

Associations between Cloninger's temperament dimensions and acute tobacco withdrawal

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Abstract

This study examined associations between three temperament dimensions measured by the Temperament and Character Inventory-125 [Cloninger, C.R. (1992). *The Temperament and Character Inventory-125 (TCI-125; Version 1.)*] and tobacco abstinence effects. Smokers ($N=203$, ≥ 15 cigarettes/day) attended two laboratory sessions, one following 12 h of abstinence and the other following ad libitum smoking (order counterbalanced). Participants completed measures of withdrawal symptoms, cigarette urges, and affect. Smokers high in Novelty Seeking reported greater abstinence-induced increases in several nicotine withdrawal symptoms, negative affect, and cigarette craving. Smokers high in Harm Avoidance reported greater abstinence-induced increases in negative affect and urges to smoke to relieve distress. Reward Dependence was not associated with abstinence effects. Novelty Seeking and Harm Avoidance showed independent predictive associations with negative affect and urges, and their associations with abstinence effects persisted when controlling for FTND scores. Smokers with different temperaments display different patterns of acute tobacco withdrawal, and may benefit from treatments matched to their particular abstinence profile.

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1. Introduction

The intensity, duration, and pattern of nicotine abstinence effects can vary widely across individuals (Gilbert, 1995). Indeed, studies have identified several predictors of the severity and quality of abstinence effects (Pomerleau, 1997), including psychiatric conditions (Pomerleau, Marks, & Pomerleau, 2000), alcohol problems (Marks, Hill, Pomerleau, Mudd, & Blow, 1997), and gender (Leventhal, Waters, Boyd, Moolchan, Lerman, & Pickworth, 2007). It is important to identify predictors of abstinence effects because interventions could be selected based upon a patient's characteristics. For example, Pomerleau et al. (2000) demonstrated that depressed smokers are at increased risk of experiencing depressed mood during nicotine abstinence and may therefore require mood management interventions to buffer these effects prior to a quit attempt (Hall, Muñoz, Reus, & Sees, 1996).

Personality is also a significant clinical characteristic that influences smoking patterns and may impact expressions of nicotine withdrawal (Gilbert & Gilbert, 1995). Several different theories and measures of personality have been used in the smoking literature, including Eysenck's personality scales (Eysenck & Eaves, 1980), Zuckerman's Sensation Seeking Scale (Zuckerman, Ball, & Black, 1990), Barratt's Impulsivity Scale (Doran et al., 2006), and Costa and McCrae's NEO-five factor inventory (Gilbert & Gilbert, 1995). These measures are designed to identify psychometrically supported affective and behavioral patterns in humans. In contrast, Cloninger's psychobiological model of personality (Cloninger, Svrakic, & Przybeck, 1993) is unique because it is based on a synthesis of information from twin and family studies, investigations of longitudinal development, neuropharmacologic and neurobehavioral studies of learning in humans and other animals, and psychometric analyses of personality in individual and twin pairs (Cloninger, 1987). This model identifies personality dimensions that may be manifestations of genetically transmitted neuropharmacological processes (Ando et al., 2002; Ebstein, Novick, & Umansky, 1996; Ebstein et al., 1997). These personality dimensions can be assessed by the Temperament and Character Inventory (TCI; Cloninger, Przybeck, & Svrakic, 1994). The factorial structures of temperament dimensions of the TCI have been supported in several studies (Cloninger et al., 1993; Pèlissolo & Lèpine, 2000). The heritability of the TCI's temperament dimensions has been supported by a large twin study that reported heritability rates between 50% and 65% (Heath, Madden, Slutske, & Martin, 1995). Nevertheless, there remains some debate about the pharmacogenetic and psychometric specificity of these dimensions (Herbst, Zonderman, McCrae, & Costa, 2000).

The TCI has three major temperament dimensions: Novelty Seeking (NS), Harm Avoidance (HA), and Reward Dependence (RD). NS tends to be associated with low basal dopaminergic activity and is related to neural systems involved in behavioral activation and appetitive responses. NS is characterized by a tendency toward exploratory behavior in search of novel and rewarding stimuli, active avoidance and escape of aversive stimuli, impulsive responding, and extravagance in approach to cues of reward (Cloninger et al., 1993; Hansenne et al., 2002). High-NS individuals are characterized as quick tempered, curious, easily bored, impulsive, extravagant, and disorderly. HA tends to be associated with high serotonergic activity and is related to neural systems involved in behavioral inhibition and aversive responses (Cloninger et al., 1993; Peirson et al., 2000). HA involves a tendency to over-respond to aversive stimuli and signals of frustrative non-reward, worry about future problems, fear uncertainty, act shy around strangers, and fatigue rapidly. High-HA individuals are characterized as fearful, socially inhibited, shy, passive, easily tired, and pessimistic in circumstances that do not typically worry other individuals. RD tends to be associated with low noradrenergic activity and is related to neural systems involved in behavioral reinforcement (Cloninger et al., 1993; Garvey, Noyes, Cook, & Blum, 1996). RD

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