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Disinhibition as a unifying construct in understanding how personality dispositions undergird psychopathology

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Abstract

Disinhibition has been a construct of interest for decades, as evidenced by its inclusion in most prominent models of general personality functioning and its link to personality pathology, other psychopathology, health behaviors, and public health concerns. Disinhibition is manifest in behavioral, task based, and physiological measures, and common etiologies are a major reason for the coherence of the domain across a variety of assessment modalities. The current review will provide a summary of the conceptualization of the construct across prominent models, its link to psychopathology and maladaptive behaviors, and its etiology. Finally, we provide discussion on its clinical application utilizing disinhibition to aid in understanding comorbid psychopathology and through a description of its potential use in treatment.

Keywords

disinhibition; general personality; dimensional model

Conceptualization of Disinhibition

The construct disinhibition (versus constraint) is a broad personality trait that refers to individual differences in the ability to self-regulate or control one's behavior, and ranges from undercontrolled to overcontrolled (Clark & Watson, 2008). Individuals high in disinhibition often act spontaneously without considering potential long-term consequences

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of their actions (Watson & Clark, 1993). Further, individuals high on this trait are often disorganized, careless, and have little concern for others (Vaidya et al., 2010).

Disinhibition is a broad personality domain, included in many prominent personality models. For example, although Eysenck's model (Eysenck, 1967, 1992, 1997; Eysenck & Eysenck, 1975) initially included two dimensions (extraversion and neuroticism), it was ultimately augmented by evidence of a third major domain. This third domain, although termed "psychoticism," is better described "as a measure of psychopathy or disinhibition" (Clark & Watson, 2008, p. 269). A number of other trait models have included disinhibition. For instance, Tellegen (1985) proposed a personality model including negative emotionality, positive emotionality, and constraint (vs. disinhibition). Within this model, disinhibition reflects components of both low agreeableness and low conscientiousness. Similarly, Watson and Clark (1993) identified three broad domains of temperament: negative temperament, positive temperament, and disinhibition vs. constraint. Despite the differences of definitions across models, research has demonstrated strong relationships between the models (e.g., Eysenck's psychoticism is highly correlated with Tellegen's constraint and Watson & Clark's disinhibition constructs; Tellegen, 1985; Watson & Clark, 1993). Disinhibition is also represented within the Five Factor Model (FFM) of personality (Digman, 1990), though typically best understood as the low end of the bipolar domain of conscientiousness.

Most recently, disinhibition has been included within the DSM-5 (APA, 2013) proposed hybrid dimensional categorical model for personality disorders (the Alternative Model of Personality Disorders; AMPD) and the Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017). Within the DSM AMPD proposed model, there are five broad maladaptive personality domains, each of which include a set of facet level traits. In this model, disinhibition (vs. conscientiousness) is defined as "orientation toward immediate gratification, leading to impulsive behavior driven by current thoughts, feelings, and external stimuli, without regard for past learning or consideration of future consequences" (APA, 2013, p. 780). Disinhibition includes five lower-level traits: irresponsibility, impulsivity, distractibility, risk taking, and (lack of) rigid perfectionism. Based on the description of these facet level traits, disinhibition within this model encompasses multiple components similar to five-factor model (FFM) conscientiousness. Furthermore, the conceptualization of disinhibition within the AMPD includes a component of urgency (an impulsivity trait often associated with FFM neuroticism). Specifically, the trait impulsivity within the AMPD includes in its definition the description "a sense of urgency and self-harming behavior under emotional distress" (APA, 2013, p. 780). Overall, the DSM-5 AMPD model appears to have the most comprehensive conceptualization of disinhibition while also having significant overlap with the general trait impulsivity.

The disinhibition component of impulsivity is worth further elaboration. Throughout the past few decades, impulsivity has been defined in several various ways, sometimes directly including disinhibition or aspects of disinhibition. For example, Eysenck and Eysenck (1975) defined impulsivity as excitement or novelty seeking, the inability to plan ahead, a lack of self-control, venturesomeness, and psychoticism while others have defined impulsivity as the tendency to act rashly (e.g., Barratt, 1993; Buss & Plomin, 1975; Tellegen, 1985; Zuckerman et al., 1993). In an effort to unify the various definitions of

impulsivity, Whiteside and Lynam (2001) developed the UPPS four-factor model of impulsivity, which refers to impulsivity as an “umbrella term that actually encompasses four distinct facets of personality associated with impulsive behavior” (p. 687). The four factors of impulsivity include urgency, sensation seeking, lack of premeditation, and lack of perseverance. Within this model, lack of perseverance and lack of premeditation are considered key components of disinhibition (Vaidya et al., 2010).

The HiTOP model has been proposed as an alternative to the traditional categorical classification and aligns well with the DSM AMPD (Kotov et al., 2017). HiTOP is a model for diagnostic classification that relies on existing empirical evidence from quantitative research studies to organize psychopathology. The HiTOP model includes, at the highest level, a general factor of psychopathology (or p factor) beneath which are the broad domains of internalizing, externalizing, and thought disorder. Externalizing is further broken down into disinhibited externalizing and antagonistic externalizing, again separating antagonism from disinhibition.

Based on a review of the conceptualization of disinhibition, it is clear that this trait has long been of interest to personality theorists. This is likely due, in part, to the association of disinhibition with personality pathology (e.g., Saulsman & Page, 2004; Samuel & Widiger, 2008), other psychopathology (e.g., substance use disorders; Kotov et al., 2010), health behaviors (e.g., unhealthy eating; Boggs & Roberts, 2004), and public health concerns (e.g., obesity; Spitznagel et al., 2015). The current review will discuss the conceptualization of the personality trait disinhibition and its role and relationship within psychopathology and treatment. Throughout the review, this term will refer to externalizing traits primarily related to low conscientiousness, as described in the FFM, DSM AMPD, and HiTOP models.

Etiologically Informed Perspectives on Disinhibition

Given the prominence of disinhibition in a variety of personality models, and evidence for the psychological coherence of the construct, biologically informed research designs may provide additional leverage in understanding the domain. For example, multivariate behavior genetic research designs can discern the etiology of observed, phenotypic relationships among specific indicators of disinhibition. If there are coherent genetic and environmental sources of the covariance among various disinhibition indicators, this suggests that the coherence of the domain stems from etiologic factors acting in concert on various manifest forms of disinhibition. For example, Young et al. (2009) studied a variety of disinhibition indicators, including substance use, conduct disorder, ADHD, and novelty seeking in twins. They showed that these behavioral indicators were correlated primarily because they share etiologic influences (as opposed to genetic and environmental forces working in distinct ways on each indicator). They further showed that task-based indicators of disinhibition (antisaccade, stop-signal, and stroop) were also coherent, and showed a notable genetic correlation with the behavioral indicators. In sum, indicators of disinhibition stemming from traditionally separate domains of individual differences research (i.e., more behavioral and more task-based) were shown to be correlated primarily because they had both genetic and environmental influences in common.

This type of approach can be extended further by explicitly seeking to combine both self-report and physiological indicators. This type of perspective has been termed “psychoneurometric” (Patrick et al. 2013). For example, working with twin data, Venables et al (2017) showed how disinhibition could be indicated by both questionnaire and physiological (specifically, ERP) indicators, and that much of the covariance between disinhibition and clinical problems was attributable to overlapping genetic influences. In sum, disinhibition is manifest in behavioral, task based, and physiological indices, and common etiologies are a major reason for the coherence of the disinhibition domain across varied assessment modalities.

Disinhibition’s Role in Comorbid Psychopathology

Gorenstein and Newman (1980) coined the term “disinhibitory psychopathology”, a term used to describe several conditions that are “marked by a failure of self-control, such as hyperactivity in children, antisocial behavior in adolescents, and psychopathy and primary alcoholism in adulthood” (Sher & Trull, 1994, p. 92). Disinhibition combines with antagonism in 3-factor models and has an important role in antisocial behavior and outcome and aggression (e.g., Jones, Miller, & Lynam, 2011; Miller & Lynam, 2001; Vize, Collison, Miller, & Lynam, 2019). Similarly, Bogg and Finn (2010) used the term “behavioral disinhibition” to describe “a pattern of antisocial, impulsive, norm-violating, sensation seeking, and externalizing tendencies and problems” (p. 441). These definitions encompass aspects of mental health problems that has been linked to disinhibition. Unsurprisingly, research has demonstrated a consistent link between disinhibition and externalizing disorders (Bogg & Finn, 2010; Iacono et al., 1999; Sleep et al., 2018). Notably, this is likely due to many of these disorders (e.g., antisocial personality disorder, conduct disorder, alcohol and drug use) having substantial portions of genetic risk in common (Krueger et al., 2002).

Of relevance to this paper is disinhibition, which is associated with numerous psychological disorders, many of which exhibit high comorbidity. For example, disinhibition is related to and/or is part of the diagnostic criteria for alcohol (AUD) and substance use disorders (SUD), BPD, APD, attention-deficit hyperactivity disorder, and other disorders of behavioral dyscontrol. As noted above, disinhibition often plays a primary role in externalizing disorders. For example, when SUDs, BPD, and APD are described, “impulsiveness” is often a key descriptor (Bornovalova et al., 2005; Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004; Sher & Trull, 1994). There is substantial evidence for the presence of disinhibition as a shared factor among psychiatric diagnoses and the comorbidity among these diagnoses further highlights the utility of a hierarchical model. This section will briefly describe the literature covering disinhibition’s association with personality disorders, other psychopathology, and maladaptive behaviors which do not necessarily constitute a mental disorder.

Disinhibition and Personality Disorders

Disinhibition is associated with a number of the categorically defined personality disorders (PDs), and is, in fact, included within the trait descriptions of certain PDs within the AMPD.

Specifically, of the six PDs retained within AMPD, two include aspects of disinhibition (APA, 2013). Antisocial Personality Disorder (APD) includes the three facet level traits of impulsivity, risk taking, and irresponsibility while Borderline Personality Disorder (BPD) includes impulsivity and risk taking. Research has demonstrated strong associations between disinhibition, early dispositional factors of disinhibition, and BPD/APD diagnoses (Caspi et al., 1996; Kyranides, et. al., 2017; Nigg et al., 2005). For example, children classified as “undercontrolled” (i.e., restless, distracted, and impulsive) at age 3 were more likely to receive a diagnosis of APD by age 21 (Caspi et al., 1996).

Beyond the specific PD entities, the AMPD also allows clinicians to identify the specific maladaptive traits for a given individual. Therefore, an individual who may not meet criteria for one of the six retained PDs may receive a diagnosis of “PD – trait specified” followed by the list of specific traits which could include the disinhibition domain or any of the five facet-level disinhibition traits (e.g., irresponsibility, distractibility, risk taking). Thus, disinhibition may be relevant to personality pathology beyond APD and BPD.

Disinhibition and Substance Use Disorders

Outside of PDs, disinhibition is also strongly associated with alcohol and substance use disorders. For instance, Iacono and colleagues (1999) demonstrated that behavioral disinhibition is associated with alcoholism, specifically, the subtype that is characterized by an early age onset. Furthermore, this subtype is also linked to high rates of childhood conduct disorder, childhood hyperactivity, as well as more severe dependence and higher rates of treatment (Babor et al., 1992; Iacono et al., 1999). Longitudinal studies have shown specific traits in childhood predict the onset of substance use and other related disinhibited behaviors. For example, those children classified as undercontrolled were more like to report alcohol problems at age 21 (Caspi et al., 1996). Studies focusing on tobacco and marijuana have found similar results regarding the role of disinhibition, while also discriminating disinhibition from other traits. Specifically, disinhibition predicted cigarette and marijuana use during adolescence, whereas thrill-seeking did not (Kopstein et al., 2001). Similarly, sensation seeking and lack of planning (facets of disinhibition) predicted use of marijuana in adolescents (Lee-Winn, Mendelson, & Johnson, 2018). Longitudinal studies have demonstrated that adolescent behavioral disinhibition (i.e., substance use, conduct disorder, and novelty seeking) predicted substance dependence in young adulthood (Palmer et al., 2013). Overall, disinhibition appears to be a significant risk factor for substance use in general, regardless of substance choice or preference.

Disinhibition and other psychological constructs

Disinhibition is also often included in the conceptualization of other constructs and is often found to predict other maladaptive behaviors. As an illustration, disinhibition is consistently included in psychopathy models, cutting across conceptualization theories. For example, the triarchic model of psychopathy (Patrick, Fowles, & Krueger, 2009) proposes that psychopathy is defined by three specific aspects of personality: meanness, disinhibition, and boldness, arguably conceptualized as aspects of antagonism, low conscientiousness, and extraversion. Research has demonstrated that disinhibition within this model is associated with a wide variety of behavioral tendencies, including impulsivity, hostility, and aggression

(Kyranides et al., 2017). Furthermore, Litzman and colleagues (2014) utilized path analyses to demonstrate that disinhibition was linked to psychopathy, regardless of which psychopathy model was tested. Psychopathy can also be understood as a constellation of general dimensional personality traits that fall within these domains: pan-impulsivity (disinhibition), interpersonal antagonism and dominance, lack of self-directed affect, and other-directed affect. For example, the Elemental Psychopathy Assessment (EPA; Lynam et al., 2011) includes subscales assessing pan-impulsivity that correspond to FFM traits (e.g., Impersistence, Rashness, Thrill Seeking, Urgency). These examples highlight how disinhibition exists within models of psychopathy.

Disinhibition has also been linked to a number of other psychiatric disorders and problematic behaviors. For example, conscientiousness, the opposite end of the disinhibition pole, has demonstrated strong, negative associations with mood and anxiety disorders (Kotov, Gamez, Schmitz, & Watson, 2010). In fact, conscientiousness was the “second most powerful general trait correlate of psychopathology”, following neuroticism (Kotov et al., 2010, p. 798). A review by Bryant and colleagues (2007) describes how trait disinhibition is linked to eating outcomes (i.e., higher body mass index, obesity, and poor food choice). Further, disinhibition predicts poorer weight loss success, weight regain after weight loss regimes are completed, and low levels of physical activity (Bryant et al., 2007). Disinhibition may contribute to a vulnerability to the presence of food cues, resulting in difficulties controlling eating behavior (Niemeier, Phelan, Fava, & Wing, 2007). Disinhibition is also related to gambling. For example, Nigro, Ciccirelli, and Cosenza (2018) demonstrated that disinhibition as assessed by the DSM-5 AMPD model was associated with chasing proneness (the tendency to continue gambling with the intent to recoup one’s losses). Overall, disinhibition is linked a range of various impulsive and maladaptive behaviors.

It is apparent that disinhibition is associated with a number of psychiatric disorders and constructs. Further illustrating the role of disinhibition within these disorders is examining the psychiatric comorbidity among disinhibition-laden disorders. For example, SUDs are highly comorbid with AUDs (Grant et al., 2015) and other disinhibition-centered disorders, such as ASPD and BPD (Trull, Jahng, Tomko, Wood, & Sher, 2010; Trull et al., 2018). For example, comorbidity rates of APD with lifetime AUD and SUD in a general population sample are approximately 50% and 23%, respectively (Trull et al. 2010). Similar trends are present with BPD, with the rates of comorbidity with AUD and SUD at approximately 47% and 23%, respectively (Trull et al., 2010). Comorbidity rates between PDs and nicotine dependence are high as well, around 50% (Trull et al., 2010).

Comorbidity Models and Heuristics.—Exploring disinhibition in the context of these disorders would be inadequate without a brief review of models and heuristics central to comorbidity. Regarding psychopathology and externalizing disorders, a simplistic and sometimes inaccurate viewpoint is that two disorders merely exist independent of one another, within the same individual. While this may be true in some instances, theoretical and empirical models regarding the nature of the comorbidities should be considered as the distinctions regarding the association among disorders are essential to the examinations of comorbidity. For example, if an individual has two disorders, there are a number of

possibilities to explain the nature of this relationship, or this ‘comorbidity’. First, it is important to distinguish between true comorbidity (disorders sharing etiological associations) and diagnostic co-occurrence (presence of two overlapping disorders; e.g., Lilienfeld, Waldman, & Israel, 1994). In the case of diagnostic co-occurrence, the conditions may co-occur, or be present within the same individual; however, the disorders may be largely unrelated and/or related by chance. Conditions may co-occur and also be correlated, suggesting they are substantially related to one another, beyond chance. Another possibility is that the disorders arise from similar or shared etiological factors, or one condition causes the other (see Krueger & Tackett, 2003 for a review of comorbidity models). A related consideration is the possibility of artifactual comorbidity (“comorbidity” due to classification systems, such as similar symptoms split across disorders; First, 2005), which can sometimes be a predominant problem in a classification system that has expanded in the number of disorders included. A more in depth understanding of psychiatric comorbidities can be achieved through examination of common factors, or underlying dimensions across disorders, to illuminate similar etiologies, mechanisms, or maintaining factors of pathology (e.g., spectrum model; Krueger & Tackett, 2003).

One application of such considerations can be seen in Perry and Carroll’s (2005) review of impulsivity’s role within SUDs. The authors posited three paths by which impulsivity and SUD are related, including: impulsivity influences drug use; drug use influences impulsivity; and a possible third variable impacts both impulsivity and drug use. Testing models such as these further delineates the comorbidities between disinhibition and pathology, and even more so with complex comorbidities of disorders, when all associated with disinhibition (e.g., SUD and BPD).

Disinhibition has emerged as a factor across models of personality and psychopathology (e.g., as described in hierarchical models such as HiTOP; Kotov et al., 2017). A key benefit of examining common traits (e.g., disinhibition) in the study of comorbidity is the information gleaned regarding the grouping, or “clustering”, of disorders (Andrews et al., 2009). The disorders contained within clusters frequently have high comorbidities with one another and even may follow a similar course (Andrews et al., 2009). Therefore, the identification of a common trait (disinhibition), and examining its function across psychopathology, can be fruitful in addressing diagnostic and clinical domains regarding a number of syndromes and/or presenting problems.

While it is evident that disinhibition is a key domain in many disorders, the process by which these disorders are or are not present, and thus, how to target them in prevention and intervention efforts is more complex. Across models of comorbidity, relevant processes (e.g., multifinality, divergent trajectories) are essential to investigate as they can shed light on aspects of comorbidity between disorders, further enhancing our ability to address these comorbidities in treatment (Nolen-Hoeksema & Watkins, 2011). For example, as described by Nolen-Hoeksema and Watkins (2011), disinhibition may be a ‘risk factor’ or trait that leads to multiple conditions or disorders (i.e., multifinality). Alternatively, not everyone with the same risk factor will have the same outcome (e.g., symptoms or conditions), thus demonstrating divergent trajectories. Examination of mechanisms and moderators is important in the comorbidity field. For example, disinhibition’s relationship to multiple

disorders, and the presence of multiple disorders in one person fall short in explaining why the comorbidity exists for some individuals and not others, and does not adequately account for the possible moderators of the association (e.g., disinhibition may not be the sole reason why the disorder(s) (co)exist; Nolen-Hoeksema & Watkins, 2011). Therefore, deconstructing disinhibition and exploring the mechanisms and role of moderating variables in the association of disinhibition and common comorbidities is essential to understanding comorbidity and steps forward (e.g., identification of streamlined and effective interventions).

Delineating Components of Disinhibition in Psychopathology.—In addition to exploring models of comorbidity, another manner of deconstructing disinhibition is by examining subcomponents and facets, or differential conceptualizations of the trait across disorders. For example, domain and facet level analyses of disinhibition across PDs provides important information regarding diagnostic co-occurrence, overlap, and clarifies the role of disinhibition. A meta-analysis of PDs and the general personality traits from the FFM revealed that APD and BPD were positively related to disinhibition and obsessive-compulsive PD (OCPD) was positively related to conscientiousness (Saulsman & Page, 2004). Samuel and Widiger (2008) replicated these findings, with APD, BPD, and OCPD associated with disinhibition in the same direction, and extending the examination to FFM facets. Specifically, PDs were associated with several facets of disinhibition, such as BPD and APD demonstrating negative associations with competence, dutifulness, self-discipline, and deliberation. OCPD had substantial positive associations with nearly all of the conscientiousness facets. Facet-level analyses illuminated interesting results for other PDs in which high or low conscientiousness (disinhibition) were present, such as low competence and self-discipline with dependent and avoidant PDs.

Focusing the FFM framework on trait-impulsivity (disinhibition) elucidates the common and distinct factors between disorders that commonly occur together. Dimensional models of impulsivity designate a multi-faceted construct ranging from general traits to maladaptive levels (e.g., Widiger & Simonsen, 2005). As noted above, the UPPS Model is one such conceptualization of pan-impulsivity (Whiteside & Lynam, 2001). While each facet demonstrates differential associations with psychopathology, a recent meta-analysis established the urgency facets were most strongly associated across psychopathology (Berg, Latzman, Bliwise, & Lilienfeld, 2015). Impulsivity facet associations that are similar and differential across comorbid disorders can begin to provide a more nuanced understanding of the comorbidities.

Other Influencing Factors.—As Perry and Carroll (2005) described, a third variable may link disinhibition to substance use. The heuristics described in the literature (Nolen-Hoeksema & Watkins, 2011; Perry & Carroll, 2005) provide a framework by which to examine and consider moderating and/or third variable explanations of comorbidity with disinhibition. Gender differences in disinhibition and comorbid psychopathology tend to follow a similar pattern. At a general trait level, conscientiousness tends to be higher in women (Schmitt, Realo, Voracek, & Allik, 2008) and increases over time at similar rates for men and women (Srivastava, John, Gosling, & Potter, 2003). However, other research shows

similar levels of disinhibition for males and females, though finding a moderating effect of gender on disinhibition, such that for adolescent males, increases in disinhibition predicted increases in marijuana use (Felton et al., 2015). Developmental context is also a crucial component to the disinhibition and comorbidity picture. The course of disinhibition over the lifespan may play a key feature in the onset or course of disorder(s) themselves (e.g., Chassin, Sher, Husson, & Curran, 2013).

The comorbidity of disinhibition with psychiatric disorders often points to a complex treatment course and response (e.g., Andrews et al., 2009; Cohen, Feinn, Arias, & Kranzler, 2007). For example, very few individuals with AUD report seeking treatment (8% past year AUD and 18% lifetime AUD; Grant et al., 2015); however, when a comorbid disorder is present, such as BPD, the likelihood of receiving treatment increases (Edlund, Booth, & Han, 2012). Further, PDs have complex treatment trajectories themselves, such that it is often challenging for individuals to receive treatment even though BPD and ASPD are salient in health and legal systems (Black et al., 2010; Frankenburg & Zanarini, 2004). Further, PDs which are highly comorbid with one another, often require intensive treatment and are generally understudied independently and/or together, compared to other disorders (e.g., depression).

Treatment

Dispositional and behavioral tendencies associated with disinhibition have significant implications for clinical intervention. For instance, Widiger and Presnall (2013) suggested that clients with maladaptively low conscientiousness may be less inclined to pursue treatment and may be disinterested in committing to necessary behavioral changes, despite possessing insight to their personality-related problems in living. Further, disinhibition may also contribute to treatment-interfering behaviors, such as missed appointments, failure to complete homework, and forgetfulness. Additionally, impulsivity is associated with clinically-relevant maladaptive behaviors (e.g., substance use, excessive reassurance seeking, nonsuicidal self-injury) that can negatively affect the intervention course and outcome (Anestis et al., 2007; Lengel, DeShong, & Mullins-Sweatt, 2016). Finally, individuals with elevated disinhibition are more likely to experience occupational, financial, physical health, and legal issues that might exacerbate one's presenting problem and negatively influence prognosis (Ozer & Benet-Martinez, 2006; Widiger & Presnall, 2013).

In addition, information regarding one's personality traits, such as disinhibition, may inform treatment by matching a client to the most optimal intervention. For example, clients with elevated disinhibition may struggle with rigorous, homework-intensive cognitive-behavioral interventions. Notably, there is evidence that personality traits might contribute to differential intervention outcomes (e.g., Bagby et al., 2008; Glinski & Page, 2010).

Another clinical utilization of personality is to design interventions that target relevant traits. For example, Conrod (2016) described a personality-targeted intervention for substance use which specifically targets traits that are "personality-specific motivational pathway to substance misuse" (p. 428)—impulsivity, sensation seeking, anxiety sensitivity, and hopelessness. Eight randomized trials, across several clinical settings, show promise in the

intervention's ability to significantly reduce several maladaptive substance use behaviors. These targeted traits are implicated in other maladaptive behaviors, suggesting the potential utility for personality-targeted interventions across a number of disinhibition-related behaviors (e.g., maladaptive eating, risky driving; Conrod, 2016).

Intervention and personality change.

In addition to identifying ways in which personality can inform, or be a target in, treatment, a growing body of research suggests interventions can lead to significant and lasting trait changes. For example, Roberts and colleagues (2017) conducted a meta-analysis of 207 studies that examined trait changes through several types of clinical intervention. Overall, results suggested that interventions led to significant trait changes after an average of 24 weeks, with most robust effects occurring with emotional stability and extraversion.

Concerning traits relevant to disinhibition, much of the existing literature has investigated conscientiousness increases following clinical interventions. For instance, Piedmont (2001) examined FFM trait change in a sample of individuals who completed a substance rehabilitation outpatient program that included components that targeted FFM traits. Specifically, the program addressed disinhibition by including components aimed at increasing vocational skills, neuroticism and extraversion by increasing coping ability, openness through spiritual development, and extraversion and agreeableness through social skills training. Results demonstrated significant changes in all five FFM domains pre-treatment to post-treatment, with increases in conscientiousness and agreeableness, as well as reductions in neuroticism sustained following an approximately 15-month follow up.

Furthermore, Krasner et al. (2009) explored the effects of an intensive mindfulness, communication, and self-awareness education program on personality, and found that the program led to post-treatment reductions in disinhibition as well as increased emotional stability. Also, DeFruyt and colleagues (2006) found that individuals who received psychotherapy, combined with fluoxetine or tianeptine, demonstrated reduced disinhibition, along with increased openness to experience, extraversion, and agreeableness.

Dialectical Behavior Therapy (DBT) skills have been utilized to treat several clinical conditions relevant to disinhibition, including BPD, substance abuse (Linehan et al., 1999), nonsuicidal self-injury (Gratz, 2007), and binge eating disorder (Telch, Agras, & Linehan, 2001), and shows promise in reducing disinhibition. For example, Davenport, Bore, and Campbell (2010) examined personality differences between individuals with a primary diagnosis of BPD who had and had not successfully completed DBT, and found that the pretreatment group reported higher antagonism and disinhibition than the posttreatment group. In fact, posttreatment scores in antagonism, extraversion, disinhibition, and openness to experience were comparable to previously established norms for the NEO-PI-R. It is important to note that, while it is possible that these personality trait scores changed due to DBT, it is unclear if these changes are due to the treatment or due to inherent differences among those who successfully completed treatment.

A potential alternative approach for changing disinhibition is to utilize a "bottom up" approach, targeting change to measurable, trait-relevant behaviors. For example, Magidson

et al (2014) explored the possibility of utilizing a behavioral activation (BA) intervention to decrease disinhibition to target specific, measurable, trait-associated behavior changes, as opposed to the personality trait itself. The authors hypothesized that this could lead to these behaviors becoming more ingrained and instinctual, and that by utilizing BA techniques (e.g., monitoring, goal setting, planning) to relevant behaviors, one's level of disinhibition could be systematically decreased. Notably, Roberts et al. (2017) recently expanded and refined the intervention described in Magidson et al. (2014), with the development of the Sociogenomic Trait Intervention Model (STIM), which highlights the importance of temperamental starting values, one's environment, as well as the duration and timing of the intervention as key moderators in the proposed intervention. Additional research is needed to determine the long-term effectiveness of these strategies.

While a growing literature suggests that personality assessment can be an important and valuable step in aiding treatment decisions (Lengel et al., 2016), it is presently unclear if and to what extent such treatments would significantly differ from traditional therapies. Additionally, questions remain regarding the extent that interventions can permanently change personality traits, including disinhibition. However, there is promising evidence that personality trait changes in therapy are lasting (e.g., Glinski & Page, 2010).

Regardless, while some research suggests these personality changes may occur in response to completed treatment (Davenport et al., 2010), future studies may provide valuable insight regarding change at the module or session level. Similarly, more work needs to be done to clarify the utility of using traits to match clients to specific interventions. Overall, disinhibition has significant implications on the course and prognosis of treatment, and interventions which directly or inadvertently target disinhibition, and personality traits in general, show promise at reducing maladaptive traits and behaviors.

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Highlights

- Disinhibition related to psychological disorders and treatment considerations
- Summary of conceptualization across prominent models
- May explain comorbid some psychopathology

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Table 1

Disinhibition at a glance

Associated Psychopathology

- Alcohol and other substance use disorders (e.g., tobacco, marijuana)
- Antisocial personality disorder and borderline personality disorder
- Maladaptive Behaviors (e.g., psychopathy, maladaptive eating, pathological gambling, nonsuicidal self-injury, risky, impulsive, and aggressive behaviors)

Treatment Considerations

- Disinhibition is associated with treatment interfering behaviors (e.g., reduced treatment seeking, disinterest in necessary behavior change, missed appointments, forgetfulness).
- Disinhibition is related to life stressors that can worsen prognosis (e.g., occupational dysfunction, financial problems, legal issues, physical health concerns)
- Disinhibition may be relevant in matching clients to specific interventions
- Interventions that directly or indirectly target disinhibition, and traits in general, may reduce disinhibition and behavior.

Future Research Directions

- Further elucidating of disinhibition's role in psychopathology
 - Clarifying the utility of using traits to match clients to interventions
 - Investigating to what extent interventions can permanently change personality traits, including disinhibition, as well as whether trait change occurs at the module or session level
 - Developing disinhibition-focused interventions
-