Clinical Psychology Review 34 (2014) 324–336

Contents lists available at ScienceDirect

Clinical Psychology Review

Review of cognitive performance in hoarding disorder

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HIGHLIGHTS

- Replicable deficits: problem-solving, visuospatial ability, attention, organization
- Deficits in categorization and inhibitory control require further investigation.
- Group differences in depression and age have not always been controlled.
- Tests of hoarding specific decision-making and categorization problems are needed.
- More research is required to understand neural mechanisms underlying hoarding.

ARTICLE INFO

Article history:
Received 25 September 2013
3 February 2014
Accepted 13 April 2014
Available online 21 April 2014

Keywords:
Hoarding
Cognitive processing
Cognitive processes
Executive functioning
Review

ABSTRACT

Hoarding disorder is characterized by extreme difficulty letting go of objects other people would routinely discard or give away, such that the home becomes dysfunctionally cluttered with possessions. Specific cognitive processes, such as decision-making, categorization, and attention, have been hypothesized to contribute to the overvaluing of objects. This review synthesizes the evidence related to those propositions and other executive functioning processes that have received research attention. In this paper, we are primarily interested in cognitive processes that can be, but are not always, studied using performance tasks. Compared to both healthy controls and clinical controls, participants with clinical levels of compulsive hoarding show replicable performance deficits in several areas: planning/problem-solving decisions, visuospatial learning and memory, sustained attention/working memory, and organization. Categorization/concept formation, visuospatial processing, and inhibitory control require further investigation and more detailed testing methods to address inconsistencies in reported findings. Many studies fail to account for potential confounds presented by comorbid depression and between-group differences in age, a problem that should be rectified in future research on this topic. The article concludes with recommendations for a research agenda to better understand contributors to abnormal valuing of objects in hoarding disorder.

Contents

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http://dx.doi.org/10.1016/j.cpr.2014.04.002
0272-7358/

1. Introduction

Hoarding disorder is characterized by extreme difficulty discarding objects other people would typically discard (or recycle or donate). People generally engage in a fairly routine effort to balance perceived value of objects with the amount of space available to retain them. That is, items with high monetary, instrumental, or sentimental value are likely to be retained even when space is tight. In the case of hoarding, however, even objects of limited objective value are retained after the point when living spaces are too filled with clutter to be functional for their intended purposes. A hoarded home often has a chaotic appearance, with many possessions piled in disarray. Although individuals with hoarding disorder may not complain of having too many possessions, they frequently complain about difficulty finding their belongings or of possessions being damaged because they are not stored properly.

In an influential paper, Frost and Hartl (1996) proposed several cognitive processing deficits to be central to the development and maintenance of hoarding. On the basis of extensive clinical experience, Frost and Hartl argued that judgments of the value of possessions drive excessive acquisition and difficulty discarding, and their paper explored types of cognition that may influence those value judgments. Many of these cognitive processes are also relevant to the disorganization that gives rise to most of the functional impairment of hoarding.

Although the Frost and Hartl (1996) paper offers the most comprehensive theoretical position on cognitive processing in hoarding, several other researchers have also offered observations and predictions. Steketee and Frost (2003) reflected that information processing problems would most likely occur in relation to clutter and disorganization rather than excessive acquisition; certainly the preponderance of the research has examined this supposition. Grisham, Brown, Savage, Steketee, and Barlow (2007) proposed problems with planning and executing complex goal-directed motor responses in the face of potential emotional and environmental distractions would impair the ability to manage (i.e., organize and discard) possessions in the home.

This paper reviews the evidence related to these propositions and other executive functioning processes that have received research attention in the 15 years since Frost and Hartl offered their theory. In this paper, we are primarily interested in cognitive processes that can be, but are not always, studied using performance tasks. Frost and Hartl also made suggestions about beliefs (e.g., responsibility for being prepared to meet a potential future need) relevant to the phenomenon of hoarding. Although many of these factors, including the specter of post-decisional regret (Tolin & Villavicencio, 2011b), are probably important contributors to abnormal valuing in hoarding, those factors are beyond the scope of this paper.

In considering types of thinking that would influence judgments of value of (and decisions to keep) a given object, Frost and Hartl (1996) focused on decision-making, categorization/organization, and memory. Frost and Hartl suggested measurable deficits would be found in these areas, including slowed performance due to fear of making mistakes, higher thresholds for decisions to discard or lower thresholds for distinctiveness of objects belonging to a category, or poor memory confidence. We first review research that has examined the Frost and Hartl propositions in these domains and then move on to research on executive functioning deficits not specifically mentioned by Frost and Hartl. Following our review of the extant research, we offer some observations about the state of the literature, summarize the conclusions that can be drawn at this point, and suggest important areas for research attention.

2. Method

In order to provide a synthesis of the current knowledge available on hoarding and cognitive performance, the current review utilized a broad collection of search terms to identify studies from multiple areas of cognition. The PsychInfo, PubMed, and Google Scholar databases were electronically searched for literature in November 2011 and again in February and December 2013. The list of search terms used to identify these studies included "hoarding", words related to cognitive domains of interest (e.g., memory, attention, ADHD, concentration, categorization, set-shifting, perceptual reasoning, decision-making, decisiveness, uncertainty, impulsivity) and tests commonly used to study cognitive domains of interest (e.g., digit span, go/no-go, sorting, gambling). Relevant studies were also identified through manual searches of reference lists. Studies were included in the current review on the basis of the following criteria: a) inclusion of at least one sample of individuals with hoarding pathology, b) statistical analyses comparing hoarding and non-hoarding participants, and c) use of at least one cognitive performance test or measure even if this was not the main point of the study. Two unpublished graduate theses were included. Although most studies examined mid-life adults, one study examined children and another examined older adults. Table 1 provides details of studies that met these criteria.

Due to the wide variety of measures used and indicators reported from those measures, the literature contains few direct replications. Furthermore, cognitive performance tests typically involve multiple cognitive functions for successful performance. For these reasons, a meta-analysis was not performed. Our interpretation of the results, however, was based more on effect sizes than on significance tests due to the frequent use of small samples. We interpreted comparisons with effect sizes of $d \geq |0.50|$ to be suggestive of possible impairment regardless of significance test results in a given article. Comparisons between hoarding samples and clinical controls were considered more stringent tests, with $d \geq |0.50|$ interpreted as suggesting specificity to hoarding pathology.

We calculated Cohen's d for comparisons between hoarding samples on the one hand and healthy and clinical comparison samples on the other hand. When possible, these effect sizes were calculated on the basis of means and standard deviations reported in each article. For some studies, we converted other reported effect size indicators (e.g., r or f^2) to d to enhance comparability across studies. In some cases, statistics from significance tests were converted to d. In a few cases, authors did not present quantitative data about a specific comparison (e.g., they reported statistics for the overall ANOVA but reported simple effects as "significantly different"). These cases are evident in Table 1.

3. Decision-making

In relation to decision-making, Frost and Hartl (1996) suggested fear of making mistakes, combined with uncertainty about the probability of needing an object in the future, would make it difficult to decide whether to discard objects. They proposed perfectionism would interfere with decision-making as individuals strive to find a solution that will satisfy all possible relevant factors, resulting in a prolonged process of weighing the pros and cons of each option. In addition, they expected people with hoarding disorder to have a higher threshold about what to discard. The decision threshold could involve perceptions of probability of future need, anticipated consequences of making an incorrect