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## Psychiatry Research

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# An initial investigation of the relationships between hoarding and smoking



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## ARTICLE INFO

### Article history:

Received 8 May 2013

Received in revised form

16 October 2013

Accepted 1 January 2014

Available online 10 January 2014

### Keywords:

Anxiety disorders

Hoarding

Obsessive–compulsive disorder

Reasons for smoking

Smoking expectancies

## ABSTRACT

Cigarette smokers have increased rates of mood and anxiety-related conditions. Hoarding is another anxiety-related condition that has yet to be examined in relation to smoking behavior. The current investigation sought to examine smoking rates among a sample of individuals with hoarding disorder and individuals with non-hoarding obsessive–compulsive disorder (OCD). Additionally, we examined the relationship between hoarding symptoms and reasons for smoking. Participants in Study 1 consisted of 57 individuals with non-hoarding OCD or hoarding disorder. Participants in Study 2 consisted of 661 adult daily smokers. Results revealed that a significantly greater proportion of individuals diagnosed with hoarding were current smokers compared to the non-hoarding OCD group. Additionally, hoarding severity was associated with negative affect reduction expectancies. These results provide important information regarding smoking behaviors within hoarding disorder. Given the poor treatment outcomes and negative health risks associated with hoarding, this information could inform future research and treatment programs.

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## 1. Introduction

Although the positive association between smoking and several of the anxiety disorders is firmly established (Amering et al., 1999; Hapke et al., 2005; Johnson et al., 2000; Sonntag et al., 2000), the relationship between tobacco use and obsessive–compulsive disorder (OCD) seems to represent an opposite end of the tobacco addiction spectrum. Unlike many anxiety-related disorders<sup>1</sup>, research suggests that individuals with OCD have comparable or even lower rates of tobacco use than other psychiatric populations and the general population. For example, one study found that only 9% of obsessive–compulsive (OC) patients smoked cigarettes, compared to 42% of those with mood or other anxiety disorders (Himle et al., 1988). Similarly, McCabe et al. (2004) found that 22.4% of their OCD group were current smokers, compared to 40.4% of their panic disorder group. Additionally, Bejerot and Humble (1999) found that the general population had almost twice the smoking rate of those with OCD (25% compared to 14%),

and that those with a non-OC anxiety disorder had nearly three times the smoking rate of those with OCD (42% compared to 25%).

Notably, hoarding has yet to be examined in relation to smoking behavior. Hoarding is defined as the accumulation of and failure to discard large quantities of objects that appear to be useless or limited in value (Frost and Hartl, 1996). In recent years, hoarding has emerged as a considerable public health burden that is linked to substantial impairment in social, occupational, and family domains (Tolin et al., 2008a, 2008b). Whereas hoarding has been observed in a number of psychiatric conditions including social phobia, schizophrenia, and anorexia, it has most commonly been assumed to be variant of OCD (Frankenburg, 1984; Frost et al., 2000b; Luchins et al., 1992). However, more recent research has demonstrated that a large percentage of individuals who hoard display no other OCD symptoms (Pertusa et al., 2010; Samuels et al., 2008). In addition, it appears that hoarding is more commonly associated with symptoms of depression rather than OCD (Frost et al., 2011), suggesting that hoarding may be a distinct clinical syndrome. Taken together, these and other findings led the American Psychiatric Association (2013) to include hoarding disorder as a discrete diagnostic entity within DSM-5.

Despite the lack of information regarding tobacco use in hoarding populations, it is theoretically plausible that hoarding may be linked to increased smoking status. Specifically, hoarders may be inclined to smoke because of the wide range of behavioral

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<sup>1</sup> It should be noted that due to changes in the DSM-5, OCD is no longer diagnosed as an anxiety disorder. However, OCD has a long history of being considered in the context of these disorders.

effects nicotine has on cognitive functioning. Research has demonstrated that nicotine improves attention, working memory, and other information processing domains (Foulds et al., 1996; Levin and Rezvani, 2002). Given the extant literature demonstrating that hoarding is associated with numerous information processing deficits in the areas of memory, attention, decision making, and categorization (Frost and Shows, 1993; Grisham et al., 2010; Hartl et al., 2005, 2004) it seems plausible that hoarders could benefit from the information processing enhancement that nicotine has on the brain.

Another potential rationale for the use of tobacco among individuals who hoard is related to nicotine's effects on the central nervous system. Smoking is associated with lower perceived stress, reduced negative affect, and enhanced positive affect among nicotine users (Brown et al., 2001; Copeland et al., 1995). From a neuropsychological perspective, research has indicated that nicotine exerts its reinforcing effects by activating dopamine neurons along the mesolimbic dopamine pathway, which enhances the positive reinforcement properties of nicotine including increased energy, reduced stress, and mild euphoria (Watkins et al., 2000). Given the high rates of depression seen among individuals diagnosed with hoarding, particularly compared to individuals with OCD (Frost et al., 2011, 2000b), it is reasonable to assume that smoking may be one mechanism by which hoarders attempt to reduce negative affect and induce positive emotional states.

Finally, hoarders may engage in tobacco use because of their increased levels of impulsivity. Hoarding is related to increased impulsivity, particularly under conditions of intense negative affect (Timpano et al., 2012), and these symptoms are not better accounted for by comorbid OCD or depression (Grisham et al., 2007). In addition, research has indicated a distinct association between impulse control disorders (e.g., compulsive buying and gambling) and hoarding symptoms (Frost and Gross, 1993, 1998, 2001). Impulsivity is a significant predictor of smoking initiation, perceived reward from smoking, and of greater relapse upon smoking cessation (Doran et al., 2004; Granö et al., 2004). Moreover, current models of drug addiction highlight the role of impulsivity in the development of drug abuse (Bari and Robbins, 2013). Thus, elevated impulsivity among hoarders may contribute to smoking initiation and sustained tobacco use.

Despite these suggested associations, to our knowledge no empirical research has examined the relationships between hoarding symptoms and smoking status. Thus, the primary aim of the current study (Study 1) was to examine smoking rates utilizing a sample of hoarding disorder patients and patients with non-hoarding OCD. An OCD sample was used as a comparison group for a number of reasons. First, there is increasing empirical evidence suggesting that the prevalence of cigarette smoking is even greater in psychiatric populations than the general population (Kalman et al., 2005). Thus, we were interested in comparing rates of smoking among hoarders to those of another psychiatric population. Second, hoarding has a long-standing history of being considered within the context of OCD. Considering recent changes to DSM-5 regarding the nosology of hoarding disorder, further information regarding distinctions between these two conditions seems warranted. Based on the aforementioned indications that individuals who hoard may be at greater risk for nicotine use, we expected elevated rates of smoking among hoarders compared to a non-hoarding OCD sample. The second aim of the current investigation (Study 2) was to examine the relationship between hoarding symptoms and potential reasons and expectancies for smoking in a large sample of adult daily smokers. Based on the limited empirical work available, we expected to find a relationship between negative affect reduction expectancies and motives, as well as positive reinforcement expectancies and pleasure/relaxation motives.

## 2. Study 1

### 2.1. Study 1 methods

#### 2.1.1. Participants

The sample consisted of 57 individuals who presented to an outpatient clinic to participate in various research and/or treatment options. Eligible individuals had to have a primary diagnosis of OCD, as determined by the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID; First et al., 1996) or hoarding disorder, as determined by the Structured Interview for Hoarding Disorder (SIHD; Pertusa and Mataix-Cols, unpublished). Participants were excluded if criteria were met for both disorders. The OCD group consisted of 28 participants (64.3% female) and the hoarding group consisted of 29 participants (82.8% female). Ages ranged from 18 to 65 ( $M=28.61$ ,  $S.D.=12.61$ ) for the OCD group and 18 to 76 ( $M=45$ ,  $S.D.=14.86$ ) for the hoarding group. Eighty-two percent of the OCD participants were Caucasian, 3.6% African American, and 14.4% Other (e.g., bi-racial). 58.6% of the hoarding group were Caucasian, 37.9% African American, and 3.4% Other.

#### 2.1.2. Measures

##### 2.1.2.1. Clinician administered

**2.1.2.1.1. Obsessive–compulsive disorder.** OCD was assessed using the SCID for DSM-IV Axis I Disorders (First et al., 1996). The SCID was administered by advanced doctoral students who had received extensive training in SCID administration. This training included reviewing SCID training tapes, observing live SCID administrations, and conducting SCID interviews with a trained interviewer. Trainees received feedback throughout the process until they demonstrated high reliability. Additionally, each SCID they completed was presented and reviewed by a licensed psychologist to ensure accurate diagnosis. The rate of agreement between clinical interviewers within our laboratory has been found to be over 80% with a kappa value of 0.77 (Timpano and Schmidt, 2012).

**2.1.2.1.2. Hoarding.** Hoarding was assessed using the SIHD. The SIHD is a brief structured interview based on the DSM-5 diagnostic criteria for Hoarding Disorder (Pertusa and Mataix-Cols, unpublished). The interview consists of detailed questions and specifiers regarding each of the 6 DSM-5 criteria. The SIHD was used in the current study to assess for potential Hoarding Disorder.

##### 2.1.2.2. Self-report

**2.1.2.2.1. Smoking behaviors.** Smoking status was assessed using a series of self-report questions. Reviews of assessment of smoking behaviors indicate that self-report is highly accurate (Patrick et al., 1994; Velicer et al., 1992). Current tobacco use was defined based on previous research examining cigarette smoking and anxiety disorders (Bejerot et al., 2000). A *current smoker* was defined as someone who consumes at least one cigarette per day for at least the last six months. A *non-smoker* was defined as someone who has not consumed during the past six months. Number of years as a smoker was also measured using a self-report question, with participants asked to indicate for how many years they had smoked daily. Additionally, number of cigarettes smoked daily was assessed using a 5-point Likert scale with answers ranging from 0 (*None*) to 4 (*30 or more*).

##### 2.1.3. Procedure

Participants were individuals from the general community who presented to an anxiety clinic to take part in various treatment and/or research studies. Upon arrival, informed consent was obtained. Next participants were instructed to complete a battery

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