It is hard for me to] Show affection to people*), Socially Inhibited (FG; *[It is hard for me to] Join in on groups*), Nonassertive (HI; *[It is hard for me to] be another person's boss*), Overly Accommodating (JK; *[It is hard for me to] Say "no" to other people*), Self-Sacrificing (LM; *I try to please other people too much*), and Intrusive/Needy (NO; *I want to be noticed too much*). Participants in this study were administered self- and peer-report versions of the 64 IIP items.

Procedure

Participants completed computer-administered questionnaires (including a variety of other measures not considered for this paper) in groups of 4 to 25 students. The peer-nomination portion of the MAPP questionnaire was a modified round-robin design in which every individual in the group could nominate any member(s) of the group. For each item, the participant was shown a list of all members of his or her group and was asked to nominate those who exhibit the characteristic in question. The participant was required to nominate at least one individual for each item but was able to nominate as many peers as he or she wished. For each nomination, the participant assigned a rating (1, 2 or 3), indicating that the nominee "sometimes," "often" or "always" displayed the characteristic. Peers who were not nominated were automatically given a rating of 0 indicating that he or she "never" displayed the characteristic. Dimensional peer-report scores for each item were calculated by adding up peer ratings (0 for no nominations, with a score ranging from 1 to 3 for each nomination) and dividing the peer ratings by the number of peer raters (between 3 and 24). Thus, peer ratings are the average dimensional rating across peers for each characteristic that the participant displayed (according to peers).

After completing the peer section of the MAPP, participants were shown the entire set of items one more time. For each item, they were asked to respond to the question "What do you think you are really like on this characteristic?" A 4-point Likert scale (0 = Never like this, 1 = Sometimes like this, 2 = Often like this and 3 = Always like this) was used.

Participants then completed the IIP items. For each self-report item, participants were asked, "What do you think you are really like on this characteristic?" They responded using a 5-point scale of how much the item applied to them, ranging from 0 (*not at all*) to 4 (*extremely*). The peer version of the IIP consisted of the same items, using third-person language. The peer nominating and rating procedure used was identical to the one used for the MAPP with the exception of the use of the IIP's 5-point scale.

Data Analytic Procedure—We expected a priori that conducting analyses entirely in a structural equation modeling (SEM) context would be problematic due to model complexity. We therefore estimated each shared variance score using SEM but tested other relationships using multiple regression.

We did not expect each variance decomposition model to evince excellent model fit because enforcing a shared factor might often decrease the parsimony that is rewarded by some fit indices. In addition, we limited our ability to improve model fit because we did not wish to exclude items, which would raise the question of whether the scale as usually instantiated was actually being used in the analyses. Nevertheless, global and local fit was of some interest. Higher levels of global fit would suggest that the items used produced more shared variance, and specific items might show more or less tendency to reflect either shared variance or variance due solely to self- or peer-report. Finally, for specific constructs, the amount of shared variance captured in peer- vs. self-report might differ because more of the relevant construct might be evident for the self or to peers.

All models were fitted using the robust weighted least squares estimator (referred to as WLSMV in Mplus), implemented in the Mplus program (version 4, Muthén & Muthén, 1998–2006). The WLSMV estimator is appropriate for categorical variables and variables that are not normally distributed. Here, self-report responses were treated as categorical because the relatively constrained response categories arguably make this method more appropriate. Peer-report variables were treated as continuous, but were not assumed to have normal distributions. Recall that the peer report variables for both the MAPP and IIP are averages of ratings, which

means that ratings varied from 0 to 3 with numerous fractional values in between; it would thus be impossible to treat these items as categorical without transforming the data.

Figure 1 displays the generic model used for each subscale. For both IIP items and MAPP-derived PD traits, self-report items loaded on both the shared and self-report factor (i.e., as do items A–D in Figure 1, although the actual number of criteria varied across the construct in question). All peer-ratings of the same construct loaded on the shared and peer-report factor (i.e., in the same manner as items E–H in Figure 1).

In evaluating global fit, we consulted the following fit indices: (a) Tucker-Lewis incremental fit index (TLI; Tucker & Lewis, 1973), (b) comparative fit index (CFI, Bentler, 1990), and (c) root mean square error of approximation (RMSEA; Steiger & Lind, 1980). The magnitudes of these indices were evaluated with the aid of recommendations by Hu and Bentler (1999). Essentially, for (a) and (b), values of .90 and above were considered adequate, whereas values of .95 or above were considered very good; for (c) values of .08 and below were considered adequate and .05 or less very good.

Results

Characteristics of Sample and Raw Data

One concern about the sample is whether any participants had the PDs of interest. We determined the number of people who would meet criteria for that PD, according to self-report, based on (a) at least "often" displaying sufficient criteria and (b) "always" displaying sufficient criteria. We expect that the actual number of people with the PD in question should fall between (a) and (b). For AVPD, 101 (10%) of the sample met criterion (a), whereas 14 (1%) met criterion (b). For DPD, 18 (2%) met criterion (a), whereas 2 (.02%) met criterion (b). For NPD, 24 (2%) met criterion (a), whereas 1 (.01%) met criterion (b). In each case, the majority of participants met neither criterion, yet some participants were clearly likely to meet criteria for each PD.

We also examined self- and peer-report of PD traits to determine whether our current data match previous findings of relatively low correlations between self and peer. These data support that trend; the correlation between self and peer for AVPD and NPD was .21, whereas the same correlation for DPD was .19 (all $ps < .001$).

Model Results

Model fit information is presented in Table 1. In line with expectation, the models used to decompose variance generally fit only fairly well, although some fit quite well. In regard to global model fit, the following IIP subscales showed at least good model fit across all fit indices: Domineering/Controlling, Self Sacrificing, and Socially Inhibited. Avoidant and Narcissistic PD traits also showed this level of fit. All other models showed adequate fit according to at least one fit index. No models showed indications of gross misspecification (e.g., all CFI and TLI values were greater than .80; no RMSEA values were greater than .15).

Table 1 also provides information about the self and peer items that loaded most strongly on each shared factor, as well as the top two items for the self-variance and peer-variance factors. In interpreting this table, it is important to keep in mind several pieces of information. First, rather than fully-standardized coefficients, we give the partially standardized coefficients; these express the standard deviation change in the latent variable expected per *unit* change in the item. Recall that the self-report items had limited response options and were treated categorically. Thus, their standard deviations are relatively meaningless, and it is change in category (i.e., unit) that is meaningful. Although continuous (including fractional values), the peer-report variables also map onto unit response categories; thus, partially standardized coefficients are used for these items as well. Finally, although only the strongest loadings are

given, the other loadings generally followed a similar pattern; for example, when the strongest peer loading was stronger than the strongest self loading, the other loadings showed a similar pattern.

With this kept in mind, Table 1 displays some apparent differences between sets of items. For most measures, the strongest self and peer loadings for the shared factor involved relatively similar effects given a unit change in ratings. Exceptions included DPD criteria and the IIP Socially Inhibited and Self Sacrificing scales, for which the shared factor was far more related to the self-report criteria. In contrast, for the IIP Overly Accommodating scale and, to a lesser extent, NPD criteria, peer-report items were more associated with the shared variance factor. For the loadings on the self- and peer-variance factors, recall that these factors are hypothesized to primarily represent bias due to self and peer. Thus, items listed here may be the most subject to self and peer bias, although that does not necessarily mean that they also lack unbiased variance. For example, for AVPD criteria, self-report criterion 1 was both the strongest loading on the shared factor and the strongest loading on the self factor, indicating a combination of systematic bias and variance shared with peer ratings of AVPD traits.

Relationships Between Traits and Problems

Correlations were computed among self-ratings and peer-ratings between personality disorder traits and the IIP subscales. These correlations were computed among the actual ratings in the raw data, and are not related to the self- and peer-variance factor scores generated in the SEM models. (Recall that the self- and peer-variance factor scores are expected to consist largely of variance related to bias, and thus are not a substitute for the raw self and peer report variables.) In addition, multiple regression was used to create residualized versions of each of the shared variance variables. Each variable reflects the factor score for the shared variance factor with the self- and peer-variance factor scores regressed out. This was done because the factor scores are estimates, making correlations between factor scores possible despite model specification of no correlation. This strategy produced the most conservative estimate of the relationship between shared-variance sources only, with self and peer variance removed to the extent that this was statistically possible. When differences between correlations were tested, the test for correlated correlations described by Meng, Rosenthal, and Rubin (1992) was used.

The self- and peer-report and shared variance intercorrelations are presented in Table 2. The self-report column reflects moderate to strong positive relationships between most IIP subscales and ratings of each set of personality disorder traits. These correlations include both those that would be expected (e.g., people with more AVPD traits are too socially inhibited) and correlations that are difficult to explain (e.g., people with more AVPD traits are too vindictive). Similarly, both NPD and DPD traits show relationships that would be expected (NPD is related to being more domineering; DPD traits are related to being self-sacrificing), as well as relationships that seem unlikely (NPD is related to being self-sacrificing; DPD is related to being domineering). A simple count of how well the correlations match hypotheses, based only on significance ($p < .001$, given multiple tests) and direction, finds that these correlations match hypothesis only half the time across all tests for self-report scales. Correlations among the peer ratings with peer-rated IIP scores show similar patterns, including some unlikely findings. For example, people with more AVPD and DPD traits are more vindictive according to these data.

The shared variance columns provide an alternative picture of the relationship between PD traits and interpersonal problems. Overall, fit with hypothesis is better for each PD using the shared variance method, although increased fit is less striking for NPD (vs. peer-report). Is this better fit significant? A binomial test demonstrates that matching 12 of 24 hypotheses, which was true for both self- and peer-report, is a reasonably likely outcome by chance alone when each hypothesis has three equally possible[3] outcomes (positive and significant, not significant,

or negative and significant): the chance of observing 12 or fewer successes on 24 trials by chance alone is 97.16%, and the chance of observing 12 or more is 6.77%. In contrast, observing 19 or more successes is extremely unlikely to have occurred by chance, and will occur 0.001% of the time by chance alone. In other words, based on a binomial test, the standard alpha level of $p < .05$ will only be satisfied by the shared variance.

For each set of PD criteria, most directional hypotheses were supported. Each set of directional hypotheses reflected the type of interpersonal problems that have been previously found to be most related to that PD according to self-report data. Thus, predictions for AVPD center on social inhibition, those for NPD focus on domineering behavior, and those for DPD focus on nonassertiveness. Interpersonal problems that are most correlated (i.e., nearest on the circumplex) to the primary interpersonal problem were also expected to have positive and significant relationships with the PDs, whereas only a single scale that most directly opposed the nature of the PD was expected to have a negative relationship. Other interpersonal problems might be expected to show negative correlations, but we hypothesized null correlations because we expected PD traits to relate to more problems in general, making it difficult for PD traits to relate inversely to interpersonal problems.

The basic directional hypotheses are supplemented by more specific strength hypotheses based on the expected strongest correlation of each set of PD traits with one kind of interpersonal problem. The PD in question should correlate more strongly with that interpersonal problem type than any other interpersonal problem; in addition, that PD should correlate more strongly with that interpersonal problem than the other PDs examined here. These strength hypotheses yield nine additional tests for each method of deriving the correlation matrix.

Self- and peer-report supported 5 of 9 strength hypotheses, whereas shared variance supported 6 of 9 hypotheses. In most cases, all of the methods agreed on the same outcome. Focusing on the shared variance, two hypotheses were supported for AVPD, in that the correlation of AVPD traits with social inhibition was stronger than the same correlation for DPD or NPD traits. However, it was only in self-report data that social inhibition was the strongest among AVPD traits' correlations with interpersonal problems. In the shared variance data, the strongest correlation of AVPD traits was with being cold and distant. Similarly, the correlation for DPD with being overly accommodating was lower than expected, and was numerically identical to or lower than at least some other correlations it was expected to exceed in all methods. In the shared variance, the strongest correlation with DPD traits was in regard to self-sacrificing. For NPD, in contrast, all hypotheses were supported in the shared variance: NPD traits were more correlated with being domineering than all other interpersonal problems, and more so than DPD or AVPD. Neither self- nor peer-reports of NPD traits correlated most strongly with being domineering according to a significance test. However, problems being domineering and problems being vindictive were equally related to both self- and peer-reports of NPD traits.[4]

Discussion

Although multiple studies have provided evidence about the types of interpersonal problems associated with AVPD and related disorders (e.g., Alden & Capreol, 1993; Kachin et al., 2001), no previous study has examined the specific relationships between AVPD *traits* and

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[3]Treating the three possible outcomes as equally likely is admittedly a simplistic assumption. Note that if obtaining a nonsignificant correlation is considered less likely than obtaining a significant one in either direction, which might seem reasonable given the sample size, then the degree of statistical significance for the shared variance method should become stronger rather than weaker.

[4]Some research regarding the IIP has focused on ipsatized scores. We conducted analyses on ipsatized scores as well, and found that results were similar. An exception was that ipsatized self-report scores for NPD showed more of the predicted relationships (6 vs. 3 directional hypotheses supported). In contrast, self-report scores for AVPD and DPD did not support hypotheses as well when ipsatized scores were used.

different types of interpersonal problems. Further, previous findings have been based on self-report measures, with only a pair of studies that we are aware of going beyond self-report (Clifton et al., 2005; Clifton et al., 2009). We combined self- and peer-report to arrive at a conservative estimate of the relationship between AVPD traits and interpersonal problems, relatively free of bias due to either self-report or peer-report alone. We included comparisons with NPD to test the limits of the method, and with DPD to demonstrate that the usefulness of this method may extend beyond AVPD alone.

Regarding AVPD, our primary findings were that, as expected, AVPD traits are at least moderately associated with excessive social inhibition and nonassertiveness. Problems related to self-sacrifice and being cold were also moderately associated, with the relationship with being cold being the strongest. Whereas most of these relationships were to be expected, this is the first time they have been clearly demonstrated in regard to AVPD traits. Further, reliance only on self-report or only on peer-report would have produced a very different picture, primarily in regard to correlations that we expect are spurious, such as a correlation between AVPD traits and domineering tendencies. This association is difficult to understand except as a result of bias (e.g., dislike, self-criticism). The analyses of shared variance, however, indicated that AVPD traits had a small and negative relationship with problems being domineering. The results suggest that reliance on either self- or peer-report alone may be vulnerable to a variety of biases. In AVPD, we would expect self-report to be misleading because people with more AVPD traits are also more likely to be self-critical, whereas peer-report would be misleading because people who are socially avoidant will be less likely to be well-liked.

The shared variance did not uniformly perform as expected, however. In particular, the expected relative size of the positive correlations with AVPD traits and DPD traits were only partially supported. We noted in the introduction that our hypotheses in this area were based on the existing literature, but this literature is driven almost entirely by self-report. Although our findings could represent a failing of the shared-variance method, it should be noted that in the case of DPD, none of the methods supported the hypotheses, and in AVPD only self-report supported the notion that AVPD traits were more correlated with social inhibition than all other interpersonal problems. The fact that none or only one method supported the hypothesis in each case raises the possibility that the hypothesis in question is simply incorrect.

Indeed, it seems plausible that people with higher AVPD traits are more striking in the interpersonal environment as being distant and nonassertive rather than socially inhibited per se, although people with higher AVPD traits may be more painfully aware of their self-perceived social inhibition. The literature regarding social anxiety is replete with reports that socially anxious people are judged as being cold and uninterested (e.g., Clifton et al., 2004), whereas the evidence that social anxiety is perceived directly as social anxiety is somewhat equivocal (Heimberg et al., 1990). Our findings could also be taken as indirectly supporting the two-cluster solution found by Alden and Capreol (1993). In that study, people with APVD clustered in an exploitable (nonassertive) group and a cold group. The strongest correlations we found within the shared variance are consistent with these two AVPD groups. Similarly, our results for DPD traits might indicate that people with higher DPD traits are more likely to be perceived as being self-sacrificing rather than merely nonassertive or overly accommodating. Alternatively, people with higher DPD traits might fall into two groups: one characterized more by social inhibition and the other by excessive self-sacrifice.

Regarding NPD traits, we should first note that we had expected that shared variance might be misleading. Overall, this does not seem to have been the case. The specific hypotheses regarding the strength of relationships were all supported in shared variance. Our hypotheses regarding direction of correlations were less well-supported, largely because of expectations

of null correlations between NPD traits and warm and submissive interpersonal problems, whereas shared variance revealed small negative correlations. The shared variance findings for NPD, we submit, are at least as consistent with our understanding of NPD traits as the findings for either of the other methods. In particular, the self-report results suggest a mixture of people reporting NPD traits due to self-criticism as well as due to actual NPD tendencies, resulting in correlations between NPD traits and a variety of implausible interpersonal problems (e.g., self-sacrificing; social inhibition). The peer-report data, in contrast, provides similar results to the shared variance data. Whereas we had been concerned that the shared variance would be distorted by a particular form of disagreement between self and peer in regard to NPD traits, it appears that computing shared variance scores at least did no harm compared to the peer-data alone, and may have improved matters (as evidenced by complete support of the strength hypotheses in the shared variance and greater support of the directional hypotheses).

This study has implications for what instruments might be most suited to analyses in which variance shared between self- and other-rating are used. Global fit for the shared variance models was not uniform; some models (e.g., Narcissistic PD criteria, IIP Socially Inhibited items) showed quite good fit, whereas others (e.g., IIP Intrusive/Needy items) showed only adequate to good fit. We are not certain what underlies these differences in fit, but future research could clarify this issue. Notably, it cannot be determined based on these data whether the limited fit for some models is due to limitations of the items or limitations of insight on the part of these particular participants. For example, a different type of informant (e.g., spouses) might be more capable of reporting information that would lead to a shared variance model with good fit. Further study would be necessary to determine whether improved measures would yield more useful information or whether our results simply point to limitations in regard to how much self and peer can agree given the context of our data collection.

The implications of this study are tempered by several limitations. Most limitations are due to the nature of the sample; our participants were undergraduates and diversity was limited. Neither our modeling strategy nor our questions of interest would have been better served by a clinical sample of people with AVPD (largely due to restriction of range in such a sample), but a sample drawn from the community or a broad clinical sample would have provided more confidence in generalizing these findings. Given the sample sizes necessary, such samples were not pragmatic. In addition, few living situations outside undergraduate school make it pragmatic to have large groups of individuals (e.g., nearly one-thousand) rate both themselves and acquaintances on a variety factors. Nevertheless, future studies with more diverse participants would help to test whether some aspect of the sample was responsible for the current results. Similarly, although a range of AVPD traits was desirable, it would have been useful if a subset of the sample had been formally diagnosed with AVPD, which would provide more assurance that the upper range of the AVPD trait continuum was represented. Based on self-report, however, a substantial minority of participants was likely to meet diagnosis for AVPD and, to a lesser extent, NPD and DPD. The model fit statistics indicate that the variance decomposition models were fairly well suited to the data, but we would have more confidence in the results if all models had had good fit; future studies should investigate whether better measures might produce more uniformly good fit in such model. Our peer-nomination method did not yield as much data as would have a complete round-robin design; such a design would have been as or more suited to our purposes here. Finally, we repeat that the analyses regarding shared variance provide a *conservative* estimate of the correlations we report. It remains possible, for example, that people with higher AVPD traits really do have more problems with domineering behavior, but that this relationship is only observable through self-report in the current sample. However, given the living environment of the participants (college students sharing a dormitory area), we are skeptical of this possibility.

The current study thus provides strong evidence that AVPD traits are at least moderately associated with interpersonal problems involving social inhibition, unassertiveness, coldness, and being overly accommodating, and are less associated with problems related to intrusiveness, vindictiveness, and domineering behavior. Given the strong relationship between AVPD traits and social phobia, we expect that similar results would be found for social phobia criteria. Our method of conservatively estimating these relationships is potentially adaptable to other round-robin ratings of participants, and thus allows the possibility of better understanding the relationship between some personality disorders and traits with a variety of outcomes.

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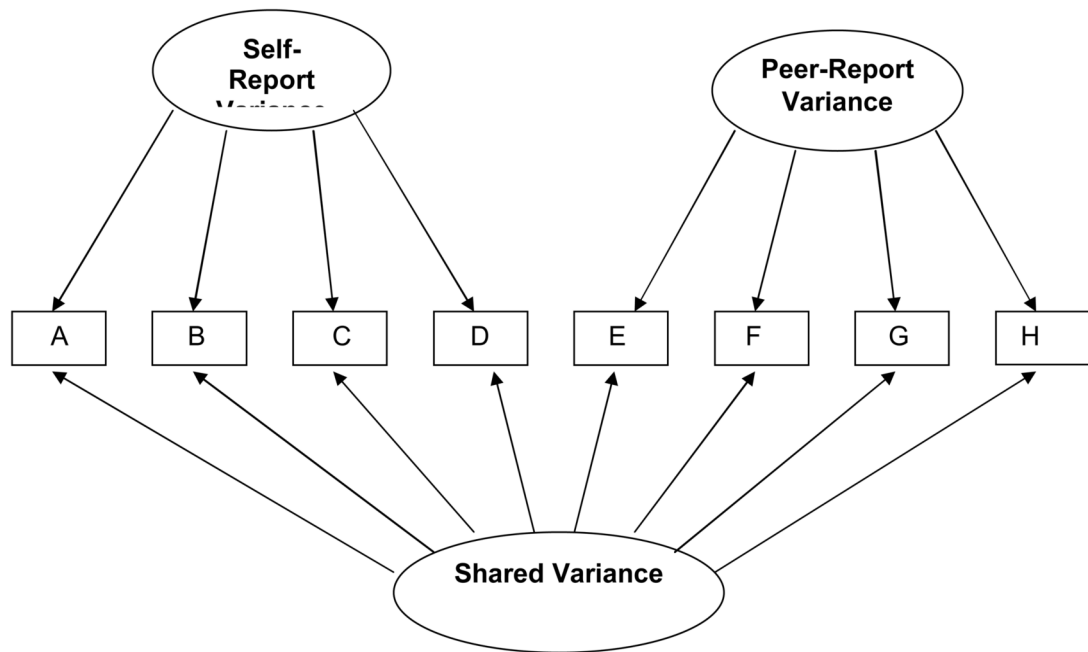
Figure 1.
A Generic Variance Decomposition Model of the Type Used to Create Factor Scores. Residual terms are omitted for the sake of simplicity. No correlation is permitted between the latent factors. Items A–D are rated by self-report only; items E–H are rated by peer-report only.

Table 1

Structural Equation Models Used to Create Factor Scores, Including Global Model Fit and Summary of Item Loadings

Model	CFI	TLI	RMSEA	Strongest Self Loading and Strongest Peer Loading for Shared Factor	Two Strongest Loadings for Self-Variance Factor	Two Strongest Loadings for Peer-Variance Factor
MAPP Avoidant PD Traits	.94	.96	.07	Self Cr. 1 = .25*** Peer Cr. 5 = .24***	Self Cr. 1 = .70*** Self Cr. 3 = .70***	Peer Cr. 4 = .18*** Peer Cr. 2 = .13***
MAPP Narcissistic PD Traits	.94	.98	.05	Self Cr. 3 = .25*** Peer Cr. 4 = .31***	Self Cr. 6 = .76*** Self Cr. 7 = .76***	Peer Cr. 9 = .16*** Peer Cr. 3 = .13***
MAPP Dependent PD Traits	.92	.94	.09	Self Cr. 6 = .91*** Peer Cr. 2 = .05***	Self Cr. 8 = .61*** Self Cr. 4 = .51***	Peer Cr. 2 = .19*** Peer Cr. 8 = .15***
IIP-Domineering/Controlling	.92	.96	.07	Self Item 59 = .36*** Peer Item 17 = .36***	Item 45 = .72*** Item 50 = .69***	Item 52 = .20*** Item 44 = .11***
IIP – Vindictive/Self-Centered	.83	.94	.09	Self Item 40 = .41*** Peer Item 40 = .25***	Item 22 = .75*** Item 32 = .69***	Item 24 = .18*** Item 29 = .17***
IIP-Cold/Distant	.85	.93	.10	Self Item 16 = .29*** Peer Item 15 = .29***	Item 23 = .82*** Item 20 = .74***	Item 60 = −.15** Item 36 = .15***
IIP – Socially Inhibited	.95	.97	.07	Self Item 14 = .86*** Peer Item 3 = .56***	Item 18 = .75*** Item 55 = .51***	Item 18 = .39*** Item 7 = .39***
IIP – Nonassertive	.87	.97	.09	Self Item 9 = .33*** Peer Item 9 = .36***	Item 8 = .81*** Item 9 = .80***	Item 39 = .20* Item 5 = .09**
IIP – Overly Accommodating	.87	.96	.08	Self Item 38 = .32*** Peer Item 38 = .84***	Item 10 = .68*** Item 61 = .68***	Item 42 = .56*** Item 53 = .52***
IIP – Self Sacrificing	.92	.95	.08	Self Item 54 = .74*** Peer Item 21 = .42***	Item 54 = .47*** Item 46 = −.32***	Item 37 = .20*** Item 49 = .20***
IIP – Intrusive/Needy	.84	.93	.10	Self Item 58 = .32*** Peer Item 48 = .38***	Item 58 = .84*** Item 43 = .76***	Item 43 = .16*** Item 58 = .11***

Note. CFI = comparative fit index; TLI = Tucker-Lewis incremental fit index; RMSEA = root mean square error of approximation; MAPP = Multisource Assessment of Personality Pathology; IIP = Inventory of Interpersonal Problems (64 item version). For the personality disorder models, items are self and peer report of personality disorder criteria. Thus, Self Cr. 1 denotes self report of the first criterion of that

disorder; Peer Cr. 2 denotes the peer report of the second criterion of that disorder; etc. All loadings are partially standardized coefficients that express the effect on the latent variable (in standard deviations) corresponding to a unit difference on the item in question.

***
$p < .001$;

**
$p < .01$;

*
$p < .05$.

Table 2

Expected and Obtained Correlations Between Personality Disorder Traits and Interpersonal Problems Scores By Method.

IIP Scale	Expected			Self-Report			Peer-Report			Shared Variance		
	AVPD	NPD	DPD	AVPD	NPD	DPD	AVPD	NPD	DPD	AVPD	NPD	DPD
Domineering/Controlling	−	++	0	.25*	.55*	.29*	.14*	.76*	.36*	−.10*	.72*	−.04
Vindictive/Self-Centered	0	+	−	.38*	.58*	.38*	.31*	.74*	.38*	.03	.60*	−.01
Cold/Distant	+	+	0	.44*	.41*	.30*	.48*	.39*	.19*	.55*	.21*	−.01
Socially Inhibited	++	0	+	.68*	.23*	.40*	.62*	−.11*	.04	.30*	−.16*	.30*
Nonassertive	+	−	+	.55*	.14*	.41*	.59*	−.25*	.20*	.51*	−.24*	.14*
Overly Accommodating	+	0	++	.44*	.13*	.39*	.48*	−.17*	.33*	.46*	−.18*	.14*
Self-Sacrificing	+	0	+	.36*	.15*	.35*	.31*	−.09	.34*	.10*	−.06	.35*
Intrusive/Needy	0	0	0	.26*	.41*	.38*	.19*	.66*	.64*	.11*	−.24*	−.01
Number of Directional Hypotheses Supported (of 8)				5	3	4	5	4	3	7	5	7

Note. IIP = Inventory of Interpersonal Problems; AVPD = Avoidant personality disorder traits; NPD = Narcissistic personality disorder traits; DPD = Dependent personality disorder traits. Expected r column is the relative size and valence of correlations, with ++ = largest and positive, + = significant and positive, 0 = near zero, − = significant and negative. These directional hypothesis columns concern only the sign and significance of the correlation, not whether the correlation is the largest; the latter point is taken up in detail in the text. Self-Report column is the correlation between the self-report of personality disorder traits and self-report of IIP subscales, and Peer-Report column is the correlation between peer-report of personality disorder traits and peer-report of IIP subscales. The Shared column is the correlation of the residualized shared variance factor scores (with self and peer factor scores partialled out). Due to sporadic missing data, n varies from 949 to 990 across cells.

*
$p < .001$.