

Connecting DSM-5 Personality Traits and Pathological Beliefs: Toward a Unifying Model

Christopher J. Hopwood · Nick Schade ·
Robert F. Krueger · Aidan G. C. Wright ·
Kristian E. Markon

Published online: 20 November 2012
© Springer Science+Business Media New York 2012

Abstract Dissatisfaction with the DSM-IV model of personality disorders has led to the development of alternative conceptualizations, including pathological trait models and models linked to particular theoretical approaches, such as Beck and Freeman's (1990) cognitive framework. An important issue involves the potential to interweave such models into a single, parsimonious system that combines their distinct advantages. In this study, pathological trait and dysfunctional belief data from 616 individuals in a non-clinical sample were evaluated for commensurability using structural equation modeling. These models can be integrated via five higher-order factors, and that specific dimensions of dysfunctional beliefs can be differentiated based on features of the DSM-5 trait model. Overall, these results suggest that traits provide scaffolding for individual differences in pathological personality, within which dysfunctional beliefs offer specific vectors for clinical intervention in a cognitive framework. Implications of the empirical commensurability of trait and cognitive models are discussed.

Keywords Personality disorders · Traits · Schema · Dysfunctional beliefs · DSM-5

C. J. Hopwood · N. Schade
Michigan State University, Lansing, MI, USA

R. F. Krueger
University of Minnesota, Minneapolis, MN, USA

A. G. C. Wright
Western Psychiatric Institute and Clinic, Pittsburgh, PA, USA

K. E. Markon
University of Iowa, Iowa City, IA, USA

C. J. Hopwood (✉)
Clinical Psychology, Michigan State University, East Lansing, MI
48824-1116, USA
e-mail: hopwood2@msu.edu
URL: <http://psychology.msu.edu/personality/>

A number of authors have commented on problematic features of the DSM-IV (American Psychiatric Association 2000) personality disorder (PD) model including diagnostic comorbidity and heterogeneity, presumed discontinuity between normal and abnormal personality in the absence of evidence for such a discontinuity, and invalid structure (e.g., Clark 2007; Widiger and Trull 2007). These criticisms have led to the development of dimensional trait models that explain the “comorbidity” among putative disorders in terms of overlapping traits (Lynam and Widiger 2001), provide an empirical bridge between normal and abnormal personality features (Markon et al. 2005; Samuel et al. 2010), offer a means for describing idiographic patterns that differentiate individuals with the same diagnosis (van Kampen 2000), and tend to fare better than the DSM-IV categorical system in empirical tests of structure (Eaton et al. 2011; Kendler et al. 2008; Nestadt et al. 2006; Wright et al. 2012c). In terms of clinical utility, some authors have argued that the descriptive, atheoretical approach of the DSM-IV does not lend itself to effective and nuanced clinical formulation. Such authors have developed systems which focus on describing treatment targets or elements of a formulation from a particular theoretical perspective (e.g., Beck and Freeman 1990; Benjamin 1996; Kernberg 1984; Wright et al. 2012a).

The DSM-5 Personality and Personality Disorder work group has proposed depicting PDs, in part, using a five-factor trait model that is a pathological variant of the well-known Five-Factor Model (FFM) of normative personality (Krueger et al. 2011; 2012; Thomas et al. 2012; Wright et al. 2012c). The trait system proposed for the DSM-5 PDs was developed initially by literature review and workgroup discussion that converged on an initial list of 37 traits as important for describing phenotypic variability in personality dysfunction. Factor analyses of items designed to assess these traits suggested that some of the initially identified traits were highly similar to one another, resulting in a refined model with 25 pathological traits that fall empirically into five higher order domains (Krueger et al. 2012).

Negative Affectivity (like FFM neuroticism) involves tendencies to experience unpleasant feelings such as anger or anxiety, hostile or passive interpersonal behavior, and labile or restricted emotionality. Detachment (like low extraversion) involves depressive affect and interpersonal withdrawal and mistrust. *Antagonism* (like low agreeableness) involves callous or antisocial traits as well as grandiosity and attention-seeking. *Disinhibition* (like low conscientiousness) involves irresponsible, impulsive, and risk taking behaviors, such as distractibility and carelessness. *Psychoticism* (like Openness to Experience) involves eccentricity, perceptual problems, and odd behavior. Initial evidence suggests that the DSM-5 trait model significantly captures the reliable variance in DSM-IV PDs (Hopwood et al. 2012) as well as the interpersonal dysfunction that is notable in personality pathology, while also solving some of the empirical problems in DSM-IV as discussed above.

The adoption of pathological traits helps solve some of the empirical problems of the DSM-IV (Krueger et al. 2011), and may also have the potential to improve the clinical utility of the diagnostic system. However, trait models aim to encompass individual differences in personality, broadly construed, and less is known about the capacity of trait models to assist in developing clinical formulations tied to a specific theoretical framework, such as a cognitive approach. Thus the potential for elements of such systems to enhance the clinical utility of trait approaches has not been fully realized. The purpose of this study is to pursue this issue by evaluating the ability of the trait model being proposed for the DSM-5 to account for the features of personality pathology thought to be most important in one popular model of personality pathology, Beck and Freeman's (1990) cognitive theory.

The Cognitive Model of Personality Disorders

The cognitive theory of PDs focuses on the dysfunctional beliefs thought to underlie pathological behavior. The assumption of this model is that these beliefs, in the case of PD, tend to be rigid and pervasive because they emanate from deeply ingrained schema. However, "once the underlying beliefs are made accessible (conscious), the patient can then apply realistic, logical reasoning to modify them" (Beck and Freeman 1990, p. 80). The goals for the clinician in assessing PD features are to identify these core schemas and resulting beliefs, and to depict the ways in which these beliefs lead to dysfunction. For instance, rather than focusing upon descriptive behaviors of paranoid PD depicted in the DSM-IV such as "recurrent suspiciousness" or "reluctance to confide in others" (APA 2000), cognitive clinicians would focus on beliefs that underlie these behaviors, such as

"if people act friendly, they may be trying to exploit me" (Beck and Beck 1991; Fournier et al. 2012). These beliefs are prescriptive for the cognitive therapist, whose goal would be to help the patient become more aware of their impact, test their validity, and modify them as necessary to improve functioning.

The cognitive perspective holds that such beliefs are readily accessible (Ingram and Hollon 1986), which both facilitates the therapeutic process of identifying core beliefs and implies the viability of assessing pathological belief systems via self-report questionnaires. The *Personality Beliefs Questionnaire* (PBQ) was developed by Beck and Beck (1991) to operationalize the beliefs identified by Beck and Freeman (1990) as underlying DSM-IV PD categories. Initial research showed that this measure distinguished patients with different PD diagnoses (Beck et al. 2001) and correlated strongly with other indicators of personality dysfunction (Trull et al. 1993). Fournier and colleagues (2012) focused on the structure of a brief form of the instrument whose items were selected based on having strong item-total correlations with parent scales in initial validation work (Butler et al. 2007). They first conducted an exploratory factor analysis on a new sample, and then applied the structure identified in that analysis to test a confirmatory model in a subset of the initial validation sample. The exploratory analysis was used to further cull the item pool to 59 items that loaded strongly and uniquely on one of 7 factors.

These factors were given labels similar to DSM-IV categories, in part because Beck and Beck (1991) initially constructed the PBQ to assess the dysfunctional beliefs underlying the DSM PDs (Butler et al. 2007). The *Dependent/Avoidant* factor included items involving beliefs about the need for others, the danger of certain situations and feelings, and the preference for avoidance as a coping strategy for difficult interpersonal situations (e.g., "I am helpless when left on my own"). The *Obsessive-Compulsive* factor included items about perfectionistic beliefs and the value of details and tightly organized systems for effective decision-making ("It is necessary to stick to the highest standards at all times, or things will fall apart"). The *Narcissistic* factor involved beliefs of an inflated self-worth and regarding the importance of being recognized ("Since I am so superior, I am entitled to special treatment and privileges"). Items on the *Autonomy* (analogous to passive-aggressive PD) factor reflected the importance of self-reliance and concerns about being controlled by others ("If I follow the rules the way people expect, it will inhibit my freedom of action"). Concerns about the trustworthiness of others were prominent on the *Paranoid* factor ("Others will try to use me or manipulate me if I don't watch out"). The *Histrionic* factor focused on the importance of entertaining and gaining or retaining attention from others ("If I don't keep others engaged with

me, they won't like me"). Finally, items on the *Schizoid* factor involved beliefs about the value of privacy and indifference to others' judgments ("I enjoy doing things more by myself than with other people").

The CFA model showed adequate fit (RMSEA=.08, CFI=.88) and all items loaded > .50 on their index factors. The instrument significantly differentiated between patients with and without PDs and patients with DSM-IV defined PDs systematically endorsed the beliefs thought to correspond to their disorder. Fournier et al. concluded that "the factors identified in the current work describe clinically meaningful sets of beliefs that have the potential to translate directly into unique targets for psychological treatment" and that "assessment systems that can help practitioners and patients to identify these cognitions could be expected to have enormous clinical utility" (pagination currently unavailable as this paper is not yet in print).

Importantly, although the beliefs comprising the PBQ were initially organized around DSM PDs, Beck and Freeman (1990) also noted that "personality 'traits' identified by adjectives such as 'dependent,' 'withdrawn,' 'arrogant,' or 'extraverted' may be conceptualized as the overt expression of these underlying (belief) structures" (p. 18). In other words, there is significant conceptual space within which to integrate trait and belief models towards a more comprehensive assessment of PD. One critical empirical question for cognitively oriented clinicians, given that the DSM-5 will adopt a trait model, is therefore the degree to which the DSM-5 trait structure can be interwoven with and elaborated by cognitions that might provide specific intervention targets.

The Current Study

To the extent that the DSM-5 traits provide a systematic and empirically valid model for depicting personality pathology, it may also assist cognitive therapists more directly than previous editions of the DSM in developing clinically meaningful formulations. The observation of strong overlap would also signify the relevance of dysfunctional beliefs to the DSM-5 trait model, despite the initial organization of these beliefs around DSM categories. However, there is no guarantee that a model based on a more valid structural organization of traits will effectively depict the dysfunctional beliefs identified as relevant to PD in cognitive research and theory. The purpose of this study is to evaluate the degree to which pathological traits being proposed for the DSM-5 can account for the variance in the dysfunctional beliefs identified by Beck and colleagues as underlying personality pathology and as useful for developing formulations and depicting treatment targets in cognitive practice.

Method

Participants ($N=616$) completed questionnaires for course credit at a large Midwestern University. They were on average 20.14 years old ($SD=2.24$, $range=18-48$); 354 (58 %) were women; 491 (80 %) were Caucasian, 48 (8 %) were Asian-American, 34 (6 %) were African-American, and 43 (7 %) identified with other ethnicities or did not report an ethnic identification. Participants completed two questionnaires. The *Personality Inventory for DSM-5* (PID-5, Krueger et al. 2012) is a 220-item measure of the 25 primary traits and 5 higher-order domains of the proposed DSM-5 personality pathology system. Its trait scales had alpha coefficients ranging from .69–.95 ($Mdn=.85$) in this sample. The *Personality Beliefs Questionnaire* (PBQ; Beck and Beck 1991; Fournier et al. 2012) is a 59-item measure of the pathological beliefs thought to underlying personality disorders from a cognitive perspective (Beck and Freeman 1990). Its seven dysfunctional belief scales had alpha coefficients ranging from .74–.89 ($Mdn=.83$).

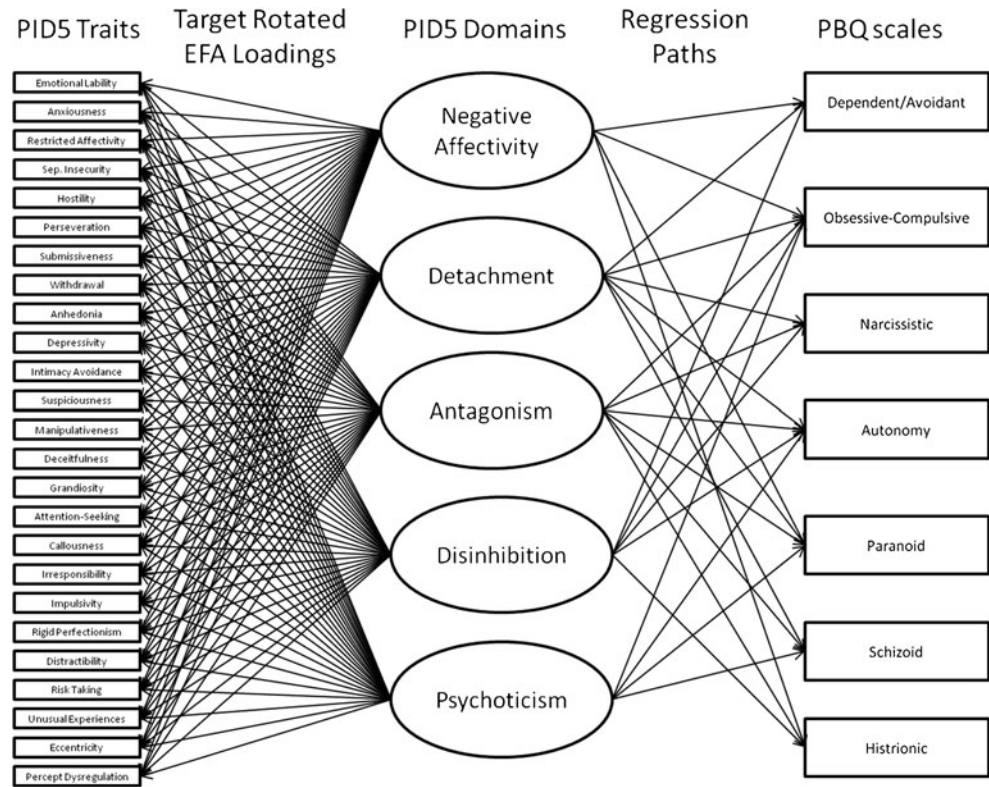
Analyses

Our primary goal was to determine the degree to which the lower order traits of the DSM-5 model and the PBQ scales could be represented in a joint model of individual differences in both pathological traits and dysfunctional beliefs. A structural equation model was constructed using maximum likelihood estimation in Mplus (Fig. 1¹). In this model, five latent factors were target rotated to the 25 PID-5 traits based on the exploratory factor analysis (EFA) pattern coefficients observed in initial validation samples (Krueger et al. 2012, see Table 3). The PBQ scales were then regressed on these factors, within the same overarching model. In other words, the portion of the model reflecting measurement of the five PID-5 factors was saturated in terms of loadings (as in an EFA), with PID-5 loadings rotated to maximally replicate the structure observed in previous validation studies. In contrast, the portion of the model reflecting the regression of PBQ scales on the PID-5 factors was specified in terms of unconstrained regression coefficients. The covariances among the latent factors and the covariances among the PBQ scales were freely estimated.

Our interpretive focus was on the coefficients describing associations between the latent domains to the PID-5 traits on one side of the model and between the latent domains and the PBQ scales on the other. This follows our interest in the degree to which the trait domains could be regarded as a junction between pathological traits and dysfunctional beliefs. We also evaluated the more specific associations

¹ The covariance matrix used for this analysis is available upon request.

Fig. 1 Structural Equation Model evaluating the association between PID-5 traits and PBQ dimensions. In this overall model, all PID-5 and PBQ scales loaded onto five higher order factors. Latent PID-5 variables were estimated using a targeted rotation of 25 PID-5 trait pattern coefficients from Krueger et al. (2012). Regression paths were then estimated to depict associations between these higher order domains and PBQ scales. Specific coefficients for each domain are provided in Figs. 2, 3, 4, 5 and 6



between pathological beliefs and traits by correlating the PBQ scales with the primary trait scales of the PID-5. This analysis complemented the initial SEM analysis in that it depicted how the individual DSM-5 traits can be used to reference the pathological beliefs emphasized by the cognitive system.

Results

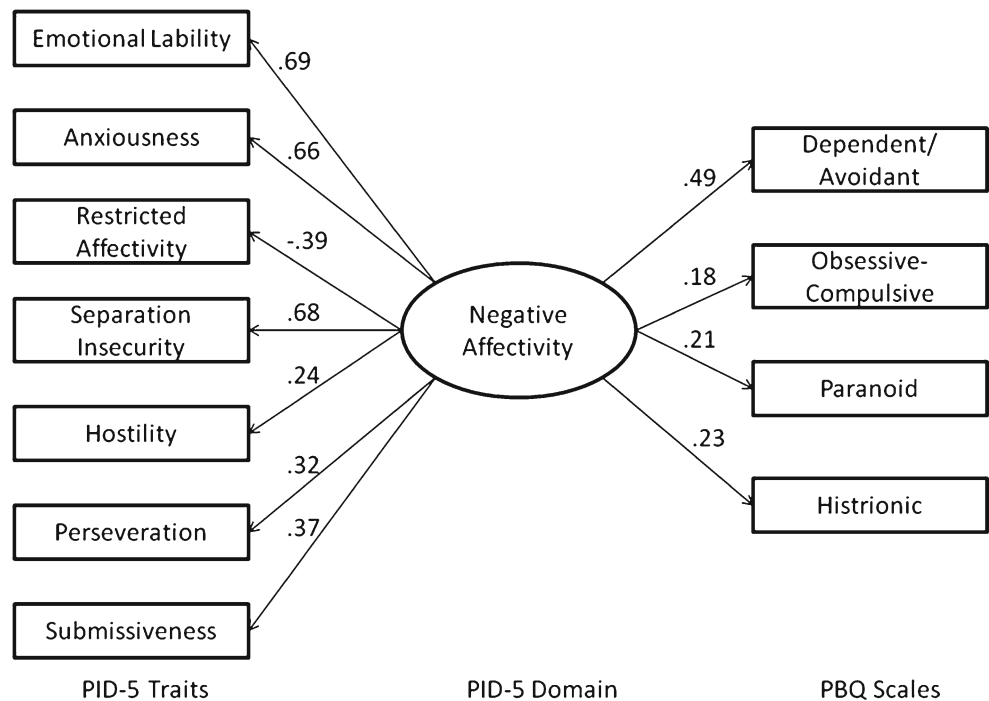
The overall structural equation model (see Fig. 1) fit the data reasonably well (RMSEA=.08, CFI=.90; SRMR=.03). As described above, the domains were target rotated to reflect the higher order structure identified in previous analyses of the PID-5. All of the primary PID-5 factor loading coefficients were substantial (mean of absolute values=.51, SD=14.91, range=.24-.79), indicating a reasonable replication of the structure identified in initial validation studies (Krueger et al. 2012).

Factor loadings from the trait domains to the PID-5 traits and regression coefficients from the domains to the PBQ scales are depicted in Figs. 2, 3, 4, 5 and 6, which show each domain one at a time, and only include primary loadings and significant regression paths. These figures show that each domain had significant associations with a unique combination of PBQ scales. For instance, Negative Affectivity was associated with Dependent/Avoidant, Obsessive-Compulsive, Paranoid, and Histrionic belief scales, whereas Psychoticism was associated with Obsessive-Compulsive,

Autonomy, Paranoid, and Schizoid belief scales. Furthermore, each dimension of dysfunctional beliefs can be described by a unique constellation of significantly associated higher-order domains. For example, Dependent/Avoidant beliefs are related to high Negative Affect, Detachment, and Disinhibition. In contrast, Obsessive-Compulsive beliefs are related to high Negative Affect, Detachment, Antagonism and Psychoticism and low Disinhibition. Taken together, these findings indicate the potential for dysfunctional beliefs to elaborate the DSM-5 trait model and, more generally, the commensurability between pathological traits and dysfunctional beliefs.

To depict associations between traits and beliefs in a finer grain, bivariate correlates were computed between each PBQ scale and the PID-5 traits (see Table 1). These correlations add nuance to domain-level results, such as instances in which associations between PID-5 domains and PBQ dimensions appear to be driven by different traits across PBQ scales. For example, Antagonism was a significant predictor of both Narcissistic and Paranoid PBQ dimensions in SEM analyses. However, whereas grandiose elements of Antagonism were strongly related to Narcissistic beliefs, they were only modestly related to Paranoid beliefs. This table also includes the multiple correlations observed in regression models in which all 25 PID-5 traits predicted each of the PBQ scales. These coefficients, which ranged from .65-.78, further support the general finding of substantial overlap between these systems.

Fig. 2 Negative Affectivity: PID-5 pattern coefficients and significant associations with PBQ dimensions. This figure represents part of the overall model shown in Fig. 1. PID-5 pattern coefficients are only given for primary loadings; path coefficients to PBQ scales are only given if significant ($p < .01$). Coefficients not reported here are available upon request



Discussion

The purpose of this study was to evaluate the potential for empirically integrating the personality traits proposed for the DSM-5 and the dysfunctional beliefs asserted by cognitive theorists to underlie PDs. Two overall findings were observed. First, DSM-5 pathological traits and PBQ dysfunctional beliefs converge at the level of five higher order domains that are broadly descriptive of personality and personality pathology. This finding illustrates the potential

to integrate these systems in a more parsimonious, empirically viable, and clinically useful model of personality pathology. Second, dimensions of pathological beliefs can be differentiated by unique constellations of higher order trait domains, and more specifically articulated by particular patterns with DSM-5 traits. This finding implies the utility of traits for developing cognitive formulations by identifying core beliefs that could represent treatment targets, as well as the potential for pathological beliefs to add clinical utility to the DSM-5 trait model.

Fig. 3 Detachment: PID-5 pattern coefficients and significant associations with PBQ dimensions. This figure represents part of the overall model shown in Fig. 1. PID-5 pattern coefficients are only given for primary loadings; path coefficients to PBQ scales are only given if significant ($p < .01$). Coefficients not reported here are available upon request

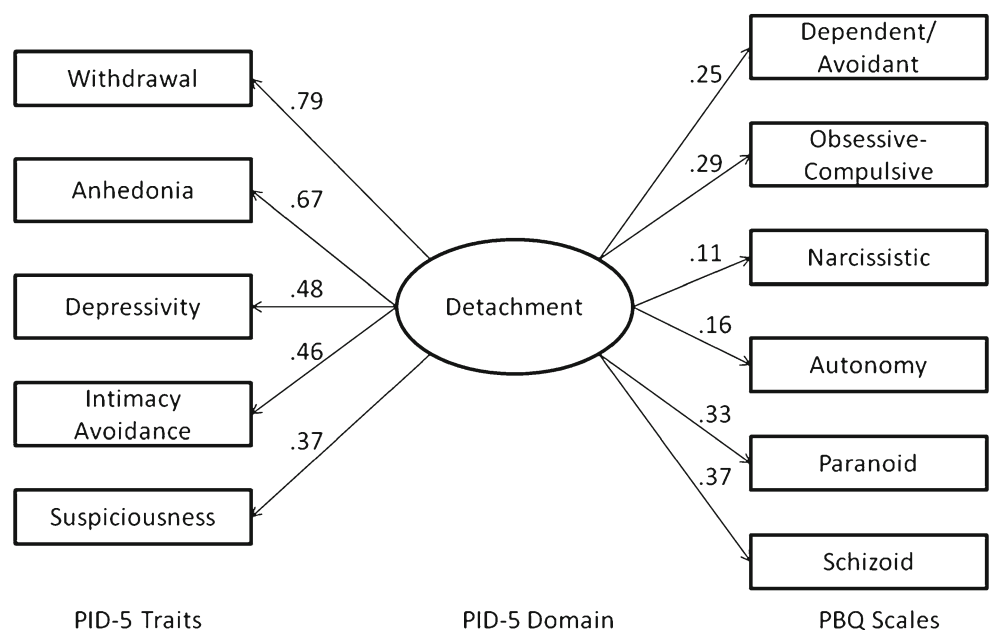
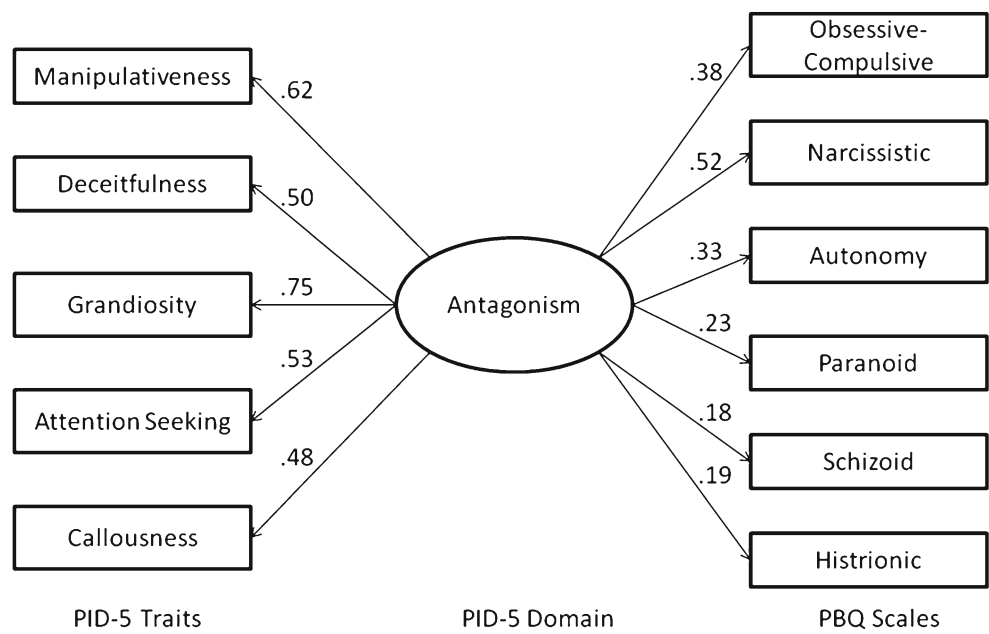


Fig. 4 Antagonism: PID-5 pattern coefficients and significant associations with PBQ dimensions. This figure represents part of the overall model shown in Fig. 1. PID-5 pattern coefficients are only given for primary loadings; path coefficients to PBQ scales are only given if significant ($p < .01$). Coefficients not reported here are available upon request



One virtue of hierarchical models is that they can be interpretively “entered” at different levels of specificity, depending on one’s purpose. This means that the clinical integration of traits and beliefs can be achieved at different levels as well. At a broad level five domains of personality variability in Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism reflect patterned clinical presentations that can be articulated by lower order traits and beliefs. Each domain can be construed as depicting a discrete but highly generative unit for organizing assessment data, building clinical formulations, and communicating diagnostic information efficiently. We describe these domains in turn.

Negative Affectivity

Negative affectivity involves the tendency to experience negative emotions such as anxiousness and emotion dysregulation. These negative emotions tend to disrupt cognition in the form of insecurity and perseveration, and interfere with interpersonal behavior in the form of hostility and submissiveness (see Fig. 2). Our results suggest that individuals with heightened negative affectivity are also likely to harbor a maladaptive constellation of beliefs about themselves. For instance, given their vulnerable sense of self-worth they may believe they need to steer clear, cling to, (dependent/avoidant), or mistrust (paranoid) for protection

Fig. 5 Disinhibition: PID-5 pattern coefficients and significant associations with PBQ dimensions. This figure represents part of the overall model shown in Fig. 1. PID-5 pattern coefficients are only given for primary loadings; path coefficients to PBQ scales are only given if significant ($p < .01$). Coefficients not reported here are available upon request

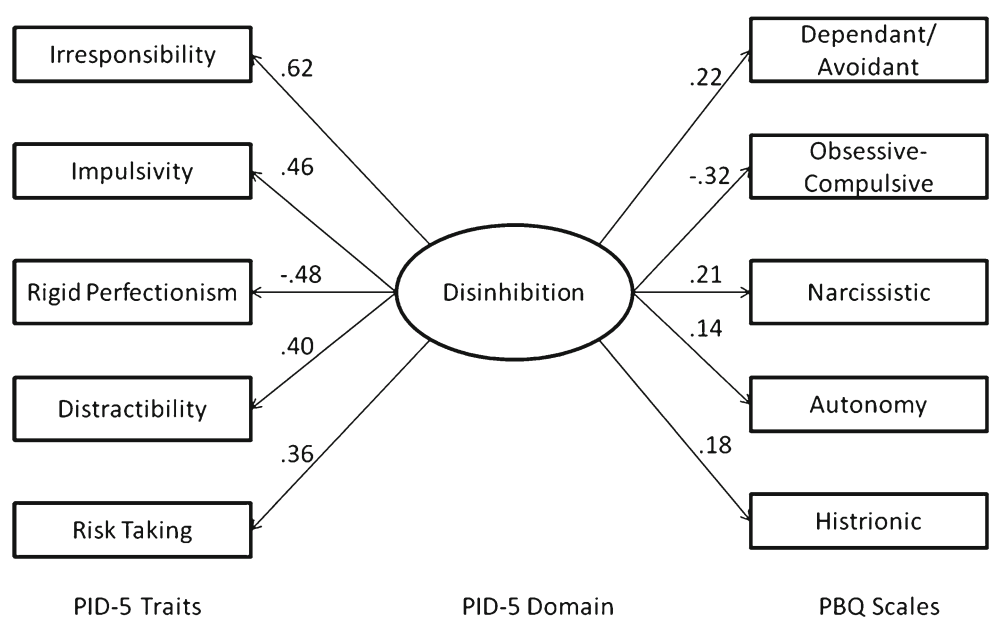
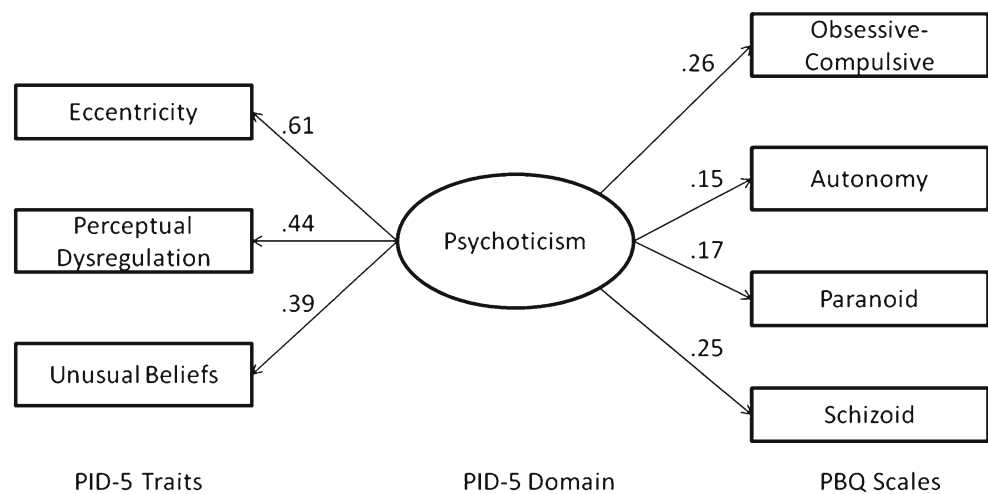


Fig. 6 Psychoticism: PID-5 pattern coefficients and significant associations with PBQ dimensions. This figure represents part of the overall model shown in Fig. 1. PID-5 pattern coefficients are only given for primary loadings; path coefficients to PBQ scales are only given if significant ($p < .01$). Coefficients not reported here are available upon request



from emotional harm. They may also believe they can quell negative emotions through attention-seeking behavior designed to illicit social support and favor (histrionic), or through imposing order on their environment (obsessive-compulsive).

Detachment

Detached individuals may be emotionally anhedonic or depressed, and may generally tend to avoid and withdraw from others, of whom they may be suspicious (see Fig. 3). This personality style was associated with a number of maladaptive beliefs in this study. As expected, beliefs involving a lack of interest in relationships (schizoid), mistrust (paranoid), independence (autonomy), and interpersonal ambivalence (dependent/avoidant) had the strongest associations with Detachment. Detached individuals may also tend to harbor self-aggrandizing beliefs (narcissism), which may further signify interpersonal disruption.

Antagonism

Antagonism involves the tendency to disregard the needs of others and to be self-focused, deceitful, manipulative, callous, grandiose, and attention-seeking traits (see Fig. 4). The results of this study suggest that antagonistic individuals are likely to maintain a relatively inflated (narcissistic) view of themselves as special and superior, an attitude which presumably facilitates antagonistic behavior towards others and which may promote attention-seeking (histrionic) behavior. They may become particularly antagonistic when others violate their rigid and dogmatic (obsessive-compulsive) expectations for how things ought to be. Antagonism may be further maintained by beliefs about the importance of self-reliance and concerns about being controlled by others (autonomy), which may even lead to overtly mistrustful (paranoid) or dismissive (schizoid) behavior.

Disinhibition

Disinhibition involves the tendency to be irresponsible, impulsive, distractible, and risk-taking. Disinhibited individuals are likely to have low scores on indicators of rigidity and perfectionism (see Fig. 5). According to our results, this personality style is also related to a number of pathological beliefs. Individuals with disinhibited personalities may be interpersonally ambivalent (dependent/avoidant), and arrogant (narcissism), and they may believe that the best way to develop and maintain social connections is to show off (histrionic) by behaving recklessly. Such individuals may believe it is best to go it alone (autonomy) and are unlikely to be particularly orderly or emotionally controlled (obsessive-compulsive).

Psychoticism

Psychoticism connotes the tendency to have odd or unusual experiences in behavior, to misperceive social cues, and to behave eccentrically (see Fig. 6). Results from this study suggest that such individuals also harbor a number of pathological beliefs. Least surprising among those are beliefs related to schizoid and paranoid PDs, which are historically thought to be associated with psychotic or pre-psychotic features. In addition, individuals with psychotic personality features may believe they need to impose order on their environment to ward off emotional dyscontrol (obsessive-compulsive), and tend to see themselves as unique or different from others (autonomy).

Trait Facets and Pathological Beliefs

More specific connections between dysfunctional beliefs and pathological traits can be mapped out at a lower level of the hierarchy. For instance, according to the results of this study, individuals with narcissistic beliefs involving an

Table 1 Correlations between PID-5 Facets and PBQ scales

PID5 Facets	PBQ Beliefs						
	Avoidant/Dependent	Obsessive-Compulsive	Narcissistic	Autonomy	Paranoid	Schizoid	Histrionic
<i>Negative Affectivity</i>							
Emotional Lability	.52	.30	.29	.28	.41	.24	.42
Anxiousness	.53	.37	.27	.30	.52	.29	.43
Restricted Affectivity	.16	.22	.29	.35	.30	.43	.25
Separation Insecurity	.59	.33	.31	.30	.39	.15	.52
Hostility	.37	.34	.49	.49	.50	.40	.41
Perseveration	.45	.39	.39	.44	.45	.36	.45
Submissiveness	.31	.24	.12	.10	.22	.14	.33
<i>Detachment</i>							
Withdrawal	.41	.33	.34	.40	.51	.55	.30
Anhedonia	.52	.31	.35	.38	.48	.37	.42
Depressivity	.60	.34	.34	.40	.51	.34	.51
Intimacy Avoidance	.23	.17	.32	.33	.35	.48	.26
Suspiciousness	.52	.40	.48	.50	.73	.43	.47
<i>Antagonism</i>							
Manipulativeness	.22	.20	.46	.39	.30	.30	.39
Deceitfulness	.36	.23	.54	.48	.39	.32	.45
Grandiosity	.22	.32	.56	.37	.29	.32	.37
Attention- Seeking	.17	.14	.39	.28	.18	.14	.45
Callousness	.34	.28	.60	.52	.48	.41	.42
<i>Disinhibition</i>							
Irresponsibility	.38	.16	.48	.50	.38	.35	.45
Impulsivity	.26	.12	.41	.39	.33	.28	.35
Rigid Perfectionism	.27	.57	.20	.19	.27	.24	.22
Distractability	.39	.18	.33	.35	.36	.27	.39
Risk Taking	-.10	-.10	.21	.20	.05	.02	.06
<i>Psychoticism</i>							
Unusual Beliefs/Experiences	.36	.30	.49	.51	.50	.41	.40
Eccentricity	.38	.28	.41	.44	.42	.36	.42
Perceptual Dysregulation	.48	.36	.51	.51	.53	.44	.49
Overall multiple r	.73	.65	.73	.67	.78	.67	.72

Coefficients > .40 are bold. Any coefficient > |.11| is statistically significant at $p < .01$. Horizontal lines demarcate PID-5 domains, which are labeled at the top of the facet list for each domain. The final row indicates the multiple correlation that is observed when all PID-5 facet scales are entered into a regression model to predict the PBQ scale indicated by the column heading (all $p < .001$)

inflated self-worth and the importance of being recognized also tend to have particular constellations of traits: they are grandiose and callous, willing to deceive and manipulate others but also prone to misperceive other’s intentions or behaviors. They can be hostile and suspicious, and may be unusual and impulsive. Although such individuals are mostly likely to be primarily antagonistic, they can also be detached and disinhibited.

Results at this lower level may be useful in developing trait profiles that are diagnostic of a certain constellation of

beliefs. For instance, the bold coefficients in Table 1 may be regarded as trait “criteria” in an assessment of the seven belief “types” from the PBQ. This approach, which has been applied to the development of PD diagnostic algorithms based on FFM traits (see, e.g., Lynam and Widiger 2001; Miller et al. 2005), may provide a concrete means for assessing dysfunctional belief dimensions with DSM-5 traits. It also provides a means for evaluating the similarity of PD type diagnosis across DSM and cognitive systems. Take the example of the obsessive-compulsive type. We

correlated two profiles, one which represented the pattern of correlations between PID-5 traits and obsessive-compulsive PD in the third column of Table 1 and the other which represented the pattern of correlations between PID-5 traits and obsessive-compulsive PD as represented in the DSM-IV (Hopwood et al. 2012). The correlation of .88 suggests that the DSM-IV and cognitive systems similarly depict obsessive-compulsive personality, and that the obsessive-compulsive type from either system can be effectively described by underlying traits.

Pathological Traits and Diagnostic Heterogeneity

However, it will often be the case that patients will not happen to have the particular constellation of traits associated with a single dimension of underlying beliefs or a single DSM-5 diagnosis. In this case, traits can be useful for understanding heterogeneity among individuals with the same diagnosis or for depicting more idiographic features that are not fully described by broad dimensions of dysfunctional belief (van Kampen 2000). For example, although it was strongly correlated with some PBQ dimensions, rigid perfectionism was modestly correlated to narcissistic patterns of belief, suggesting that some grandiose individuals will be more perfectionistic than others. Among narcissistic individuals who are high in rigid perfectionism, core beliefs may involve the connection between rigid personal standards and self-worth, the social currency of high quality work, or the importance of pointing out to others insufficiencies in their performance. Among those low in rigid perfectionism, core beliefs may involve the importance of impression management (despite low quality work), the risks to self-concept associated with trying to do well, or the value in taking time for one's own needs relative to occupational or interpersonal details. These examples suggest that the trait system may promote a more individualized depiction of the belief patterns of patients than is possible in a system comprised of diagnostic categories, in which diagnostic heterogeneity is masked by high-bandwidth but low-fidelity diagnostic labels, and nuance beyond primary diagnoses is awkwardly described as "comorbidity".

Directions for Further Research

Although these results generally suggest the viability of using proposed DSM-5 traits to develop inferences about the pathological beliefs emphasized by Beck and Freeman's (1990) cognitive theory, further research is needed to maximize the clinical advantage that could be achieved by integrating pathological trait and dysfunctional belief systems of PD. For example, incorporating cognitive item content such as contingent (if-then) statements about the contexts within which pathological trait and beliefs are

likely to contribute to dysfunction on questionnaire measures such as the PID-5 or providing detailed descriptions of the cognitive implications of traits on clinical rating forms may improve the clinical utility of trait assessments. Given that a) the current study suggests that traits and beliefs can be integrated via five common higher-order factors and b) there is potential clinical value in elaborating the cognitive features of traits, it is likely that developing a common method for assessing these features would be empirically viable and clinically useful.

Treatment research aimed at determining the degree to which changes in traits coincide with changes in beliefs would be a particularly useful avenue for future clinical research. There is some evidence that clinical change in cognitive therapy corresponds to changes in underlying pathological beliefs (Boden et al. 2012), and other evidence that trait change tracks with changes in PD features (Warner et al. 2004; Wright et al. 2011, 2012b). An assumption that pathological traits and dysfunctional beliefs are elements of common units of personality might lead to the hypothesis that improvement in cognitive therapy of PDs in terms of less rigid and dysfunctional beliefs would be associated with changes on empirically overlapping traits. However, it is also possible that either dysfunctional beliefs or pathological traits are primary. Longitudinal research would thus inform further clinical integration of trait and cognitive models, as well as more basic questions about the underlying nature of personality pathology.

It is important to recognize that traits only comprise one element (criterion B) of PD diagnosis proposed in the DSM-5. Criterion A will consist of symptomatic elements of PDs that reflect the specific kinds of self and interpersonal dysfunction relevant to particular categories (e.g., concerns about abandonment in the borderline type, or the link between emotion regulation and self esteem in the narcissistic type). These elements may provide incremental information over the traits for clinical practice, including information about the kinds of dysfunctional beliefs maintained by patients with PD. Future research on the incremental value of Criterion B traits and Criterion A features, and of the PD types relative to the traits in general, is needed to determine the optimal balance of coverage and parsimony in PD diagnosis. Of particular concern to cognitive clinicians, given strong evidence of overlap between pathological traits and dysfunctional beliefs in this study, will be the incremental value of Criterion A features and the types for depicting the underlying belief systems of PD patients.

Further research should also address the specific limitations of this study. One limitation involved the use of a single measurement method to represent DSM-5 traits and PD-relevant cognitions. There are currently no validated methods explicitly developed for assessing proposed DSM-5 traits or the underlying cognitions in PD other than

self-report questionnaires, although an informant-report version of the PID-5 is currently being developed (Markon 2012). Ongoing research should focus on the use and development of multi-method systems for assessing personality pathology, and for testing the convergence of trait and belief models of PD specifically. It would also be useful to address any specific limitations of the measures used in this study. For instance, the PBQ does not map precisely onto the original clinical formulations developed by Beck and Freeman (1990), the DSM-IV, or the DSM-5 proposal. Although changes have been based on empirical tests of the structure of the PBQ and are in the direction of parsimony, it is possible that clinical nuance has been lost in the collapsing of ostensible dimensions of dysfunctional beliefs. Likewise, although the PID-5 appears to cover most of the relevant aspects of interpersonal dysfunction associated with PD, some research indicates that it does not fully cover variance in interpersonal problems related to pathological warmth (Wright et al. 2012a). As what is ultimately important is the model these instruments are attempting to represent, ongoing efforts to increase fidelity between instruments such as the PBQ and PID-5 and the models they endeavor to instantiate will provide a more effective means for comparing their convergence and any potential divergences.

A second limitation involved the use of a non-clinical sample. Although such samples may not be ideal for studying clinical problems, previous evidence generally supports the similarity of results in PD research across clinical and non-clinical samples (e.g., Wright et al. 2012c; Lenzenweger 2008), and that rates of PD in student samples, in part because of normative developmental issues situating young adults at greatest risk for personality problems (Hopwood et al. 2011), tend to be higher than in the community dwelling adult population (Kessler et al. 2005). Future research in clinical samples is needed to increase confidence in the current results and to explore more fully the links between pathological traits and beliefs in PD patients.

Conclusion

In summary, the findings from this study suggest that the dysfunctional beliefs that reflect the core features of Beck and Freeman's (1990) cognitive model of PD and the pathological traits proposed for the DSM-5 can be interwoven to depict an integrative model of pathological personality features. This finding is encouraging given recent concerns have been expressed about the potential loss of clinical utility that could occur in the transition to a trait model (Shedler et al. 2010). Indeed, dysfunctional belief dimensions appear to have significant relevance in the DSM-5 despite this transition.

References

- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text-Revised (DSM-IV-TR)*. Washington: Author.
- Beck, A. T., & Beck, J. S. (1991). *The Personality Belief Questionnaire*. Bala Cynwid: The Beck Institute for Cognitive Therapy and Research.
- Beck, A. T., & Freeman, A. (1990). *Cognitive Therapy of Personality Disorders*. New York: Guilford.
- Beck, A. T., Butler, A. C., Brown, G. K., Dahlsgaard, K. K., Newman, C. F., & Beck, J. S. (2001). Dysfunctional beliefs discriminate personality disorders. *Behaviour Research and Therapy*, 39, 1213–1225.
- Benjamin, L. S. (1996). *Interpersonal diagnosis and treatment of personality disorders*. New York: Guilford Press.
- Boden, M. T., John, O. P., Goldin, P. R., Werner, K., Heimberg, R. G., & Gross, J. J. (2012). The role of maladaptive beliefs in cognitive-behavioral therapy: evidence from social anxiety disorder. *Behaviour Research and Therapy*, 50, 287–291.
- Butler, A. C., Beck, A. T., & Cohen, L. H. (2007). The personality belief questionnaire-short form: development and preliminary findings. *Cognitive Therapy and Research*, 31, 357–370.
- Clark, L. A. (2007). Assessment and diagnosis of personality disorder: perennial issues and emerging conceptualization. *Annual Review of Psychology*, 58, 227–258.
- Eaton, N. R., Krueger, R. F., South, S. C., Simms, L. J., & Clark, L. A. (2011). Contrasting prototypes and dimensions in the classification of personality pathology: evidence that dimensions, but not prototypes, are robust. *Psychological Medicine*, 41, 1151–1163.
- Fournier, J.C., DeRubeis, R.J., & Beck, A.T. (2012). Dysfunctional cognitions in personality pathology: The structure and validity of the Personality Beliefs Questionnaire. *Psychological Medicine*, 42, 795–805.
- Hopwood, C. J., Donnellan, M. B., Blonigen, D. M., Krueger, R. F., McGue, M., Iacono, W. G., & Burt, S. A. (2011). Genetic and environmental influences on personality trait stability and growth during the transition to adulthood: a three wave longitudinal study. *Journal of Personality and Social Psychology*, 100, 545–556.
- Hopwood, C. J., Thomas, K. M., Markon, K. E., Wright, A. G. C., & Krueger, R. F. (2012). DSM-5 traits and DSM-IV personality disorders. *Journal of Abnormal Psychology*, 121, 424–432.
- Ingram, R. E., & Hollon, S. D. (1986). Cognitive therapy of depression from an information processing perspective. In R. E. Ingram (Ed.), *Information processing approaches to clinical psychology*. Orlando: Academic.
- Kendler, K. S., Aggen, S. H., Czajkowski, N., Roysamb, E., Tambs, K., Torgersen, S., Neale, M. C., & Reichborn-Kjennerud, T. (2008). The structure of genetic and environmental risk factors for DSM-IV personality disorders. *Archives of General Psychiatry*, 65, 1438–1444.
- Kernberg, O. F. (1984). *Severe personality disorders: Psychotherapeutic strategies*. New Haven: Yale University Press.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. F. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Study Replication. *Archives of General Psychiatry*, 62, 593–602.
- Krueger, R. F., Eaton, N. R., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2011). Personality in DSM-5: helping delineate personality disorder content and framing the meta-structure. *Journal of Personality Assessment*, 93, 325–331.
- Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2012). Initial construction of a maladaptive personality trait model and inventory for DSM-5. *Psychological Medicine*, 42, 1879–1890.

- Lenzenweger, M. F. (2008). Epidemiology of personality disorders. *Psychiatric Clinics of North America*, *31*, 395–403.
- Lynam, D. R., & Widiger, T. A. (2001). Using the five factor model to represent the DSM-IV personality disorders: an expert consensus approach. *Journal of Abnormal Psychology*, *110*, 401–412.
- Markon, K.E. (2012). The development of an informant-report form of the PID-5: Rationale and initial results. Paper presented at the Society for Personality Assessment, Chicago IL.
- Markon, K. E., Krueger, R. F., & Watson, D. (2005). Delineating the structure of normal and abnormal personality: an integrative hierarchical approach. *Journal of Personality and Social Psychology*, *88*, 139–157.
- Miller, J. D., Bagby, R. M., Pilkonis, P. A., Reynolds, S. K., & Lynam, D. R. (2005). A simplified technique for scoring the DSM-IV personality disorders with the five-factor model. *Assessment*, *12*, 404–415.
- Nestadt, G., Hsu, G., Samuels, J., Bienvenu, O. J., Reti, I., Costa, P. T., Jr., & Eaton, W. W. (2006). Latent structure of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition personality disorder criteria. *Comprehensive Psychiatry*, *47*, 54–62.
- Samuel, D. B., Simms, L. J., Clark, L. A., Livesley, W. J., & Widiger, T. A. (2010). An item response theory integration of normal and abnormal personality scales. *Personality Disorders: Theory, Research, and Treatment*, *1*, 5–21.
- Shedler, J., Beck, A. T., Fonagy, P., Gabbard, G. O., Gunderson, J., Kernberg, O., Michels, R., & Westen, D. (2010). Personality Disorders in DSM-5. *The American Journal of Psychiatry*, *167*, 1026–1028.
- Thomas, K.M., Yalch, M.M., Krueger, R.F., Wright, A.G.C., Markon, K.E., & Hopwood, C.J. (2012). The convergent structure of DSM-5 personality trait faces and Five Factor Model trait domains. *Assessment*. doi:10.1177/1073191112457589.
- Trull, T. J., Goodwin, A. H., Schopp, L. H., Hillenbrand, T. L., & Schuster, T. (1993). Psychometric properties of a cognitive measure of personality disorders. *Journal of Personality Assessment*, *61*, 536–546.
- van Kampen, D. (2000). Idiographic complexity and the common personality dimensions insensitivity, extraversion, neuroticism, and orderliness. *European Journal of Personality*, *14*, 217–243.
- Warner, M. B., Morey, L. C., Finch, J. F., Gunderson, J. G., Skodol, A. E., Sanislow, C. A., Shea, M. T., McGlashan, T. H., & Grilo, C. M. (2004). The longitudinal relationship of personality traits and disorders. *Journal of Abnormal Psychology*, *113*, 217–227.
- Widiger, T. A., & Trull, T. J. (2007). Plate tectonics in the classification of personality disorder: shifting to a dimensional model. *American Psychologist*, *62*, 71–83.
- Wright, A. G. C., Pincus, A. L., & Lenzenweger, M. F. (2011). Development of personality and remission and onset of personality pathology. *Journal of Personality and Social Psychology*, *101*, 1351–1358.
- Wright, A. G. C., Pincus, A. L., Hopwood, C. J., Thomas, K. M., Markon, K. E., & Krueger, R. F. (2012a). An interpersonal analysis of pathological personality traits in DSM-5. *Assessment*, *19*, 263–275.
- Wright, A.G.C., Pincus, A.L., & Lenzenweger, M.F. (2012b). A parallel process growth model of avoidant personality disorder symptoms and personality traits. *Personality Disorder: Theory, Research, and Treatment*. doi:10.1037/a0027773.
- Wright, A.G.C., Thomas, K.M., Hopwood, C.J., Markon, K.E., Pincus, A.L., & Krueger, R.F. (2012c). The hierarchical structure of DSM-5 pathological personality traits. *Journal of Abnormal Psychology*. doi:10.1037/a0027669.