J. Behav. Ther. & Exp. Psychiat. 52 (2016) 17–28

Contents lists available at ScienceDirect

Journal of Behavior Therapy and Experimental Psychiatry

journal homepage: www.elsevier.com/locate/jbtep

Characterizing implicit mental health associations across clinical domains

Alexandra J. Werntz [a, *], Shari A. Steinman [b], Jeffrey J. Glenn [a], Matthew K. Nock [c], Bethany A. Teachman [a]

[a] Department of Psychology, University of Virginia, PO Box 400400, Charlottesville, VA, 22904, United States
[b] New York State Psychiatric Institute, 1051 Riverside Drive, Unit 69, New York, NY, 10032, United States
[c] Psychology Department, Harvard University, William James Hall, 33 Kirkland St., Cambridge, MA, 02138, United States

ARTICLE INFO

Article history:
Received 13 April 2015
Received in revised form
19 January 2016
Accepted 24 February 2016
Available online 3 March 2016

Keywords:
Implicit associations
Alcohol use/abuse
Depression
Eating disorders
Anxiety
Internet research

ABSTRACT

Background and objectives: Implicit associations are relatively uncontrollable associations between concepts in memory. The current investigation focuses on implicit associations in four mental health domains (alcohol use, anxiety, depression, and eating disorders) and how these implicit associations: a) relate to explicit associations and b) self-reported clinical symptoms within the same domains, and c) vary based on demographic characteristics (age, gender, race, ethnicity, and education).
Methods: Participants (volunteers over age 18 to a research website) completed implicit association (Implicit Association Tests), explicit association (self + psychopathology or attitudes toward food, using semantic differential items), and symptom measures at the Project Implicit Mental Health website tied to: alcohol use (N = 12,387), anxiety (N = 21,304), depression (N = 24,126), or eating disorders (N = 10,115).
Results: Within each domain, implicit associations showed small to moderate associations with explicit associations and symptoms, and predicted self-reported symptoms beyond explicit associations. In general, implicit association strength varied little by race and ethnicity, but showed small ties to age, gender, and education.
Limitations: This research was conducted on a public research and education website, where participants could take more than one of the studies.
Conclusions: Among a large and diverse sample, implicit associations in the four domains are congruent with explicit associations and self-reported symptoms, and also add to our prediction of self-reported symptoms over and above explicit associations, pointing to the potential future clinical utility and validity of using implicit association measures with diverse populations.

1. Introduction

If asked to indicate the extent to which you think of yourself as a sad person, you may think about the last time you were sad or about what it means to be sad. Such assessments are *explicit* in that consciously controlled processing informs your reports. To measure less controlled, more spontaneous assessments that may reside outside conscious awareness, researchers have developed tools for measuring *implicit* cognition to capture ways that past experiences (that may not be explicitly remembered) influence performance or behaviors (for a comprehensive definition, see Greenwald & Banaji, 1995). *Implicit associations* are a key component of implicit cognition and reflect the relative strength of associations between concepts held in memory (see Lane, Banaji, Nosek, & Greenwald, 2007; Nosek, Greenwald, & Banaji, 2007). Importantly, implicit associations are relatively difficult to consciously control, in contrast to *explicit associations*, which require conscious, more deliberate reflection of one's attitudes towards the concepts. In the current study, implicit and explicit associations across four mental health-related domains (alcohol use, anxiety, depression, and eating disorders) are examined.

Implicit and explicit associations are not perfectly correlated

* Corresponding author.
E-mail addresses: ajw3x@virginia.edu (A.J. Werntz), haxelsh@nyspi.columbia.edu (S.A. Steinman), jglenn@virginia.edu (J.J. Glenn), nock@wjh.harvard.edu (M.K. Nock), bteachman@virginia.edu (B.A. Teachman).

http://dx.doi.org/10.1016/j.jbtep.2016.02.004
0005-7916/

and the magnitude of correlation strength between the two can depend on many moderators (e.g., social desirability of the content area; see Nosek, 2005). Although there is a rich literature evaluating implicit–explicit relationships in the social cognition field, less research has been devoted to implicit–explicit relationships specifically in the clinical domain (though see Roefs et al., 2011; for a useful review). Moreover, most studies in the clinical field have relied on small samples, making it difficult to evaluate the influence of individual differences on the expression of implicit associations (e.g., within small samples there may be minimal representation of a given ethnic group, limiting the opportunity to conduct high powered tests of ethnic group effects, and one cannot assume random assignment of other factors across participants so it may be difficult to disentangle the influence of co-occurring participant attributes, such as a discrepant gender ratio across different ethnic groups). Thus, using a large sample, the present study describes associations among implicit and explicit associations and self-reported symptoms in four highly prevalent mental health domains. We also investigate how implicit and explicit associations and symptom measures vary as a function of demographic variables (e.g., age, race).

Launched in September 2011, Project Implicit Mental Health (PIMH; a sister-site to Project Implicit, a popular implicit social cognition research website launched in 1998) is a demonstration and research website that allows individuals to learn more about their implicit biases associated with mental illness, such as anxiety and depression (To take a demonstration test, visit www.ImplicitMentalHealth.com.). The size and relative diversity of visitors to the public website provides a unique opportunity to characterize these implicit associations across multiple mental health domains and evaluate variability in implicit associations relating to differences in demographic characteristics.

The Implicit Association Test (IAT) was selected to operationalize implicit mental health associations because of its strong psychometric properties. The IAT has been found to correlate with mental health symptoms, such as specific phobias (e.g., Teachman, Gregg, & Woody, 2001), social anxiety (e.g., de Jong, 2002), alcohol use (e.g., Lindgren, Neighbors, et al., 2013), and even suicidality (e.g., Nock & Banaji, 2007). Further, the IAT uniquely predicts disorder-related behavior (e.g., an alcohol-arousing IAT predicts alcohol use; Houben & Wiers, 2008) and treatment outcomes (e.g., change in panic disorder symptoms; Teachman, Marker, & Smith-Janik, 2008). In a review of psychopathology research involving implicit measures, Roefs et al. (2011) conclude that although results across disorders are mixed, implicit association measures like the IAT provide insight into psychopathology not captured by explicit measures. However, the majority of these studies examined single problem areas only and often used relatively homogenous, small samples in the lab, limiting our ability to make more reliable estimates of implicit–explicit relationships and determine how demographic variables moderate the implicit evaluations.

Theoretical support for the use of implicit measures in psychopathology research follows from numerous models highlighting how various features of automatic processing biases are key components of mental health disorders (for review on automaticity in anxiety and depressive disorders, see Teachman, Joormann, Steinman, & Gotlib, 2012). For instance, in the anxiety domain, Beck and Clark's (1997) model of anxiety pathology posits that information processing in anxious individuals is a combination of automatic and strategic processes. In the mostly automatic stage of threat stimulus recognition, individuals process the threat outside of conscious awareness before using more elaborated or strategic processing to act on the threat. Similarly, Beevers' (2005) dual-process model for depression suggests that individuals who are unable to strategically correct for negative automatic, associative biases may be more vulnerable to depressive disorders. In the alcohol literature, Wiers, Gladwin, Hofmann, Salemink, and Ridderinkhof (2013) suggest that focusing on iterative reprocessing and interactions between relatively automatic and controlled processing will lead to a more nuanced understanding of addiction and psychopathology. Finally, Vitousek and Hollon (1990) hypothesize that automatic processing biases arise among individuals with eating disorders given the association between the self and unhealthy weight-related beliefs. The role of automatic processing is central to a broad range of psychopathology theories, suggesting implicit associations may be transdiagnostic maintaining or vulnerability factors. Therefore, understanding how implicit–explicit relationships vary across disorder domains is critical.

1.1. Overview

This is the first study that examines the relationship among implicit and explicit associations and self-reported symptoms across multiple disorder domains in large and relatively diverse samples (though see important work by Glashouwer & de Jong, 2010, examining implicit anxious and depressed associations in a large Dutch sample recruited from different health settings). Our primary aim is to describe these relationships and examine how implicit associations vary based on demographic variables, so the approach is mainly descriptive, rather than conducting formal tests of theory. Four clinical domains were selected because of their high prevalence and the prominence of uncontrollable processing biases in the models for each of these problem areas: alcohol use (hazardous drinking), anxiety, depression, and eating disorder symptoms. In each case, self-reported symptoms were measured, as opposed to diagnoses, in part for logistical reasons given the online data collection method, but also to better understand implicit evaluations across persons with a broad range of symptom severity. We also included measures of explicit associations to allow for a more direct comparison with the implicit measures because both capture simple associations based on analogous relative construct comparisons. We recognize that the selected mental health domains encompass some heterogeneity (e.g., panic disorder and social anxiety disorder differ in meaningful ways, despite both being part of the anxiety domain). However, we focus on the broader domains as opposed to diagnostic categories for this initial evaluation, consistent with a Research Domain Criteria (RDoC; Insel et al., 2010) perspective, and because of our primary interest in implicit associations that we expect to be fundamental across diagnostic categories.

In the present study, it is expected that positive correlations will emerge among implicit associations, explicit associations, and self-reported symptom measures across domains; however, given prior meta-analyses showing a small mean effect size of the implicit–explicit relationships (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; Roefs et al., 2011), these correlations are expected to be relatively modest in magnitude. In addition to examining correlations across the measures, we will also present how implicit, explicit, and symptom measures vary by demographic variables, and whether implicit associations are uniquely predictive of symptoms (above and beyond explicit associations). Establishing incremental predictive validity is important for determining the ultimate clinical utility of these measures.

2. Methods

2.1. Participants

A total of 67,932 participants consented and completed at least one task among the Alcohol (12,387), Anxiety (21,304), Depression