



Are personality and behavioral measures of impulse control convergent or distinct predictors of health behaviors?

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ABSTRACT

Both traditional personality measures of impulse control and behavioral measures of impulse control have been shown to predict health behaviors. Despite a strong conceptual overlap between these two approaches to measuring impulse control, it is unclear how these two modes of measurement converge. We tested three different models relating behavioral and personality measures to a broad measure of health behaviors. Participants ($N = 147$) completed a series of behavioral measures of impulse control along with a lexically-based adjective checklist for conscientiousness, and Eysenck's I_7 impulsiveness scale. Participants' personalities were also evaluated via peer-ratings. Health behaviors were assessed using the health behaviors checklist (HBC). Across most domains of health behaviors both types of measures operated as parallel independent predictors.

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1. Introduction

Impulse control involves the ability to inhibit responses or actions in a variety of situations. It is one of the most important facets of conscientiousness for predicting health behaviors (Roberts, Walton, & Bogg, 2005). Meta-analytic results indicate that the relationship between trait measures of impulse control and health behaviors holds across multiple personality and health behaviors measures (Bogg & Roberts, 2004). Impulse control has been operationalized in several ways (White et al., 1994). The two dominant modes of measurement are (1) personality measures, such as the broad big five dimension of conscientiousness and (2) laboratory behavioral measures of inhibitory control such as the GoStop task. The first type of measure consists of a broad assessment of typical thoughts feelings and behaviors referring either to impulsivity or, in the case of conscientiousness, the absence of impulsivity and the exercise of forethought and restraint (Srivastava, 1999). Broad measures of this type can be further broken down into more narrowly constructed higher fidelity predictors or facets which have been found to be stronger predictors with respect to specific domains than broader measures (Hogan & Roberts, 1996; Lynam & Miller, 2004; Miller, Lynam, & Jones, 2008; Paunonen & Ashton, 2001).

The second type of measure, often referred to as cognitive measures of impulsivity (White et al., 1994) includes a diverse array of

tasks each of which are meant to tap a discreet underlying component of impulse control. Here we refer to these measures as laboratory behavioral measures of impulse control. Within the rubric of laboratory behavioral measures of impulse control, a further distinction can be made between rapid response measures and reward-delay measures (Swann, Bjork, Moeller, & Dougherty, 2002). Rapid response measures entail a speeded reaction time task focusing on visual and auditory stimuli presented in a well-controlled setting, while the second class of measures focuses on a participant's ability to favor a larger distal reward in favor of a smaller proximal one.

At the definitional level traditional personality measures of impulse control are described in nearly identical terms as laboratory behavioral measures. One of the most commonly cited definitions of conscientiousness includes a propensity to follow socially prescribed norms for impulse control, to be task- and goal-directed, to be planful, delay gratification, and follow norms and rules (Srivastava, 1999). A broad definition of inhibitory control, which many behavioral measures of impulse control are meant to measure, includes planning, goal-directed or intentional action, inhibition and resistance to distraction, problem-solving and strategy development, selection, and monitoring, and maintenance of persistence toward attaining a goal (Barkley, 2000). Further, measures that evaluate an individual's propensity to prefer a proximal reward over a distal one correspond explicitly with the components of conscientiousness that involve being planful and delay of gratification. Despite the diversity of methods employed across

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different measures, each one is conceptualized as an indicator of impulsive behavior at a broader level, which we term impulse control. Clearly, both personality and laboratory behavior approaches to impulse control are conceptually indistinguishable if methodologically quite different.

Given the conceptual overlap between these two distinct methods of measuring impulse control, we conducted a study to determine: (1) the relation between these two ways of measuring impulse control, (2) the relation between personality and laboratory behavior measures of impulse control and health behaviors, and (3) whether laboratory behavior measures of impulse control could account for the relation between personality measures of impulse control and health behaviors. As will be seen below, despite the clear conceptual overlap, the empirical linkages among these three sets of variables have as yet, not been clarified.

2. Personality and laboratory behavioral measures of impulse control

As noted above, at a conceptual level, personality and laboratory behavioral measures of impulse control have been defined in almost identical terms. Despite this, there is mixed evidence for such a clear association between personality and laboratory behavioral measures of impulse control. Numerous studies have demonstrated a positive association between these two approaches to assessing impulse control, and this relationship has been found across laboratory behavioral measures falling into both the rapid response classification, such as the immediate and delayed memory tasks (IMT/DMT), and measures of reward delay such as the Iowa gambling task (IGT). Participants who were slower to inhibit responding to stop trial stimuli in the go/no-go task also scored higher on self-reported impulsivity (Logan, Schachar, & Tannock, 1997). Similarly, trait impulsiveness was most strongly correlated with performance on a go/no-go task even when adjusting for age and education (Keilp, Sackeim, & Mann, 2005). In a sample of parents of children diagnosed with disruptive behavioral disorders and parents of normal controls, self-reported impulsivity scores were correlated with commission errors on the IMT/DMT (Dougherty et al., 2003). In a sample of adult women, split with respect to scores on the Eysenck impulsivity scale, high impulsive women made more commission errors than low impulsive women on the IMT/DMT and the GoStop task (Marsh, Dougherty, Mathias, Moeller, & Hicks, 2002). In a sample of both cocaine dependent adults and normal controls, self-reported impulsivity was positively correlated with commission errors on the IMT and the ratio of commission errors to correct detection on the DMT (Moeller et al., 2004). In a sample of adult inter-episode bipolar participants and normal controls, self-reported impulsivity scores were positively correlated with IMT/DMT commission error rate (Swann, Anderson, Dougherty, & Moeller, 2001). Using Whiteside and Lynam's (2001) UPPS Impulsive Behavior Scale, Zermatten, Van der Linden, D'Acremont, Jermann, and Bechara (2005) found that greater impulsivity was associated with impulsive decision making assessed via the IGT (Bechara, Damasio, Damasio, & Anderson, 1994). Schmeichel and Zell (2007) found modest correlations between self-reported self-control and participants ability to inhibit eye blinking and persistence in a cold pressor task. In yet another sample of normal young adults performance on the mazes test, a laboratory behavioral measure meant to tap planning and impulse control, was positively correlated with a self-reported measure of impulse control (Pietrazak, Sprague, & Snyder, 2008).

Evidence in support of a relationship between laboratory behavioral and personality measures of impulse control can be also be seen indirectly, where both constructs seem to share a similar relationship to a third construct. The indirect evidence comes from the literature on delinquency and Attention Deficit Hyperactivity

Disorder (ADHD). In a study focusing on predicting adolescent delinquency, White et al. (1994) found that a composite of personality measures of impulsivity and a composite of laboratory measures of impulsivity were highly correlated. Individuals identified as following a life-course persistent antisocial path, which is correlated with scoring higher on personality measures of impulsivity (Miller & Lynam, 2001), were also prone to performing poorly on laboratory measures of impulsivity (Raine et al., 2005). Analogously, adolescents diagnosed with a disruptive behavioral disorder displayed higher rates of commission errors on the IMT/DMT and a GoStop task when compared a group of control subjects (Dougherty et al., 2003). Furthermore, children diagnosed with ADHD showed poor impulse control on multiple laboratory measures, including the go/no-go test (Van der Meer, Marzocchi, & De Meo, 2005). The link to ADHD is more compelling when one considers that one of the key elements of the personality profile for ADHD includes low conscientiousness (Nigg et al., 2002). In school age children, parent and teacher ratings of DSM IV criteria for ADHD are moderately related to multiple laboratory behavioral measures of impulse control (Avila, Cuenca, Félix, Parcet, & Miranda, 2004). That both behavioral measures of impulse control and trait measures are related to ADHD diagnosis suggests a link between measures of impulse control and both peer- and self-reported personality. Taken together, the direct and indirect research suggests a systematic link between different types of impulse control measures.

However, there are instances where these measures have shown little or no association. For example, in a sample that included both adolescents and their parents, IMT/DMT error rates showed positive correlations with self-reported impulsivity in adults only; their adolescent children showed near zero correlations on the same measures (Dougherty, Bjork, Harper, et al., 2003). Similarly, in a sample of adults that included patients diagnosed with bipolar disorder and normal controls IMT/DMT outcomes were not correlated with self-reported impulsivity (Swann, Pazzaglia, Nicholls, Dougherty, & Moeller, 2003). In another sample consisting of normal young adults there was a complete lack of significant correlations between four different laboratory measures of inhibitory control and self-reported impulsivity (Cheung, Mitsis, and Halperin (2004). Finally, Reynolds, Ortengren, Richards, and de Wit (2006) used a battery of both personality measures of impulsivity and laboratory measures of impulsivity, including the go/no-go and delay discounting tasks, and found little or no substantive correlations across multiple measures.

The mixed results with respect to the relationship between laboratory behavioral measures and traditional personality measures of impulse control are difficult to interpret. The inconsistency may be attributable to the particular laboratory measure, which is often used in isolation. Or, the inconsistency may be attributable to the vagaries of self-report personality measures, which most, if not all of the above studies relied upon. In order to address these potential confounds, we used multiple laboratory measures and both self-report and observer ratings of personality in order to provide a more definitive test of the link between personality and laboratory measures of impulse control. Further, our self- and peer-report measures of personality allowed for both broad level measurement of impulse control, and for a finer grained analysis at the level of the five most replicated facets of conscientiousness.

3. Personality and laboratory behavioral measures of impulse control and health behaviors

Personality measures of impulse control are related to a broad spectrum of health behaviors that includes both positive behaviors

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