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General Factors of Psychopathology, Personality, and Personality Disorder: Across Domain Comparisons

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Abstract

Three separate and distinct literatures exist investigating general factors of psychopathology (*p* factor), personality (GFP), and personality disorder (*g*-PD). Surprisingly, there has been little-to-no investigation regarding the convergence of these three distinct general factors. In the present investigation, two studies were conducted examining the convergence of the *p* factor, GFP, and *g*-PD. In Study 1, a combined model extracting all three factors from self-report data simultaneously found high convergence. The findings for the *g*-PD and GFP were replicated in Study 2 using multi-method data, wherein the GFP and the *g*-PD were extracted from a community sample of 1,630 older adults and correlated with an index of maladaptivity. The present findings support the position that general factors of psychopathology, personality disorder, and personality are likely to entail a common individual differences continuum, which may impact on how these general factors are to be understood.

There has been a recent surge in the study of general factors of psychopathology (Caspi et al., 2014; Lahey et al., 2012; Lahey, Krueger, Rathouz, Waldman, & Zald, in press), personality (Rushton & Irwing, 2011), and personality disorder (Jahng et al., 2011; Wright, Hopwood, Skodol, & Morey, 2016), but, to date, no apparent consideration of their potential convergence, and the implications of any such convergence. Currently, three largely independent literatures exist.

It is also noteworthy that the interpretations of the general factors are quite different across these three domains of study. Advocates of a substantive understanding of the GFP have conceptualized it as a fundamental domain of social effectiveness (Rushton & Irwing, 2011; van der Linden et al., 2017). Musek (2007) provided the initial impetus for the GFP. He interpreted it as a substantive factor representing “positive versus negative aspects of personality... emotionality... motivation... well-being... and self-esteem” (p. 1228).

The GFP has been extracted from multiple measures and multiple models of personality (particularly though the five-factor model [FFM]), explaining large amounts of variance in EFAs and displaying good fit indices in CFAs (Loehlin, 2012; Rushton & Irwing, 2011). However, the GFP has also met with considerable criticism (Hopwood, Wright, &

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Donnellan, 2011; Revelle & Wilt, 2013). One particular concern is that the GFP may not in fact have any substantive meaning. Petterssen et al. (2012), for example, suggested that the GFP arises from an evaluation bias, comparable to social desirability identified years ago (Edwards, 1953). They point out compellingly that items that have opposite meanings will load quite similarly on the GFP (e.g., the items “sluggish” and “manic” both loaded positively). Because items with opposite meanings should not be endorsed by the same persons, they have suggested that the GFP likely represents a tendency for persons to answer questions with an evaluative bias (e.g., a disposition to answer in a socially desirable or undesirable manner, irrespective of the item’s content).

The literature concerning the general factor of personality disorder (*g*-PD) is much smaller than that of the GFP and considerably less contentious, albeit perhaps it warrants more skeptical consideration. Jahng et al. (2011) examined a bifactor model of personality disorder criteria and substance abuse. They struggled, though, to understand what the *g*-PD might be substantively. They acknowledged that it might reflect negative affectivity or level of insight, but concluded instead that it represented a level of interpersonal dysfunction. “Although we cannot specify exactly the nature of this general personality disorder factor, one that clearly drives most of the positive association we see between PDs and substance dependence, our results seem most consistent with characterizing this factor as [a level of] interpersonal dysfunction” (Jahng et al., 2011, p. 666).

Sharp and colleagues (2015) also found evidence of a *g*-PD in an exploratory bifactor analysis (EBFA) of the diagnostic criteria for six PDs. They noted that all the borderline personality disorder (BPD) criteria loaded solely on the *g*-PD factor and therefore suggested that the *g*-PD factor was a substantive representation of the DSM-5-Section III Alternative Model of Personality Disorders (AMPD) Criterion A. “Although we do not yet know the exact nature of the general factor, to stimulate further research, we speculate on some intriguing interpretative possibilities . . . One answer may lie in Criterion A of the new *DSM-5*-III General Criteria of Personality Disorder” (p. 394). Criterion A concerns deficits in the sense of self and interpersonal relatedness that are considered, in theory, to be central to all personality disorder (Bender, Morey, & Skodol, 2011). “BPD is unique in that impairment in the ability to maintain and use benign and coherent internal images of self and others are integrated into one disorder” (Sharp et al., 2015, p. 394).

Wright and colleagues (2016) reached the same conclusion when considering the results of a bifactor analysis of the covariation among the criteria for all 10 personality disorders. They, too, found that the BPD criteria loaded uniquely on the *g*-PD factor. Wright et al. (2016) again acknowledged that “the core makeup of the general factor remains . . . ambiguous” (p. 1129), but, consistent with Sharp et al. (2015), they suggested that “one possible interpretation is that it reflects borderline personality organization (Kernberg, 1984), with core impairments involving maladaptive self and other representations and identity formation” (p. 1129).

With respect to the general factor of psychopathology, Lahey et al. (2012) again used bifactor analysis. Lahey et al. (2012) emphasized that the *p* factor had a strong relationship with a variety of negative life outcomes, yet acknowledged at least four alternative

explanations for its existence. They suggested that it might represent an implicit theory of psychopathology held by the participants, but they rejected this because it would seem doubtful that participants would so uniformly align all forms of psychopathology. They also considered that it might be an evaluative bias, as suggested by Petterson et al. (2012) for the GFP, or simply reflect a common underlying personality disposition, such as neuroticism. However, they largely concluded that it reflected "etiologic factors that are shared by all mental disorders" (Lahey et al., 2012, p. 976).

Caspi and colleagues (2014) similarly examined a bifactor model with a *p* factor and two specific internalizing and externalizing factors. Caspi and colleagues again reported that the *p* factor was strongly related to a variety of negative life outcomes. Caspi et al. (2014), though, posed the question, "is p merely a statistical reductio ad absurdum or is it real and meaningful?" (p. 132). They forthrightly acknowledged, "We do not know yet" (p. 132), but were clearly on the side of a substantive meaning. On the other hand, they did not characterize or conceptualize the *p* factor any more specifically than suggesting that it "summarized individuals' propensity to develop any and all forms of common psychopathology" (p. 131).

There indeed appears to be strong evidence that variance in personality, personality pathology, and psychopathology can be explained by general factors (referred to here as the GFP, *g*-PD, and the *p* factor, respectively). No study, however, has yet explored whether these three general factors are convergent with one another. The current investigation explores this relationship in two studies. The first study extracts and compares the general factors for each of the three domains. The second study seeks to replicate the Study 1 findings in a second sample and extend the literature by using multi-method data and examining associations with external criteria, but is confined to markers of the GFP and *g*-PD only.

Study 1

Method

In the first study, persons who were currently or had been in mental health treatment were recruited for participation from the United States via Mechanical Turk (MTurk). The questionnaire battery was administered online and took 1.5 hours to complete. Participants were compensated $1.50 for their time. Participants were on average 36.3 years old (*SD* = 11.7 years), and were 65% female. Racial and ethnic backgrounds consisted of 80% white/Caucasian, 9% black/African-American, 6% Hispanic/Latino, 3% Asian, 1% American Indian or Alaskan Native, and 1% other. Thirty-eight percent were currently in mental health treatment, 11% in the past one month, 23% in the past one year, 13% in the past five years, 8% in the past ten years, and 7% outside the past ten years. Fifty-three percent were currently taking psychiatric medications. Eighty-five percent had been on psychiatric medications in the past. Thirty-three persons were excluded from the dataset due to noncontent-based responding (scale described below), for a final sample size of *N* = 474. The study was approved by the local institutional review board.

Measures

The supplemental file provides a complete list and further description of all the measures that were administered. Participants completed 16 scales to assess different forms of psychopathology consistent with prior *p* factor studies, including measures of psychoticism, somatization, depression, hostility, phobia, obsessive-compulsive, anxiety, fear, paranoia, alcohol usage, cannabis usage, drug abuse, antisocial behaviors, nicotine dependence, mania, and delusions. Internal consistency values were above .84 on 15 of the scales.

Participants also completed two alternative measures of the FFM of general personality used in the GFP analyses. For one measure, Coefficient α ranged from for the domain scores, coefficient α ranged from .84 (Openness) to .92 (Neuroticism), with a median of .89. For the second measure, coefficient α ranged from .82 (Agreeableness) to .87 (Neuroticism).

Participants also completed two alternative measures of maladaptive personality used in the *g*-PD analyses. For one, coefficient α ranged from .93 (Detachment) to .97 (Eccentricity). For the other, coefficient α ranged from .69 (Antagonism) to .77 (Disinhibition).

Finally, five items were included throughout the questionnaire battery to assess for non-content responding carelessness (e.g., “I have used a computer in the past two years” [keyed negatively]). Participants with a score of 12+ were eliminated from the dataset ($n = 33$).

Results

Structural equation model analyses were completed in R statistical software (R Core Team, 2013; Rosseel, 2012). Bifactor models were used to maintain consistency with the prior general factor studies, but bifactor models should be applied with caution and have been criticized for “overfitting” data (Bonifay et al., 2017). Thus, we also calculated the omega hierarchical statistic for the general factors (ω_h; Zinbarg, Revelle, Yovel, & Li 2005), examined criterion validity (in Study 2), and tested models in which the general factors were extracted using second-order hierarchical and single-factor estimation methods. Absolute measures of model fit (RMSEA, SRMR) were given preference over relative indices of model fit (CFI, TLI) due to the large number of indicators in the models (Kenny & McCoach, 2003). Descriptive statistics and intercorrelations for the psychopathology, personality, and personality disorder scales are provided in the supplemental materials.

Figure 1 displays a full model of three general bifactors of psychopathology, personality, and personality disorder, with correlations specified between them. The fit indices for the model were less than adequate (Kline, 2015): RMSEA = .090 (90% CI = .088, .092), and SRMR = .135 (CFI = .631), $\chi^2(2344) = 11{,}337.201$, AIC = 183,349.588, BIC = 184,527.210. They were also less than adequate for 2nd-order hierarchical and single-factor versions of the model, details of which are provided in the supplemental materials. General factor saturation was higher for the *p* factor ($\omega_h = .89$) and the *g*-PD ($\omega_h = .86$), and relatively lower for the GFP ($\omega_h = .69$). The correlation between the *p* factor and *g*-PD was $r = .92$ ($SE = .02$, $p < .001$), the correlation between the *p* factor and the GFP was $r = -.70$ ($SE = .05$, $p < .001$), and the correlation between *g*-PD and the GFP was $r = -.90$ ($SE = .04$, $p < .001$). The results of this model clearly indicated that the general factors were highly correlated. However, the model fit was less than adequate, and the model was therefore re-specified.

An additional model was constructed to examine a possible better fit. The GFP and the *g*-PD were combined, consistent with the current understanding of the DSM-5 maladaptive trait model (APA, 2013). Due to high overlap, the internalizing, negative affectivity, and neuroticism indicators were also combined. Further, domain-level personality scores were used as indicators to promote model parsimony. This model figure can be seen in the supplemental materials. The fit indices for the model were RMSEA = .082 (90% CI = .079, .085), and SRMR = .070 (CFI = .852), $\chi^2(548) = 2287.044$, $p < .001$, AIC = 106374.187, BIC = 107015.013, which met absolute fit index standards for acceptable fit. General factor saturation for the *p* factor was $\omega_h = .89$, and for the GFP/*g*-PD factor was $\omega_h = .70$. The correlation between the combined GFP/*g*-PD factor and the *p* factor was $r = -.90$ ($SE = .017$, $p < .001$). All but one indicator loaded strongly on the *p* factor. The GFP/*g*-PD factor was largely defined by high neuroticism and low agreeableness and conscientiousness. Full loadings for this model are displayed in the supplemental materials.

Study 2

Method

Participants were a representative sample of 1,630 older adults from the St. Louis Personality and Aging Network (SPAN) longitudinal study of personality and health in later life (Oltmanns, Rodrigues, Weinstein, & Gleason, 2014). Each participant nominated one informant who “knew them best” to complete informant-report questionnaires about him or her (these informants included 50% romantic partners, 27% other family members, 22% friends, and 2% other). Personality data for the present study were collected at a 2.5-year follow-up assessment. Over 1,200 target participants and 1,000 informants completed all measures (numbers vary due to sporadic missing data). Further details are provided in Oltmanns et al. (2014). The study was approved by the local institutional review board.

Measures

Targets and informants both reported on the target’s personality using a well-validated full-length measure of normal personality for the GFP analyses, with coefficient α at the facet level ranging from .58 (Tender-Mindedness) to .84 (Depression) for the self-report and .60 (Actions) to .89 (Self-Discipline) for the informant report.

Targets also completed a structured interview for the assessment of the DSM-IV personality disorders used in the *g*-PD analyses. The interviews were administered by trained staff and case conferences were regularly conducted to discuss ratings. Inter-rater reliability for a sample of baseline assessment interviews ($n = 265$) was ICC = .67 (Oltmanns et al., 2014). Internal consistency for the interview criteria used in the present study ranged from $\alpha = .52$ (Dependent) to .83 (Avoidant).

Finally, targets and informants both completed a questionnaire about the target to assess ten DSM-IV personality disorders for the *g*-PD analyses. Internal consistency ranged from .50 (Antisocial) to .80 (Avoidant) for target self-reports and .66 (Schizoid) to .85 (Avoidant) for informant-reports.

A subset of target participant/informant pairs (n = 665) completed seven well-validated measures of self- and informant-rated physical health and self-reported social support, loneliness, insomnia, and life satisfaction. Reliabilities ranged from coefficient α = .66 to α = .94.

See the supplemental materials for a complete list and further description of all the measures that were administered.

Results

A model was constructed to compare correlations between general bifactors of the GFP and *g*-PD. Due to the novelty of the *g*-PD model, exploratory methods were used to identify specific factors to be extracted. Model construction details and factor loadings are provided in the supplemental materials. Correlations were specified between latent factors of the same perspective (e.g., self-self and informant-informant), and following associations between personality and personality disorder found in Samuel and Widiger (2008). Fit indices were: RMSEA =.065 (.064, .065), and SRMR = .083 (CFI = .722), $\chi^2(3719) = 19488.142$, $p < .001$, AIC = 85078.645, BIC = 87374.430. The model is depicted in Figure 2. The GFP factor loadings in this model were consistent with previous research; defined by low neuroticism, high extraversion, high agreeableness, and high conscientiousness. The *g*-PD factor loadings were consistent with what has been found previously, in that the borderline, avoidant and dependent personality disorder indicators loaded highly on the *g*-PD (c.f., Jahng et al., 2011; Wright et al., 2016). GFP saturation in the combined model was ω_h = .51 and *g*-PD saturation was ω_h = .48. The correlation between the GFP and *g*-PD was −.82 (*SE* = .03) $p < .001$. Fit indices for second-order hierarchical and single-factor estimation of the general factors were less than adequate and can be found in the supplemental materials. Descriptive statistics and intercorrelations of the scales used in Study 2 are displayed in the supplemental materials.

A total score of maladaptivity was created by combining measures of physical health, insomnia, social support, satisfaction with life, and loneliness. The GFP correlated with total maladaptivity $r(665) = -.65$ (*SE* = .04), $p < .001$. The *g*-PD correlated with total maladaptivity $r(660) = .68$ (*SE* = .04), $p < .001$.

Discussion

The results of the current study suggest that there may be considerable shared variance among the *p* factor, the *g*-PD, and the GFP. Investigators have had trouble arriving at a consensus understanding of the GFP, with many questioning whether it has any real meaning at all. It might be even more difficult to understand a common general factor that is shared by such disparate individual differences as psychopathology, personality disorder, and normal (general) personality. There would appear to be little in common across (for instance) nicotine dependence, mood disorder, antagonism, negative symptoms of schizophrenia, obsessive-compulsive personality, psychosis, narcissism, and low conscientiousness.

The current results might also question some of the existing substantive interpretations of a respective general factor. For example, it did appear to be compelling to suggest that *g*-PD is largely equivalent to borderline personality organization (Kernberg, 1984) given the prominence of BPD diagnostic criteria within some *g*-PD studies (Sharp et al., 2014; Wright et al., 2016). However, it would be difficult to suggest that borderline personality organization also largely defines the general factor of psychopathology and general personality. It might seem comparably difficult to suggest that a disposition toward psychopathology (Caspi et al., 2014) provides an apt description of the general factor of personality, or conversely that social ineffectiveness (Rushton & Irwing, 2011; van der Linden et al., 2017) provides an apt description of the general factor of psychopathology. Yet, the results of the current study suggest that the *p* factor, GFP, and *g*-PD may share much in common.

One might then consider the results of the current study to be consistent with the view that the *p* factor and *g*-PD are also artifactual products of an evaluative bias, as suggested for the GFP (Pettersson et al., 2012). However, social desirability was largely rejected years ago when it became apparent that much of the variance within measures of social desirability was substantively meaningful individual differences (McCrae & Costa, 1983), consistent with the fact that the *p* factor and the *g*-PD are correlated with a substantial amount of real life outcomes (Caspi et al., 2014; Lahey et al., 2012; Patalay et al., 2015; Wright et al., 2016). It is not that persons are attributing to themselves desirable (or undesirable) traits that they do not have; it is that some persons do indeed have many desirable traits whereas other persons have many undesirable traits.

Nevertheless, it perhaps remains problematic if some of these traits and disorders are themselves inconsistent, if not contradictory (Pettersson et al., 2012). Indeed, what is really shared in common across nicotine dependence, psychosis, disinhibition, fear, mood disorder, schizophrenia, and narcissistic personality disorder? We offer another interpretation of the general factors of personality, psychopathology, and personality disorder, which we feel is consistent with both a substantive and an artifactual understanding (Widiger & Oltmanns, 2017). All persons who offer a substantive understanding of the general factor are providing alternative descriptions or bases for the extent of maladaptive dysfunction, whether it reflects interpersonal dysfunction (Jahng et al., 2011), self-other deficits (Sharp et al., 2014; Wright et al., 2016), a general disposition toward psychopathology (Caspi et al., 2014; Lahey et al., 2012), an impulsive responsivity to emotion (Carver et al., in press), or social ineffectiveness (Rushton & Irwing, 2011). What all of these general factors might have in common, or perhaps how they should be understood, is that they simply reflect extent of impairment or dysfunction within the respective persons' lives, irrespective of the basis for that dysfunction or impairment, whether it be from the presence of a mood disorder, a psychosis, a personality disorder, or a personality trait. Disparate disorders do not share the same symptoms (Lahey et al., in press), but they may share the same impairments and dysfunctions that are secondary to the different symptoms or original fundamental deficits from which the symptoms arise (e.g., irresponsibly lax and excessively perfectionistic persons will both fail to complete tasks on time, yet they will do so for opposite reasons).

Our interpretation is admittedly speculative, but perhaps no more speculative than what has been previously offered. Indeed, most proponents of a substantive interpretation have acknowledged that their proposals were speculative, often with a clear expression of uncertainty as to the precise understanding (e.g., Caspi et al., 2014; Jahng et al., 2001; Sharp et al., 2015; Wright et al., 2016). In addition, in Study 2, both the GFP and *g*-PD correlated substantially with a diverse, indiscriminate set of indicators of maladaptivity, consistent with our proposed understanding.

Indeed, it is important to recognize that the level of impairment or dysfunction along which the different forms of psychopathology, personality disorder, and personality traits are being organized is largely independent of the basis for that impairment. There is then unlikely to be a common etiological basis for the occurrence or existence of the general factor. In that regard, the dimension is artifactual, as it reflects the associated impairment or dysfunction (e.g., occupational dysfunction) rather than the basis for that impairment (e.g., laxness or perfectionism). It is the level of impairment that determines one's relative position on the general factor (e.g., the occupational dysfunction), not the presence of a particular disorder or trait (e.g., laxness or perfectionism).

One can normally interpret a factor by the items obtaining the highest scores on that factor. However, in the case of the general factor, the highest loading traits or disorders will simply be the most dysfunctional traits and/or disorders. In the case of the *g*-PD, this will typically be borderline traits (e.g., Sharp et al., 2014; Wright et al., 2016), whereas in the case of the *p* factor, it would be the psychotic symptoms and/or disorders (Caspi et al., 2014). *p* factor researchers have not interpreted this factor as representing level of psychosis on the basis of the psychotic symptoms obtaining the highest loadings, because it is apparent that the other disorders loading on this factor have nothing to do with being psychotic. It would appear then similarly inaccurate to interpret the *g*-PD as a borderline personality disorder factor because the other personality disorders loading on this factor have little to do with borderline personality disorder.

Conclusions

No prior study has explicitly concerned the convergence of the *p* factor, the *g*-PD, and the GFP. The current investigation demonstrated across two studies that the *p* factor, *g*-PD, and GFP are highly convergent, thereby defining a common individual differences continuum. This common variance should have significant implications as to how the general factors across all three domains are to be understood conceptually.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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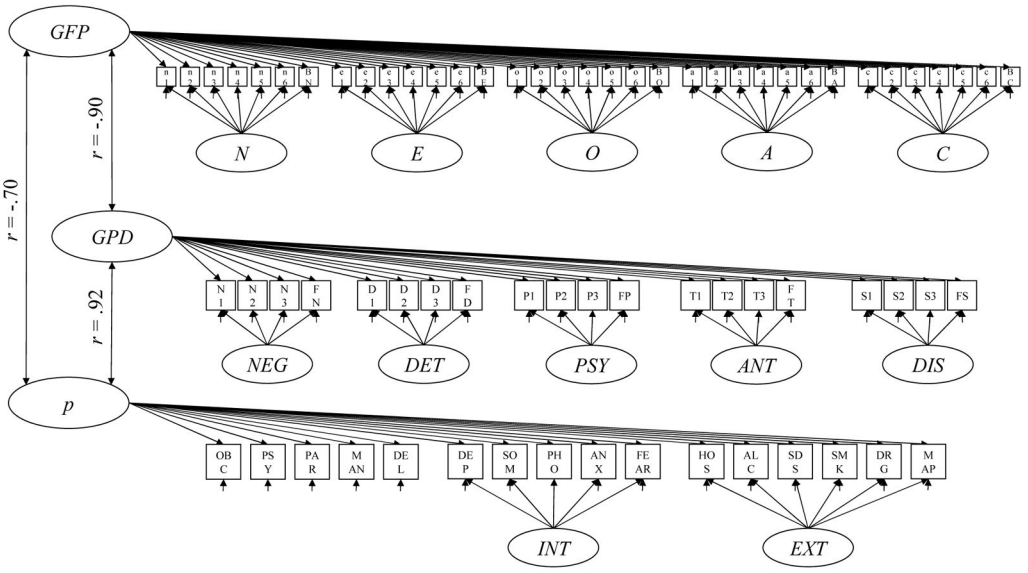

Figure 1. Study 1 Combined Three-Domain Model of Psychopathology, Personality, and Personality Disorder

GFP = general factor of personality, G-PD = general factor of personality disorder, *p* = p factor of psychopathology. N = neuroticism, E = extraversion, O = openness, A = agreeableness, and C = conscientiousness. NEG = negative affect, DET = detachment, PSY = psychoticism, ANT = antagonism, DIS = disinhibition. INT = internalizing, EXT = externalizing. B = Big Five Inventory. FN = Five-Factor Form Neuroticism, FD = Five-Factor Form Detachment, FP = Five-Factor Form Openness, FT = Five-Factor Form Antagonism, FS = Five-Factor Form Disinhibition. OBC = obsessive-compulsive, PSY = psychoticism, PAR = BSI Paranoia, MAN = BSI Mania, DEL = Peters et al. Delusions Inventory, DEP = BSI Depression, SOM = BSI Somatization, PHO = BSI Phobia, ANX = BSI Anxiety, FEAR = Fear Questionnaire, HOS = BSI Hostility, ALC = Alcohol Use Disorders Identification Test, SDS = Severity of Dependence Scale, SMK = Fagerstrom Test for Nicotine Dependence, DRG = Drug Abuse Screening Test, MAP = Multi-Source Assessment of Personality Pathology Antisocial scale. Double sided arrows = correlation, single sided arrows = regression.

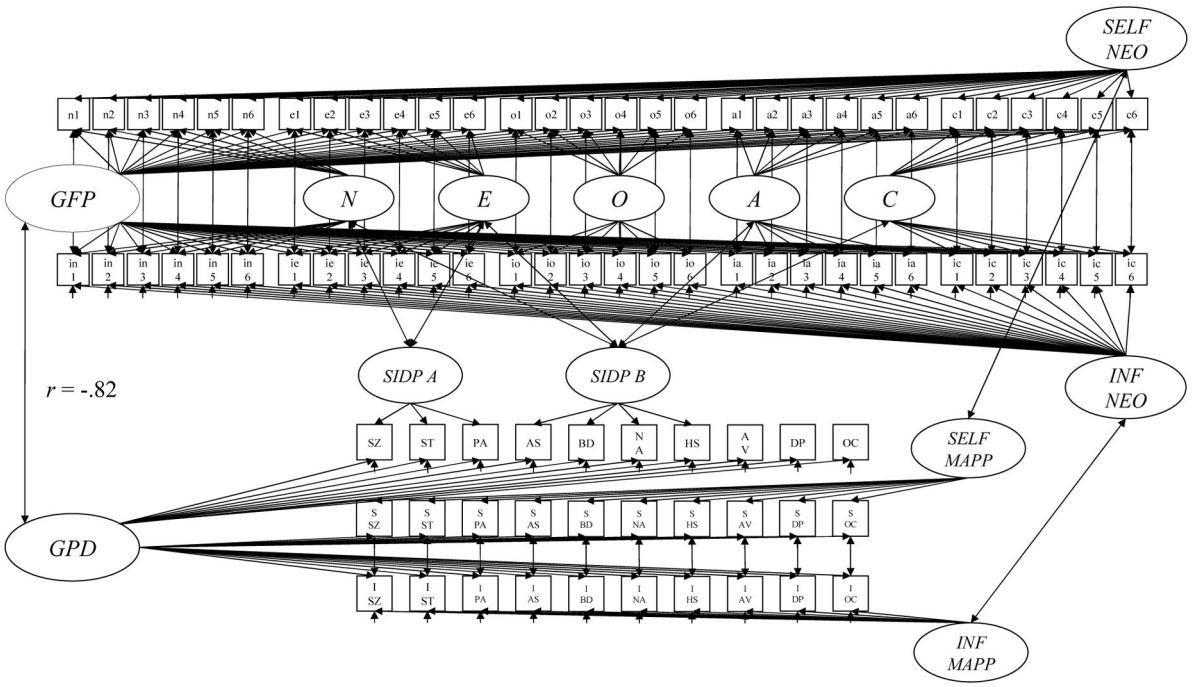

Figure 2. SPAN Multi-Method GFP and g-PD Structural Equation Model

GFP = general factor of personality, G-PD = general factor of personality disorder, SELF = self-report, INF = informant-report, SIDP = Structured Interview for DSM-IV Personality, SIDPA = DSM cluster A personality disorders, SIDPB = DSM cluster B personality disorders, MAPP = Multi-Source Assessment of Personality Pathology, N = neuroticism, E = extraversion, O = openness, A = agreeableness, C = conscientiousness, SZ = schizoid, ST = schizotypal, PA = paranoid, BD = borderline, NA = narcissistic, HS = histrionic, AV = avoidant, DP = dependent, OC = obsessive-compulsive, S = self-report, I = informant-report. Double sided arrows = correlation, single sided arrows = regression.