HOARDING DISORDER: CURRENT TREATMENTS AND FUTURE DIRECTIONS

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Abstract

Hoarding disorder is a disabling condition experienced within the population. It is characterized by the accumulation, and/or excessive acquisition of belongings and a difficulty discarding these possessions (Frost & Gross, 1993). The clutter is suggested to prevent the intended use of areas in the home, and result in significant distress or impairment. In addition, psychosocial implications of hoarding disorder are vast, with a range of health consequences, increased risk of injury, and an impact on social relationships.

Since the introduction of hoarding disorder in the DSM-5, there has been an increased focus on treatment, in an attempt to enhance our understanding of the most effective treatment features or modalities. Treatment for hoarding disorder has generally focused on cognitive behavior therapy, in addition to pharmacological interventions and bibliotherapy. The continual emergence of treatment outcome studies highlights the importance of the frequent analysis of treatment outcome studies, and the potential for innovation and advancement of our existing treatment structures. Therefore, the central goal of this thesis was to examine the effectiveness of current treatments for hoarding disorder, and in particular, examine factors that may improve long-term effectiveness and accessibility of psychological treatments. To achieve this overarching goal, the dissertation was separated into three studies.

Study one aimed to extend previous meta-analyses by examining the overall efficacy of available treatments with the integration of new studies and examining both within-subjects and between subjects’ effects. In addition, this study aimed to examine the impact of treatment for hoarding on secondary outcome measures and moderating factors. Findings suggested an overall strong effect size (hedges’ $g = 1.04$) for overall hoarding severity, and comparable outcomes for group cognitive behavior therapy ($g = .94$), individual cognitive behavior therapy ($g = 1.04$), bibliotherapy ($g = 1.02$) and pharmacological trials ($g = 1.40$). In
addition, meta-regression findings suggested that only duration of treatment (weeks) was a significant predictor of treatment outcome.

Study two aimed at investigating the efficacy of a 12-week group Cognitive behavioral therapy program for hoarding disorder at improving hoarding symptomology at one year post-treatment. Results demonstrated no change in symptoms from post-treatment to follow-up. Although decreases in hoarding symptoms were evident amongst measures from pre-treatment, only one participant was classified as achieving clinically significant change. Further research into the differential responses to treatment, and various clinical predictors could significantly benefit treatment protocols.

Finally, study three aimed to develop and evaluate a ‘blended’ treatment program for hoarding disorder (HoPE), involving 12-weeks of face-to-face therapy, and an 8-week online e-therapist assisted program. Findings demonstrated no significant differences between the HoPE group and waitlist control group, however trends suggested continued improvement in overall hoarding scores for the ‘HoPE’ condition, when compared to the waitlist control condition. After the waitlist period, all participants engaged in the HoPE treatment program. All participants showed continued improvement, demonstrating a significant reduction in hoarding behavior from pre-treatment to 28 weeks.

Overall findings appeared to highlight various strengths and weaknesses evident in current treatment trajectories. Although treatment outcome studies appear to have high efficacy, there are a range of limitations including a majority of participants remaining symptomatic post-treatment, questions around the sustainability of treatment effects, and limitations associated with novel treatment approaches, including small sample sizes. Future directions are discussed within the context of findings.
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Declaration

"I declare that this dissertation does not incorporate without acknowledgment any material previously submitted for a degree in any University, College of Advanced Education, or other educational institution, and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text. I further declare that the ethical principles and procedures specified in the Faculty of Health, Arts and Design Human Research Ethics Committee document have been adhered to in the preparation of this report."

Signed

Molly Fitzpatrick

Date
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CHAPTER ONE: INTRODUCTION AND THESIS OVERVIEW

1.1 Chapter guide

This chapter aims to provide an introduction and overview of the thesis objectives and overall thesis structure. Section 1.2 orients the reader to the central goal(s) of the thesis, and intended format of thesis by associated papers. Section 1.3 provides an overview of the structure of the thesis, and the content of subsequent chapters.

1.2 Thesis objectives/goal

The central goal(s) of this thesis is to examine the effectiveness of current treatments for hoarding disorder, and in particular, examine factors that may improve long-term effectiveness and accessibility of psychological treatments. Hoarding disorder is a condition characterized by the accumulation and/or acquisition of clutter, and difficulty in discarding possessions, regardless of their actual value (Frost, 2010). This disorder is a significantly disabling psychological condition that affects an individual’s ability to work, maintain relationships and function in a daily routine (Frost, Hristova, Steketee, & Tolin, 2013). This thesis aims to: 1) empirically evaluate the effectiveness of existing treatments, 2) examine the long-term outcomes associated with current evidence based treatment, and factors that may impact on this, and 3) develop and evaluate an internet delivered program as an adjunct to face-to-face treatment.

This thesis aims to achieve the central goals in a series of empirical studies, in the format of thesis by associated papers. This format requires the papers to be under review, in press or published, in peer reviewed academic journals. The nature of this thesis format requires an element of repetition, particularly within the empirical papers. However, it is important to note that each individual paper is unique in its objective and methodology, and intends to contribute to the scientific understanding of each selected research area.

A preamble provides the reader an orientation to each chapter, in an attempt to highlight
1.3 Thesis overview

The objectives of this thesis were addressed through three studies which included: 1) an evaluation of current treatments for hoarding disorder, 2) an examination of the long-term effectiveness (1-year) of a 12 week internet-based treatment program, and 3) development and evaluation of a blended model of treatment for hoarding, combining face-to-face and e-therapy.

The thesis comprises of six chapters, including three manuscripts submitted for publication. Chapter two presents an introduction of hoarding disorder, including an historical overview, clinical features and diagnosis, epidemiology, psychosocial implications, and the proposed etiology of hoarding disorder. This initial chapter presents the basis for the thesis rationale and the development of the overarching aims. Chapter three presents the first manuscript, a systematic review and meta-analysis of the treatment of hoarding disorder to date. This paper includes an analysis of various predictors involved in treatment efficacy in a meta-regression. This paper has been submitted for publication in Clinical Psychology Review. Chapter four presents the second manuscript, an evaluation of the efficacy of a group cognitive behavior therapy program for hoarding disorder, examining the long-term efficacy and predictors of treatment outcome. This section builds on Chapter three, which highlights the limited and mixed findings of the sustainability of treatment gains. This manuscript has been submitted for publication in the Journal of Clinical Psychology. Chapter five presents the third manuscript, the development and pilot evaluation of a ‘blended’
therapy program for hoarding disorder, involving face-to-face and online therapy. This manuscript aims at attempting to address various barriers to treatment, and a novel format of treatment that may enable greater access to care. This manuscript has also been submitted for publication in Internet Interventions. Finally, Chapter six presents the integrated discussion and conclusions for this dissertation, attempting to draw together the abovementioned research, highlighting both strengths and weaknesses and providing a range of potential clinical applications.
CHAPTER TWO: INTRODUCTION TO HOARDING DISORDER

2.1 Historical overview

Hoardings behaviors have been documented for centuries, with a variety of explanations and interpretations, within the context of instinctive behavior, environmental, and psychoanalytic views. It is important to initially examine hoarding’s historical conceptualization, to have a clear understanding of its development from a common behavior of protecting one’s belongings, to a clinical disorder in the Diagnostic and Statistical Manual of Mental Disorders – 5th edition (APA, 2013).

Historically, the accumulation of belongings was initially understood as an instinctive behavior that is learnt and reinforced by the environment, and described as a common human experience (James, 1918; Grisham & Barlow, 2005; Lahera et al., 2006). James (1913) suggested that hoarding behaviors become more problematic when the individual fixates on potential missed opportunities, the future utility of an object (rather than current usefulness), and when individuals collect and conceal items of little value (e.g. pins, pieces of thread, buttons). Thorndike (1913) also highlighted the instinctive behavior to accumulate objects that initially attract attention, but emphasized that the satisfaction and attachment gained from these objects is what may lead to a more ‘crystallized’ habit (Lehman & Witty, 1927). Others have suggested that hoarding’s instinctive nature can be a way of protecting oneself from the outside world, achieving a level of security (Bindra, 1948). For example, Bindra (1948) investigated hoarding behavior in rats, finding that that perceived security predicted hoarding behavior, where rats in a secure environment were less likely to hoard than those without a secure environment. Interestingly, Fromm (1947) suggested that individuals acquire belongings as a way of connecting and relating to their surroundings, in addition to developing security from these objects (Grisham & Barlow, 2005). These early phenomenological explanations of hoarding seem to suggest that, although there may be an
initial instinct to acquire an object, the level of satisfaction, comfort and security the individual receives from this object may predict the likelihood of keeping the object.

Early psychoanalytic explanations have presented hoarding as a behavior that results from anal fixation, orderliness, inflexibility and frugality resulting in the significant accumulation of belongings (Frost & Steketee, 1998; Grisham and Barlow, 2005; Melamed, Szor, Barak, & Elizur, 1998). Psychoanalytic theorists have also suggested that hoarding is a result of perfectionistic ideals, where an attempt to have perfect control over the environment leads to difficulties in discarding possessions that may be of future use (Frost & Steketee, 1998; Salzman, 1973). In addition, psychoanalytic theory has proposed that hoarding may be a result of feeding patterns during the infantile period. For example, Hunt (1941) investigated the role of feeding regimes in rats’ likelihood of engaging in hoarding related behavior. Hunt found that those who were in an irregular feeding conditions hoarded 2.5 times more food pellets than the rats who had unlimited access to food, proposing that feeding during the infantile period can influence adult behavior.

Increased investigation into hoarding behavior led to the development of the cognitive behavioral model of hoarding, which places one’s beliefs about objects and emotional attachment as central drivers of hoarding behavior (Frost & Hartl, 1996). Furthermore, this model suggests information processing deficits and behavioral avoidance to play an important role in the initiation and maintenance of hoarding behavior (Frost & Hartl, 1996). The introduction of this model led to the development of the first validated hoarding specific scales, including the Savings Cognition Inventory Revised (SCI-R; Steketee, Frost, & Kyrios, 2003) Savings Inventory Revised (SI-R; Frost, Steketee, & Grisham, 2004), UCLA hoarding severity scale (UHSS; Saxena, Ayers, Dozier, & Maidment, 2015), Hoarding Rating Scale (HRS; Tolin, Frost, & Steketee, 2010), and other additional measures (Frost & Gross, 1993). Initially, hoarding was considered as a subtype of OCD, due to a range of similarities,
including avoidance of discarding possessions (relating to compulsions), the fear of losing important belongings (relating to obsessions), and significant concerns around people touching or repositioning belongings (symmetry obsessions and arranging compulsions; Frost, Steketee, & Tolin, 2012). Furthermore, a study by Mataix-Cols et al. (2010) found moderate to high correlations between hoarding and additional OCD symptoms in a non-clinical population (Mataix-Cols et al., 2010).

However, research in OCD based treatment found that participants with hoarding behaviors appeared to demonstrate limited success. For example, Exposure and Response Prevention (ERP), which is a component of cognitive-behavioral therapy for OCD, has been found to show minimal results in individuals with hoarding symptoms, who generally demonstrate poor treatment compliance, early treatment dropout rates and limited treatment response (Tolin, 2011). A relatively poor response to CBT for OCD resulted in additional research, which highlighted a range of differences between these two clinical presentations. The research suggested that individuals with hoarding disorder did not appear to experience thoughts about possessions as unwanted or intrusive, there was no urge to control thoughts about possessions, hoarding behavior was relatively stable over time (as opposed to OCD), and individuals with hoarding showed less insight, and present later for treatment than individuals with OCD (Frost et al. 2012; Rachman, Elliott, Shafran, & Radomsky, 2009)

With increased research and debate, hoarding disorder was characterized as a distinct disorder in the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5; APA, 2013). The changing boundaries of OCD and HD, and the development of hoarding-specific treatment has led to increased research into the clinical features, epidemiology, etiology and effectiveness of a range of pharmacological and psychological interventions, varying in format and duration, that intend to minimize or alleviate hoarding behavior.
2.2 Clinical features and diagnosis

Hoarding disorder is classified in the Diagnostic and Statistical Manual (5th Ed) as a persistent difficulty discarding or parting with possessions, in addition to the accumulation of possessions that compromises the intended use of living spaces. This behavior results in clinically significant distress or impairment, and the classification requires that the behavior should not be better explained by a medical condition (e.g. Prader-Willi syndrome) or another mental disorder. The diagnosis also can be further specified as to whether the behavior involves the excessive acquisition of belongings, whether there is good, fair, poor or absent insight, and whether there are delusional beliefs linked to the hoarding behaviors. Other common features of hoarding disorder include perfectionism, indecisiveness, avoidance, procrastination, difficulty planning and organizing tasks, and distractibility (American Psychiatric Association [APA], 2013). Animal hoarding is another form of hoarding, where the individual accumulates a large number of animals and fails to provide the basic needs of nutrition, sanitation, and veterinary care.

2.2.1 Subtyping of hoarding behavior. The inclusion of hoarding disorder in the DSM-5 has now created a platform for further exploration into sub-groupings of hoarding behavior, and investigation into whether different features of hoarding disorder should lend more consideration to the individuals’ treatment trajectory. Subtyping in hoarding behaviors was initially proposed by Furby (1978), who suggested that the type of item hoarded can significantly inform the individual’s treatment trajectory, for example, the treatment of instrumental saving may be directed at challenging beliefs about the usefulness of the object, whereas treatment for sentimental saving may be more directed at difficulties in attachment and relationships (Furby (1978) as cited in Andrews-McClymont, Lilienfeld, & Duke. 2003). In addition, Seaman, Oldfield, Gordon, Forrester, and Salkovskis (2010) highlighted the role of beliefs in hoarding, suggesting that beliefs play a primary role in the heterogenous nature
of each hoarding presentation. Seaman et al. (2010) hypothesized that hoarding may be a result of (a) harm avoidance, where an individual wants to retain objects at the risk of causing harm to themselves or others, (b) maternal deprivation, where the absence of a close attachment leads to an individual keeping belongings in fear of being deprived in the future, and finally, (c) disturbances in attachment, where objects hold emotional significance, and discarding objects is alike to losing a part of the individual. Interestingly, beliefs relevant to harm avoidance have been suggested to be more relevant to those who also experience obsessive-compulsive traits (Seaman et al., 2010). Future research into more tailored interventions, such as more exposure-based treatment or more behavioral strategies, according to specific hoarding features may be beneficial (Ayers & Dozier, 2014).

2.2.2 Measurement. There are a range of clinical assessment tools that have been developed to gain greater insight into the extent and severity of hoarding behavior. Many studies previously used items from the Y-BOCS checklist to assess hoarding; however, this form of measurement did not seem to address the central components of hoarding such as clutter, acquisition or difficulty discarding (Steketee & Frost, 2003). Currently, the most commonly used measure of hoarding behaviors is the Saving Inventory Revised (SI-R), which is designed to gauge an individual’s level of clutter, difficulty of discarding and excessive acquisition (Frost et al., 2004). Additional measurement tools include the Hoarding Rating Scale Interview (HRS-I; Tolin et al., 2010), the Clutter Image Rating Scale (CIRS), which uses pictorial representations to gauge the extent and severity of an individual’s clutter (Frost, Steketee, Tolin & Renaud, 2008), the UCLA Hoarding Severity Scale (UHSS; Saxena, Brody, Maidment & Baxter, 2007), the Savings Cognition Inventory Revised (SCI-R; Steketee et al., 2003), the Structured Interview for Hoarding Disorder (SIHD; Nordsletten et al., 2013), the Activities of daily living scale (ADL; Frost et al., 2013) and the Hoarding Assessment Scale (HAS; Schneider, Storch, Gefken, Lack & Shytle., 2008; Frost & Hristova,
2011). More detailed descriptions of assessment tools can be seen in the empirical studies found in Chapters 2, 3, and 4.

2.3 Comorbidity with other disorders

Research suggests that hoarding disorder is associated with a range of other comorbid diagnoses including Major Depressive Disorder (MDD), anxiety disorders, OCD, Attention Deficit Hyperactivity Disorder (ADHD) inattention and trauma related disorders (Frost, Steketee & Tolin, 2011; Cromer, Murphy, & Schmidt., 2007; Hall, Tolin, Frost & Steketee, 2013; Hartl, Duffany, Allen, Steketee & Frost, 2005; Tolin & Villavicencio, 2011; Tolin, 2011). In fact, it has been highlighted that comorbidity occurs in approximately 92% of individuals that meet the diagnostic criteria for hoarding disorder (Frost, Steketee, & Tolin, 2011; Hall et al., 2013; Samuels et al., 2002). As previously mentioned, hoarding behavior was considered as a subtype of OCD and therefore treated within the context of OCD (Ayers, Saxena, Golshan & Wetherell, 2010). Interestingly, it appears that individuals with hoarding disorder have a greater likelihood of experiencing symptoms consistent with depression (50.7% comorbidity) and anxiety (24.4%) than symptoms consistent with obsessive-compulsive symptomology (18.6%; Frost et al., 2011; Hall et al., 2013). In addition, research has found notable levels of comorbidity with social phobia and the reported experience of a traumatic event (Cromer et al., 2007; Hartl et al., 2005; Landau et al., 2011; Przeworski, Cain, & Dunbeck, 2014). Attention Deficit Hyperactivity Disorder (ADHD), specifically inattention, has been found to have a significant association with hoarding behavior (Hartl et al., 2005), with research suggesting that those with childhood ADHD have a greater likelihood of developing hoarding disorder (10.9%) when compared with controls (3%; Fullana et al., 2013). The characteristics of ADHD are likely to have a range of treatment implications, highlighting the importance of additional research. Research has also suggested that gender plays a role in the likelihood of being diagnosed with a comorbid disorder. A study
conducted by Wheaton, Timpano, LaSalle-Ricci, and Murphy (2008) investigated comorbidity in 115 participants with a diagnosis of OCD with hoarding features. Interestingly, it was found that females with hoarding behavior had a greater prevalence of bipolar disorder 1 (17.19%), panic disorder (40.63%), binge-eating disorder (10.94%), alcohol use disorder (32.81%) and substance use disorder (26.56%), than males, whereas men had a higher prevalence of social phobia (43.14%; Wheaton, Cromer, LaSalle-Ricci, & Murphy, 2008) than women. Research has suggested that hoarding behavior is different according to the presence of comorbid disorders e.g. ‘pure hoarding’, ‘hoarding with depression’ and ‘hoarding with depression and ADHD’ (Hall et al., 2010). Hall et al. (2013) investigated various patterns of comorbidity and clinical correlates using a latent class analysis, finding that these three groups showed varied presentations. The pure hoarding group were suggested to show greater success in treatment, with lower levels of depression, stress, and anxiety, whereas the other two groups more likely to report low mood, indecisiveness and little memory confidence (Hall et al., 2013). The diagnosis of comorbid disorders in hoarding is important, with the potential to affect treatment delivery, compliance and outcomes.

2.4 Epidemiology

2.4.1 Prevalence

Since its inclusion in the Diagnostic and Statistical Manual (5th Ed), there has been increased focus towards the prevalence rates of hoarding, in both the USA and Europe. Initial research conducted by Iervolino et al. (2009) investigated the prevalence of hoarding behaviors within a twin sample of 5,022 and found that 2.3% met the criteria for hoarding, with significantly higher rates found in men compared to women. In addition, a recent study examined the prevalence of a range of obsessive-compulsive and related disorders, in addition to anxiety related symptoms. After surveying 2,495 participants they found that
hoarding scores above the clinical cut-off were reported in 2.6% of the individuals (Lopez-Sola et al., 2014). Studies have also investigated the prevalence of hoarding in non-western cultures. For example, Mueller, Mitchell, Crosby, Glaesmer, and Zwann (2009) investigated the prevalence rates of hoarding disorder in a German sample, with findings estimating a prevalence rate of approximately 4.6%. It was also found that two thirds of the participants who were classified with compulsive hoarding were also classified with compulsive buying, which is consistent with the literature and key criteria of acquisition in hoarding disorder (Mueller et al., 2009). In addition, Bulli et al. (2014) investigated the prevalence of hoarding in Italy over two studies, using a validated Italian version of the Savings Inventory Revised. With a total of 1092 participants, they found that prevalence ranged from 3.7-6.0%, with no differences in any demographical features such as age, gender, or level of education. Consistent with previous studies, correlations between obsessive-compulsive symptoms and compulsive buying were evident, particularly when controlling for anxiety and depression symptoms (Bulli et al., 2014).

Not only has the prevalence of hoarding disorder been investigated, but also its core feature, difficulty discarding. Rodriguez, Simpson, Liu, Levinson and Blanco (2013) investigated the prevalence of difficulty discarding in the US population. They found that approximately 20.6% of participants endorsed significant difficulties with discarding objects, and that this feature was associated with high rates of psychiatric disorders, with a wide range of presentations, including substance use disorders, mood disorders, and most significantly with obsessive-compulsive personality disorder (OCPD). In addition, they found that difficulty discarding was more likely to be present in older age, although no gender differences were noted (Rodriguez et al., 2013). It does therefore appear that the prevalence of hoarding disorder across both USA and Europe is approximately 2.3 – 6%, with research suggesting that age may increase the likelihood of hoarding behavior. This high rate of
prevalence is interesting, particularly given that hoarding is generally kept within the private dwelling, and therefore awareness of its extent has been suggested to be difficult to gauge (Samuels et al., 2008).

### 2.4.2 Psychosocial implications of hoarding disorder

Living in an environment with such intense clutter has been found to have severe psychosocial consequences, including the inability to work, maintain personal hygiene, and function in a daily routine (Tolin, 2011). Functional impairment has been found to be significant, particularly when comparing to collectors or healthy control groups (Drury, Ajmi, Fernandez de la Cruz, Nordsletten, & Mataix-Cols, 2014; Mataix-Cols, Billotti, Fernandez de la Cruz, & Nordsletten, 2013; Nordsletten et al., 2013b; Pertusa et al., 2008). Tolin, Frost, Steketee, Gray, & Fitch (2008) investigated the economic and social burden of compulsive hoarding, and found that individuals with hoarding disorder had an average of 7 days in which they were unable to work, which is said to be consistent with individuals with a diagnosis of a psychotic disorder. In addition, the severity of hoarding predicted the degree of work impairment. Furthermore, the financial burden of hoarding can be severe, with people with hoarding disorder generally failing to have the means to pay bills and fund daily living (Tolin et al., 2008). The financial implications of hoarding disorder can also impact on an individuals ability to access and pay for treatment. It has also been suggested that participants with hoarding disorder are three times more likely to be overweight than family members, and more likely to report chronic or severe medical concerns (Tolin et al., 2008). The potential risk of falling and of fire hazards also greatly increases the risk of this chronic condition on both the individual and wider community (Frost, Steketee, & Williams, 2000; Grisham & Barlow, 2005). Finally, in a study conducted by Tolin et al. (2008), 63.6% individuals with hoarding disorder endorsed at least one significant health consequences,
with the most frequently reported conditions including hypertension, arthritis, fibromyalgia, thyroid disorder, autoimmune disease, chronic fatigue and diabetes (Tolin et al., 2008).

Not only can hoarding be a serious problem for the individual, it can greatly affect interpersonal relationships, creating conflict between family members and friends (Grisham, Steketee & Frost, 2008). Buscher, Dyson, and Cowdell (2013) conducted a review of the literature in an attempt to gauge the impact of hoarding disorder on familial relationships. The research found common themes of reduced quality of life, shattered family dynamics and the ‘rallying around’, which was defined as the collusion or resignation of family members to the condition (Buscher et al., 2013). Hoarding disorder can therefore have a significant impact on the mental, physical and social wellbeing of family members; however, shame and embarrassment can be a deterrent in reaching out for support. In some cases, the social and emotional impact of supporting a family member with hoarding disorder can be comparable to the individual experiencing hoarding disorder (Drury et al., 2014). These strained relationships can lead to further social isolation, which may perpetuate hoarding and acquiring behaviors (Buscher, Dyson & Cowdell, 2013; Grisham et al., 2008; Meddard & Kellet, 2014).

2.5 Prognostic and Risk Factors

2.5.1 Age of onset

Mild hoarding symptoms are suggested to begin in early teens, progress to moderate in early 20s, and advance to severe in early 30s (Tolin, Meunier, Frost, & Steketee, 2012). Interestingly, insight and recognition of the symptoms are said to be noted in early 30s, where the clutter is already substantial (Cromer et al., 2007; Frost & Gross, 1993; Grisham, Frost, Steketee, Kim, & Hood, 2006; Samuels et al., 2002). Acquisition symptomology is suggested to show a different pattern, beginning in late teens, which may be an indication of finances or independent living situations (Grisham et al., 2006). Interestingly, Grisham et al. (2006)
proposed that individuals who reported a stressful life event prior to hoarding behavior had a later age of onset than individuals who reported no significant trigger (Grisham, 2005). These findings suggest that different patterns of onset and progression of hoarding behaviors may impact response to treatment and thus the course of the disorder (Grisham et al., 2006).

Existing research also examines hoarding in later life, which can appear under-represented in hoarding trials. In the elderly population, hoarding can frequently be confused with squalor, a condition characterized by living conditions that are unfit for use due to poor sanitation and neglect, and generally secondary to conditions such as dementia, alcohol use disorder and other mental health conditions (Lee & Logiudice, 2012). Interestingly, individuals with hoarding disorder have been found to have discrete neurobiological profiles when compared with individuals living in squalor, with distinct differences in visuospatial reasoning, abstraction, planning, organization, problem solving and mental flexibility (Lee et al., 2016).

There are a range of increased challenges for older adults with hoarding behaviors, for example, an increased risk of injury by belongings, isolation and physical challenges in sorting or discarding clutter (Tolin., 2011). Eckfield (2012) conducted a qualitative study examining the relationship between aging and the accumulation of belongings. Participants reported a “dynamic interaction” between accumulation and aging, suggesting factors such as changes in health status, social context and home environment worsened hoarding behaviors and outcomes (Eckfield, 2012). These findings highlight the importance of additional research into the experience of hoarding disorder in older adults, and the potential need for more targeted interventions (Eckfield, 2012).

### 2.5.2 Early life experiences

Along with age, research suggests that hoarding can be a result of environmental factors, with the experience of trauma suggested to be significant
predictors of hoarding (Hartl et al., 2005). Cromer et al. (2007) examined the relationship between traumatic life events (TLE) and hoarding in 180 individuals with OCD. Interestingly, participants classified as hoarders (24%) were significantly more likely to have experienced a TLE in their life. In addition, participants who met the criteria for hoarding and TLEs demonstrated significantly higher severity in hoarding symptoms when compared to hoarders that had not experienced a TLE (Cromer et al., 2007; Hartl et al., 2005). Furthermore, this robust relationship between hoarding and trauma was not better accounted for by age, OCD symptoms, depression, or mood and anxiety comorbidities (Cromer et al., 2007). Hartl et al. (2005) suggested a possible link between traumatic experiences and compulsive hoarding, with findings suggesting that PTSD diagnoses, and a higher number and frequency of trauma are evident in those with hoarding disorder, suggest that there may be a predisposing link. In addition, Przeworski, Cain and Dunbeck (2014) examined the relationship between traumatic life experiences and hoarding and found that hoarding severity shared a positive association with the number of traumatic events experienced before the onset of hoarding symptoms. These findings highlight the idea that traumatic experiences may be related to the onset of hoarding disorder. Research conducted by Tolin (2011) found that 76% of the participants had a history of interpersonal violence, notable when compared to the 32% of women in the general population. A high proportion of participants endorsed the traumatic incident prior to the onset of hoarding disorder, suggesting a temporal link for some individuals. Interestingly, these findings are not consistent with that of an OCD sample, and suggested to be more aligned to those that have been receiving treatment for severe psychiatric disorders or substance-related disorders (Tolin, 2012).

2.5.3 Genetics and Neurological Functioning. Attempts to explain hoarding behavior have led to increased investigation into the genetic composition and neurological functioning of individuals with hoarding disorder.
Genetics. Factor analytic studies suggest a specific hoarding factor that is strongly familial, with hoarding individuals also reporting that first-degree relatives have had difficulties with hoarding (Grisham & Barlow 2005; Samuels et al., 2007; Tolin, 2011; Winsberg, Cassic & Koran, 1999). Interestingly, Nordletten et al. (2013) examined the degree to which compulsive hoarding is genetically predisposed or environmentally influenced in a sample of twins. They found that there was a substantial genetic overlap between difficulty discarding and excessive acquisition, which suggests a potential genetic phenotypic component to hoarding behavior (Nordsletten et al., 2013). However, they also found that 40% of variance is also explained by the environment, highlighting the importance of environmental influences (Nordsletten et al., 2013). These findings may suggest that hoarding can eventuate as a result of potential genetic heritability, in addition to environmental influences.

Neurological. In addition to genetics, neurological functioning has also been suggested to influence the existence and severity of hoarding behavior. For example, An et al. (2009) used neuroimaging to investigate the neurobiological patterns in the brain in participants with hoarding type OCD and OCD without hoarding. Interestingly, they found that there were distinct variations in the brain structures, where OCD patients with hoarding showed greater activation in bilateral anterior ventromedial prefrontal cortex than OCD patients without hoarding (An et al., 2009). In addition, Tolin, Witt and Stevens (2014) investigated whether participants with hoarding disorder showed a different pattern of hyperactivation normalities when compared to participants with OCD. They found that individuals with hoarding disorder showed greater activation in the right precentral gyrus, whereas the individuals with OCD showed activation in the greater right OFC (Tolin, Witt, & Stevens, 2014). In addition, Saxena et al. (2004) investigated the cerebral glucose metabolism of individuals with hoarding disorder, obsessive-compulsive disorder and healthy control
participants. When compared to the control conditions, participants with hoarding disorder had significantly lower glucose metabolism in the posterior cingulate gyrus and cuneus. When compared to participants with OCD (non hoarding), participants with hoarding disorder had significantly lower glucose metabolism in the dorsal anterior cingulate gyrus; with hoarding symptoms negatively correlated with glucose metabolism in this area. This research appears to highlight the role that neurological structures may play in initiation and maintenance of hoarding behaviors, in addition to significant differences between OCD and HD. Furthermore, Anderson, Damasio, and Damasio, (2005) investigated the role of traumatic brain lesions in the onset of hoarding behavior and found that individuals exhibiting ‘abnormal collecting behavior’ also had damage to mesial prefrontal regions on the brain. More specifically, the right mesial prefrontal region, at the level of the anterior cingulate and frontal pole, seems to be most prominently implicated (Anderson, Damasio, & Damasio, 2005). Finally, Mataix-Cols, Pertusa and Snowdon (2011) reviewed previous research investigating the relationship between neurological structures and hoarding and found that the ventromedial prefrontal/anterior cingulate cortices, medial temporal regions and the subcortical limbic structures all appear to be implicated in hoarding behavior. However, they found that many of the studies had small sample sizes or limited reliability, suggesting that these are only preliminary findings and need further investigation (Mataix-Cols et al., 2011).

Taken together, these findings do highlight significant impairments in neurological functioning, with a focus on abnormal functioning in the anterior cingulate, precentral and superior frontal gyri (Grisham & Baldwin, 2015). However, it does appear that there are additional factors at play. More recent developments have emphasized the role of psychological factors, in particular hoarding related beliefs, various cognitive deficits and
emotional attachments, as central to the development of hoarding disorder. These factors will be reviewed next.

2.7 Cognitive Behavioral Model of Compulsive Hoarding.

Hoarding is best conceptualized by the multidimensional model proposed by Frost and Hartl (1996), which attempts to explain the core features and processes of hoarding behavior (Grisham & Barlow, 2005). The model suggests that a range of vulnerabilities, including information processing deficits, avoidance behavior, difficulties in emotional attachment, and erroneous beliefs about the nature of possessions are key factors in eliciting hoarding behavior (Frost & Hartl, 1996; Gordon, Salkovskis, & Oldfield, 2013).

2.7.1 Information processing deficits

Information processing deficits have been suggested to be a fundamental component of the hoarding model, emphasizing the role of difficulties in decision-making, difficulties in categorization/organization and poor memory confidence in maintaining hoarding behavior (Frost & Hartl, 1996; Hartl et al., 2004).

Decision-making. Research has suggested that difficulties in decision-making are a common difficulty experienced by people with hoarding disorder (Tolin et al., 2012b). Some researchers have suggested that a fear of making mistakes drives the accumulation of clutter, which has been linked to perfectionistic tendencies seen in OCD and OCPD (Frost & Steketee, 1997; Frost & Steketee, 2007). By saving, the individual can avoid the decision and therefore potential worry, loss or distressed emotional state (Frost & Hartl., 1996). The decision making threshold is said to involve perceptions of future need, anticipated consequences of making the wrong decision, and self-efficacy for dealing with wrong decisions (Woody, Kellman-McFarlane, & Welsted, 2014). When attempting to make a decision about discarding an object, individuals appear to focus on the cost associated with the loss of the object, as opposed to the cost of keeping the object (Frost & Hartl, 1996). A
recent review conducted by Woody et al. (2014) investigated cognitive abilities demonstrated within hoarding disorder, and found that, using self-report measures, such as the Frost Indecisiveness Scale, hoarding clients appear to complain more of indecisiveness than healthy controls (Grisham, Norberg, Williams, Certoma, & Kadib, 2010; Steketee et al., 2003; Tolin & Villavicencio, 2011a; Wincze et al., 2007). Interestingly, research has found differing results on individuals with hoarding disorders’ abilities on tasks measuring decision-making, such as the Iowa Gambling Task (IGT). The IGT is frequently used as an indicator of an individual’s capacity to make advantageous decisions, particularly integrating both emotional and additional cognitive information to arrive at a decision (Becerra & Robies, 2010; Grisham, Brown, Savage, Steketee, & Barlow, 2007; Woody et al., 2014). Some research found that hoarders with OCD demonstrated poorer performance on the IGT, when compared to non-hoarding individuals with OCD (Lawrence et al., 2006). However, findings from other research found no impairments in functioning on the IGT when comparing HD and healthy controls (Blom et al., 2011; Fitch & Cougle., 2013; Grisham et al., 2007; Grisham et al., 2010; Tolin & Villavincenio, 2011). Studies using imaging have found that, when controlling for depression and OCD without hoarding, individuals with hoarding disorder took significantly longer to make decisions of whether to shred their own paper items than non-hoarders (Tolin, Kiehl, Worhunsky, Book & Maltby, 2009; Tolin et al., 2012; Woody et al., 2014). In addition, Tolin et al. (2012) also found that there was a significant difference in the time taken to make decisions when shredding their own items, when compared to the experimenter’s items, with individuals with hoarding tendencies making decisions about the experimenter’s objects more quickly. In an examination of various cognitive deficits, Grisham, Norberg, Williams, Certoma & Katib (2010) found that although hoarders reported difficulties in decision-making, this was not evident on the neuropsychological tasks. These findings may suggest that there may be a discrepancy
between perceived and actual abilities in decision making, with these findings also consistent with findings in memory (Grisham et al., 2010; Hartl et al., 2004).

**Memory.** Difficulties with memory are another component of the cognitive behavioral model for hoarding proposed by Frost and Hartl (1996). However, it appears that there are mixed findings as to whether there are significant memory deficits in hoarding. Some research has found differences in implicit memory, where individuals with compulsive hoarding performed significantly worse when compared to the OCD group and healthy controls (Blom et al., 2011). Furthermore, Hartl et al. (2004) investigated differences between participants with compulsive hoarding in their perceived and actual memory abilities, finding that participants with compulsive hoarding recalled less information, and used less effective organizational strategies on one of the memory testing instruments (Rey-Osterrieth Complex Figure Test [RCFT]). However, subsequent investigations of memory deficits found no significant differences between individuals with compulsive hoarding and clinical or control groups (Fitch & Cougle, 2013; Mackin et al., 2011; Tolin, Villavicencio, Umbach, & Kurtz, 2011; Woody et al., 2014). It may be that the hypothesized difficulties in memory may be more related to poor memory confidence, overestimation of consequences of impaired memory and beliefs about the importance of memory (Grisham & Balwin, 2015; Woody et al., 2014).

**Categorization.** Individuals who demonstrate hoarding behaviors have been suggested to have difficulties in categorization, in that they tend to have a greater number of categories when compared to those who do not demonstrate hoarding tendencies (Frost & Hartl, 1996). Research conducted by Winzce, Steketee and Frost (2007) supported this claim. They examined number of categories and time taken when individuals with hoarding tendencies were sorting common household items compared to sorting their own belongings (Winzce, Steketee, & Frost, 2007). They found that there were no significant differences in
the number of piles and time taken to sort when working with the common household items. However, when sorting personal items, the hoarding group made significantly more piles than the control group, and also took significantly longer to sort when compared to the OCD group and control group (Winzce et al., 2007). In addition, Grisham et al. (2010) examined categorization abilities in hoarding participants, and also found that hoarding participants made more piles than clinical controls for personal objects and index cards. In addition, Grisham et al. also found that hoarding participants took longer to sort items when compared to clinical and non-clinical controls, and had significantly higher levels of distress, measured by the Subjective Units of Distress Scale (SUDS), before and after almost all tasks, when compared to both comparison groups. These findings suggest that individuals with hoarding tendencies find it more difficult to categorize belongings, and also experience significantly more distress when compared to control conditions (Grisham et al., 2010). The difficulties involved in categorizing, and the significant anxiety experienced, may be strongly related to emotional attachment and beliefs about objects that arise in the sorting process. However, more research is required to further understand the categorization process.

2.7.2 Avoidance behavior

Approach behavior is suggested to occur when excessive amounts of positive emotion are associated with possessions of low value, and thus the clutter, saving and acquisition is positively reinforced (Grisham & Barlow, 2005). However, avoidance behavior is suggested to be a result of conditioned emotional responses of anxiety or fear when faced with losing possessions, leading to saving and difficulties in discarding. Frost and Gross (1993) have suggested that hoarding can be defined as an avoidance behavior, and linked to issues of indecisiveness and perfectionistic tendencies. It has been suggested that behavioral avoidance involves the avoidance of decision-making due to the fear of making a mistake, avoidance of potential harmful consequences of making a wrong decision, and avoidance of potential loss
of important attachments (Frost & Hartl, 1996). There has been increased research into avoidance behavior, and more recently, experiential avoidance (EA), which is defined by purposeful avoidance of unpleasant emotions and thoughts due to an inability to tolerate negative internal states (Ayers, Castriotta, Dozier, Espejo, & Porter, 2014). Both behavioral and experiential avoidance appear to play an important role in the maintenance of hoarding behavior. For example, Wheaton, Abramowitz, Franklin, Berman and Fabricant (2011) found a relationship between EA and hoarding behaviors using a university sample. They found that EA predicted SI-R scores, even when accounting for scores of distress and depression. In addition, Ayers, Castriotta, Dozier, Espejo and Porter (2014) examined behavioral and experiential avoidance in those with hoarding disorder and found that avoidance accounted for different facets of hoarding severity, with behavioral avoidance contributing to participants’ clutter score on the SI-R subscale, and experiential avoidance uniquely predicting variance on both the difficulty discarding and the acquisition subscales on the SI-R. These findings suggest that there may be a relationship between avoidance and various aspects of hoarding behavior (Ayers et al., 2014).

2.7.3 Emotional attachment to objects

Emotional attachment to objects has been found to play an important role in hoarding behavior, beginning with a study conducted by Frost and Gross (1993) which found that those with hoarding disorder reported greater levels of emotional attachment to belongings when compared to control participants. In a later study, Frost, Hartl, Christian, & Williams (1995) further investigated emotional attachment to belongings in a sample of university students and volunteers, finding that higher scores of hoarding severity were linked to higher emotional attachment to belongings, a greater reliance on belongings to provide comfort, and a high level of responsibility for caring for their belongings. Research in emotional attachment has also found that objects can be seen as an extension of one’s self and be
attributed human-like qualities (Frost & Hartl, 1996). Frost and Hartl (1996) proposed that there are two types of emotional attachment, 1) individuals who hoard attribute greater emotional attachment or ‘hypersentimentality’ to objects, and 2) Emotional attachment to objects that provide a sense of safety or comfort, which has also been seen in many animal studies and economic literature (Anderson & Krebs, 1978; Frost et al., 1995). Phung, Moulding, Taylor and Nedeljkovic (2015) investigated the relationship between emotional regulation and hoarding behavior, suggesting that there is an important relationship between emotional attachment and emotional regulation, with strong emotional attachment to objects serving as a ‘replacement’ for using general emotional regulation strategies. Their findings supported this idea, with beliefs about emotional attachment mediating the link between emotional regulation and hoarding symptoms (Phung et al., 2015). These findings do highlight the potential for a strong emotional attachment to objects to be used as a type of emotional regulation, thus strengthening the attachment and dependence (Phung et al., 2015). In addition, Steketee, Frost, and Kyrios (2003) examined the role of beliefs in hoarding disorder, examining beliefs about memory, attachment, control and responsibility, using a factor analysis. It was found that memory; responsibility and control were supported, in addition to a factor dimension of beliefs about emotional attachment to possessions, which accounted for the largest proportion of variance (Steketee, Frost, & Kyrios, 2003).

2.7.4 Beliefs about the nature of possessions

Beliefs about possessions have been suggested to play a significant role in the maintenance of hoarding behavior (Frost & Hartl., 1996; Steketee & Frost, 2003). Frost and Hartl (1996) proposed that there are three central beliefs involved in hoarding behavior: beliefs about the importance of maintaining control over possessions, beliefs about responsibility for possession and beliefs about the importance of perfection (Frost & Hartl.,
Additional research highlights the common beliefs that impact on the individuals' ability to discard objects, which include beliefs about the utility an object, beliefs about the potential value of the object, and beliefs around the importance of objects (Gordon, Salkovskis, & Oldfield, 2013). Gordon et al. (2013) therefore suggest that these beliefs then guide the other cognitive processes, such as making decisions, experiential avoidance, and attachment to possessions. Comorbidity is also suggested to influence the types of beliefs experienced in hoarding behavior, with OCD suggested to increase the likelihood of beliefs of harm avoidance when compared to hoarding only presentations (Gordon, Salkovskis, & Oldfield, 2013). The cognitive behavior model for compulsive hoarding has received much support since its proposal by Frost and Hartl (1996). However, increased debate in terms of neuropsychological underpinnings, and challenges encountered in treatment are important considerations for further research.

### 2.8 Treatment of hoarding disorder: Current treatment

The conceptualization of hoarding behavior has been continually developed, from an underlying basic human instinct (James, 1913) and Freud’s (1908) idea of a lack of progression in the psychosexual stages (as cited in Grisham & Barlow, 2005) to complex cognitive processes and examining the role of neurological vulnerabilities. It is evident that hoarding behavior affects both the individual and the wider community, with clutter not only causing significant distress for the individual, but also financial strain within community services. It appears that early childhood experiences, biological vulnerabilities, and difficulties in cognition all play a role in the initiation and maintenance of hoarding behavior. Although research in hoarding is still in its infant stages, research to date has significantly improved our understanding of hoarding behavior, and assisted in both the development and refinement of treatment programs.
2.8.1 Cognitive behavior therapy. CBT for hoarding is based on Frost and Hartl’s (1996) cognitive behavioral model, which addresses the three central aspects of hoarding: clutter, difficulty discarding and acquisition (Muroff et al., 2011). The treatment protocol aims to reduce hoarding behavior by focusing on the previously mentioned four main problem areas, including information-processing deficits, emotional attachment problems, behavioral avoidance and beliefs about the nature of possessions (Steketee, 2003). The CBT intervention is standardized, using a therapist guide and participant workbook, and adapted for differing durations and formats (i.e. individual vs. group). Motivational interviewing forms a component of treatment, attempting to address the ambivalence experienced, in addition to limited insight into the degree of impairment. The cognitive behavioral component aims at minimizing clutter, enhancing decision-making abilities, educating individuals in how to organize belongings, and assisting individuals in reducing urges to acquire (Frost & Steketee, 2007; Grisham & Barlow, 2005). The cognitive restructuring component aims at attempting to challenge various fears associated with discarding objects, such as anxiety experienced when discarding an object that holds sentimental value. Knowledge of the avoidance of uncomfortable emotions can assist in helping the individual understand and conceptualize their hoarding behavior. Emphasis is placed on motivation of the individual and their commitment to treatment (Frost, Steketee, & Greene, 2003; Saxena 2004). Furthermore, CBT treatment for hoarding involves a client workbook with various homework tasks that reinforce what is learnt in session and encourage application of the learnt knowledge at home (Frost & Steketee, 1998). These regular homework assignments include developing organizing plans, creating a hierarchy of possessions and cognitive restructuring of unhelpful hoarding related beliefs.

Studies examining individually administered CBT based on the hoarding model have shown significant declines in hoarding symptomology. For example, Tolin, Frost and
Steketee (2007) examined the effects of 26 weeks of individually administered CBT for 10 participants with hoarding behaviors and found that there were significant decreases on the SI-R and CIRS, with 50% of individuals post treatment stating that they were ‘much’ or ‘very much’ improved. In addition, Ayers, Loebach Wetherell, Golshan, and Saxena (2011) examined the effects of individual cognitive behavioral therapy for older adults using the hoarding model proposed by Frost and Steketee (2007). They found that, after 26 sessions over 17 weeks, there were significant changes on hoarding severity and depression, however, these changes were not maintained at follow-up (Ayers et al., 2011). These findings suggest that hoarding specific CBT has resulted in significant declines in hoarding severity, however, it is unclear whether these changes are maintained for a longer period of time. Furthermore, further research using a control group may provide greater evidence of efficacy.

Cognitive Behavioral Group therapy (GCBT) has also demonstrated to be efficacious in the treatment of hoarding disorder. Gilliam et al. (2011) conducted an open trial, examining the efficacy of GCBT for 35 individuals over 16-20 sessions. They found significant decreases in hoarding behavior shown on the SI-R, the SI-R subscales and the ADL. They also found that after treatment, 19 participants rated themselves as ‘much’ or ‘very much’ improved (Gilliam et al., 2011). Similarly, Steketee, Frost, Tolin, Rasmussen and Brown (2010) explored the effects of GCBT when compared to a waitlist control group in 40 individuals with hoarding disorder. The results found that, after the 12-week program, individuals in the GCBT condition benefitted significantly more than waitlist participants in decreasing both hoarding severity and mood, which had moderate effect sizes (Steketee et al., 2010). In addition, 37 of the participants undertook GCBT for a total of 26 weeks, with these participants showing significant reductions in hoarding severity and large effect sizes.

Finally, Moulding, Nedeljkovic, Kyrios, Osborne, & Mogan (2016) examined the effectiveness of a 12-week CBT group program for hoarding using a repeated measures
design. They found a significant reduction of scores on the SI-R (n=41), moderate effect sizes on hoarding related beliefs of emotional attachment and responsibility, in addition to 34% of participants demonstrating clinically significant change. These findings appear to offer support for the efficacy of GCBT for hoarding disorder, however, whether these findings are sustained in the longer term is of interest.

2.8.2 Peer facilitated Bibliotherapy. Not only has CBT based treatment proven effective for the treatment of hoarding disorder, but also hoarding-specific peer facilitated bibliotherapy, which involves the use of a self-help book to aid or replace therapy. Tolin, Frost and Steketee (2007) developed a self-help book specifically for individuals with hoarding difficulties, known as “Buried in Treasures”. In two studies, Frost, Maxner, and Pekareva-Kochergina (2011) used “Buried in Treasures” to investigate the efficacy of a bibliotherapy based peer led support group, attempting to examine a more cost-effective form of therapy for hoarding disorder. In the first study, they measured self-reported hoarding symptoms and beliefs before and after a 13-week support group and they found that all measures declined from pre-treatment to post treatment, with almost 50% of participants meeting the criteria for clinically significant change, and 30% of participants having SI-R scores below the clinical cut-off at post-treatment and one month follow-up. In the second study, Frost et al. (2012) attempted to replicate these findings, and found that that over 50% met the criteria for clinically significant change at follow-up for the SI-R, and the participants showed significant declines on the ADL, CGI and SCI from pre-treatment to follow-up. Sixty-one percent of participants considered themselves as very much improved or much improved across both studies at follow-up. In addition, Frost, Ruby and Shuer (2012) examined the effects of a 13-week peer-facilitated bibliotherapy-based support group in 38 participants, who were randomly assigned to a treatment (n = 18) or waitlist (n = 20) condition. Each session focused on a chapter from the Buried In Treasures self help book by
Frost and colleagues. It was found that all participants in the treatment condition demonstrated significant improvement in hoarding symptoms, with an exception of hoarding related beliefs related to emotional attachment and control, measured by the SCI. Sixty-two percent of the participants were judged by the assessor to be ‘much’ or ‘very much’ improved and almost 30% were reported to demonstrate clinically significant change. The findings suggest that a peer-facilitated support group can significantly reduce the severity of the principal components in hoarding, clutter, difficulty discarding and acquisition, as well as interferences due to hoarding and beliefs regarding clutter.

In contrast, Muroff, Steketee, Bratiotis, and Ross (2012) examined the effects of GCBT and bibliotherapy in 38 participants with hoarding disorder. Participants were randomly allocated to GCBT with home visits, GCBT without home visits or a bibliotherapy group. They found that SI-R total scores and HRS scores significantly declined after the 20 GCBT sessions, with large effect sizes and overall symptom reduction in the 23-35% range. However, those in the bibliotherapy condition, showed no decline on any of the hoarding scales. This study therefore suggested that, while bibliotherapy may be useful for psychoeducation, it might not be a viable treatment option, without additional therapeutic support. In a meta-analysis conducted by Tolin, Frost, Steketee, and Muroff (2015), cognitive behavioral and bibliotherapy interventions were found to be highly effective, with female gender, lower ages, more CBT sessions and a higher amount of home visits suggested to be associated with greater clinical outcomes. Taken together, these findings highlight the need for further research into the efficacy of bibliotherapy, particularly with a consistent definition and implementation to ensure comparability.

2.8.3 Pharmacological interventions. Along with CBT, pharmacological treatment interventions have also been examined as an effective treatment for hoarding. To date, pharmacological interventions have involved Paroxetine, SSRIs and other forms of
serotonergic medication, and often prescribed in addition to various therapies (Saxena, 2008). Previous research has suggested a neural basis for hoarding behavior, indicating the potential for pharmacotherapy to be effective (Tolin, 2011). In investigating the effects of pharmacological treatment, Saxena, Brody, Maidment, and Baxter (2007) examined the role of Paroxetine in alleviating hoarding symptomology in 79 OCD patients, 32 with hoarding behavior and 47 without. Interestingly, there were no differences between groups in response rate or likelihood of completion, with hoarding symptoms improving just as much as other OCD symptoms (Saxena, Brody, Maidment & Baxter, 2007). In addition, Saxena, Sumner and Barios (2011) investigated the role of Venlafaxine in the treatment of hoarding disorder, which is proposed to be a medication better tolerated by older individuals. In an open label trial, they found that after 12 weeks of treatment, participants demonstrated significant improvements in hoarding symptoms, with individuals demonstrating a mean decrease of 37% and 32% on the UHSS and SI-R, respectively. Furthermore, symptoms of depression, anxiety and OCD were also found to be markedly improved, suggesting that venlafaxine may be an effective for treatment of HD. However, several studies have investigated the role of other pharmacological interventions in the treatment of hoarding symptoms and have found less than desirable outcomes. For example, Stein, Anderson, and Overo (2007) examined the response to Citalopram in individuals with OCD and found that those with symptoms of symmetry/hoarding were less likely to respond to treatment, with suggestions that this symptom dimension may be mediated by the dopamine system. In addition, numerous other studies have found that compulsive hoarders, or individuals with OCD that have a high score on the hoarding symptom dimension, are less likely to respond to SSRI medication compared to other individuals with OCD (Mataix-Cols, Rauch, Manzo, Jenike, & Baer, 1999; Stein et al., 2008). With some research suggesting a neural basis for hoarding behavior, particular pharmacological interventions appear to have the potential to be effective, however, there has
been limited research into the effectiveness of pharmacotherapy for specifically hoarding disorder. A recent meta-analysis conducted by Brakoulias, Eslick, and Starcevic (2015) found a moderate effect size for pharmacotherapy in improving overall hoarding severity. However, a majority of research investigating the role of pharmacological interventions has mainly been conducted with samples of OCD participants with hoarding, who were assessed primarily with OCD-based measures. This has made it difficult to generalize the effects of medication on individuals with hoarding disorder, given that decreases in the Y-BOCS scores may not indicate decreases in hoarding related behavior per se (Saxena et al., 2007). Further investigation of the efficacy of pharmacotherapy when compared to CBT-based interventions appears important, particularly due to the fact that most recent analysis indicated that psychiatric medication was associated with better outcome (Tolin et al., 2015).

Finally, common to all treatment modalities, are questions around the impact of the structure of treatment characteristics, such as the duration of treatment (weeks), intensity of the intervention (hours), and the role of home visits in treatment. There is a lack of existing research evaluating the impact of these key features on treatment outcome, particularly when examining aggregate data. This may be a reflection of the early stages in treatment evaluation for hoarding, however, highlights the importance of further investigation, particularly in an attempt to update and refine treatment.

2.8.4 Summary and rationale. Hoarding disorder is a disabling condition, resulting in significant consequences for psychological wellbeing, physical wellbeing, as well as interpersonal and financial difficulties. Prevalence rates suggest that hoarding behavior is present amongst 2.3-6% of the population, and also experienced alongside a range of other disorders including OCD, depression, and ADHD. Hoarding disorder is still a relatively new area of research, which highlights the importance of the frequent review and analysis of studies to date. Treatment studies in hoarding appear to show that, although participants show
significant declines in hoarding behaviors, many individuals remain symptomatic post-treatment, with SI-R scores still remaining in the clinical range (Tolin, Steketee, Frost, & Muroff, 2015; Matthews et al., 2016). The continual emergence of treatment outcome studies, with varying methodologies, highlights the importance of additional studies investigating the integration and examination of overall treatment effects.

Not only is the knowledge of treatment outcome studies important, but also the understanding of the effectiveness of treatment in the long term, with only three studies reporting findings from follow-up periods. Furthermore, these follow-up periods substantially vary, ranging from 1 month, 6 months and 12 months. Findings from these studies also greatly vary, with some studies demonstrating relapse, and others showing a maintenance of treatment gains (Ayers et al., 2011; Frost, Maxner, & Pekareva-Kochergina, 2011; Muroff, Steketee, Frost, & Tolin, 2013) In addition, there appears to be limited information into various factors that may moderate an effective treatment outcome, such as depression, motivation levels or treatment duration. An understanding of predictors of treatment outcome may also contribute to our overall understanding of hoarding disorder, in addition to developing and refining existing treatment programs.

Finally, emerging evidence, in both hoarding research and other diagnoses, have highlighted the effectiveness of online-based interventions (Muroff et al., 2011). Although individuals with hoarding disorder have reported common struggles with financial constraints, and difficulties in access to treatment, there do not appear to be many potential alternative forms of treatment. Thus, it appears that there is a requirement for more research into the efficacy of novel treatment modalities, such as blended models of care, involving both face-to-face and online components, to improve accessibility and cost for individuals.
2.9 Thesis Research aims

The focus of this thesis is on examining and improving the longer-term effectiveness of treatment of hoarding behaviors. It seeks to investigate whether the current available treatment is adequate enough to sustain treatment effects, factors associated with poorer outcomes and ways to address some of these, so as to subsequently improve the burden of hoarding behaviors on the individual, family and wider society. Each aim was therefore formulated in an attempt to create a greater understanding of hoarding treatment and factors that may influence treatment outcome. The research aims presented here have associated hypotheses, which can be found within each individual empirical study.

2.9.1 Research aim one: To evaluate the efficacy of pharmacological, behavioral and cognitive-behavioral interventions for individuals with hoarding disorder. To date, research has evaluated cognitive-behavior therapy based programs, peer-facilitated bilbiotherapy and pharmacotherapy interventions, all with varying degrees of efficacy. A meta-analysis examining the efficacy of CBT-based interventions for hoarding demonstrated a large effect size (Tolin et al., 2015). With an increased number of published studies since the previous meta-analysis, particularly in a range of interventions (e.g. pharmacotherapy), an additional attempt to integrate and synthesize reliable estimates of the current effects for all treatment formats, would prove beneficial. The first aim was therefore to evaluate the efficacy of pharmacological, behavioral and cognitive-behavioral interventions for individuals with Hoarding Disorder. An integrated analysis of treatments using hoarding-specific assessment tools will assist in informing clinical practice and assist in refining efficacious treatment programs.

2.9.2 Research aim two: To examine the efficacy of hoarding specific treatment on secondary outcomes. Research has suggested that treatment for hoarding not only improves hoarding symptoms, but also quality of life, depression and anxiety (Tolin et al.,
2015). Therefore, we are also interested as to examine the efficacy of hoarding-specific
treatment on secondary outcomes. Study one therefore also aimed to examine the efficacy of
treatment for hoarding on overall functioning, depression and anxiety scores.

2.9.3 Research aim three: To examine potential moderating effects on the
efficacy of hoarding specific treatment, including of the duration of intervention
(weeks), intensity of intervention (hours), pre-treatment severity, mean age and number
of home visits. There has been much debate as to which feature of a treatment program plays
an important role in improving hoarding symptoms, with treatment programs varying in
duration, hours of treatment, age, and the provision of home visits. Our third aim was to
examine available literature to investigate whether any of these factors contribute to greater
treatment efficacy.

2.9.4 Research aim four: To investigate the efficacy of CBT group therapy at a
12-month follow-up period, including secondary outcomes and examining predictors for
treatment outcome. Although CBT for hoarding has shown to have strong efficacy, with
comparable findings for group, individual and peer-led bibliotherapy, there are limited
studies examining the long-term treatment outcome of hoarding disorder. Knowledge of the
long-term outcome seems important in a disorder where treatment and recovery is a time
consuming and lengthy process. In addition, research has suggested that treatment for
hoarding not only improves hoarding symptoms, but also quality of life, depression and
anxiety. Therefore, we are also interested as to whether these changes in functioning are
maintained after a long-term follow-up period. Finally, investigation of the long-term
treatment outcome may also enable an analysis of potential predictors of treatment outcome,
with some research suggesting that depression and anxiety may predict poor treatment
response. The aim of study three was to investigate the long-term outcome of a 12 week
hoarding specific group CBT for hoarding disorder, including secondary outcomes and
potential predictors of treatment outcome. The predictor variables that were examined include demographic variables, comorbid disorders, and initial hoarding severity.

2.9.6 Research aim five: To develop and evaluate the efficacy of a ‘blended’ format of treatment in continuing to improve hoarding symptoms using an online program post face-to-face CBT. As noted previously, while face-to-face treatment has proven effective for hoarding disorder, a majority of individuals do not achieve clinically significant change, and without ongoing support, there appears to be limited improvement in the disorder, which is consistent with its chronic nature. Developing a cost effective and accessible blended form of CBT (bCBT) program, that is suitable to the local health care system, may assist in maintaining motivation, reducing the likelihood of relapse, and subsequently improving longer-term outcome (Andersson & Titov, 2014). *The aim of this study was to develop and evaluate the efficacy of a ‘blended’ format of treatment in continuing to improve hoarding symptoms post face-to-face CBT, this program was denoted Hoarding Plus e-therapy (HoPE).*
CHAPTER THREE: TREATMENT OF HOARDING DISORDER: A SYSTEMATIC REVIEW AND META-ANALYSIS

Treatment in hoarding disorder: A systematic review and meta-analysis

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Abstract

Hoarding disorder is a condition that involves the excessive acquisition of, and difficulty in discarding possessions leading to significant distress or impairment in the individual, as well as their family and the wider community. Psychological and pharmacological interventions have been established in an attempt to treat hoarding symptoms, with varying degrees of success. The aim of this meta-analysis was to evaluate the efficacy of psychological and pharmacological interventions for hoarding disorder, building upon other reviews through the integration of newly published trials, and analyzing both repeated measures and randomized controlled trials. Eighteen articles were identified using SCOPUS, EBSCOHOST, EMBASE and MedLINE. Using both a between and within-subjects analysis, findings suggested an overall strong effect size (hedges’ g = 1.04) for overall hoarding severity, and comparable outcomes for group cognitive behavior therapy (g = .94), individual cognitive behavior therapy (g = 1.04), bibliotherapy (g = 1.02) and pharmacological trials (g = 1.40). Furthermore, overall functioning (g = .79) demonstrated moderate efficacy, whilst depression (g = .48) and anxiety (g = .38) showed small to moderate efficacy post-treatment. However, meta-regression findings suggested that only duration of treatment (weeks) was a significant predictor of treatment outcome. Overall, the findings support the efficacy of current treatment for hoarding disorder, although continued research into the impact of the duration of treatment and long-term effectiveness would prove beneficial.

Keywords: hoarding disorder, cognitive behavior therapy, pharmacotherapy, meta-analysis, systematic review, randomized controlled trials
Hoarding disorder (HD) is a pervasive and debilitating condition that is characterized by a pattern of behavior involving excessive acquisition and a difficulty in discarding possessions, regardless of their value (DSM-5; American Psychiatric Association [APA], 2003; Frost & Hartl, 1996). The subsequent accumulation of clutter prevents the use of living spaces and leads to significant psychological distress and impairment (Frost, Rosenfield, Steketee & Tolin, 2013). HD is suggested to be apparent in approximately 2.3-5% of the population, however, as it is generally kept hidden within the private dwelling, its true extent is difficult to gauge (Iervolino et al., 2009; Lopez-Sola et al., 2014; Samuels et al., 2008; Steketee & Frost, 2003). Hoarding is often conceptualized through the cognitive behavior model of compulsive hoarding, proposed by Frost and Hartl (1996), which attempts to explain the core features and processes of hoarding behavior (Frost & Hartl, 1996; Grisham & Barlow, 2005). The model suggests that a range of vulnerabilities, including cognitive deficits, pre-established beliefs, emotional attachment problems and impaired executive functioning, are key factors in approach or avoidance behavior in managing belongings (Frost & Steketee, 1998; Gordon, Salkovskis, & Oldfield, 2013). In the time leading up to and after the inclusion of Hoarding Disorder in the DSM for the first time in 2013, there has been a great increase in research into the etiology, assessment and treatment of the disorder.

Cognitive Behavioral Therapy (CBT) is one of the most prominent treatments for hoarding, in both an individual and group setting (Muroff, Bratois & Steketee, 2011). CBT for hoarding is based on Frost and Hartl’s (1996) cognitive behavioral model, and addresses what are seen as the three central aspects of hoarding - clutter, difficulty discarding, and acquisition (Muroff et al., 2011). The treatment protocol aims to target the central cognitive components of the model, through the use of skills training in planning, organizing and decision-making, and through addressing maladaptive beliefs.
and emotional responses through exposure tasks and through cognitive restructuring (Frost & Hartl, 1996; Frost & Steketee, 2007; Grisham & Barlow, 2005; Hartl et al., 2004). In addition, common CBT components such as psychoeducation, goal setting, and motivational interviewing are also employed. In an attempt to synthesize the research-to-date, Tolin, Frost, Steketee and Muroff (2015) conducted a meta-analysis to examine the effectiveness of CBT for HD based on articles published up until May, 2014. Using a within-subjects meta-analysis, they found that CBT demonstrated a strong effect for overall hoarding severity (Hedges g=.82), and in addition to the central component of hoarding, difficulty discarding (Hedges g = .89). In addition, they found that number of treatment sessions in the home and the percentage of females in studies was associated with a greater likelihood of success in treatment (Tolin et al., 2015). However, it was highlighted that only a small percentage of participants reached clinically significant change, suggesting that although there was significant decline in symptoms, improvements in therapeutic efficacy are still required.

Along with CBT, pharmacological interventions have been suggested to be beneficial in improving hoarding behavior. Research evidence for the neural basis of hoarding supports the idea that pharmacotherapy may hold some benefit. While studies are limited due to small samples sizes and questions of reliability, a recent review has suggested that ventromedial prefrontal/anterior cingulate cortices, medial temporal regions and the subcortical limbic structures may play a role in the drive to acquire and collect (Mataix-Cols, Pertusa, & Snowdon, 2011). To date, trials of paroxetine, SSRIs and other forms of serotonergic medication have shown some benefit in improving hoarding behavior, and in practice, these medications are often prescribed in addition to various therapies (Saxena, 2008; Tolin, 2011). In a recent meta-analysis, Brakoulias, Eslick and Starcevic (2015) examined the effectiveness of pharmacotherapy for hoarding
symptoms in papers published up until October 27 2014, finding that medication had a moderate effect size in improving hoarding behaviors from pre- to post-treatment (ER = .58).

Finally, the use of self-help books to aid or replace therapy, known as bibliotherapy, has been examined by a number of researchers, with studies utilizing a hoarding-specific self-help book “Buried in Treasures”, which was developed by Tolin, Frost and Steketee (2007; Frost, Maxner, & Pekareva-Kochergina, 2011). This form of intervention was developed in an attempt to provide support in an accessible format with minimal cost, and an accompanying group manual was also developed (Frost, Maxner, & Pekareva-Kochergina, 2011; Frost, Ruby, & Shuer, 2012). Bibliotherapy involves elements of CBT in a self or peer-help format, including psychoeducation about hoarding as well as techniques addressing motivation, issues in acquisition, cognitive restructuring and issues in discarding (Tolin et al., 2007). The chapters also outline in-vivo exposure to sorting and discarding, and how to conduct exposure to purchasing opportunities where the individual is discouraged from acquiring objects (“non-acquisition trips”). A combination of peer-facilitated group therapy based around the bibliotherapy resource has been suggested to be a beneficial format of therapy, with the meta-analysis by Tolin et al. (2015) not finding any significant difference between therapist-facilitated ($n = 9$) and non-therapist facilitated ($n = 3$) treatments in overall hoarding severity.

Despite existing meta-analyses demonstrating support for the effectiveness of treatments for HD (Brakoulías et al. 2015; Tolin et al. 2015), there are still unanswered questions regarding treatment efficacy. Due to the limited availability of randomized controlled trials (RCTs) and controlled trials (CTs), the meta-analysis conducted by Tolin et al. (2015) used a within-subjects design, which has the tendency to over inflate the effect size, as a result of a lack of control group and the potential effects of extraneous
variables (Morris & DeShon, 2002). Recent publications since July 2014, enabling the use of both a within and between subjects design may allow a more accurate interpretation of the research literature. Furthermore, Brakoulias’s (2015) meta-analysis into the efficacy of pharmacotherapy for hoarding was conducted with samples of participants with a diagnosis of both OCD and hoarding, who were assessed primarily with OCD-based measures. This has made it difficult to generalize the effects of medication for most individuals with hoarding disorder, given that decreases in the Yale Brown obsessive-compulsive scale (Y-BOCS) may not indicate decreases in hoarding related behavior per se (Saxena, 2007). Finally, when examining available studies, a comparison between treatment modalities (i.e., cognitive behavior therapy, bibliotherapy, pharmacotherapy) may enable greater insight into the effectiveness of treatment, and highlight the different features of treatment programs that may be beneficial.

Furthermore, the comparison of treatment modalities may give further insight into how treatment can be provided in a cost-effective and accessible format, contributing to our understanding of the treatment of hoarding disorder.

Therefore, the objective of this review and meta-analysis was to evaluate the efficacy of pharmacological, behavioral and cognitive-behavioral interventions for individuals with hoarding disorder. This study aimed to extend previous meta-analyses by examining the overall efficacy of available treatments with the integration of new studies (including comparing the efficacy of different treatment modalities), and when using a research protocol examining both within-subjects and between subjects effects. In addition, this study aimed to examine the impact of treatment for hoarding on secondary outcome measures, including overall functioning, depression and anxiety scores. Finally, there is limited research examining potential moderators on treatment efficacy, including the duration of intervention (weeks), intensity of intervention (hours), pre-treatment
severity, mean age and number of home visits. An understanding of the impact of these factors, particularly in an aggregate nature, could significantly inform structural components of treatment, and assist in refining and informing existing treatment programs.

Method

Protocol

The review was conducted based on the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement, and in accordance with recommendations for improving the quality of systematic reviews in other fields (Bryce, Sloan, Lee, Ponsford & Rossell, 2016). This review protocol was developed following the procedures outlined in the Cochrane Handbook for Systematic Reviews (Higgins & Green, 2011).

Inclusion criteria

Studies that were included required to:

a) be in English in a peer reviewed journal up to 24 Dec 2016;

b) describe data from randomized controlled trials, controlled trials or pilot trials, with latter trial types included due to the limited studies available;

c) utilize a clinical sample of individuals with hoarding disorder or (pre-DSM-5) compulsive hoarding, as defined by participants’ symptoms either meeting criteria of the Diagnostic Statistical Manual of Mental Disorders (APA, 2013), or participants being recruited from a clinical treatment setting with the relevant symptoms of interest in this review.

d) not describe data from studies on neurodegenerative disease, neurodegenerative impairment or genetic disorders;
e) describe outcome data utilizing valid and reliable measures for hoarding, specifically being the Savings Inventory Revised (SI-R), the UCLA Hoarding Severity Scale (UCLA HSS);

f) include pharmacological, cognitive behavioral, or bibliotherapy based treatment, regardless of whether the treatment was in an individual or group setting.

**Exclusion Criteria**

The exclusion criteria were studies that:

a) focused on neurodegenerative disease, neurodegenerative impairment or genetic disorders;

b) used the YBOCS as the primary hoarding measure, as it is unclear whether they had the ability to accurately measure changes in hoarding behavior.

c) Described data from case studies, case series, conference abstracts, and letters to the editor due to their weak methodology.

**Identification and Selection of Studies**

A systematic review was conducted using the databases SCOPUS, EBSCOHOST, EMBASE and MedLINE. The keyword search was conducted using the following combination of terms: (treatment OR outcome OR pilot OR therapy OR psychotherapy OR pharmaco* OR "reducing hoarding" OR intervention OR "support group" OR group OR "cognitive* behavio* therapy" "cognitive therapy" OR "behavio* therapy" ) AND (compuls* OR obsess* OR "hoarding disorder" OR "compulsive hoarding" OR hoarding OR "excessive acquisition" OR clutter). For a full search strategy see Appendix A. In addition, the grey literature was examined, and reference lists were hand-searched for additional articles that may be relevant. Articles were collated and managed using EndNote (Thomas Reuters, Version 7).
Studies were screened by firstly: a) the title of each article, then b) the abstract of relevant articles, and finally c) the full text of the relevant articles were accessed. Two review authors (M.F., M.N.) were involved in the study selection process, and they independently screened the title of each article, read the abstracts, and then retrieved the full text of the relevant papers. The process of study selection can be seen in Figure 1. Information about the following variables was extracted from each study: demographic features of participants, study design, assessment measures, intervention format (individual vs. group), treatment duration, attrition rate, clinical outcome measures and statistical analyses (see Table 1).

Figure 1. Study flow diagram for selection of studies
Risk of bias in individual studies

The quality of screened articles was assessed independently by the first two authors using the Clinical Trial Assessment Measure (CTAM; Tarrier & Wykes, 2004). This tool aims to not only assess the risk of bias, but also to evaluate the overall strength of the evidence according to design features common in psychological research (Tarrier & Wykes, 2004). Six quality components were addressed which included: sample bias and recruitment, allocation to each treatment condition, adequacy of measurement, the use of control groups, description of treatment and data analysis (Tarrier & Wykes, 2004). Each section was summed to provide an indication of each study’s overall quality rating. The measure has demonstrated adequate inter-rater reliability, internal consistency and concurrent validity (Tarrier & Wykes, 2004). The methodology is deemed to be adequate when CTAM scores are over 65 points (Wykes, Steel, Everitt, & Tarrier, 2008). The review authors were not blinded to the study authors or institutions throughout the review. Scores and acceptance or rejection decisions were compared, with any discrepancies referred to the third author.

Model selection

A random-effects rather than fixed-effects model was used in this analysis, as it assumes that the true effect size between studies may vary (Borenstein, 2009). In addition, it suggests that all effect sizes should be equally represented in the summary estimate, not focusing solely on weightings based on total $N$. The random effects model takes into account slight variability among the interventions; however, due to the direction of the data, it has the potential to overinflate the effect size (Borenstein, 2009). This model was adopted for this analysis due to individual differences in the therapeutic outcome and due to the wide age range of participants.
## Table 1. Summary of Treatment Characteristics for Included Studies

<table>
<thead>
<tr>
<th>Study and country of origin</th>
<th>N</th>
<th>Recruitment</th>
<th>Therapist involved?</th>
<th>Study design</th>
<th>Intervention format</th>
<th>% Female</th>
<th>Mean age</th>
<th>% Employed</th>
<th>Attrition</th>
<th>Total treatment hours</th>
<th>Mean number of sessions in the home</th>
<th>Outcome measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayers, Wetherell, Golshan, &amp; Saxena (2011); USA</td>
<td>12</td>
<td>Older adults recruited with flyers posted through San Diego</td>
<td>Yes</td>
<td>Repeated measures</td>
<td>Manualized Individual CBT</td>
<td>58</td>
<td>73.66</td>
<td>Not reported (NR)</td>
<td>0</td>
<td>26</td>
<td>6.5</td>
<td>SI-R, HRS, UCLA HSS, CIRS, CGI, SDI, BAI, BDI, MINI, MINI-NEU</td>
</tr>
<tr>
<td>Ayers et al. (2014); USA</td>
<td>11</td>
<td>Older adults recruited with flyers posted</td>
<td>Yes</td>
<td>Repeated measures</td>
<td>Individual CBT</td>
<td>81.8</td>
<td>66</td>
<td>NR</td>
<td>24</td>
<td>4.5</td>
<td>MCA; HRS; MINI; SI-R; UHSS; CIR; CGI; HAD</td>
<td></td>
</tr>
<tr>
<td>Frost, Pekareva-Kochergina, &amp; Maxner (2011); USA; Study 1</td>
<td>17</td>
<td>Participants were recruited through radio and newspaper ads or referred by local health and housing agencies</td>
<td>No, peer facilitated</td>
<td>Repeated measures</td>
<td>Bibliotherapy with manualized support group</td>
<td>88.24</td>
<td>53.7</td>
<td>NR</td>
<td>26</td>
<td>0</td>
<td>SI-R, CIRS, ADL-H, CGI-S, SCI, DASS, ADHDSS</td>
<td></td>
</tr>
<tr>
<td>Frost et al. (2011); USA; Study 2</td>
<td>11</td>
<td>Participants were recruited through radio and newspaper ads or referred by local health and housing agencies</td>
<td>No, peer facilitated</td>
<td>Repeated measures</td>
<td>Bibliotherapy with manualized support group</td>
<td>81.8</td>
<td>61.3</td>
<td>NR</td>
<td>26</td>
<td>26</td>
<td>SI-R, CIRS, ADL-H, CGI-S, SCI, DASS, ADHDSS</td>
<td></td>
</tr>
<tr>
<td>Frost, Ruby, &amp; Shuer (2012); USA</td>
<td>38</td>
<td>Recruited through radio/newspaper advertisements</td>
<td>No, peer facilitated</td>
<td>RCT</td>
<td>Bibliotherapy with manualized support group</td>
<td>94.4</td>
<td>56.4</td>
<td>44%</td>
<td>17</td>
<td>26</td>
<td>0</td>
<td>SIR, HRSI, CIRS, ADL-H, SCI</td>
</tr>
<tr>
<td>Gilliam, Norberg, Villaviencio, Morrison, Hannan, &amp; Tolin (2011); USA</td>
<td>35</td>
<td>Individuals recruited from outpatient clinic</td>
<td>Yes</td>
<td>Repeated measures</td>
<td>Manualized Group CBT</td>
<td>85.7</td>
<td>55.06</td>
<td>56%</td>
<td>128</td>
<td>26</td>
<td>0</td>
<td>SI-R, ADIS, MINI plus, CGI, SDS, ADL, DASS, CSQ</td>
</tr>
<tr>
<td>Kellett, Matuozzo, &amp; Kotecha (2015); United Kingdom</td>
<td>14</td>
<td>Participants with mild intellectual disability recruited from the social services case register in Birmingham</td>
<td>Yes</td>
<td>Repeated measures</td>
<td>Manualized Individual CBT</td>
<td>35.8</td>
<td>41.78</td>
<td>0</td>
<td>24</td>
<td>NR</td>
<td>CIRS; SI-R, GDS-LD, GAS-ID</td>
<td></td>
</tr>
<tr>
<td>Matthews, Uhm, Chan, Gause, Franklin, Plumadore, Stark, Yu, Vigil, Salazar, Delucchi, &amp; Vega (2016); USA</td>
<td>Recruited by emailing former members of weekly drop-in support groups for hoarding and word of mouth. Participants were given choice between self help group or G-CBT</td>
<td>Yes</td>
<td>Controlled trial</td>
<td>Manualized Group CBT</td>
<td>43.8 (g-CBT), 70 (G-BiT)</td>
<td>n/a</td>
<td>37.9 (CBT), 5% (BiT)</td>
<td>G-CBT = 32 hours, G-BiT = 30 hours</td>
<td>≈1.5</td>
<td>G-BiT = 0</td>
<td>SI-R; SCI, ADL-H, only HSS for BiT group</td>
<td></td>
</tr>
<tr>
<td>Moulding, Nedeljkovic, Kyrios, Osborne, &amp; Mogan (2015); Australia</td>
<td>41</td>
<td>Recruited by referral from primary care physicians, from mental health professionals and self referral.</td>
<td>Yes</td>
<td>Repeated measures</td>
<td>Manualized Group CBT</td>
<td>85</td>
<td>53.5</td>
<td>47</td>
<td>18</td>
<td>NR</td>
<td>MINI, SHI, CIRS, SI-R, SCI, DAS-21, MACCS, OBQ, Q-les-Q</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Percentage of Female: The percentage of female participants in each study.
- Mean age: The mean age of participants.
- % Employed: The percentage of participants who were employed.
- Attrition: The percentage of participants who dropped out.
- Total treatment hours: The total number of treatment hours.
- Mean number of sessions in the home: The mean number of sessions conducted in the home.
- Outcome measures: The measures used to evaluate the outcomes of the intervention.
<table>
<thead>
<tr>
<th>Study Authors</th>
<th>Year</th>
<th>Country</th>
<th>Recruitment Method</th>
<th>Study Design</th>
<th>Intervention Description</th>
<th>Key Measures</th>
<th>Results</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muroff, Steketee, Bratiotis, &amp; Ross (2012); USA</td>
<td>2012</td>
<td>USA</td>
<td>Recruited from mental health outpatient clinics, OCD support groups or self-referrals</td>
<td>RCT</td>
<td>Manualized Group CBT</td>
<td>SI-R, ADIS, HRS-SR, SCID, CGIS, BDI</td>
<td>63.2</td>
<td>Yes</td>
</tr>
<tr>
<td>Muroff, Steketee, Frost, &amp; Tolin (2013); USA</td>
<td>2013</td>
<td>USA</td>
<td>Recruitment from the Boston and Hartford metropolitan areas</td>
<td>Follow-up</td>
<td>Individual CBT</td>
<td>SI-R, CGI, HRS, BDI, OCI-R, SIAS, OBQ, ADDHS</td>
<td>61.3</td>
<td>NR</td>
</tr>
<tr>
<td>Muroff et al. (2009); USA</td>
<td>2009</td>
<td>USA</td>
<td>Recruitment from mental health outpatient clinics, OCD support groups or self-referrals from another hoarding-related study</td>
<td>Repeated measures</td>
<td>Manualized Group CBT</td>
<td>SI-R, SCI, CIR, CGS, BDI</td>
<td>32.2</td>
<td>≈35 hours (including home sessions) 2 X 90 minute home sessions</td>
</tr>
<tr>
<td>Muroff, Steketee, Himle, &amp; Frost (2010); USA</td>
<td>2010</td>
<td>USA</td>
<td>Recruited current users of an online self-help support group for hoarding</td>
<td>Quasi-experimental</td>
<td>Online self help</td>
<td>SI-R, CIR, CGIS, DASS Short health survey</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Saxena, Brody, Maidment, &amp; Baxter Jr (2007); USA</td>
<td>2007</td>
<td>USA</td>
<td>Participants with OCD and hoarding; Recruited using newspaper advertisements and flyers</td>
<td>Controlled trial</td>
<td>Pharmacotherapy (Paroxetine)</td>
<td>YBOCS, CI, schedule for affective disorders and schizophrenia, HDRS, HAM-A, GAS-A, CGI, UCLA HSS</td>
<td>NR</td>
<td>18 12 n/a</td>
</tr>
<tr>
<td>Steketee, Frost, Tolin, Rasmussen, &amp; Brown (2010); USA</td>
<td>2010</td>
<td>USA</td>
<td>Recruited from anxiety clinics, community service providers and local and national media presentations.</td>
<td>RCT</td>
<td>Manualized Individual CBT</td>
<td>SI-R, ADIS, HRS-SR, HRS, CGIS, BDI</td>
<td>66</td>
<td>44.8 8 participants received 1-2 sorting sessions at home (3-6hr duration)</td>
</tr>
<tr>
<td>Tolin, Frost, &amp; Steketee (2007); USA</td>
<td>2007</td>
<td>USA</td>
<td>Recruited from a specialty CBT clinic.</td>
<td>Repeated measures</td>
<td>Manualized Individual CBT</td>
<td>SI-R, ADIS, CIR, CGI</td>
<td>6.5</td>
<td>≈26 29 29 26</td>
</tr>
<tr>
<td>Tolin, Stevens, Nave, Villavicencio, &amp; Morrison (2012); USA</td>
<td>2012</td>
<td>USA</td>
<td>Recruited by newspaper advertisements. 6 hoarders, 6 healthy controls</td>
<td>Repeated measures</td>
<td>Manualized Group CBT</td>
<td>SI-R; HRSI, ADIS, CGI</td>
<td>NR</td>
<td>n/a</td>
</tr>
<tr>
<td>Saxena &amp; Sumner (2014); USA</td>
<td>2014</td>
<td>USA</td>
<td>Recruited from the San Diego area with flyers, print, internet advertisements, and local clinicians.</td>
<td>Repeated measures</td>
<td>Pharmacotherapy (Venlafaxine)</td>
<td>SI-R, UHSS, HDRS, HAM-A, YBOCS, ADIS, CGI</td>
<td>51.8</td>
<td>4 12 0</td>
</tr>
</tbody>
</table>

Note: SI-R = Savings Inventory Revised; HRS = Hoarding Rating Scale; UHSS = peer facilitated: Facilitated by "peer" with training in hoarding treatment.
Data synthesis

Effect sizes were recalculated using pre- and post-intervention scores and standard deviations into Hedges’ $g$, a variation of Cohen’s $d$ that accounts for potential bias due to a small sample size (Morris & DeShon, 2002). To accurately investigate the effects of all study designs, all studies were included in the repeated measures meta-analysis, using pre-post measurement. The repeated measures meta-analysis requires the calculation of pre-post correlations. While this is not always reported, multiple techniques to obtain pre-post correlation scores are described in the literature. Following the recommendations of Rosenthal (1979), a conservative pre-post correlation of .7 was used, due to limited access to raw data of each study. Where a study included more than one treatment arm, the additional treatment arms were presented as an independent study, given that the samples were independent (Muroff, Steketee, Bratiotis, & Ross., 2012). One study was analyzed as two independent studies due to containing two independent studies (Frost et al., 2011). An additional between-subjects meta-analysis was also conducted using only RCTs or controlled trials examining psychological interventions. RCTs and CTs were analyzed using post-data only. If a study contained more than one treatment condition in the between groups analysis, the most relevant condition was chosen for the analysis. Publication bias was assessed using Rosenthal’s (1979) fail-safe N method and Orwin’s fail-safe N method (Borenstein, 2011).

Meta-regression

Meta-regression analyses were used to investigate potential heterogeneity between-studies that may be explained by: the type of intervention, duration of intervention (weeks), intensity of intervention (hours), pre-treatment severity, mean age and number of home visits. These variables were chosen on the basis of previous
research suggesting potential influence of these various factors on treatment outcome (Ayers et al., 2014)

**Heterogeneity**

The measure of heterogeneity indicates the extent of variation of the true effect size between studies, reflecting methodological or clinical differences (Borenstein et al., 2003). $I^2$ is used to measure the amount of variance on a relative scale, and enables one to compare heterogeneity to benchmarks provided by Higgins and Green (2003): scores between 0-40% suggest heterogeneity might be unimportant, 30%-60% that there may be evidence of heterogeneity, and scores between 50%-90% indicates substantial heterogeneity. Subgroup and moderator analyses were undertaken due to methodological and clinical differences among studies.

**Results**

**Included studies**

The process of study selection can be seen in Figure 1. Of 1498 papers, 578 papers were discarded due to duplication and 920 records were therefore initially screened. After screening, 181 abstracts were examined and 40 full texts were retrieved to assess for eligibility. Further, 20 studies were excluded due to their using the Y-BOCS to measure hoarding symptoms. As noted earlier, studies solely using the Y-BOCS to measure hoarding symptoms were not included due to their inability to determine the accuracy of this measurement for hoarding, and as they generally used participants who firstly met the criteria for OCD, which may not be representative of the hoarding population. Furthermore, four studies were discarded due to their case study format and one study was excluded, as it was not in English. Eighteen studies were included in the systematic review, with 2 of these not suitable for inclusion in the meta-analysis due to examination of an alternative population (e.g., intellectual disabilities; Kellett et al.,
2015), or to the nature of the data (e.g. inconsistent measurement of data points; Muroff et al., 2010). A summary of all 18 studies can be seen in Table 1. The primary outcome measures were overall hoarding severity, acquisition, clutter and difficulty discarding, with secondary outcome measures of overall functioning, depression and anxiety.

The 18 studies in this systematic review included a total of 498 participants. Sample sizes ranged from six to 46 participants, with the exception of the online hoarding treatment program who had participation from 89 individuals. Percentage of attrition in each study can be seen in Table 1. Studies used a variety of recruitment methods, including newspaper advertisements, flyers and referrals from mental health professionals or from outpatient clinics. Sixteen of the 18 included studies took place in the United States, one in Australia, and one in the United Kingdom. The included studies examined the effectiveness of hoarding-specific CBT administered in an individual format (Ayers et al., 2011; Ayers et al., 2014; Tolin et al., 2007), hoarding specific CBT administered in a group format (Gilliam et al., 2011; Matthews et al., 2016; Moulding et al., 2015; Muroff et al., 2009; Muroff et al., 2012; Steketee et al., 2010; Tolin et al., 2012), hoarding specific bibliotherapy (Frost et al., 2011; Frost et al., 2012; Matthews et al., 2016; Muroff et al., 2012), and pharmacological therapy (Saxena et al., 2007; Saxena et al., 2014). As previously mentioned, one paper included two independent studies, so these two studies were included as independent studies (Frost, Pekareva-Kochergina, & Maxner, 2011a; 2011b). In addition, one study had more than one treatment condition, and therefore was treated as two independent studies (Muroff, Steketee, Bratiotis, & Ross, 2012a; 2012b). It is important to note that the bibliotherapy-based study conducted by Muroff et al. (2012) has methodological differences when compared to the other bibliotherapy studies included (e.g. studies conducted by Frost et al., 2011; Frost et al., 2012; Matthews et
al., 2016 provided additional support via support groups) however, the sensitivity analysis or heterogeneity scores did not significantly influence overall effect sizes when comparing therapeutic modalities. Thus, the paper was included in the analysis.

Overall, 17 studies were included in the within-subjects meta-analysis. Of the studies included in the meta-analysis, 12 of the 17 studies had a repeated measures design, using the baseline results as a control. Three studies were randomized controlled trials, and two studies were controlled trials. Four studies were included in the between-subjects meta-analysis (Frost et al., 2012; Matthews et al., 2016; Muroff et al., 2012; Steketee et al., 2010). One controlled trial (Saxena et al., 2007) was excluded from the between-subjects analysis due to highly uneven sample sizes, (n=19 in the treatment group vs. n=6 in control group).

Risk of Bias within Studies

The CTAM score for each study is reported in Table one. There appeared to be a significant variability in the risk of bias between studies, with 13 out of 14 studies suggested to have a considerable risk of bias according to the CTAM threshold levels (Wykes et al., 2008). However, these findings are expected, particularly given that studies have tended to be uncontrolled. However, a meta-regression did not find that the risk of bias, indicated by the CTAM, was associated with treatment effects of hoarding symptoms ($B = 0.005$, SE = 0.0054, 95% CI = -0.005, 0.361, $p = 0.36$).

Risk of bias across studies

Publication bias was considered using two methods, Rosenthal’s (1979) fail-safe N method and Orwin’s fail-safe N method. Calculations for Rosenthal’s fail-safe N suggested that 1823 studies with non-significant findings would be necessary to reduce the z value and thus nullify the overall synthesized treatment effect. In addition, Orwin’s fail-safe N calculation indicated that 322 studies with an average
Hedges’ g score of 0 would be needed to suggest that the primary outcome measure would be ‘trivial’ with an effect size of 0.05 (Orwin, 1983). Based on these calculations of publication bias, there were no difficulties with publication bias.

**Synthesis of results**

**Within subjects analysis.** Data from 17 studies was analyzed using random effects models to estimate the effects of CBT, pharmacotherapy and bibliotherapy treatment interventions on hoarding severity, and on the secondary outcomes of overall functioning, depression and anxiety. A summary of the results is presented in Table 2. Regardless of treatment format, the overall hoarding severity significantly decreased from baseline scores ($g=1.04$, 95%CI [.88, 1.20], $p<.001$; see Figure 3). Fifteen studies reported the effects of treatment specifically on clutter, and found overall strong effects from baseline to post intervention ($g=.71$, 95%CI [.54, .89], $p<.001$; see Figure 4). Aggregate scores on difficulty discarding showed strong effect sizes pre-post intervention for the 10 studies reporting it ($g=.96$, 95%CI [.81, 1.10], $p<.001$; see Figure 5). In addition, 10 studies reported an overall strong effect size on acquisition from pre-post intervention ($g=.71$, 95%CI [.60, .81], $p<.001$). Aggregate secondary outcomes were also examined, including overall functioning, depression and anxiety. Overall functioning showed a moderate effect size pre-post intervention ($g=.79$, 95%CI [.62 -.96], $p=.001$), whereas changes in depression ($g=.48$, 95%CI, [.34 -.63], $p<.001$) and anxiety ($g=.38$, 95%CI, [.17 -.60], $p<.001$) demonstrated small-to-moderate effect sizes (see Figures 6, 7, 8).

Due to the differing modalities of the treatment interventions, the studies were additionally investigated in a subgroup analysis according to intervention format (see Table 3). Findings suggest that individual CBT, group CBT, peer-facilitated bibliotherapy and pharmacotherapy all demonstrated strong effect sizes. There were no
significant differences between type of intervention and effect size estimates, demonstrated in the overlap of the confidence intervals evident in Figure 2. However, this could also be an indication of a lack of power, particularly for pharmacotherapy studies.

**Within subjects moderator analysis.** The results of the meta-regression can be seen in Table 4. The analysis suggests that there was a significant association between effect sizes and duration of treatment, accounting for 41% of the variance \( (B = 0.030, \text{SE} = 0.014, 95\% \text{ CI} = 0.003, 0.058, p = 0.03, R^2 .41) \). This suggests that the greater the duration of treatment, the higher the effect size. The meta-regression revealed no association between the type of intervention and intensity of intervention (hours), mean age or number of home visits and effect size.

**Between subjects analysis.** Data from four randomized controlled trials or controlled trials were analyzed in a random effects model to estimate the effects of CBT on overall hoarding severity, hoarding subgroups and secondary measures (Frost et al., 2012; Matthews et al., 2016; Muroff et al., 2012; Steketee et al., 2010). Results suggest that, when compared to a control group, overall hoarding severity had a moderate effect size change \( (g=.68, 95\% \text{CI} [.43, .88], p<.001) \). Difficulty discarding also appeared to have a moderate effect size change when compared to the control group, however, due to a high level of variance this finding was not significant. When compared to the control group, clutter, changes in acquisition and overall depression demonstrated a small effect (see Table 2). Finally, treatment for hoarding appeared to have a strong effect on overall functioning, when compared to control \( (g=1.22, 95\% \text{CI} , .36-.2.09, p<.01) \). Due to low power, a subgroup analysis or meta-regression could not be performed.
# Table 2.

### Pooled Pre-post Treatment Effects of Interventions for Hoarding Disorder

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Sample size</th>
<th>Heterogeneity</th>
<th>Global effect sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Within-group (pre-post analysis)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total hoarding severity(^a)</td>
<td>17</td>
<td>368</td>
<td>40.1</td>
</tr>
<tr>
<td>Clutter(^b)</td>
<td>15</td>
<td>334</td>
<td>48.1</td>
</tr>
<tr>
<td>Difficulty Discarding(^c)</td>
<td>10</td>
<td>245</td>
<td>13.3</td>
</tr>
<tr>
<td>Acquisition(^d)</td>
<td>10</td>
<td>236</td>
<td>9.16</td>
</tr>
<tr>
<td>SI-R Total</td>
<td>15</td>
<td>328</td>
<td>35.6</td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall functioning(^e)</td>
<td>14</td>
<td>274</td>
<td>31.8</td>
</tr>
<tr>
<td>Depression(^f)</td>
<td>12</td>
<td>286</td>
<td>25.4</td>
</tr>
<tr>
<td>Anxiety(^g)</td>
<td>8</td>
<td>205</td>
<td>26.1</td>
</tr>
<tr>
<td><strong>Between group (RCTs/CTs)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total hoarding severity(^a)</td>
<td>4</td>
<td>83/7</td>
<td>3.26</td>
</tr>
<tr>
<td>Clutter(^b)</td>
<td>4</td>
<td>83/7</td>
<td>.99</td>
</tr>
<tr>
<td>Difficulty Discarding(^c)</td>
<td>3</td>
<td>72/6</td>
<td>5.48</td>
</tr>
<tr>
<td>Acquisition(^d)</td>
<td>3</td>
<td>72/6</td>
<td>.09</td>
</tr>
<tr>
<td>SI-R Total</td>
<td>3</td>
<td>52/5</td>
<td>1.63</td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall functioning(^e)</td>
<td>3</td>
<td>52/5</td>
<td>8.65</td>
</tr>
<tr>
<td>Depression(^f)</td>
<td>2</td>
<td>25/3</td>
<td>.86</td>
</tr>
</tbody>
</table>

\(^a\) Total HD Severity – HRS, HSS total, Savings Inventory – Revised, UHSS; \(^b\) Clutter – Savings Inventory - Revised Clutter subscale, Hoarding Severity Scale – Clutter subscale; \(^c\) Difficulty Discarding – Savings Inventory - Revised Difficulty Discarding subscale, Hoarding Severity Scale - Difficulty discarding subscale; \(^d\) Acquisition – Savings Inventory - Revised Acquisition subscale, Hoarding Severity Scale – Acquisition subscale; \(^e\) Overall functioning – Sheehan Disability Scale, CGI, Activity and Daily Living Scale, GAS; \(^f\) Depression – Beck Depression Inventory, Depression, Anxiety and Stress Scale – Depression subscale; HDRS; HDSR-28; \(^g\) Anxiety – Beck Anxiety Inventory, Depression, Anxiety and Stress Scale – Anxiety subscale, HAM-A, GAS-A.

**Follow-up analysis.** Data from 4 studies was analyzed in random effects models to estimate the effects of CBT and bibliotherapy treatment interventions on hoarding severity at follow-up. A summary of all results is presented in Table 5. Overall hoarding severity significantly decreased from baseline scores to follow-up (g = .99, 95%CI [.77 –
Table 3.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Sample size</th>
<th>Heterogeneity</th>
<th>Global effect sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>K</td>
<td>N</td>
<td>Q</td>
</tr>
<tr>
<td><strong>Individual CBT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total hoarding severitya</td>
<td>3</td>
<td>58</td>
<td>3.72</td>
</tr>
<tr>
<td>Clutterb</td>
<td>3</td>
<td>57</td>
<td>11.84</td>
</tr>
<tr>
<td>Difficulty Discardingc</td>
<td>2</td>
<td>43</td>
<td>.64</td>
</tr>
<tr>
<td>Acquisitiond</td>
<td>2</td>
<td>43</td>
<td>21.21</td>
</tr>
<tr>
<td>SI-R Total</td>
<td>3</td>
<td>57</td>
<td>3.54</td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
<td></td>
<td></td>
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<tr>
<td>Overall functioningg</td>
<td>3</td>
<td>53</td>
<td>13.35</td>
</tr>
<tr>
<td>Depressionf</td>
<td>2</td>
<td>43</td>
<td>2.94</td>
</tr>
<tr>
<td><strong>Group CBT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total hoarding severitya</td>
<td>8</td>
<td>202</td>
<td>21.05</td>
</tr>
<tr>
<td>Clutterb</td>
<td>8</td>
<td>211</td>
<td>30.27</td>
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<tr>
<td>Difficulty Discardingc</td>
<td>6</td>
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<td>9.11</td>
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<tr>
<td>Acquisitiond</td>
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<td>145</td>
<td>5.06</td>
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<tr>
<td>SI-R Total</td>
<td>8</td>
<td>202</td>
<td>21.73</td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Overall functioningg</td>
<td>3</td>
<td>52</td>
<td>8.65</td>
</tr>
<tr>
<td>Depressionf</td>
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<td>12.78</td>
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<tr>
<td>Anxietyg</td>
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<td>108</td>
<td>14.50</td>
</tr>
<tr>
<td><strong>Group facilitated bibliotherapy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total hoarding severitya</td>
<td>4</td>
<td>66</td>
<td>3.32</td>
</tr>
<tr>
<td>Clutterb</td>
<td>4</td>
<td>83</td>
<td>.74</td>
</tr>
<tr>
<td>Difficulty Discardingc</td>
<td>3</td>
<td>72</td>
<td>5.50</td>
</tr>
<tr>
<td>Acquisitiond</td>
<td>3</td>
<td>72</td>
<td>.09</td>
</tr>
<tr>
<td>SI-R Total</td>
<td>3</td>
<td>46</td>
<td>1.08</td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall functioningg</td>
<td>3</td>
<td>52</td>
<td>8.65</td>
</tr>
<tr>
<td>Depressionf</td>
<td>2</td>
<td>28</td>
<td>1.27</td>
</tr>
<tr>
<td>Anxietyg</td>
<td>2</td>
<td>46</td>
<td>2.21</td>
</tr>
<tr>
<td><strong>Pharmacotherapy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total hoarding severitya</td>
<td>2</td>
<td>42</td>
<td>2.96</td>
</tr>
<tr>
<td><strong>Secondary outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall functioningg</td>
<td>2</td>
<td>55</td>
<td>9.79</td>
</tr>
<tr>
<td>Depressionf</td>
<td>2</td>
<td>55</td>
<td>1.62</td>
</tr>
<tr>
<td>Anxietyg</td>
<td>2</td>
<td>55</td>
<td>3.53</td>
</tr>
</tbody>
</table>

aTotal HD Severity – HRS, HSS total, Savings Inventory – Revised, UHSS; bClutter – Savings Inventory - Revised Clutter subscale, Hoarding Severity Scale – Clutter subscale; cDifficulty Discarding – Savings Inventory - Revised Difficulty Discarding subscale, Hoarding Severity Scale – Difficulty discarding subscale; dAcquisition – Savings Inventory - Revised Acquisition subscale, Hoarding Severity Scale – Acquisition subscale; eOverall functioning – Sheehan Disability Scale, CGI, Activity and Daily Living Scale, GAS; fDepression – Beck Depression Inventory, Depression, Anxiety and Stress Scale – Depression subscale; HDRS, HDSR-28 gAnxiety – Beck Anxiety Inventory, Depression, Anxiety and Stress Scale – Anxiety subscale, HAM-A, GAS-A.

1.19], p<.001), and it did not significantly change from post-treatment to follow-up (g =.06, 95%CI [-11 - .47], p =.47). These results should be interpreted with caution, given the varying time points used for follow-up, with reassessment periods ranging from one month to 12 months.
Figure 2. Forest plots of within group analyses with comparison between treatment modality

**Heterogeneity.** In the within subjects analysis, heterogeneity was detected in measures of overall hoarding severity, with the $I^2$ statistic for overall severity falling within the 50% to 90% threshold, suggesting that heterogeneity may be a problem ($I^2 = 67.36$). Further investigation suggests that this indication of potential heterogeneity may be a reflection of aggregate data from varying formats of therapy. Heterogeneity scores for bibliotherapy and individual CBT individually fall within the moderate range, however, variability for group-based CBT appears to be higher. Further investigation of heterogeneity by assessing outliers found that scores of heterogeneity were affected by study conducted by Tolin et al. (2012), however, this appeared to be due to the non-significant findings, and was thus not removed with a risk of affecting publication bias. Therefore, the high levels of heterogeneity should be considered when interpreting the data. In the between subjects analysis, no issues with heterogeneity were detected.

**Sensitivity Analysis.** A sensitivity analysis was undertaken to test the robust nature of the data. Each study was removed from the analysis, to examine whether the
Table 4.

Results of univariate meta-regressions for the 17 studies of cognitive behavior therapy for hoarding

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>95% CI</th>
<th>p</th>
<th>I squared</th>
<th>Adjusted R squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>.030</td>
<td>.014</td>
<td>.003, .058</td>
<td>.031</td>
<td>41.51</td>
<td>0.41</td>
</tr>
<tr>
<td>Intensity of intervention (hours)</td>
<td>.010</td>
<td>.011</td>
<td>-.012, .032</td>
<td>.384</td>
<td>56.73</td>
<td>0</td>
</tr>
<tr>
<td>Mean age</td>
<td>-.001</td>
<td>.015</td>
<td>-.035, .025</td>
<td>.761</td>
<td>62.69</td>
<td>0</td>
</tr>
<tr>
<td>Number of home visits</td>
<td>.036</td>
<td>.038</td>
<td>-.039, .110</td>
<td>.347</td>
<td>57.10</td>
<td>0</td>
</tr>
</tbody>
</table>

*p<.05

Inclusion of specific studies could significantly affect the outcome. Results indicated that the removal of any study did not affect the outcome of the meta-analysis.

Papers not included in the meta-analysis. Due to methodological reasons, two studies were included in the systematic review, but not in the meta-analysis (Kellett et al., 2016; Muroff, Steketee, Himle & Frost., 2010). These studies examined the efficacy of CBT in individuals with an intellectual disability and the efficacy of internet based cognitive behavior therapy (iCBT) for hoarding. Kellett et al. (2016) examined the effect of CBT for hoarding with individuals diagnosed with both hoarding disorder and intellectual difficulties. The program was adapted according the CBT for intellectual dissability guidelines, adjusting the amount and complexity of diary keeping, increasing the session duration of each individual session, reducing the amount of written psychoeducation, and simplifying the hoarding formulation (Kellet et al., 2016). Results

Figure 3. Forest plot of RCT and controlled trials for overall hoarding severity.
Table 5.

Long term outcome of overall hoarding severity for 4 studies

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Sample size</th>
<th>Heterogeneity</th>
<th>Global effect sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>K</td>
<td>N</td>
<td>Q</td>
</tr>
<tr>
<td><strong>Within-group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(pre-follow-up analysis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIR-Total</td>
<td>4</td>
<td>71</td>
<td>1.47</td>
</tr>
<tr>
<td>Clutterb</td>
<td>3</td>
<td>57</td>
<td>1.27</td>
</tr>
<tr>
<td>Difficulty Discardingc</td>
<td>3</td>
<td>57</td>
<td>2.87</td>
</tr>
<tr>
<td>Acquisitiond</td>
<td>3</td>
<td>57</td>
<td>.37</td>
</tr>
</tbody>
</table>

demonstrated a significant reduction in hoarding severity, indicated in both self report and environmental measures.

Not only have studies examined varied populations, but also varied mediums of delivering therapy, such as online. Muroff et al. (2010) examined the effects of web-based self-help group integrating support and CBT techniques (N=106) compared with a waitlist control (N=155). The survey at 3 months found significant decrease in scores on SI-R compared to a waitlist control, supporting the potential for iCBT to provide support, particularly in a stepped care model. Theses findings suggest that, not only can treatment be delivered in multiple mediums, but it can also be tailored to distinct populations. This online format for the treatment of hoarding is still in its earlier stages, however, there has been increased support for the efficacy of online interventions, which has proven effective in a range of other mental illnesses (Andersson et al., 2005; Bergstrom et al., 2010; Carlbring, Westling, Ljungstrand, Ekselius, & Andersson., 2001; Cuijpers, Donker, van Straten, & Li, 2010).

**Discussion**

The purpose of this systematic review and meta-analysis was to assess the research to date on the effectiveness of interventions for HD. The within-subjects meta-analysis, with a sample of 17 published studies, suggested that cognitive behavioral and
pharmacological interventions for hoarding had large effects on overall hoarding severity, clutter, difficulty discarding and acquisition. In addition, there was a strong effect for overall functioning (QoL, SDS, ADL) and a small to moderate effect on depressive and anxiety symptoms. The findings are consistent with the previous meta-analysis conducted by Tolin et al. (2015) who found strong effect sizes in a within-subjects meta-analysis design. The between subjects meta-analyses conducted for the four controlled trials showed a large effect size for overall functioning, moderate effect size on overall hoarding severity and difficulty discarding, and small to moderate effect sizes for clutter, acquisition and depression. Overall, these findings suggest that treatments are effective for hoarding disorder. However, the discrepancy between within-subjects meta-analysis (no comparison group) and between subjects meta-analysis highlight the need for continued evaluation of treatment for hoarding using randomized controlled trial. It is important to ensure that the treatment effects evident in the trials are due to the intervention, rather than being due to other extraneous variables or demand effects.

Multiple meta-analyses were conducted to investigate potential variation between interventions in reducing hoarding symptoms. There was no significant difference between intervention modality (CBT individual, CBT group, bibliotherapy, and pharmacotherapy) suggesting that all forms of treatment result in a reduction of overall hoarding severity. Although, it does appear that there are differences between modalities for the effect sizes of changes in overall hoarding severity and clutter, the lack of significant differences may be an indication of low power in the subgroups, and the corresponding large confidence intervals. Of interest, the pharmacotherapy interventions demonstrated a strong effect, which is inconsistent with findings from Brakoulias et al. (2016), who found a smaller effect size in their investigation of the efficacy of
pharmacological interventions for hoarding disorder. The differences in magnitude may be due to the fact that Brakoulias et al. included studies (n=7) that were all using the YBOCS as their primary measure of hoarding reduction, which may not have accurately captured the nature of hoarding symptoms before and after treatment. These findings should be interpreted with caution, due to the small sample size investigating pharmacological interventions in this review, and due to the moderate heterogeneity between these studies. The beneficial role of medication does appear to be consistent with findings from Tolin et al. (2015) who found that medication use moderated scores on difficulty discarding.

The comparable results of the interventions are interesting, particularly as individual CBT for hoarding has been said to be the ‘gold standard’ treatment (Ayers et al., 2014; Steketee & Frost, 2007). The comparable nature of group-based support vs. individual is consistent with previous research in OCD-based studies, who have found no differences (Gava et al., 2007; Rosa-Alcazar et al., 2008). It has been suggested that this may be due to the influential nature of cohesion, mutual aid, socializing and inclusion in group-based CBT for hoarding (Schmalisch, Sorrentino, Bratiotis, & Muroff, 2013). As a disorder that is characterized by social isolation and stigmatization, it may be significantly improved through this peer and/or consumer interaction.

The comparable treatment effects of peer-facilitated bibliotherapy and clinician-administered CBT highlights the potential for the provision of efficacious treatment via peer-support modalities that may be more accessible and cost effective than therapist-delivered treatment. The comparable results of peer-facilitated bibliotherapy to other therapist assisted and pharmacological interventions may give support to other modalities of treatment that do not require therapist contact, such as iCBT (Andrews, Newby, & Williams, 2014; Wootten, 2016). However, it is important to note that the peer-facilitated
bibliotherapy was run by individuals with significant experience with hoarding disorder, and who were supervised by trained psychologists including the leading expert Randy Frost. As such, the peer-groups may not be representative of the efficacy of such studies when they are “rolled out” in more general community settings, and future work is needed to investigate this.

Investigations of various predictors of treatment outcome within psychological therapy found that the duration of treatment was significantly associated with treatment success, such that longer duration (weeks) appears to predict a greater effect size in studies (for example, 12 sessions twice weekly, for 6 weeks, compared to 12 sessions conducted weekly, enabling participants more time between sessions). Furthermore, hours of treatment did not hold a significant relationship with a stronger effect size, which may suggest that weeks of treatment engagement, rather than hours engaged in therapy, is of more clinical utility. This is consistent with clinical observations that individuals benefit from “checking in” on their progress in order that their work at home continues. No other moderators demonstrated a significant relationship with treatment outcome.

Finally, novel treatment outcome studies, demonstrated by Muroff et al. (2010) and Kellett et al. (2015) provide support for CBT for hoarding using diverse and alternative mediums. These findings may provide a platform for additional research into tailoring treatment specific for populations such as the elderly population, or perhaps individuals with a high level of comorbidity or more chronic presentation.

Limitations

Despite the growing number of studies in this area, there are few RCTs. It is important to note that studies using a repeated measures design have a higher likelihood of overestimating the overall effects, due to the lack of comparison group and the
potential uncontrolled effects of extraneous variables. Future RCTs are important to accurately gauge the treatment efficacy for hoarding disorder. Furthermore, the low power when comparing different intervention formats is a limitation, particularly when considering studies of pharmacotherapy. A greater number of pharmacological interventions utilizing hoarding specific measurement would assist in our knowledge of the potential effectiveness of medication in reducing hoarding symptoms. Another limitation is the lack of availability of long-term outcome studies. Although the findings do show significant decreases in hoarding symptoms for a range of interventions, the durability of these effects in the long-term is unclear. To date, research into the long-term outcome of psychological interventions is inconsistent, with some studies suggesting that results are maintained (Muroff et al., 2013) and others suggesting that individuals require continued support (Ayers et al., 2011). Further research into long-term outcomes of treatment, and whether the duration of treatment may influence longer-term maintenance of gains, would be beneficial.

**Future directions**

The present study provides support for current psychological and pharmacological interventions for hoarding disorder, highlighting the comparability of treatments, including non-therapist facilitated treatment. Therefore, future research may be focused on further examining the effectiveness of such accessible and cost-effective treatments for hoarding disorder. Knowledge of the efficacy of peer-facilitated group therapy for hoarding in more representative settings may enable this format of therapy to be integrated in a stepped care model, allowing individuals to access this as a first line of therapy/adjunct therapy. Furthermore, this finding opens the door to alternative mediums of delivering therapy, such as internet-based CBT, which may also be integrated in a
stepped care approach, providing greater access to treatment, in a potentially more cost-effective way.

The findings that duration (weeks), rather than hours in therapy, moderate the overall treatment outcome is also an area for future research. Providing greater duration of treatment, rather than intensity, may be helpful in further reducing hoarding severity. Tolin et al. (2015) noted that increased access to therapeutic support, over a longer period of time, might be influential in leading to a greater reduction of clutter scores. The use of treatment that is more staggered over time (one session per week or one session per fortnight for 52 weeks), rather than intensive (e.g. 2 sessions per week for 16 weeks) might be an area for additional research. In addition, although treatment duration explains a portion of the outcome variance, questions remain as to what explains the remaining variance. Future research would be beneficial to investigate other predictors of treatment outcome, including factors such as the therapeutic alliance. Finally, additional research into long-term treatment outcome of these various interventions would be beneficial, to assist in refining treatment programs, and to contribute to a greater understanding of the optimal duration, frequency and nature of interventions for hoarding.
CHAPTER FOUR: GROUP COGNITIVE BEHAVIOR THERAPY FOR HOARDING: FOLLOW-UP OUTCOME STUDY

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Abstract

Hoarding disorder involves the accumulation of clutter and subsequent difficulty in discarding possessions. This condition is suggested to affect 2-5% of the population, and causes significant distress and impairment. Research investigating the treatment of hoarding has found significant improvement in hoarding symptoms. However, there have been mixed results as to whether these improvements are maintained in the longer term. This study aimed at investigating whether a 12-week group cognitive behavioral therapy program for hoarding disorder was effective at improving hoarding symptomology at one year post-treatment. Sixteen participants, with a mean age of 55.36 (10.79), who completed the assessments pre, post and at 1-year follow-up, were recruited to this study. It was found that there was no change in overall hoarding from post-treatment to follow-up, with the exception of the difficulty discarding subscale, which showed a significant reduction when compared to pre-treatment, with the other differences at trend level. Although decreases in hoarding symptoms were evident amongst measures from pre-treatment, only one participant was classified as achieving clinically significant change. Further research into the differential responses to treatment, and various clinical predictors could significantly benefit treatment protocols.

Keywords: hoarding, treatment outcome, long term, follow-up, cognitive behavior therapy, treatment, predictors
Hoarding disorder is a condition experienced by approximately 2-5% of the population, and that is characterized by an accumulation of clutter, due to compulsive acquisition and difficulty in discarding of possessions, leading to significant distress or impairment (Frost & Hartl, 1996; Iervolino et al., 2009; Lopez-Sola et al., 2014). As a recent addition to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association [APA], 2013), hoarding disorder has been found to significantly affect quality of life, impacting on one’s daily functioning, in addition to having costs for the wider community (Saxena et al., 2011). Frost and Hartl (1996) proposed a cognitive behavioral model of hoarding, suggesting that difficulties in information processing, emotional attachment and beliefs about possessions are the main components that influence hoarding behavior (Frost & Steketee, 1998; Gordon, Salkovskis, & Oldfield, 2013). Along with deficits in cognitive functioning, research suggests that hoarding can be a result of both environmental and neurological factors, with experiences of trauma, dysfunctional family environments and neurological differences found to be significant predictors of hoarding (Hartl, Duffany, Allen, Steketee & Frost, 2005).

While there are a range of treatments available for hoarding disorder, Cognitive Behavioral Therapy (CBT), in individual or group formats, has received the most attention (Muroff, Bratiotis, & Steketee, 2011). CBT for hoarding is based on Frost and Hartl’s (1998) cognitive behavioral model, which addresses the three central aspects of hoarding—clutter, difficulty discarding, and acquisition (Muroff, Bratiotis, & Steketee., 2011). CBT aims to reduce hoarding behavior by targeting the main cognitive factors proposed in the model, with components including psychoeducation, goal setting, exposure, cognitive restructuring, and skills training in organizing and decision-making (Frost & Steketee, 2007; Grisham & Barlow, 2005).
Tolin, Frost, Steketee and Muroff (2015) investigated the effectiveness of 10 CBT treatment studies published to date in a meta-analysis. They found that CBT-based treatment for hoarding had a large effect from pre- to post-treatment, particularly in the outcome of difficulty discarding. Changes in clutter and acquisition had smaller effect sizes, with Tolin et al. suggesting that clutter might require more time and a longer intervention than that typically seen in clinical trials. However, while these studies indicate generally positive results for CBT-based treatment, few studies have examined whether these hoarding-related improvements are maintained in the longer term.

One study in the longer-term outcomes of CBT for hoarding was conducted by Muroff, Steketee, Frost and Tolin (2013), who analyzed longer-term treatment outcomes and predictors of outcome for 31 individuals with hoarding disorder. Their treatment involved 26 sessions of manualized hoarding-specific CBT, with pre-post scores producing significant and larger effects for all hoarding symptoms. At the 12-month follow-up, it was found that, although there was no further improvement, there was a maintenance of treatment gains as indicated by scores on the hoarding measures. Frost, Maxner, and Pekareva-Kochergina (2011) examined the effects of a 13-16 week facilitated support group for hoarding, including a one-month follow-up. They found that the bibliotherapy-based support group significantly reduced hoarding symptoms and unhelpful beliefs related to hoarding, with changes in hoarding-related scales maintained at one-month follow-up. Frost et al. also found that some participants achieved clinically significant change only at follow-up, and suggested that continuation of the groups for a further short period of time may prove beneficial (Frost et al., 2011).
Finally, Ayers, Wetherell, Golshan, and Saxena (2011) investigated the longer-term treatment outcomes for hoarding disorder in 12 older adults. Their treatment consisted of a 26-session manualized psychotherapy program, over 16 weeks, for hoarding. Although it appeared that there was a significant reduction in scores on the Savings Inventory Revised (SI-R) and the UCLA Hoarding Severity Scale (UHSS) from baseline to 6-month follow-up, Ayers et al. reported that improvements in hoarding symptomatology were not maintained, with two of the three participants who were classified as treatment responders at post-treatment relapsing, with hoarding scores similar to those they reported at baseline. Their findings suggested a need for further support for individuals with hoarding disorder, with a 16-week program not proving to provide a sustained improvement in symptoms (Ayers et al., 2011).

Given the significant heterogeneity in both the clinical presentation of hoarding and response to treatment, it is also important to examine whether a range of demographic and psychiatric factors can influence treatment outcome. Research into the etiology of hoarding behavior has suggested that those with hoarding disorder have a high likelihood of experiencing Major Depressive Disorder (MDD), anxiety disorders, Obsessive Compulsive Disorder (OCD), and Attention Deficit Hyperactivity Disorder (ADHD; specifically inattention; Ayers & Dozier, 2014; Frost, Steketec, & Tolin, 2011; Fullana et al., 2013; Hall, Tolin, Frost, & Steketee, 2013; Hartl et al., 2005). Frost, Steketee and Tolin (2011) investigated comorbidity in 217 participants with hoarding disorder, finding that depression and generalized anxiety disorder were apparent in 50% and 24.4% of participants, respectively. Only 18% of participants met criteria for OCD, which appears somewhat low given that hoarding symptoms were historically considered a subtype of OCD by clinicians (Hall
et al., 2013), although it is elevated when considering the low general prevalence of OCD relative to disorders such as GAD. Previous research has not found age, gender or other comorbid disorders to be significant predictors of treatment outcome (Ayers et al., 2011; Muroff et al., 2013), while, research conducted by Ayers et al. (2014) has suggested that higher levels of comorbidity can predict a worsened treatment outcome. Knowledge of the relationship of comorbid disorders, gender, age, and hoarding severity to treatment outcome is important, as it can assist in our understanding of factors that may affect treatment delivery, compliance and outcomes (Ayers & Dozier, 2014).

Given that hoarding disorder is a pervasive and chronic condition (Frost & Steketee, 2007) and given the limited findings as to whether improvements are maintained in the longer term or what predicts outcome, it appears important to further investigate whether CBT can lead to longer-term gains. The current study reports on data collected 12-months post-treatment for a treatment outcome study conducted by Moulding, Nedeljkovic, Kyrios, Osborne and Mogan (2017). The naturalistic treatment outcome study examined the effects of a 12-week cognitive behavioral group treatment program for hoarding disorder. Treatment showed significant and large effects, as evident on scores on the SI-R (Cohen’s $d=.80$), with 34.1% of participants classified as achieving clinically significant change on the SI-R. The aim of the current study is to investigate the longer-term outcome of the 12-week hoarding specific group CBT for hoarding disorder, including potential predictors of treatment outcome (demographic variables, comorbid disorders, and initial hoarding severity). It was hypothesized that participants would show a significant improvement in hoarding scores on the SI-R from pre-treatment to 12-month follow-up. No hypotheses were made with respect to the different predictor variables.
Method

Participants and procedure

Participants in the initial group program were recruited from the Melbourne Metropolitan areas by self-referral, referral from mental health professionals, primary care physicians, and housing authorities. Information about the program was also provided on the Swinburne Psychology Clinic website. Forty-one participants who had completed a CBT for hoarding manualized group program were therefore contacted, with 16 (39%) providing one-year follow-up data. One of the primary reasons for not attaining follow-up data from the sample of 41 participants was that the one year follow-up period had lapsed when this study began for a percentage of the participants. Therefore, 20 of the 41 participants were contacted that had finished the CBT group program one year prior to the initiation of this study and therefore met the criteria for involvement in the study. The main reason for participants not providing follow-up data was a failure to return questionnaires. The design of this study was repeated measures, obtaining data pre-treatment, post-treatment and 12 month follow-up. On analysis, there were no significant differences in baseline scores on key measures or non-hoarding related measures in those who were or were not involved in the follow-up study. The sample was mainly female and well educated, with a mean age of 55.36 (SD = 10.79; see Table 1). Of those included in follow-up, approximately half of the participants were employed. All participants met the criteria for hoarding disorder, and also met the criteria for other diagnoses at pre-treatment baseline including generalized anxiety disorder (4), major depressive disorder (10), post-traumatic stress disorder (1), obsessive compulsive disorder (1), and panic disorder (2). The pre-treatment SI-R score is consistent with previous studies examining a clinical population (M= 57.07, SD =16.87). Participants were mailed the follow-up questionnaire and a consent form, which were identical to the assessment
questionnaires the participants received at post-treatment. Sixteen questionnaires were returned by mail.

**Measures**

**Savings Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004).** The SI-R is designed to gauge an individual’s level of clutter, difficulty of discarding and excessive acquisition. This 23-item self-report measure has been factor analytically derived and found to effectively distinguish between groups of individuals with and without hoarding (Frost et al., 2004). Furthermore, the SI-R has been found to have good internal consistency (Cronbach’s $\alpha = .88$) and test-retest reliability, and has demonstrated strong correlations with other measures of hoarding (Frost et al., 2004).

**The Hoarding Rating Scale – Self-Report (HRS-SR; Tolin, Frost, & Steketee, 2010).** The HRS-SR is a brief five-item measure, which aims to measure five primary features of hoarding that are emphasized in the DSM-5 criteria, namely

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Table 1.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Treatment completers*</th>
<th>Follow-up completers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N= 41</td>
<td>N = 16</td>
</tr>
<tr>
<td>Mean Age (SD)</td>
<td>53.5 (10.80)</td>
<td>55.36 (10.79)</td>
</tr>
<tr>
<td>% female</td>
<td>85%</td>
<td>78.6%</td>
</tr>
<tr>
<td>Martial status – single</td>
<td>66%</td>
<td>42.9%</td>
</tr>
<tr>
<td>Education level – Post HS</td>
<td>78%</td>
<td>71.4%</td>
</tr>
<tr>
<td>Employed</td>
<td>47%</td>
<td>49.9%</td>
</tr>
<tr>
<td>Previous treatment</td>
<td>92%</td>
<td>50%</td>
</tr>
<tr>
<td>Medication – current use</td>
<td>53%</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Comorbidity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- MDD</td>
<td>51%</td>
<td>64.3%</td>
</tr>
<tr>
<td>- GAD</td>
<td>24%</td>
<td>28.6%</td>
</tr>
<tr>
<td>- OCD</td>
<td>14%</td>
<td>7.1%</td>
</tr>
<tr>
<td>SI-R &lt;42</td>
<td>17%</td>
<td>21.43%</td>
</tr>
<tr>
<td>SI-R Total</td>
<td>59.6 (17.2)</td>
<td>57.07 (16.87)</td>
</tr>
<tr>
<td>SCI Total</td>
<td>98.4 (33.6)</td>
<td>91.9 (33.3)</td>
</tr>
</tbody>
</table>

*Note. MDD= Major Depressive disorder; GAD = Generalized Anxiety Disorder; OCD= Obsessive Compulsive Disorder; *Data provided by Nedeljkovic et al. (2016)
clutter, acquisition, difficulty discarding, distress and impairment (Tolin, Frost & Steketee, 2010). This measure has been found to have strong internal consistency (Cronbach’s $\alpha = 0.97$) and reliability in a range of settings and time periods, effectively discriminating between OCD patients and a community-based sample.

**The Savings Cognition Inventory Revised (SCI-R; Steketee, Frost, & Kyrios, 2003).** The SCI-R is a 31-item self-report measure, which was devised to assess the attitudes and beliefs among compulsive hoarders (Steketee, Frost & Kyrios, 2003). The SCI-R has four factor analytically-derived subscales, including emotional attachment, memory, control and responsibility. It has been found to have very good to excellent internal consistency (Cronbach’s $\alpha = .86-.95$) and to effectively distinguish participants with hoarding from those with OCD and from community controls (Steketee et al., 2003). The SCI-R has also been found to show a moderately high correlation with the SI-R inventory (Steketee et al., 2003).

**Depression, Anxiety and Stress Scales (DASS-21; Lovibond & Lovibond, 1995).** The DASS-21 is a 21-item self-report scale measuring levels of depression, anxiety and stress. The Depression scale assesses symptoms including dysphoria, devaluation of life, hopelessness, self-deprecation, a lack of interest or involvement, anhedonia, and inertia. The Anxiety scale assesses symptoms of situational anxiety, autonomic arousal, skeletal muscle effects, and subjective experience of anxious affect. The Stress scale assesses symptoms such as the person having difficulty relaxing, experiencing nervous arousal, and being easily upset or agitated, irritable or over-reactive and impatient. This scale has high reliability and concurrent validity, and each scale is suggested to have high internal consistency, with Cronbach’s $\alpha$ ranging from .87 to .94.
The Mini International Neuropsychiatric Interview 5.0 (MINI; Sheehan et al., 1997). The MINI is a short structured interview developed to classify psychiatric disorders, in accordance with the DSM-IV. At the commencement of this study (2012), a structured clinical assessment consistent with the DSM-5 was not offered. Therefore, the SIHD was also used, to enable a satisfactory assessment for hoarding disorder, which refers to all significant information appropriate to the hoarding criteria later included in the DSM-5 (APA, 2003). Research proposes the MINI to show good inter-rater and test-re-test reliability, in addition to being a reliable and valid diagnostic tool (Lecrubier et al., 1997; Sheehan et al., 1997).

The Scheduled Interview for Hoarding Disorder (SIHD; Nordsletten et al., 2013). The SIHD is a semi-structured interview, which is designed to complement the new diagnostic criteria for HD in the DSM-5, and also includes a risk assessment (Nordsletten et al., 2013). The SIHD has been found to have ‘near perfect’ inter-rater reliability and excellent convergent and discriminant validity. In addition, it has also been found to be relatable to existing hoarding measures (Nordsletten et al., 2013).

Treatment

Treatment involved a 12-week group therapy program, led by a clinical psychologist assisted by two trainee psychologists. The program was adapted from the individual CBT program for compulsive hoarding by Steketee and Frost (2007). Each week addressed specific topics including engagement, motivation, psychoeducation, exposure to sorting and discarding, organization, decision making, thinking and challenging unhelpful thinking styles, beliefs and attachment to objects, acquisition and relapse prevention (see Moulding et al., 2017). There was also a focus on the role of self-blame in hoarding, hopelessness and the impact of social isolation. The group
involved three sorting sessions, in addition for the option of up to two home visits. The group met for 1.5-1.75 hours per week for 12 weeks. The treatment program is described in more detail in Moulding et al. (2015).

**Results**

**Data analysis**

Data was analyzed using SPSS 22.0 and SPSS Missing Value Analysis 7.5. While there were only two missing items in the overall dataset, these were imputed using expectation maximization. A repeated measures General Linear Modeling (GLM) analysis was undertaken to examine the differences between time one (pre-treatment), time two (post-treatment) and time three (12 month follow-up post-treatment). In addition, post-hoc analysis using paired samples t-tests were calculated. Table 2 displays the means and standard deviations of participants at pre, post and follow-up time periods. Table 2 also indicates the percentage change in scores from pre- to post-treatment, and pre-treatment to follow-up.

**Follow-up outcomes.**

Analyses of SI-R total, SI-R difficulty discarding, and SI-R Clutter all showed significant and moderate effects for time over the pre-, post- and follow-up period (Table 2). Though there was no main effect for time on the SI-R Acquisition Subscale, there was a decrease in acquisition symptoms that did not reach significance. Post-hoc analyses using two paired samples t-tests revealed that there was significant improvement in the SI-R total, and the SI-R difficulty discarding and SI-R clutter sub scores between pre- and post- treatment (see Table 3). Furthermore, post-hoc analyses revealed that difficulty discarding significantly improved from pre-treatment to the 12-month follow-up period. However, there was no significant difference in scores on SI-R total or SI-R clutter from pre-treatment to follow-up.
(with differences narrowly missing significance), and symptoms did not significantly change from post-treatment to follow-up. Analyses of scores on the DASS, SCI and SCI subscales of emotional attachment, responsibility, memory and control, showed no significant effects for time (Table 2).

Clinically significant change was calculated according to Frost et al.’s (2004) criteria, defined as a 14-point or greater decrease in score on the SI-R from pre to post treatment, where the pre-treatment score is above 50 and post-treatment score below

Table 2.
Means and Standard Deviations and Effect Sizes Pre, Post and Follow-up Treatment for the 16 Participants who Completed Follow-up Treatment Questionnaires.

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>Pre Mean (SD)</th>
<th>Post Mean (SD)</th>
<th>Follow-up Mean (SD)</th>
<th>Within groups analysis (F)</th>
<th>p</th>
<th>Effect size</th>
<th>% change baseline to post-treatment</th>
<th>% change baseline to follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI-R Total</td>
<td>16</td>
<td>57.07 (16.87)</td>
<td>48.29 (11.06)</td>
<td>49.00 (13.63)</td>
<td>F(2,24) = 3.84</td>
<td>.03*</td>
<td>.24</td>
<td>14.86</td>
<td>14.14</td>
</tr>
<tr>
<td>SI-R Acquisition</td>
<td>16</td>
<td>17.73 (5.52)</td>
<td>15.61 (3.97)</td>
<td>15.36 (5.03)</td>
<td>F(2,24) = 2.01</td>
<td>.16</td>
<td>.13</td>
<td>11.96</td>
<td>13.37</td>
</tr>
<tr>
<td>SI-R Diff.</td>
<td>16</td>
<td>18.21 (5.28)</td>
<td>15.18 (3.43)</td>
<td>15.57 (3.44)</td>
<td>F(2,24) = 4.73</td>
<td>.02*</td>
<td>.27</td>
<td>16.64</td>
<td>14.40</td>
</tr>
<tr>
<td>SI-R Clutter</td>
<td>16</td>
<td>23.77 (7.28)</td>
<td>19.68 (4.86)</td>
<td>20.07 (5.73)</td>
<td>F(2,24) = 4.62</td>
<td>.02*</td>
<td>.26</td>
<td>17.21</td>
<td>15.86</td>
</tr>
<tr>
<td>SCI-R Total</td>
<td>16</td>
<td>91.90 (33.10)</td>
<td>89.73 (36.13)</td>
<td>86.16 (27.90)</td>
<td>F(2,24) = 0.69</td>
<td>.51</td>
<td>.05</td>
<td>2.36</td>
<td>6.25</td>
</tr>
<tr>
<td>SCI-R EA</td>
<td>16</td>
<td>35.84 (15.70)</td>
<td>35.42 (14.69)</td>
<td>32.16 (11.96)</td>
<td>F(2,24) = 0.76</td>
<td>.47</td>
<td>.06</td>
<td>1.18</td>
<td>10.27</td>
</tr>
<tr>
<td>SCI-R Respons.</td>
<td>16</td>
<td>22.99 (9.09)</td>
<td>22.54 (9.55)</td>
<td>22.07 (7.53)</td>
<td>F(2,24) = 0.58</td>
<td>.57</td>
<td>.05</td>
<td>1.96</td>
<td>4.00</td>
</tr>
<tr>
<td>SCI-R Memory</td>
<td>16</td>
<td>19.25 (8.01)</td>
<td>18.15 (8.97)</td>
<td>17.64 (8.92)</td>
<td>F(2,24) = 0.86</td>
<td>.44</td>
<td>.07</td>
<td>5.71</td>
<td>8.36</td>
</tr>
<tr>
<td>SCI-R Control</td>
<td>16</td>
<td>13.82 (5.45)</td>
<td>13.62 (6.53)</td>
<td>14.29 (6.10)</td>
<td>F(2,24) = 0.23</td>
<td>.80</td>
<td>.02</td>
<td>1.45</td>
<td>-3.4</td>
</tr>
<tr>
<td>DASS-21 Total</td>
<td>16</td>
<td>20.28 (3.46)</td>
<td>17.79 (2.71)</td>
<td>19.14 (3.27)</td>
<td>F(2,24) = 0.57</td>
<td>.58</td>
<td>.04</td>
<td>12.28</td>
<td>5.62</td>
</tr>
<tr>
<td>DASS Dep</td>
<td>16</td>
<td>8.45 (5.96)</td>
<td>7.00 (4.72)</td>
<td>7.00 (4.66)</td>
<td>F(2,24) = 1.77</td>
<td>.19</td>
<td>.12</td>
<td>17.16</td>
<td>17.16</td>
</tr>
<tr>
<td>DASS Anx</td>
<td>16</td>
<td>3.86 (4.17)</td>
<td>3.00 (2.25)</td>
<td>4.36 (3.73)</td>
<td>F(2,24) = 1.09</td>
<td>.35</td>
<td>.08</td>
<td>22.30</td>
<td>-12.95</td>
</tr>
<tr>
<td>DASS Stress</td>
<td>16</td>
<td>7.98 (5.24)</td>
<td>7.79 (5.03)</td>
<td>7.79 (5.38)</td>
<td>F(2,24) = 0.02</td>
<td>.98</td>
<td>.00</td>
<td>2.38</td>
<td>2.38</td>
</tr>
</tbody>
</table>

Note. SI-R = Savings Inventory Revised. SCI-R = Savings Cognition Inventory Revised. DASS = Depression and Anxiety Stress scale. Diff. = Difficulty Discarding. Respons. = Responsibility. *Significant p< 0.05
A more stringent criteria proposed by Gilliam et al. (2011) suggests that clinically significant change is indicated with a post-treatment score of 42 or below, which was also calculated. In accordance to both criteria, one participant met the criteria for clinically significant change (post-treatment score of 41), with all other participants having post-treatment scores over 50. Unfortunately, this participant’s scores were no longer classified as CSC at follow-up (SI-R = 60). A total of one participant met the criteria for clinical significant change at follow-up, suggesting further improvement in hoarding related symptoms. A display of average scores on the SI-R across time points can be seen in Figure 2.

Although hoarding related beliefs, measured by the SCI did not demonstrate statistically significant improvement from pre-treatment, post-treatment and follow-up, it is evident that there is a gradual improvement in scores, with some changes evident when examining the percentage change scores (see Table 2.)

Predictors of follow-up treatment outcome.

Potential predictors of follow-up scores were examined, using a Pearson’s correlational analysis due to the small sample size. There appeared to be a significant, positive relationship between age and post treatment scores on the SI-R total ($r=.725$, $p<.01$), SI-R difficulty discarding ($r=.561$, $p<.05$) and acquisition subscales ($r=.721$, $p=.07$).
and SCI total ($r = .720, p < .01$) and SCI EA ($r = .792, p < .001$), SCI control ($r = .649, p < .01$), and SCI responsibility ($r = .774, p < .01$); suggesting that those who are older had higher scores on hoarding-related measures post-treatment. In addition, age and SI-R clutter scores had a positive association, where increased age was related to an increased clutter score at post-treatment ($r = .691, p < .01$) and follow-up ($r = .533, p < .05$). There were no significant relationships between hoarding-related measures and gender, level of education, hoarding severity or comorbid disorders.

Figure 1. Means at pre-treatment, post-treatment and follow-up for all participants.

Discussion
This study examined the longer-term outcome of a manualized group-based CBT program for hoarding disorder for 16 participants. Contrary to the hypothesis, it was found that the significant improvements in hoarding-related symptoms from pre- to post-treatment were not significant at one-year follow-up, evident in scores on the SI-R Total, Clutter and Acquisition, and the SCI. However, scores did demonstrate an overall decrease from baseline to follow-up, with scores on the SI-R total approaching significance ($p = 0.07$). In addition, the percentage change from baseline indicated improvement, with scores on the SI-R, SI-R subscales and SCI emotional attachment showing change within the range of 10-21%, comparable to other group-based CBT studies (Ayers et al., 2011; Muroff et al., 2009; Muroff, Steketee, Himle, & Frost, 2010; Steketee et al., 2000). These findings suggest that this subset of participants involved in a short-term group CBT program demonstrated an overall improvement in hoarding related symptoms that was largely maintained at 12-month follow-up; however, there are questions as to what additional factors may enhance treatment outcomes in the long-term, with participants showing continued improvement. A larger sample size may provide further clarity and thus make these findings more robust.

Improvements on the SI-R difficulty discarding subscale were statistically significant from pre-treatment to follow-up. These findings are consistent with previous treatment outcome studies that found that the difficulty discarding subscale of hoarding demonstrated the strongest effect size, being theorized as the core behavioral feature of HD (Tolin et al., 2015). Furthermore, as difficulty discarding is a central focus in the manualized program by Steketee and Frost (2007) it is therefore unsurprising that difficulty discarding shows the most consistent improvement amongst studies (Tolin et al., 2015).
Although the overall hoarding scores from pre-treatment to follow-up did approach significance, only one participant was classified as achieving clinically significant change at follow-up. The remaining participants who were initially classified above 50 on the SI-R still remained at a clinical level, with SI-R total scores over 42 points. These findings, which are similar to those of Ayers et al. (2011), may suggest that additional assistance may be required to achieve continued behavior change and the maintenance of effects in the longer-term. With the chronic nature of hoarding behavior, researchers have suggested that it is unsurprising for individuals seeking treatment for hoarding disorder to remain symptomatic, due to significant initial impairment, and because de-cluttering requires substantial time (Tolin, 2011). These findings suggest that additional or ongoing support may be warranted beyond a short-term treatment program.

Although initially demonstrating statistically significant change between pre-treatment and post-treatment, the clutter subscale appeared to marginally worsen at the follow-up period, with the percentage change from baseline reducing from 17.67% to 15.86%. This similar pattern for change in clutter is evident in other studies, including Muroff et al. (2013). In addition, the meta-analysis conducted by Tolin et al. (2015) found that increased sorting during sessions and at the participants’ homes improved clutter scores. Increased scores or lack of improvement on the clutter scale may be due to the fact that substantial de-cluttering may require additional time and treatment outside what is offered in most trials (Tolin et al., 2015). If ongoing treatment is available in an accessible and cost-effective format, and/or if there is external support, clutter scores may have a greater potential to improve.

Changes in scores on the acquisition subscale from pre to post and pre to follow-up were not statistically significant. However, these scores demonstrated
improvement over time, with a 13.37% change in scores from baseline to follow-up; albeit that the significance of such changes remained at the trend level. Tolin et al. (2015) have suggested that limited success in reducing acquisition may be due to the fact that earlier treatment protocols had a more central focus on discarding, rather than acquisition symptoms. This may be a reason for this subscale not showing a statistically significant improvement (Tolin et al., 2015). However, other studies, such as Gilliam et al. (2012) have found significant improvement in acquisition behaviors, with improvement ranging from 22% - 34%. This study provided participants with a greater duration of treatment, which may suggest that increased duration of therapy may assist in improving scores of acquisition, or provide participants with more therapeutic content. However, since these findings are based on pre-post scores of the group CBT program, it would be important to further investigate whether these changes would be maintained at 12- or 24-month follow-up. These findings suggest that a greater focus on acquisition in treatment, or a greater focus on the effectiveness of various treatment components, may be beneficial in future studies.

We did not find significant change in hoarding-related beliefs, as evident in scores on the SCI-R. These findings are not consistent with the previous literature, which found significant declines in scores on the SCI-R (Frost et al., 2011; Frost et al., 2012). However, there did appear to be improvement from pre-treatment to follow-up, particularly when examining emotional attachment—which measures the emotional comfort the possessions provide, the value that is attached to possessions, and the tendency for possessions to form part of an individual’s identity (Frost & Hristova, 2011). These findings may suggest that, although there was some improvement in beliefs related to possessions, that the 12-week treatment period may be too short for a significant change to occur.
In addition, scores on depression, anxiety and stress did not show significant improvement from pre-treatment to follow-up, which is inconsistent with previous research showing significant declines in depression scores post treatment and follow-up (Ayers et al., 2011; Muroff et al., 2013). However, scores on the depression subscale did show a slight decline, with a percentage change from baseline of 22.3%. Interestingly, scores on the anxiety scale initially decreased post-treatment, but were found to have increased from the initial assessment to follow-up. These findings may reflect the emotionally intense process involved in de-cluttering areas of the home, along with the potential role of possessions in working as an emotional regulation strategy for participants who lack other coping mechanisms (e.g., Moulding, Mancuso, Rehm, & Nedelljkovic, 2016; Phung, Moulding, Taylor, & Nedeljkovic, 2015; Timpano et al. 2014). Further examination of the role in anxiety in the treatment of hoarding disorder may be warranted. The trends evident in this subset of participants, suggesting a decrease in hoarding symptoms and in depression are consistent with Moulding et al. (2015), and the lack of significance may reflect issues in power.

**Predictors of outcome**

Predictors of outcome were examined, with the finding of a positive relationship between age and treatment outcome, such that an increase in age was related to an increase in hoarding symptoms, with this relationship evident at post-treatment and follow-up on the clutter subscale. These findings are consistent with previous research, which suggests that the chronic nature of compulsive hoarding means that it requires a longer duration of treatment for older adults (Ayers, Wetherell, Golshan, & Saxena, 2011). There were no significant relationships between other demographic variables or the presence of comorbid disorders, and
treatment outcome. These findings are consistent with Muroff et al. (2013) and Ayers et al. (2011), who did not find a significant relationship between comorbid disorders and/or demographic variables and hoarding treatment outcome. However, further examination of the potential impact of age, and other predictors (for example, comorbid disorders) is important, given that research examining comorbidity in hoarding suggests that comorbidity may impact the onset of the disorder, the expression of the disorder, and differences in treatment engagement (Hall et al., 2013; Grisham et al., 2005; Gómez-Feria Prieto, 2009).

**Need for additional support**

Although there appeared to be considerable improvement in terms of percentage change from baseline, additional support may improve progress and assist in maintaining motivation for individuals with hoarding disorder. A difficulty in the treatment for hoarding is that in some cases, clutter can appear to get initially worse, particularly when the individual is emptying out rooms and full cupboards. From clinical experience, this can feel overwhelming for the client and have an influential effect on motivation levels. Particularly in reference to clutter, Tolin et al. (2015) emphasized the need for ongoing support, past that offered in clinical trials. Additional support could be in the format of extended treatment groups, support groups and online programs, all aimed at increasing motivation, maintaining progress and reiterating key information covered during the various treatment programs. Given limitations of cost and accessibility, there is a good potential for a ‘blended’ form of therapy, with face-to-face treatment plus an iCBT or biblio-based intervention. There appears to be limited research examining the use of a multi-modal format of treatment, which would enable individuals to enjoy the benefits of both formats, but in a more accessible way (Van der vaart et al, 2014). Future studies could examine
various additional support methods in order to improve progress and to continue to reduce hoarding symptoms.

Limitations and Future Research

A notable limitation of this study was the small sample size, which may have had an impact of detecting a true effect (Button et al., 2013). Furthermore, a majority of participants were female, and although this is reflective of other hoarding-related studies, it does not portray an accurate representation of the general population with hoarding (Iervolino et al., 2009). In addition, the long-term data was collected from a naturalistic study with no control group. Future research into the longer-term treatment outcome from a randomized control trial is essential to enable the examination of symptoms, whilst taking into account non-specific factors that can impact on therapeutic outcome, such as the expectations of participants, the therapeutic relationship, and group processes. Finally, future research examining various patterns of longer-term outcome data would be beneficial, in terms of both informing best treatment practice and in creating a more developed understanding of hoarding disorder at a conceptual level (Ayers & Dozier, 2014).

Conclusion

This study investigated the long-term efficacy of a 12-session group CBT program for hoarding disorder at a 12-month follow-up period. The findings suggested that, although the changes in scores fell shy of significance, there was notable improvement in hoarding symptoms by the 12-week mark that appears to be maintained over time. However, it appeared that only one participant demonstrated clinically significant change, achieving a score under 42 SI-R points. Although the results pre-post the group CBT program were comparable to other studies of greater duration (see Moulding et al., 2015 for discussion), it appears that, in order to see
continued improvement at follow-up, additional support may be necessary. The
differential pattern of treatment response was related to demographic variables, such
as age. However, additional research in the heterogeneity in treatment outcomes
would prove beneficial, and contribute to our understanding of which individual
differences affect treatment adherence, progress, and motivation (Hall et al., 2013).
CHAPTER FIVE: ‘BLENDED’ THERAPY: THE DEVELOPMENT AND PILOT EVALUATION OF AN INTERNET-FACILITATED COGNITIVE BEHAVIORAL INTERVENTION TO SUPPLEMENT FACE-TO-FACE THERAPY FOR HOARDING DISORDER

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Abstract

Mixed findings regarding the long-term efficacy of cognitive behavior therapy (CBT) for the treatment of hoarding has led to the investigation of novel treatment approaches. ‘Blended’ therapy, a combination of face-to-face (f2f) and online therapy, is a form of therapy that enables longer exposure to therapy in a cost-effective and accessible format. Blended therapy holds many benefits, including increased access to content, lower time commitment for clinicians, and lower costs. The aim of the present study was to develop and evaluate a ‘blended’ treatment program for hoarding disorder (HoPE), involving 12-weeks of face-to-face group therapy, and an 8 week online therapist assisted program. A sample of 12 participants with hoarding symptomology were recruited from the Melbourne Metropolitan area, and were involved in one of two conditions; 12 weeks group therapy + 8 weeks online therapy (HoPE) or 12 weeks group therapy + 8 weeks waitlist + 8 weeks online therapy. Questionnaires were completed at all time points. The 8-week online component consists of 8 CBT-based modules, addressing psychoeducation, goal setting, motivation, relapse prevention and other key components. No significant differences were found over time between the HoPE group and waitlist control group, however trends suggested continued improvement in overall hoarding scores for the HoPE group, when compared to the waitlist control group. There were significant differences in scores from pre-treatment to 28 weeks, suggesting that all participants who were involved in the online intervention showed continued improvement from pre-treatment to post-treatment. This study highlights the potential benefit of novel formats of treatment. Future research into the efficacy of blended therapy would prove beneficial.
Hoarding disorder is a complex psychological disorder, characterized by excessive acquisition and difficulty in discarding possessions regardless of value (American Psychiatric Association [APA], 2013; Frost & Hartl, 1996). Hoarding Disorder has been suggested to be apparent in approximately 2-5% of the population (Iervolino et al., 2009; Rodriguez et al., 2013; Samuels et al., 2008), and has a significant impact on many domains of life, including daily functioning, interpersonal relationships and on occupation (Grisham, Steketee & Frost, 2008; Tolin, Frost, Steketee, Gray & Fitch, 2008). While previously considered to be as a sub-category of OCD, hoarding disorder is now classified as a distinct disorder (APA, 2013), with research finding significant benefits of a range of hoarding-specific treatments (Tolin, Frost, Steketee, & Muroff, 2015).

Psychological treatments for hoarding disorder are mainly based on a cognitive-behavioral model, with program elements including exposure to sorting and categorizing; psychoeducation, goal setting, cognitive challenging and restructuring, along with various homework tasks. A recent meta-analysis conducted by Tolin et al. 2015 examined the comparative effect sizes across CBT hoarding treatment studies. Studies have used varying treatment formats, including CBT-based treatment, pharmacotherapy, and bibliotherapy, with the number of sessions of psychological interventions ranging from 13 to 33 ($M=20.2$). Cognitive-behavioral treatment of hoarding disorder was found to be highly effective in reducing overall hoarding severity, in both individual and group settings ($Hedges’s \ g = .82$; Tolin, Frost, Steketee, & Muroff., 2015). However, a more recent meta-analysis found that aggregate data of long-term studies did not indicate that clutter and other hoarding-related symptoms continued to decrease after the termination of treatment (Fitzpatrick, Nedeljkovic, Moulding, & Kyrios, unpublished). These findings may
suggest that continued improvement in clutter may require additional or ongoing support (Fitzpatrick et al. unpublished; Tolin et al., 2015). Hence, although the results of CBT-based programs for hoarding disorder are promising, the complex and pervasive nature of hoarding disorder may suggest a need for a more innovative treatment approach, which provides additional support that is more cost-effective and accessible. This is particularly the case, given that – while CBT-based treatments are effective in reducing symptoms – most people finish treatment with significant symptoms, with only 35% of participants reporting clinically significant change (Tolin et al., 2015)

Online treatment programs, particularly internet-based cognitive behavior therapy (iCBT) have had great success in treating a range of mental health conditions, such as depression, anxiety and obsessive-compulsive disorder (Andrews, Newby, & Williams, 2014; Mewton, Smith, Rossouw, & Andrews, 2014; Wootton, 2016). In comparison to traditional face-to-face CBT, iCBT provides a consumer with benefits such as access to the programs at any time and place, reduced cost, and the potential to seek support in an anonymous environment (Carroll & Rounsaville, 2010). Several meta-analyses have demonstrated that iCBT for conditions such as anxiety is more effective than a no treatment comparison, and it is even more effective than face-to-face treatment in some trials (Andersson & Cuijpers, 2009; Andersson et al., 2014; Berger, Boettcher, & Caspar, 2014; Cuijpers et al., 2009; Lewis, Pearce & Bisson, 2012; Romijn et al., 2015). Although still in its early stages, iCBT for hoarding disorder has been found to be beneficial. Muroff, Steketee, Himle and Frost (2010) examined the effectiveness of an existing online CBT-based self-help program for hoarding disorder, with both active intervention and waitlist control participants. Participants in the intervention condition were found to demonstrate modest
improvement over a 6-month and 15-month period. However, the findings were not found to be comparable in efficacy to face-to-face CBT in other trials (Muroff et al., 2010). Interestingly, those who were engaged in the iCBT program for a longer period of time reported milder symptoms at the conclusion of treatment than did shorter-term participants, which may suggest that extended access to treatment may prove beneficial in terms of sustaining change or even continuing progress. These findings may suggest that, although iCBT may demonstrate significant benefits, this treatment format may be limited due to a lesser capacity than a face-to-face medium to provide empathy and rapport, and a lesser ability to tailor content in an individualized fashion. Furthermore, participants in iCBT usually do not have the opportunity to benefit from the potential benefits of face-to-face therapy outside of the therapeutic techniques themselves; for example, group CBT for hoarding has a number of non-specific helpful factors, including normalization, mutual aid and social cohesion (Schmalisch, Bratiotis, & Muroff, 2010).

**Efficacy of Blended Therapy**

Blended therapy (bCBT), the combination of face-to-face therapy and online therapy, is an innovative treatment option that has the potential to combine the benefits of both treatment formats. For those with hoarding disorder, bCBT could provide the individual with benefits such as increased engagement as well as rapport, but also provide a potential crucial ability for the person to extend therapy - continuing therapeutic supports. bCBT may therefore provide support beyond that available in a health care system with limited resources, thus increasing accessibility, in a cost-effective manner (Romjin et al., 2015). Providing psychotherapy through a modality that is less subject to time constraints, and in a format that does not create
more demand on mental health service providers, may thus be a logical alternative to sole face-to-face therapy (Newman, Erickson, Przeworski, Dzus, 2003).

Although the concept of blended therapy is still in its infant stages, it has a number of potential benefits. As noted more generally by Ong, Pang, Sagayadevan, Chong and Subramaniam (2015), the potential benefits of bCBT include: (a) the client being able to access and review content at any time, (b) having lower costs when compared to face-to-face treatment, (c) having lower time commitment for clinicians, (d) minimizing the waiting time between initial face-to-face group treatment programs and subsequent continued support, (e) having the potential for a client to take more of an active role in treatment, given the self-paced nature of the iCBT component of treatment, (f) providing an ability for individuals with hoarding disorder to actively de-clutter immediately after face-to-face treatment, using the online program to maintain their motivation and momentum, (g) assisting with reducing feelings of social isolation commonly experienced in hoarding disorder, and finally (h) enabling the transmission of photographs from the participant to therapist to track the client’s continued progress and enhance accountability. Studies highlight the importance of integrating therapist contact into iCBT programs, with empirical research finding that the therapeutic alliance predicts treatment outcome regardless of the therapeutic approach (Richards & Simpson, 2014).

To date, the term ‘blended’ therapy has been used to describe varying combinations of face-to-face and online support. Research has examined the integration of online modules with face-to-face therapy, for use either in-between face-to-face sessions, prior to face-to-face sessions in terms of preparing the client for therapy, or post-interventions as a form of supplemental therapy. In the form of face-to-face therapy with inter-session online therapy, bCBT has been suggested to help
the therapeutic relationship and lead to further progress post-therapy (Kemmerman et al., 2016). Qualitative data from a blended acceptance and commitment-based program found that participants reported greater breadth, greater exposure to treatment, depth and quality of the face-to-face therapy as a result of the technological adjunct between therapy sessions (Richards & Simpson, 2015). Carroll et al. (2008) examined the role of between-session supplemental online therapy for substance use disorders, which involved weekly individual and group counseling, in addition to access to bi-weekly CBT-based modules for substance use reduction for six weeks. Carroll et al. found that those who had access to the additional bi-weekly modules showed significantly fewer positive drug screen results and had longer periods of abstinence when compared to those in the Treatment As Usual (TAU) group. These findings may suggest that additional support, in the form of an inter-session online CBT based program, may improve the quality, quantity and outcome of therapy.

Another format that can combine face-to-face therapy and online CBT-based therapy is engaging in iCBT prior to beginning face-to-face therapy, a format which has been used in the ‘stepped care’ model (Bower & Gilbody, 2005). Stepped care is a delivery model where treatment options are organized in levels of intensity, with each individual triaged and allocated to a step (Draper & Donohue, 2011). The model works in a ‘fail-upward’ approach, where individuals are stepped up in intensity if a lower level of treatment is not suitable or working for that individual (Draper & Donohue, 2011). Bower and Gilbody (2005) explored the structure of a stepped care model, proposing participants undergo a 90 minute psychoeducation session, followed by iCBT with therapist assistance, and then, depending on progress, manualized face-to-face CBT. This form of bCBT has been found to be effective for a range of presentations, including depression (Firth, Barkham, & Kellett, 2015),
trichotillomania (Rogers et al., 2014), anxiety disorders (Muntingh, 2014), and for chronic health conditions such as chronic fatigue (Tummers, Knoop, Bleijenberg, 2010), and obesity (Carels et al., 2012). However, there are a range of potential difficulties with stepped care, specifically in how to best combine treatment programs according to the individuals’ needs (Manber, Simpson, & Bootzin, 2015).

**Continued Care Post-Treatment/Aftercare**

Researchers have attempted to integrate supplemental online CBT-based treatment programs into face-to-face therapy in a number of ways. Post-treatment programs, also known as ‘aftercare’ or ‘maintenance phase treatments’, aim to provide psychological treatment after acute psychotherapy, and have been found to improve the likelihood of the outcome being sustained (Bockting et al., 2005; Ebert et al., 2013b; McKay, Todaro, Neziroglu, & Yaryura-Tobias, 1996). For example, Kordy, Theis, and Wolf (2011) examined the use of an online aftercare program post-hospital discharge for 254 patients experiencing psychosomatic symptoms, finding that it led to sustainable, and significant improvements in psychological wellbeing, social difficulties and psychosocial abilities, when compared to a control condition. In a randomized controlled trial, Holländare et al. (2011) investigated the use of a 10-week iCBT program by people with major depression after completing face-to-face treatment with a psychologist or psychotherapist, compared to a control group of 84 participants. They found that significantly fewer participants demonstrated relapse in the online CBT group when compared to the waitlist control, with the differences between groups maintained for 6 months (Holländare et al., 2011). Studies have found brief blended programs have success in maintaining physical activity levels after a brief motivational interviewing intervention delivered by telephone or face-to-face (Fleig, Pomp, Schwarzer, & Lippke., 2013; Goyder et al., 2014). Research therefore
suggests that the provision of continued care or aftercare post-treatment may play a key role in preventing relapse, but due to the novelty of such treatment plans, further research is required.

**Intention of Hoarding Plus E-therapy (HoPE)**

As noted previously, while face-to-face treatment is effective for hoarding disorder, a majority of individuals do not achieve clinically significant change, and without ongoing support, there appears to be limited improvement in the disorder, which is consistent with its chronic nature. Therefore, although bCBT is still in its early stages as an overall treatment modality, it holds potential benefit for hoarding, given its ability to provide, at a low cost, ongoing support. This is particularly important in a country such as Australia, where there are a number of rural and regional areas with low access to services, and where access to subsidized treatment includes a capped number of sessions via Medicare (Australia’s publicly funded health care system). Developing a cost effective and accessible bCBT program, that is suitable to the local health care system, may assist in maintaining motivation, reducing the likelihood of relapse, and subsequently improving longer-term outcome (Andersson & Titov, 2014).

The aim of this study was to develop and evaluate the efficacy of a ‘blended’ format of treatment in continuing to improve hoarding symptoms post face-to-face CBT, this program was denoted Hoarding Plus E-therapy (HoPE). The face-to-face component of a 12-session group therapy program, was supplemented by an 8-week CBT-based online program for hoarding, with online therapist support. Participants were allocated to the treatment group, which involved a 12-week face-to-face group-based CBT program plus an 8-week online CBT-based program, or a waitlist condition, which involved the same 12-week group plus an 8-week waitlist period,
before these participants also undertook the 8-week online program. We hypothesized that the 12 + 8-week ‘blended’ therapy program would result in a greater decrease in scores from pre-treatment to post-intervention on the Savings Inventory – Revised (SI-R), a well-validated measure of hoarding symptoms, when compared to the waitlist control group. In addition, we hypothesized that hoarding specific beliefs, and also mood (depression, anxiety and stress) would also decrease from post-treatment following the 8-week online intervention. Finally, we hypothesized that all participants, regardless of waitlist periods, would show a decline in scores on the SI-R after engaging in the online intervention.

**Method**

**Participants**

Sixteen participants were recruited from the Melbourne Metropolitan areas by self-referral, referral from mental health professionals, primary care physicians, and housing authorities. All participants had taken part in the 12-week group cognitive behavior therapy program for Hoarding Disorder at Swinburne University of Technology (see Moulding et al., 2016). Four participants did not complete the program. Reasons for dropout included health problems requiring long-term hospitalization (n=2), and other mental health concerns (n=2). Allocation to the waiting period was not random, but reflected the order of entering the study, with the first six participants being waitlisted. Therefore, six participants provided data for the waitlist period, and six participants started the program immediately after treatment. All participants in the waitlist condition also completed the online program after the waitlist period, however two participants did not provide post-HoPE data.

**Measures**
Savings Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004). The SI-R is designed to measure an individual’s level of clutter, difficulty of discarding and excessive acquisition. This 23-item self-report measure was factor analytically derived and has been found to effectively distinguish between hoarding and non-hoarding groups (Frost et al., 2004). The SI-R has been found to have good internal consistency ($\alpha=.88$) and test-retest reliability, and has demonstrated strong correlations with other measures of hoarding (Frost et al., 2004).

Savings Cognitions Inventory-Revised (SCI-R; Steketee, Frost, & Kyrios, 2003). The SCI-R is a 31-item self-report measure, which was devised to assess the attitudes and beliefs among compulsive hoarders (Steketee, Frost & Kyrios, 2003). The SCI-R has four factor-analytically derived subscales, including emotional attachment, memory, control and responsibility. It has been found to have very good to excellent internal consistency (Cronbach’s $\alpha = .86-.95$) and to effectively distinguish participants with hoarding from those with OCD and from community controls (Steketee et al., 2003). The SCI-R has also been found to show a moderately high correlation with the SI-R inventory (Steketee et al., 2003).

Depression and Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995). The DASS is a 21-item self-report scale measuring levels of depression, anxiety and stress. This scale has high reliability and concurrent validity, and each scale is suggested to have high internal consistency, with Cronbach’s $\alpha$ ranging from .87 to .94.

The Mini International Neuropsychiatric Interview 5.0 (MINI; Sheehan et al., 1997). The MINI is a short structured interview established to identify psychiatric disorders, in accordance with the DSM-IV. At the initiation of this study (2012), a structured clinical assessment in accordance with the DSM-5 was not
available. So although this version of the MINI did not incorporate the diagnostic
criteria for hoarding, the Scheduled Interview for Hoarding Disorder (SIHD) was also
used to ensure adequate assessment for hoarding disorder, which discusses all relevant
information relevant to the hoarding criteria later included into the DSM-5 (APA,
2003). Research suggests the MINI to be a reliable and valid diagnostic tool, showing
good inter-rater reliability and test-retest reliability (Lecrubier et al., 1997; Sheehan et
al., 1997).

The Scheduled Interview for Hoarding Disorder (SIHD; Nordsletten et
al., 2013) is a semi-structured interview, which is designed to complement the new
diagnostic criteria for hoarding disorder (HD) in the DSM-5, and also includes a risk
assessment. The SIHD has been found to have ‘near perfect’ inter-rater reliability and
excellent convergent and discriminant validity. In addition, it has also been found to
relate to existing hoarding measures (Nordsletten et al., 2013).

Procedure

Participants were initially enrolled in a structured 12-week group program, but
were provided information about the additional Internet component towards the
completion of the program. If participants expressed interest, they were then followed
up with a phone call to assess eligibility to be involved in the study. If eligible, the
participant was given an initial assessment session over the phone, in order to
complete the pre-assessment questionnaire, the MINI interview and to be talked
through how to use the online program. If the participant did not have access to the
Internet they were offered use of a tablet with wireless Internet. Participants were
informed that there were eight modules, with one to complete each week. They were
also informed of the e-therapist assistance, which involved email correspondence
from the e-therapist each week, with the opportunity for the participant to respond for
feedback or to ask questions. The participants were provided detailed instructions on how to use the program and were able to contact the e-therapist for assistance over the phone when getting started. After the 8-week online program, participants were directed to complete a survey online at 20 weeks (12 week group + 8 week post-group). Participants in the waitlist condition were then directed to use the online program.

**HoPE program development.** The HoPE online supplemental intervention was created to provide individuals with continued support for their hoarding symptoms post-treatment. The content was informed by the Cognitive Behavior Group Therapy manual for Hoarding Disorder developed by Moulding, Nedeljkovic, and Kyrios (2009), which was based on the CBT approach developed by Steketee and Frost (2006). Various materials were adapted to reinforce key material outlined in the group, as well as the addition of content around relapse prevention, motivational interviewing, relaxation, and examining barriers to continuation with de-cluttering. A clinical team involved in the face-to-face group therapy and experts in the field reviewed all content. The structure and format of the program was modeled off previous and current online interventions for other disorders (Klein, Meyer, Austin, & Kyrios, 2011; Kyrios et al., 2014). The Mental Health Online platform was used to host the program, an interface developed by the National eTherapy Centre (NeTC).

The program consisted of 8 weekly modules. Each module provided the participants with worksheets, interactive textboxes that the e-therapist could review, and vignettes of various challenges that individuals have faced with hoarding, and how these could be overcome. Based on the research of Muroff et al. (2010), a great focus was placed on interactive content in order to increase engagement and interest. There was also homework provided each week, and a review of this homework at the...
start of each module. These homework tasks aimed to reinforce what was learnt during sessions, and to encourage continued application of new knowledge in the home (Frost & Hartl, 1996).

Given research that suggests that the therapeutic relationship predicts treatment outcome, regardless of the therapeutic approach (Horvath, Del Re, Flückiger, & Symonds, 2011; Norcross, 2002; Richards & Simpson, 2015; Ahn & Wampold, 2001), this program involved the option of therapist assisted email support, where the participants were given the option of sending up to two emails per week to their e-therapist. The provision of e-therapist support was intended to increase the participants’ perceived support and to increase their adherence to the program (Richards & Simpson, 2015). The email format was chosen as it has been suggested to be the best form of adjunct therapy (Clough & Casey, 2011). The e-therapist nominated a day to each participant when they would expect a weekly response from the e-therapist. The e-therapist provided weekly feedback on homework tasks, provided support and encouragement for each participant’s progress and to address their challenges, and helped to reinforce key components from the 8-week program. The e-therapist support enabled participants to continue to work on challenges that they encountered during the group and to identify barriers faced in progression after the termination of the group (Whisman, 1990; Andersson et al., 2014). The e-therapist support required significantly less interaction than would face-to-face therapy, with the e-therapist allocating approximately 10-15 minutes to respond to emails and check each participant’s progress. The e-therapist was a provisional psychologist (first author), who had close supervision by a clinical psychologist (second author) and training in the treatment of hoarding disorder (second and third author). Participants retained the same e-therapist throughout the program, and, at the conclusion of the
program, the participants were able to have continued access to the program. The ability to review information provided at any time is a significant benefit of bCBT based programs, for example the ability of the participant to access various relaxation recorded exercises at times of distress (Kemmerman et al., 2016).

The program was designed to begin immediately after the group, as fewer days between the end of a treatment program and first appointment of continuation has been suggested to show increased engagement in post-intervention support (Clough & Casey, 2011). Furthermore, the program involves guidance, which has been found to demonstrate significantly better outcomes than treatment without guidance (Andersson & Titov, 2014; Richards, Richardson, Timulak, & McElvaney, 2012; Spek et al., 2007; Palmqvist, Carlbring & Andersson, 2007). An outline of the program structure can be seen in Table 1.

### Table 1.

**Contents in Weekly Modules for Hoarding Online Plus**

<table>
<thead>
<tr>
<th>Module</th>
<th>Content</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>Recap of key themes and information learnt in the group</td>
<td>Engaging in pleasurable activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thinking about goals for this program</td>
</tr>
<tr>
<td>Module 2</td>
<td>Revisiting your hoarding model</td>
<td>Sorting sessions</td>
</tr>
<tr>
<td></td>
<td>Vignette</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Goal setting</td>
<td></td>
</tr>
<tr>
<td>Module 3</td>
<td>Sorting/in-session sorting</td>
<td>Weekly planning</td>
</tr>
<tr>
<td></td>
<td>Anxiety around sorting</td>
<td>Sorting sessions</td>
</tr>
<tr>
<td>Module 4</td>
<td>Maintaining motivation</td>
<td>Sorting</td>
</tr>
<tr>
<td></td>
<td>Meditation</td>
<td>Updating weekly planner</td>
</tr>
<tr>
<td></td>
<td>Stages of change model</td>
<td>Gathering paper for next in-session sorting module</td>
</tr>
<tr>
<td></td>
<td>Useful strategies</td>
<td></td>
</tr>
<tr>
<td>Module 5</td>
<td>Organization of belongings</td>
<td>Practicing organization skills</td>
</tr>
<tr>
<td></td>
<td>E.g., Paper planning</td>
<td>Sorting sessions</td>
</tr>
<tr>
<td>Module 6</td>
<td>Challenging your cognitions</td>
<td>Positive activities</td>
</tr>
<tr>
<td></td>
<td>Values</td>
<td>Thinking about your values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sorting sessions</td>
</tr>
<tr>
<td>Module 7</td>
<td>Managing set-backs</td>
<td>Developing personalized strategies to manage set-backs</td>
</tr>
<tr>
<td></td>
<td>Acquiring</td>
<td></td>
</tr>
</tbody>
</table>
Results

Data analysis

Data was analyzed using SPSS v21 and SPSS Missing Value Analysis 7.5. Missing data was imputed using expectation maximization. A repeated measures Analysis of Variance (ANOVA) was conducted to assess changes in hoarding behavior across three time points - pre-treatment, post face-to-face treatment (12-weeks) and post HoPE (20 weeks) for participants in the HoPE or intervention-waitlist condition. In addition, eight participants provided data at 28 weeks, with four of the participants that were initially in the waitlist condition providing data after involvement in the intervention. Effect sizes were calculated using partial eta squared, with .01, .06 and .14 interpreted as small, medium and large effect sizes, respectively (Cohen, 1988). Clinically significant change was calculated for each participant (CSC; Jacobson & Truax, 1991). Hoarding literature calculates CSC according to two criteria. Firstly, Frost et al. (2004) calculates CSC as a 14-point or greater reduction in scores on the SI-R pre to post treatment, where the pre-treatment score is above 50 and post-treatment score below 50. A more strict criteria proposed by Gilliam et al. (2011) suggests that clinically significant change is indicated with a post-treatment score of 42 or below, which falls between the average of the clinical and non-clinical populations (Frost et al., 2004). CSC was therefore calculated using both methods, to enable potential comparison. Three participants did not provide post-intervention data, and therefore were excluded from the analysis. Post hoc analysis was undertaken where relevant. Participants demonstrated significant improvement on the SI-R from pre-treatment to post-treatment in the group program ($F_{(1, 11)} = 6.20, p=.03, \eta^2_p = .36$). The sample demographics for the involved participants can be seen in Table 2.
Hoarding symptom changes

Analysis of scores on the SI-R revealed no significant main effect for time or time by condition interaction ($F_{(1, 20)} = 3.66, p=.07, \eta^2_{p} = .27$). However, there were evident trends across the three time points, with notable declines from pre-treatment to post-treatment (12 weeks) and pre-treatment to 20 weeks in the HoPE condition, with the percentage of reduction in symptoms from baseline to be 15.62% and 18.86%, respectively (see Figure 1). In comparison, those in the waitlist condition showed an increase in scores on the SI-R at 20 weeks, demonstrating a reduction of

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Participant characteristics N=12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (SD)</td>
<td>55.20 (10.50)</td>
</tr>
<tr>
<td>% female</td>
<td>90%</td>
</tr>
<tr>
<td>Martial status – single</td>
<td>70%</td>
</tr>
<tr>
<td>Education level – Post HS</td>
<td>70%</td>
</tr>
<tr>
<td>Employed</td>
<td>40%</td>
</tr>
<tr>
<td>Previous treatment</td>
<td></td>
</tr>
<tr>
<td>Medication – current use</td>
<td>50%</td>
</tr>
<tr>
<td>Comorbidity</td>
<td></td>
</tr>
<tr>
<td>- MDD</td>
<td>60%</td>
</tr>
<tr>
<td>- GAD</td>
<td>20%</td>
</tr>
<tr>
<td>- OCD</td>
<td>10%</td>
</tr>
<tr>
<td>SI-R &lt;42</td>
<td>20%</td>
</tr>
<tr>
<td>SI-R Total</td>
<td>60.99 (18.25)</td>
</tr>
<tr>
<td>SCI Total</td>
<td>96.74 (40.66)</td>
</tr>
<tr>
<td>DASS-21 total</td>
<td>19.49 (13.28)</td>
</tr>
</tbody>
</table>

Note. MDD = Major Depressive disorder; GAD = Generalized Anxiety Disorder; OCD = Obsessive Compulsive Disorder; SI-R = Savings Inventory Revised, SCI = Savings Cognition Inventory, DASS-21 = Depression and Anxiety Stress Scale.

percentage change from 16.94% (change from pre-post treatment) to 9.78% (pre-treatment to 20 weeks). The effect sizes for participants in the HoPE condition were large, and relative to other published effect sizes within the literature, which is notable, considering the small sample size. SI-R subscales were also examined (clutter, difficulty discarding, acquisition), with the analysis of the clutter subscale revealing a significant effect for time ($F_{(2, 20)} = 4.32, p = .03, \eta^2_{p} = .30$), but with no
interaction between time and condition (see Figure 2.). Scores on the SI-R difficulty discarding and acquisition subscales showed no significant main effect for time or time by condition interaction, however, these subscales also demonstrated trends over the three time points (see Table 3). Finally, analyses of the SCI and DASS showed no effect for time or time by condition interaction (see Table 3).

**Analyses Including Additional Participants Post-Waitlist Period.**

Additional analyses of four participants who undertook HoPE after the waitlist period were compared with the four participants who provided additional data at 28

### Table 3.

**Mean Scores, Effect Sizes and Percentage Change on All Measures for Mixed Model ANOVA**

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>Condition</th>
<th>Pre Mean (SD)</th>
<th>Post Mean (SD)</th>
<th>20-week follow-up Mean (SD)</th>
<th>Within groups analysis (F)</th>
<th>P value</th>
<th>Cohen’s d</th>
<th>% change baseline to pre-post treatment</th>
<th>% change baseline to 20 week follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI-R Total</td>
<td>6</td>
<td>Control</td>
<td>62.81 (15.48)</td>
<td>52.17 (14.65)</td>
<td>56.67 (16.02)</td>
<td>F(1, 20) = 3.66</td>
<td>.07*</td>
<td>.27</td>
<td>1.22</td>
<td>16.94</td>
</tr>
<tr>
<td>SI-R Diff.</td>
<td>6</td>
<td>Control</td>
<td>21.00 (3.74)</td>
<td>17.67 (3.93)</td>
<td>18.00 (3.95)</td>
<td>F(2,20) = 2.75</td>
<td>.09</td>
<td>.22</td>
<td>1.06</td>
<td>16.00</td>
</tr>
<tr>
<td>SI-R Acq.</td>
<td>6</td>
<td>Control</td>
<td>14.00 (7.32)</td>
<td>12.33 (6.71)</td>
<td>12.83 (7.14)</td>
<td>F(2,20) = 1.50</td>
<td>.25</td>
<td>.13</td>
<td>.77</td>
<td>11.93</td>
</tr>
<tr>
<td>SI-R Clutter</td>
<td>6</td>
<td>Control</td>
<td>15.67 (7.81)</td>
<td>13.00 (2.76)</td>
<td>12.67 (3.50)</td>
<td>F(2,20) = 4.32</td>
<td>.03**</td>
<td>.30</td>
<td>1.31</td>
<td>20.28</td>
</tr>
<tr>
<td>SCI Total</td>
<td>6</td>
<td>Control</td>
<td>84.58 (37.32)</td>
<td>81.17 (40.72)</td>
<td>78.00 (36.93)</td>
<td>F(2, 18) = .52</td>
<td>.60</td>
<td>.06</td>
<td>.51</td>
<td>4.03</td>
</tr>
<tr>
<td>DASS</td>
<td>5</td>
<td>Control</td>
<td>16.58 (13.38)</td>
<td>16.20 (16.84)</td>
<td>16.60 (19.98)</td>
<td>F(2, 18) = .05</td>
<td>.95</td>
<td>.01</td>
<td>.20</td>
<td>3.50</td>
</tr>
</tbody>
</table>

*Note. SI-R = Savings Inventory Revised, SCI = Savings Cognition Inventory, DASS-21 = Depression and Anxiety Stress Scale, Diff = Difficulty Discarding; Acq = Acquisition; *Greenhouse Gessier correction; **p<0.05*
Table 4. Mean Scores, Effect Sizes and Percentage Change for Participants who Provided Follow-up Data

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>Condition</th>
<th>Pre Mean (SD)</th>
<th>Post Mean (SD)</th>
<th>20-week follow-up Mean (SD)</th>
<th>28-week follow-up Mean (SD)</th>
<th>Within groups analysis (F)</th>
<th>P value</th>
<th>Cohen’s d</th>
<th>% change baseline to post-treatment</th>
<th>% change baseline to 20 weeks</th>
<th>% change baseline to 28 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI-R Total</td>
<td>4</td>
<td>Control</td>
<td>62.47 (19.97)</td>
<td>48.35 (17.19)</td>
<td>54.75 (20.32)</td>
<td>47.00 (16.02)</td>
<td>F(3, 18) = .03**</td>
<td>.39</td>
<td>1.60</td>
<td>22.66%</td>
<td>12.36%</td>
<td>24.76%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>HoPE int.</td>
<td>62.75 (22.49)</td>
<td>48.00 (8.29)</td>
<td>44.75 (11.00)</td>
<td>46.5 (5.20)</td>
<td></td>
<td></td>
<td></td>
<td>23.51%</td>
<td>28.69%</td>
<td>25.90%</td>
</tr>
<tr>
<td>SI-R Diff</td>
<td>4</td>
<td>Control</td>
<td>21.25 (4.65)</td>
<td>16.63 (3.35)</td>
<td>16.50 (4.20)</td>
<td>14.75 (3.30)</td>
<td>F(3, 18) = .029**</td>
<td>.39</td>
<td>1.60</td>
<td>25.88%</td>
<td>22.35%</td>
<td>29.41%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>HoPE int.</td>
<td>19.75 (6.40)</td>
<td>15.00 (3.30)</td>
<td>16.50 (4.33)</td>
<td>14.75 (3.30)</td>
<td></td>
<td></td>
<td></td>
<td>15.80%</td>
<td>16.46%</td>
<td>25.32%</td>
</tr>
<tr>
<td>SI-R Acq</td>
<td>4</td>
<td>Control</td>
<td>13.00 (9.20)</td>
<td>12.00 (9.06)</td>
<td>15.50 (5.20)</td>
<td>2.38 (2.82)</td>
<td>F(3, 18) = .10</td>
<td>.28</td>
<td>1.25</td>
<td>13.46%</td>
<td>7.70%</td>
<td>+19.23%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>HoPE int.</td>
<td>16.75 (8.30)</td>
<td>12.00 (9.06)</td>
<td>15.50 (8.20)</td>
<td>2.38 (8.2)</td>
<td></td>
<td></td>
<td></td>
<td>28.36%</td>
<td>34.33%</td>
<td>10.45%</td>
</tr>
<tr>
<td>SI-R Clutter</td>
<td>4</td>
<td>Control</td>
<td>28.22 (6.45)</td>
<td>21.25 (6.70)</td>
<td>26.00 (9.13)</td>
<td>18.00 (7.35)</td>
<td>F(3, 18) = .01**</td>
<td>.45</td>
<td>1.81</td>
<td>24.70%</td>
<td>7.87%</td>
<td>36.22%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>HoPE int.</td>
<td>26.25 (8.18)</td>
<td>19.38 (9.48)</td>
<td>19.75 (6.13)</td>
<td>16.75 (2.06)</td>
<td></td>
<td></td>
<td></td>
<td>26.17%</td>
<td>36.19%</td>
<td>26.67%</td>
</tr>
<tr>
<td>DASS</td>
<td>3</td>
<td>Control</td>
<td>15.31 (13.54)</td>
<td>9.67 (9.87)</td>
<td>12.00 (17.44)</td>
<td>18.33 (15.16)</td>
<td>F(3, 12) = .67</td>
<td>.05</td>
<td>.46</td>
<td>36.84%</td>
<td>21.62%</td>
<td>+19.73%</td>
</tr>
</tbody>
</table>
|                | 3 | HoPE int.      | 27.33 (20.75) | 29.00 (10.15) | 26.00 (10.58)              | 26.00 (13.00)               |                          |         | +6.11%    | 4.87%                            | 4.87%                         |}

Note. SI-R = Savings Inventory Revised, DASS = Depression and Anxiety Stress Scale, Diff = Difficulty Discarding; Acq = Acquisition; Blended int. = Blended intervention; **p<0.05

Figure 1. Mean scores on SI-R across the HoPE intervention (n=6) and waitlist conditions (n=6)

Figure 2. Mean scores on the SI-R clutter subscale across the HoPE intervention (n=6) and waitlist conditions (n=6)
weeks. Analysis of scores on the SI-R revealed a significant main effect for time ($F_{(3, 18)} = 3.88, p = .03, \eta^2_p = .39$). Furthermore, post-hoc tests revealed that SI-R total scores significantly decreased from pre-treatment to post-treatment, and post-treatment to 28 weeks ($p<.05$). As evident in Figure 3., there are apparent trends evident between the conditions, with those in the waitlist condition appearing to show a decline in improvement, followed by greater improvement after involvement in the HoPE intervention; however, the time by condition interaction analysis was not significant. These findings suggest that the participants in the waitlist condition appeared to show improvement in hoarding symptoms after involvement in the HoPE condition, in a similar pattern to those immediately involved in HoPE.

**Clinically significant change (CSC)**

According to the criteria of both Frost et al. (2004) and Gilliam et al. (2004), two of the six participants in the HoPE condition met the criteria for clinically significant change at 20 weeks. Two participants met the criteria for clinically significant change in the waitlist condition at 12 weeks, however, these participants no longer met the criteria for clinically significant change at 20 weeks.

**Evaluation of HoPE for all participants**

A repeated measured ANOVA was undertaken to examine the effect of time during treatment for all 10 participants (see Table 5.). When examining pre-post scores and post HoPE scores for all participants in the intervention, there was a significant main effect for time ($F_{(2, 18)} = 4.86, p = .02, \eta^2_p = .35$). Post hoc analyses revealed that there
Table 5.  
*Mean Scores, Effect Sizes and Percentage Change for All Participants who Completed HoPE*

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>Pre Mean (SD)</th>
<th>Post Mean (SD)</th>
<th>Post HoPE intervention Mean (SD)</th>
<th>Within groups analysis (F)</th>
<th>P value</th>
<th>Cohen’s d</th>
<th>% change baseline to post-treatment</th>
<th>% change baseline to 28 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI-R Total</td>
<td>10</td>
<td>62.09 (18.78)</td>
<td>50.60 (13.54)</td>
<td>49.60 (11.67)</td>
<td>F(2,18) = 4.86</td>
<td>.02</td>
<td>.35</td>
<td>18.50%</td>
<td>20.12%</td>
</tr>
<tr>
<td>SI-R Diff.</td>
<td>10</td>
<td>19.40 (5.85)</td>
<td>16.15 (3.96)</td>
<td>16.10 (3.57)</td>
<td>F(2,18) = 3.26</td>
<td>.09</td>
<td>.27</td>
<td>16.75%</td>
<td>17.01%</td>
</tr>
<tr>
<td>SI-R Acq.</td>
<td>10</td>
<td>19.98 (5.70)</td>
<td>16.25 (4.65)</td>
<td>15.30 (4.76)</td>
<td>F(2,18) = .05</td>
<td>.33</td>
<td>1.40</td>
<td>18.67%</td>
<td>23.42%</td>
</tr>
<tr>
<td>SI-R Clutter</td>
<td>10</td>
<td>25.60 (8.34)</td>
<td>20.55 (5.73)</td>
<td>19.60 (5.74)</td>
<td>F(2,18) = 4.91</td>
<td>.05</td>
<td>.35</td>
<td>19.73%</td>
<td>23.44%</td>
</tr>
<tr>
<td>DASS</td>
<td>8</td>
<td>19.62 (14.71)</td>
<td>19.25 (12.15)</td>
<td>19.38 (12.56)</td>
<td>F(2,14) = .00</td>
<td>1.00</td>
<td>.001</td>
<td>1.89%</td>
<td>1.22%</td>
</tr>
</tbody>
</table>

Note. SI-R = Savings Inventory Revised; DASS-21 = Depression and Anxiety Stress Scale, Diff = Difficulty Discarding; Acq = Acquisition; **p<0.05.

There were significant differences in scores from pre to post-treatment and from pre-treatment to post HoPE, suggesting that all participants who were involved in the HoPE showed continued improvement from pre-treatment (see Figure 4).

*Figure 3. Mean scores on the SI-R across four time points for the HoPE intervention (n=4) and waitlist conditions (n=4)*
Figure 4. Mean scores for all participants after undertaking the online intervention (N=10)
Discussion

The aim of this study was to examine the efficacy of a ‘blended’ format of treatment (HoPE) for hoarding disorder - a combination of face-to-face group therapy and online therapy. Contrary to the hypothesis, there were no significant differences over time on the SI-R Total score between the HoPE group and waitlist control condition. However, there did appear to be trends evident in the data, showing a distinction between the HoPE group and the waitlist control. These trends seem to suggest that participants in the HoPE condition showed continued improvement in hoarding behavior whereas participants in the waitlist condition appeared to have an increase in hoarding behavior after the group. The HoPE condition also produced a large effect size on the SI-R total, which is comparable to other studies, with improvement ranging from 10-21% in group CBT (Muroff, Steketee, Himle, & Frost, 2010; Muroff et al., 2009, Steketee et al., 2000). These findings appear to provide support for the notion of ‘blended’ therapy, and are consistent with findings from other ‘blended’ treatment formats which have examined the benefits of continued maintenance treatment or ‘aftercare’ post-inpatient discharge (Bauer, Wolf, Haug, & Kordy., 2011; Ebert, Tarnowski, Gollwitzer, Sieland, & Berking, 2013; Golkarammay, Bauer, Haug, Wolf, & Kordy, 2007; Kordy et al., 2011). Findings from these studies have highlighted the ability of internet-based programs to sustain treatment benefits post-discharge from face-to-face treatment. The lack of significant differences between groups are likely due to the small sample size, and further investigation with a larger sample size is warranted.

Examination of the subscales found that there was a significant difference between the ‘blended’ intervention group and waitlist control group from post f2f treatment to post HoPE (20 weeks) on the clutter subscale only. These findings suggested that those who were involved in the HoPE condition showed further decline in their levels of clutter, whereas those in the waitlist condition appeared to demonstrate an increase in clutter scores at 20 weeks. Clutter showed the greatest improvement among all the measures, with a 27.58% change from pre-
treatment to 20 weeks in the intervention condition, and a strong effect size of $\eta^2_p = .30$. This significant reduction in clutter is interesting, given that previous studies have highlighted that clutter generally shows weaker improvement than the other SI-R subscales (Tolin et al., 2015). These findings appear to support the notion that a greater duration of treatment for hoarding may be a key factor in a further reduction in clutter (Fitzpatrick et al., unpublished). Tolin et al. has also highlighted the importance of extended treatment, due to the timely nature of de-cluttering. The 20-week duration of blended therapy appears to enable continued support, in a format that may be more accessible to both consumers and clinicians with numerous time and monetary constraints. A program of this style may help meet the future demand and/or requirement for efficacious treatment programs for hoarding, providing extended access to resources and giving continued engagement.

There were no main effects of time and no time by condition interaction evident on scores on the Savings Cognition Inventory. These findings are inconsistent with previous research, which has found significant reduction in scores on the SCI, highlighting the importance of challenging beliefs and attachments in the treatment of hoarding (Frost et al., 2011a, Frost et al., 2012). The lack of significant findings may emphasize the difficult nature of challenging beliefs, and suggest that the greater focus on behavior change may eventually result in the challenging and reconstruction of core beliefs. The lack of significant changes in SCI may also be an indication of insufficient power.

There were no main effects of time nor a time by condition interaction of scores on mood as measured by the DASS. However, these findings appear to be consistent with previous research, which has found that mood has not followed the pattern of symptom change seen on the SI-R (Frost et al., 2011a; Frost et al., 2011b). A potential explanation of this may be due to the anxiety/stress provoking nature of undergoing treatment, particularly when treatment is evoking high levels of anxiety when participants are faced with decisions around discarding or non-acquisition (Timpano, Keough, Traeger, & Schmidt, 2011). It is not uncommon for anxiety
and stress to be heightened when presenting for CBT for any condition, as the individual is generally aware that they will have to confront uncomfortable emotions. Indeed, both stress and anxiety rose (non-significantly) for both conditions, which appear to be consistent with the sensitive nature of the treatment/sorting. Given the sensitivity of individuals with hoarding symptoms to anxiety and other mood symptoms (Medley, Capron, Korte, & Schmidt, 2013; Phung, Moulding, Taylor, & Nedeljkovic, 2015; Timpano, Buckner, Richey, Murphy, & Schmidt, 2009; Wheaten et al., 2011), these findings may suggest a role for emotional regulation strategies in treatment, in order to provide individuals with more support in terms of regulating their stress or anxiety, rather than their avoiding decluttering.

The hypothesis that all participants, regardless of waitlist periods, would show a decline in scores on the SI-R after engaging in the online intervention was supported. The strong effect sizes demonstrated are comparable to other studies, particularly those with a longer duration (see Fitzpatrick et al., unpublished). These findings provide support for a ‘blended’ format of treatment, with significant declines in the SIR total, clutter and acquisition subscales. Additional research into an integrated form of treatment, providing greater accessibility and in a cost effective format appears to be advantageous.

**Clinical implications**

The notable trends, significant differences between groups on the clutter subscale, and improvement when examining overall participants suggest that participants showed benefit from involvement in HoPE. This highlights the potential for ‘blended’ therapy to be further examined and utilized, with its many practical advantages, such as continued support, in an accessible and cost effective format. One of the main drivers in the rationale of this study was to be able to develop a program that is congruent with the current healthcare model in Australia, where government rebates for psychological services are provided, but only for a limited number of sessions (originally 12, now reduced to 10); although the study is relevant to any system where access to services is limited by cost or accessibility. As we have seen in the
hoarding literature to date, hoarding is a pervasive problem, and it requires significant time in
treatment, particularly to address the large amounts of clutter. As such, knowledge of the
benefits and usability of this novel form of treatment may assist in overcoming barriers due to
limited accessibility of treatment – that is, a limited number of available and trained therapists,
difficulty taking time off work, and associated stigma relating to mental health concerns.
Internet-based support makes treatment flexible, and enables treatment without rigid time
constraints (Carroll & Rounsaville, 2010; Hedman, 2014). Furthermore, enhanced accessibility
enables access to content at times of distress, for people who are rurally/regionally located or
who have physical ailments (Carroll & Rounsaville, 2010). Knowledge of the benefits of
continued support may enable mental health practitioners to pursue alternative means of
continuing treatment and help prevent relapse of clients.

Another important factor in the provision of treatment is cost. While the initial development
of online programs incurs costs, as does development of secure online systems to provide the
programs, once developed, computer-assisted therapies, especially with therapist assistance, are
generally more cost-effective to deliver, as responding to queries/email assistance takes
significantly less time per session (McCrone et al., 2004). Of course, reduction in travel and
time off work for clients if they are employed further adds to indirect cost-benefits for the
clients. Furthermore, various inconsistencies seen in clinical practice in standardized treatment
may be less present in the standardized online programs, achieving a similar level of quality for
each individual (Carroll et al., 2008). This is particularly important for hoarding, where the
number of trained specialists is quite limited. Therefore, continued research into “blended”
programs may enable clinicians to provide support to a greater number of clients, due to the
lower time commitment.

Some might question why there needs to be a face-to-face component, and whether there is
value in focusing instead on purely iCBT based therapy program. It is important to note that the
face-to-face component in the treatment of hoarding is a significant component of treatment. It
enables accountability that is likely to enhance commitment and adherence, provides the opportunity for the client to obtain support when faced with challenges, allows for encouragement from a clinician, particularly when small gains are made, and it enables tailored pacing and the ability to ask questions (Manber, Simpson & Bootzin, 2014). Therefore, we believe that the ‘blended’ format enables the individuals with the benefits of both aspects of treatment.

Limitations and future research

There are a number of limitations in this study. Firstly, the waitlist control condition was non-randomized, and reflected the order of entry into the study. Furthermore, like other studies, this study relied only on self-report data, with no clinician rated measure administered after the intake interview. Therefore, it is possible that participants have overemphasized or underemphasized their symptoms. Other notable limitations include the low sample size, and the involvement of mostly female participants, although this is reflective of a majority of other hoarding studies (Moulding et al., 2015).

Future research examining treatment that is tailored to the client would be beneficial. Current research in iCBT programs is examining the benefits of tailoring programs according to age/gender and other factors (Berger, Boettcher, & Caspar, 2014). Enhancing the personalization of the online component of ‘blended’ therapy may improve engagement. Prochaska and Norcross (2001) highlight the importance of tailoring treatment programs, especially to a participants’ stage of change, suggesting that this can enhance the outcome, and increase compliance and completion. In addition, future research examining the most effective format to structure ‘blended’ treatment would be beneficial (stepped care mode, booster program, intermittent – between sessions), in addition to the level of involvement of the mental health practitioner, with previous research highlighting the importance of therapeutic alliance in iCBT.
Conclusion

A novel treatment approach, combining face-to-face therapy with an internet intervention, can provide the consumer with a more cost-effective and accessible treatment program, with added benefits of maintaining therapeutic alliance and providing the client ongoing support (Romjin et al., 2015). Furthermore, a treatment program of this format could potentially help the person maintain the gains of face-to-face treatment (Ebert, Tarnowski, Gollwitzer, Sieland, & Berking., 2013). Although there is limited research on the combination of both face-to-face and online interventions, it does appear that blended therapy may be a viable and attractive alternative to solely face-to-face or solely online-driven programs. It is therefore hoped that this study provides further impetus for development and evaluation of such programs, particularly for chronic disorders that require ongoing therapeutic support, such as hoarding disorder.
CHAPTER SIX: INTEGRATED DISCUSSION

6.1 Chapter guide

The objectives of this dissertation were to explore the efficacy of current treatment modalities for hoarding disorder, to investigate the long-term efficacy of a CBT based group therapy program, and to develop and evaluate a novel treatment approach, combining face-to-face and online treatment. Furthermore, the intention of this dissertation was to contribute to the scientific understanding of hoarding disorder, in terms of the efficacy of treatment and suggestions for future research. Based on this, the specific research aims included:

• To evaluate the efficacy of pharmacological, behavioral and cognitive-behavioral interventions for individuals with Hoarding Disorder

• To examine the efficacy of hoarding specific treatment on secondary outcomes

• To examine potential moderating effects on the efficacy of hoarding specific treatment, including of the duration of intervention (weeks), intensity of intervention (hours), pre-treatment severity, mean age and number of home visits.

• To investigate the efficacy of CBT group therapy at a 12-month follow-up period, including examining predictors for treatment outcome.

• To develop and evaluate the efficacy of a ‘blended’ format of treatment in continuing to improve hoarding symptoms using an online program post face-to-face group CBT.

This discussion attempts to summarize and synthesize the main findings of each of the empirical studies conducted. The findings from each paper are discussed within relevant themes, and within the context of the overall thesis goal. The discussion also aims to highlight the significant contributions of this thesis to knowledge of current and novel treatment approaches in hoarding. Furthermore, this discussion attempts to highlight potential implications of this body of work, particularly in terms of treatment development. Limitations and future directions of this research are also discussed. This chapter then concludes with a brief overview of findings.
6.2 Summary of key findings

The findings across the three studies broadly supported the effectiveness of CBT treatments as well as the importance of moderating factors such as treatment duration and ongoing support in improving treatment outcomes. Importantly, the current findings also provided support for the effectiveness of blended treatments in providing more accessible and effective treatment for HD.

The aim of study one was to extend on previous meta-analyses to examine the efficacy of current treatment for hoarding, comparing various modalities in addition to predictors of treatment outcome. Although the findings demonstrated treatment to be effective, the aggregate effect size appeared to be lower in controlled studies when compared to repeated measures research, suggesting potential over-inflation of the effect size in existing research. When examining predictors of treatment outcome, the meta-regression demonstrated that greater duration of treatment in weeks predicted a stronger effect size. Interestingly, number of sessions or hours in therapy was not significant predictors of treatment outcome. The results from this study significantly contribute to our understanding of hoarding disorder, and also contribute to the overarching thesis goal depicting various factors that are of benefit of existing treatment trajectories.

Study two attempted to build on the previous findings to investigate the sustainability of treatment effects for a 12-week group therapy program, and whether there is continued improvement post-treatment. Finding suggested that participants demonstrated a continued decline in hoarding symptoms, however, initial significant changes from pre-treatment to post-treatment were not significant at a 12-month follow-up period. In addition, only one participant showed clinically significant change at follow-up. Findings did show significant change in the subscale difficulty discarding from pre-treatment to 12-month follow-up, consistent with previous literature emphasizing difficulty discarding as the key feature of treatment programs. These findings appear to contribute to the overarching thesis goal, and findings from study one,
by highlighting that there may still be a requirement for additional support in treatment to achieve sustained treatment effects in overall hoarding severity and other secondary outcomes such as overall functioning, depression and anxiety.

Building on the findings in the first two studies, study three included the development and pilot evaluation of an online CBT-based maintenance program for hoarding to be used in combination with face-to-face treatment. This program sought to provide individuals with a combination of face-to-face treatment and online therapy, with a total of 20 weeks of therapy. Although there were no significant differences between groups over time, there was a distinct trend evident in the data, suggesting that the blended condition demonstrated a greater improvement in hoarding symptoms when compared to the waitlist condition. Findings demonstrated significant differences between groups on the clutter subscale from post-treatment to 20 weeks, suggesting that those in the blended condition showed greater improvement in levels of clutter than compared to those in the waitlist condition. Finally, when examining all participants, including those who undertook the online program following waitlist period, participants all showed a significant decline from pre-treatment, post-treatment and post online intervention.

6.3 Integrated discussion

The findings from all studies appear to contribute to the understanding of the treatment of hoarding disorder by highlighting various strengths and weaknesses of existing treatment trajectories. Integrated findings will be discussed in the context of common themes present throughout the dissertation. These include findings associated with the comparability in treatment modalities, duration of treatment, and sustainability of treatment effects, other factors such as age and cognition, and finally, barriers to accessing treatment.

6.3.1 Comparability of treatment modalities.

Findings from this dissertation have suggested that current available treatment modalities for hoarding are comparable in reducing overall hoarding severity. These findings are
consistent with previous research (Tolin et al., 2015) emphasizing comparability between individual and group CBT, as well as clinician and non-clinician administered treatment. This dissertation also found comparability in psychological and pharmacological interventions, which had not previously been compared in hoarding literature. These findings are important for the future provision of psychological services, in terms of treatment accessibility, cost, and our current understanding of the various mechanisms in treatment that are effective.

With individual CBT previously classified as the gold standard of treatment, the comparable nature of group and individual CBT is interesting, and may be a function of a range of factors, including group processes. Although group therapy can be less individualized, group process, including factors such as mutual aid (where group members help other group members), universality (normalizing the illness), cohesion (connectedness experienced within a group setting), and social contact are suggested to enable a reduction in feelings of loneliness, significant stigma, and attempt to enhance wellbeing (Schmalish, Bratiotis, & Muroff., 2010). GCBT is said to be a cost-effective and efficient form of therapy, enabling more individuals to access treatment in any one period. Furthermore, access to clinicians with training in administrating CBT for hoarding is relatively rare, suggesting that GCBT is an efficient use of available resources (Schmalish, Bratiotis, & Muroff, 2010; Weissman et al. 2006). Group processes may be a significant factor in improving overall hoarding severity, which also capitalizes on additional resources such as peer support (Schmalish et al., 2010).

The comparability of clinician administered CBT and peer-facilitated bibliotherapy was another finding that may have a wide range of implications. The investigation of bibliotherapy, as a cost-effective alternative or addition to therapy led to the development and evaluation of peer-facilitated bibliotherapy support groups. These non-clinician administered groups focus on content framed by the key chapters in the book “Buried in Treasures”. Not only did study one suggest that the efficacy of peer-facilitated bibliotherapy was comparable to individual CBT, group CBT and pharmacotherapy, but the study conducted by Frost, Ruby, and Shuer (2012).
was also one of the few studies to show a strong effect size in reducing hoarding related beliefs. The comparability of this form of intervention may enable a wider dispersion of treatment for hoarding, with the potential of a treatment program that is a lower cost and can be implemented independently or alongside treatment (Frost et al., 2012) or an alternative when limited available funds for treatment.

The comparability of treatment effects in psychotherapy and pharmacotherapy raises some important considerations in the neurobiology and theoretical understanding of hoarding disorder. Pharmacotherapy has previously demonstrated mixed findings due to studies conducted on largely OCD samples (Brakoulias et al., 2015). These comparable findings provide a strong platform for additional randomized controlled research to be conducted to further investigate efficacy and comparability, particularly investigating the impact of venlafaxine and paroxetine. This knowledge can significantly impact the understanding of hoarding treatment, and the potential for greater accessibility. In addition, theoretically, these findings may indicate that neurological factors may have a role in maintaining hoarding disorder, and support the need for further research to increase our understanding of the disorder. Finally, a combination of a range of abovementioned therapies may improve access to a greater duration of treatment, in a format that may be effective, more cost effective and more accessible.

6.3.2 Duration of treatment

This dissertation provides support for the importance of longer duration of treatment when treating hoarding disorder. The meta-regression from study one found weeks engaged in therapy to be a significant predictor for overall hoarding severity. These findings are important, given that there is continued pressure to reduce therapy duration, whilst still providing high quality and efficacious treatment (Shapiro et al., 2003). As proposed by Tolin et al. (2015), the treatment of hoarding disorder remains in a stage of a ‘work in progress’, and understanding the significant components that are beneficial in treatment, in addition to determining the dose-
response relationship is essential. Generally, it appears that the dose-response relationship is determined when examining at what stage the participants will reach clinically significant change in treatment (Hansen et al. 2002). Other studies investigating dose-response in psychological treatment found individuals require from 13 to 18 sessions for 50% of participants to achieve symptom alleviation or clinically significant change (Hansen et al., 2002). However, within hoarding studies, it appears that with 20+ therapy sessions, participants are still not able to reach that clinically significant change, with research suggesting that only a minimal amount of studies demonstrated pre-post scores indicative of clinically significant change (Tolin et al., 2015). Interestingly, the importance of duration in weeks, rather than hours of therapy or number of sessions may therefore highlight the idea that individuals with hoarding disorder do require time in treatment, particularly with the time consuming and lengthy nature of de-cluttering. In order to achieve a clinically significant reduction in clutter, it has been suggested that “successful de-cluttering may require, for many, more time and intervention beyond that represented in most CBT trials.”(Tolin et al., 2015; p163). Interestingly, findings from the meta-analysis of pharmacotherapy in hoarding suggested that the average treatment duration of 12 weeks was not sufficient for the chronic nature of hoarding, highlighting the importance of understanding the ‘optimal treatment dosage’ (Brakoulias et al., 2015). It is important to acknowledge the chronic and disabling nature of hoarding disorder, and that a greater focus on understanding the dose-response requirements of treatment to reach that non-clinical level is still yet to be investigated. However, there are a number of barriers that prevent the ability to provide longer treatments. These include resource limitation, in terms of the availability of trained clinicians to provide evidence-based treatment for hoarding, accessibility, and affordability of treatment. These limitations do highlight the rationale for prior focus on evaluating shorter term treatments, particularly given the common demographic of those with hoarding disorder, with a higher number unemployed, and experiencing a range of chronic health conditions. Bridging this gap between providing longer treatment to improve treatment
outcome, and providing treatment that is accessible and cost effective does emphasize the importance of innovative treatment options, such as a blended form of therapy, face-to-face and online treatment.

6.3.3 Sustainability of treatment effects.

Although this dissertation has highlighted that current treatment for hoarding is efficacious, it is still unclear whether these treatment effects are sustained in the longer term. Results from study two found that a 12-week group CBT program did not demonstrate statistically or clinically significant changes in overall hoarding severity at a 12-month follow-up. These findings are consistent with other research, (e.g., Ayers et al., 2011), that found that the three treatment responders at post-treatment demonstrated relapse at the 6-month follow-up period. In addition, Muroff et al. (2013) found minimal improvement in participant scores at a 12-month follow-up period, however, participants did demonstrate maintenance of treatment gains. Taken together, these findings appear to show lack of continuing improvement following the termination of treatment, however, in some cases, participants sustaining improvement. As previously mentioned, the improvement demonstrated in current clinical trials generally fail to reach a non-clinical level, with a majority of participants remaining symptomatic (Frost, 2010). These findings therefore raise important questions regarding our current understanding of treatment, and whether it is sufficient. Tolin et al. (2015) proposed that increased support might result in continued improvement, as a recent long-term outcome study (Muroff et al., 2013) suggests that some symptoms, particularly clutter, are not likely to improve post-treatment. Findings from the meta-analysis regarding treatment duration may be an important next step in investigating what factors may increase the likelihood of sustained treatment gains. However, it does appear important to investigate other alternative factors that may improve the likelihood of treatment success beyond the conclusion of treatment.

6.3.4 Other factors to consider
**Findings associated with age.** The finding that age demonstrated a negative relationship with treatment outcome is consistent with existing literature suggesting that age can be a potential impediment to treatment success. For example, Ayers et al. (2011) found that CBT for hoarding in older adults had minimal clinical impact on hoarding behaviors and secondary outcomes. Whether the negative relationship with age and treatment outcome is influenced by physical capabilities or neurological deficits is also important to consider in treatment.

Treatment programs, such as cognitive rehabilitation combined with behavior therapy (Ayers et al., 2014) may be a continued avenue of research, targeting neurocognitive deficits in addition to general CBT principles. This study, found double the response rate to treatment, in overall hoarding severity, when compared to previous research in geriatric hoarding (Ayers, Wetherell, Golshan, & Saxena, 2011). With hoarding disorder suggested to be three times higher in older adults when compared to younger adults, future investigation into efficacious treatment for older adults is necessary (Samuels et al., 2008)

**Findings associated with cognition, depression, anxiety and stress.** Findings from studies one, two and three all appear to suggest that cognition in hoarding, demonstrated limited success in treatment. These findings are also consistent with findings from Muroff et al. (2009) who also found minimal improvement in cognition. With a treatment protocol that is largely focused on cognition, it remains unclear as to why there is a limited shift. Some research has suggested that the long-term nature of hoarding, suggested to begin in early teens, may be a large factor in the limited cognitive change over 12-24 weeks of treatment (Tolin et al. 2015).

Wheaton et al. (2008) suggests that the high level of impairment, higher level of comorbid disorders, and greater symptom severity, particularly when compared to non-hoarding individuals, plays a prominent role in the limited cognitive shift. It does therefore appear that cognitive change may take a greater amount of time with this specific population, particularly as new information is practiced and integrated. Finally, the egosyntonic nature of hoarding related beliefs may have played a role in the limited cognitive shift. Egosyntonicity refers to
thoughts or beliefs that are consistent with an individual's self-view, values and personality (Belloch, Roncero, & Perpina, 2012) and is evident in a range of impulse control disorders (ICDs), that share similarities with hoarding including: compulsive gambling, compulsive buying, and a range of other ICDs (Steketee & Frost, 2003). The egosyntonic nature of beliefs in hoarding significantly differs to what is evident in a range of other disorders, for example, OCD. OCD beliefs are traditionally ego-dystonic, where an individual recognizes the beliefs as illogical and distressing, and wants to alleviate them (Gilliam & Tolin, 2010). Whether egosyntonicity is hoarding beliefs plays a role in limited cognitive shift in treatment may be an interesting area for future research. There therefore appear to be a range of potential explanations for the lack of cognitive shift evidence in some treatment outcome studies, whether there is potential for extended treatment programs to enhance potential cognitive shift or further research into the egosyntonic nature of beliefs, and integrating this key component into treatment trajectories.

In addition, it appears that scores on depression, anxiety and stress also have shown minimal improvement in treatment. Novel research has suggested that the lack of reduction in scores of depression, anxiety and stress may also be linked to a limited capacity in regulating emotions. Research suggests that the avoidance of discarding is an attempt to avoid experiencing a negative emotional state, resulting in a learnt pattern of negative reinforcement (Phung et al., 2015; Timpano, Shaw, Cougle, & Fitch, 2014). Furthermore, it has been suggested that those with hoarding symptoms are more likely to have difficulties in tolerating distress, in addition to a greater fear of symptoms related to anxiety (Timpano et al., 2009). These findings suggest that individuals with hoarding may not only have a greater difficulty in tolerating emotions, but are also conditioned to use avoidance strategies as a way of avoiding negative emotional states. Therefore, the minimal treatment response in scores of depression, anxiety and stress may be due to the fact that, without the usual avoidant response, the individual may experience more heighten emotions. The limited shift in cognition, depression, anxiety and
stress may play a role in the lack of long-term sustainability of treatment, with the difficulties in distress resulting in relapse. This research highlights the importance of increasing focus on emotional aspects in hoarding, in an attempt to improve effectiveness, and sustainability of treatment outcomes. Additional research into emotional regulation in hoarding, and potentially integrating this into the treatment protocol may be beneficial and result in higher efficacy of treatment.

6.3.4 Barriers to the provision of treatment

Although there are a range of innovative research findings in the treatment for hoarding disorder, it is important to acknowledge the potential barriers to the provision of these programs. Barriers such as high treatment costs and challenges in accessing hoarding specific treatment can result in many not receiving adequate care. Although it appears that individuals will benefit from a greater duration, it is important to consider a format in which this can be implemented, particularly in accordance with the Australian Medicare model. As previously mentioned, the Medicare model enables individuals to claim a rebate for up to 10 individual psychological sessions and 10 group sessions. Alternative models of providing greater access to therapy have been seen in the United Kingdom with the stepped care models of therapy (Bower & Gilbody, 2005). This involves individuals to be assessed and allocated to treatment programs according to an individual’s presentation, whether this involves initial online CBT, CBT-based bibliotherapy, individual therapy or a combination of therapeutic modalities. A recent meta-analysis examining stepped care in the treatment of anxiety and depression found that stepped care treatment demonstrated significantly better efficacy than care as usual (CAU) and in a reduction of symptoms of anxiety, in addition to higher treatment response rates of anxiety disorders (Yan-Yee Ho, Yeung, Ho-Hee Ng, & Chan, 2016). Although there were no significant differences between stepped care and CAU in prevention of anxiety/depression, or a reduction in depressive symptoms, this form of treatment has great potential to increase the accessibility of treatment and minimize the existing burden on available resources. Increased
knowledge into the varying formats of stepped care, and potential benefits, may enhance our current ability to provide evidence based efficacious treatment to the Australian population.

Study three highlighted the benefit of continued access to treatment using a ‘blended’ model of care, with face-to-face and online psychotherapy. This model of care may be the future in psychological therapies, to assist in continued access to treatment, with reduced clinician time and potentially reduced costs. With a clear, significant decline in overall hoarding symptoms for all participants involved in the program, it is important for this form of therapy to be further investigated. Providing blended therapy also enables treatment ‘in home’, which was reported to be beneficial, and consistent with findings from other studies who implemented home visits (Muroff, Steketee, Bratiotis, & Ross, 2012).
6.4 Implications

6.4.1 Implications for treatment

Based on the research presented in this dissertation, there appears to be a wide range of implications for our understanding of the treatment of hoarding disorder. Study one demonstrated strong efficacy for CBT group, individual, bibliotherapy and pharmacotherapy in reducing overall hoarding severity, however, findings from all papers also demonstrated that there is limited data suggesting long-term efficacy, limited clinically significant change evident amongst the studies, and minimal change evident in scores of cognition, depression, stress and anxiety. Taken together, these findings highlight the need to re-evaluate the status of hoarding treatment. Research examining the individual components of CBT for hoarding does appear to be minimal (Wheaton, 2016; Williams & Viscusi, 2016). Furthermore, the treatment protocol does not appear to factor in other challenges often seen in the treatment in hoarding, for example, attention problems or poor insight. The basis of the structured treatment program for hoarding disorder was initially formed using case reports, which may highlight the need for additional evaluation. Knowledge on which practices are most effective is important, particularly to then allow tailored treatment programs to suit each client (Williams & Viscusi, 2016). Although this standardized model is useful for distributing to treatment providers, it is necessary for additional research to be undertaken to understand the essential treatment components and most beneficial structure of therapy (Wheaton, 2016).

Increasing research has begun to highlight a range of areas that may benefit hoarding treatment trajectories. Firstly, research has highlighted the importance of building on CBT to integrate additional concepts, such as cognitive rehabilitation and exposure therapy (Ayers et al. 2014). As previously mentioned, findings using cognitive rehabilitation in older adults demonstrated promising results (Ayers et al., 2014). In addition, CBT combined with cognitive remediation had a greater focus on executive functioning and tapering treatment to the individual, which has been suggested to be an important future direction for treatment (Singh &
Jones, 2013). Secondly, research has also suggested a greater focus on neurocognitive deficits may be a way to improve the efficacy of CBT. A study conducted by Tolin (2011) suggested that various neurocognitive impairments (for example, executive functioning, attention or memory) may play an influential role in individuals with hoarding disorder remaining symptomatic post-treatment. Furthermore, results evident in study one do support the efficacy of pharmacotherapy, so a combination of treatment targeting cognition, behavioral factors, as well as neurocognitive deficits may prove beneficial. Thirdly, research has suggested that the CBT model may have constraints in engaging individuals with hoarding disorder, with its specific focus on beliefs and behavior (Singh & Jones, 2013). Some have suggested the importance of the integration other treatment components, such as experiential tools, and emotional regulation (Singh & Jones, 2013). An greater mastery of regulating one’s emotions may have an impact on behavioral avoidance.

Fourth, findings suggest that the treatment appears to be efficacious in terms of overall hoarding severity, but efficacy in terms of measures of cognition and secondary outcomes such as depression, stress and anxiety do not appear to be as strong, as reflected in findings from study two and three, and other studies (Frost et al., 2011; Steketee et al., 2010). These findings may suggest that treatment could have a greater focus on cognitive change and overall functioning. However, these components may also shift with greater exposure to treatment. There may be potential for treatment programs to integrate a greater focus on cognition, along with symptoms of depression, anxiety and stress.

Finally, client feedback regarding the acceptability of hoarding treatment and services from a study conducted by Rodriguez et al. (2016) highlighted the importance of personalization of care, being held accountable and a belief that treatment works. Ensuring adequate personalization of care is essential, and therefore various adjustments to standardized treatment of hoarding may be important, to then ensure continued engagement and rapport.
Future research examining client experiences in treatment may be useful in enhancing treatment delivery and effectiveness.

**Providing a greater duration of therapy.** Knowledge of the influence of duration of treatment rather than hours of therapy may significantly inform the treatment trajectories of clinicians. There a range of viable options for clinicians to tailor their treatment to the presentation of hoarding disorder. This may involve structuring treatment to enable cover for a longer period of time, without increasing number of sessions. This can be done by providing treatment for changing periods, from weekly, to fortnightly and monthly, in accordance with stage in treatment. This is particularly important if it is to be appropriate for the current psychotherapy Medicare model in Australia (10 sessions). For example, treatment may begin weekly, then transition to fortnightly during the initial stages of exposure and response prevention work, where the need for guidance is balanced with sufficient time to engage in decluttering and organizing tasks. Then treatment could transition to monthly, as learned skills are applied with therapeutic contact to troubleshoot and provide ongoing support. Evaluation of this form of providing treatment is important, as it appears to be a common strategy present within the community of private psychologists, to enable an individual a longer-term access to care.

**Integration of a range of treatment formats.** Although there are a range of constraints involved in providing longer-term therapy, such as accessibility and cost, this dissertation suggests that there are a range of additional options. Options of providing longer-term therapy may involve the integration of bibliotherapy-based therapy with a support group or using a ‘blended’ format of care, and combining face-to-face support with e-therapy. Although previous benefits of online treatment for hoarding has been made evident (Muroff et al., 2010), knowledge of the benefits of blended care may provide clinicians with a novel platform to create their treatment trajectories, which may not be limited to hoarding presentations. With the increasing awareness of e-therapy, more research demonstrating efficacy, feasibility and
potential for cost-effectiveness and increased accessibility may assist clinicians in trialing these forms of treatment. Furthermore, the integration of additional supports, such as social work and OT may also improve access to treatment in a more affordable manner.

6.4 Limitations and directions for future research

A range of limitations were apparent in this overall dissertation. One of the most prominent limitations was the small sample size, particularly in papers two and three. A small sample size increases the risk of a type 2 error, potentially accepting the null hypothesis when it is, in fact, false (Miles & Banyard, 2007). Future research with greater sample sizes may have the potential to strengthen the results found and may demonstrate stronger treatment effects.

This dissertation also highlighted the limited quality of currently available treatment outcome literature in hoarding. It does appear that the area is significantly lacking in randomized controlled trials, so an understanding of treatment efficacy should still be interpreted with caution, given that the majority of research is using a repeated measures design. Furthermore, the quality assessment of studies demonstrated other methodological weaknesses, including the low sample sizes, clinical assessments and therapy carried out by the same clinician, and the lack of assessing the adherence to treatment protocols (Tarrier & Wykes, 2008). Knowledge of the methodological weaknesses in hoarding treatment outcome studies is important, as it creates further rationale and justification for additional research. Therefore, future research using randomized controlled trials and stronger methodology is important, to gain a greater understanding of the factors that result in an efficacious treatment outcome, and a sustainable treatment outcome.

Finally, study three examined the development and efficacy of a “blended” format of CBT + iCBT. This program was evaluated as a pilot program, and involved a range of unforeseen delays. These delays were generally a result of technical problems, such as difficulties with online modules loading, problems with coding, and challenges in uploading content. These difficulties, although generally minimal, may have had an impact on engagement, affecting the
ease of working through the modules for some participants. As research in online therapy is still in its early stages, there does not appear to be available literature that has examined the impact of technical difficulties on engagement in treatment. These challenges are a realistic limitation of research using programs on an online platform, however still a very important factor to be further investigated. Additional research into the feasibility and efficacy on blended models of care in Australia would prove beneficial, particularly investigating potential challenges in engagement from technical difficulties encountered in e-therapy.

Finally, the use of subjective measurement was a limitation in this dissertation. The project relied on an accurate indication of the participants’ progress using a range of self-report measures. Research in hoarding utilizing clinician rating scales, in addition to participant rating scales may prove beneficial. However, evaluating an individual’s progress using clinician rating scales in hoarding would require home visits, which may not be feasible. Additional research, using clinician rating scales for long-term outcome trials, and ‘blended’ therapy conditions would be beneficial, in ensuring that there is a more objective measurement available.

Conclusions

This dissertation aimed at examining the effectiveness of current treatments for hoarding disorder, and in particular, examining factors that may improve long-term effectiveness and accessibility of psychological treatments. Overall findings appeared to highlight various strengths and weaknesses in available treatment trajectories. Strengths appeared to be evident in the high level of efficacy seen in the various treatment outcome studies. Furthermore, it appeared that there is a potential for novel treatment programs, such as HoPE to be efficacious and enable cost effective and accessible treatment. However, this dissertation appeared to demonstrate that current treatment for hoarding has a range of limitations, particularly given that a majority of participants remain symptomatic post-treatment. Furthermore, the longevity of improvements in treatment is also questionable, as demonstrated in a range of long-term
treatment studies, and study two in this dissertation. It still appears that the treatment for hoarding disorder remains in its early stages of development and evaluation. Novel approaches, examining cognitive remediation, and new advancements in neuropsychology may provide greater knowledge for the potential direction of treatment.
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doi:10.1016/j.cbpra.2010.01.009


doi:http://dx.doi.org/10.1016/0005-7967(95)00043-W


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*Journal of Anxiety Disorders, 22*(2), 243-252. doi:10.1016/j.janxdis.2007.01.015


Appendix A: Ethics approval for all studies

Subject: SHR Project 2014/335 - Ethics clearance
Date: Wednesday, 7 January 2015 at 12:10:51 pm Australian Eastern Daylight Time
From: Astrid Nordemann
To: Maja Nededjovic
CC: FES Ethics, Molly Fitzpatrick
To: Dr. Maja Nededjovic, FHAD

SHR Project 2014/335 Treatment of hoarding disorder: longer-term treatment outcome of CBT-based group program for hoarding disorder
Dr Maja Nededjovic, Molly Fitzpatrick (Student) - FHAD
Approved duration: 07-01-2015 to 07-02-2016 [adjusted]

I refer to the ethical review of the above project protocol by Swinburne’s Human Research Ethics Committee (SUHREC). Your responses to the review, as emailed on 07 January 2015 with several attachments, were put to the Committee delegate for consideration.

I am pleased to advise that, as submitted to date, ethics clearance has been given for the above project to proceed in line with standard on-going ethics clearance conditions outlined below. In issuing this clearance, the understanding is that research or funding agreements entered into to cover the research are in accord with the research protocol submitted for ethical review.

- All human research activity undertaken under Swinburne auspices must conform to Swinburne’s human research ethics and external regulatory standards, including the National Statement on Ethical Conduct in Human Research and with respect to secure data use, retention and disposal.
- The named Swinburne Chief Investigator/Supervisor remains responsible for any personnel appointed to or associated with the project being made aware of ethics clearance conditions, including research and consent procedures or instruments approved. Any change in chief investigator/supervisor requires timely notification and SUHREC endorsement.
- The above project has been approved as submitted for ethical review by or on behalf of SUHREC. Amendments to approved procedures or instruments ordinarily require prior ethics appraisal/clearance. SUHREC must be notified immediately or as soon as possible thereafter of (a) any serious or unexpected adverse effects on participants and any redress measures; (b) proposed changes in protocols; and (c) unforeseen events which might affect continued ethical acceptability of the project.
- At a minimum, an annual report on the progress of the project is required as well as at the conclusion (or abandonment) of the project. Information on project monitoring, self-audits and progress reports can be found at:
- A duly authorised external or internal audit of the project may be undertaken at any time.

Please contact the Research Ethics Office if you have any queries about on-going ethics clearance, or the project number. Please retain a copy of this email as part of project record-keeping.

Best wishes for the project.

Yours sincerely,
Astrid Nordemann
Acting Secretary, SUHREC

Page 1 of 2
Dear Maja and Molly

SUHREC Project 2013/269 Evaluation of the effectiveness of Individual Online Supplemental Therapy for Hoarding problems

Dr Maja Nedelevic, FMAD, Ms Molly Fitzpatrick, Dr Lucian Chaffey, Prof Michael Kyrios
Approved Duration: 21/02/2014 to 28/02/2015 [Adjusted]

I refer to the ethical review of the above project protocol by Swinburne’s Human Research Ethics Committee (SUHREC). The responses to the review, as emailed on 11 February 2014 with attached revised consent instruments, were put to the Committee delegate for consideration.

I am pleased to advise that, as submitted to date, ethics clearance has been given for the above project to proceed in line with standard on-going ethics clearance conditions outlined below.

- All human research activity undertaken under Swinburne auspices must conform to Swinburne and external regulatory standards, including the National Statement on Ethical Conduct in Human Research and with respect to secure data use, retention and disposal.

- The named Swinburne Chief Investigator/Supervisor remains responsible for any personnel appointed to or associated with the project being made aware of ethics clearance conditions, including research and consent procedures or instruments approved. Any change in chief investigator/supervisor requires timely notification and SUHREC endorsement.

- The above project has been approved as submitted for ethical review by or on behalf of SUHREC. Amendments to approved procedures or instruments ordinarily require prior ethical appraisal/clearance. SUHREC must be notified immediately or as soon as possible thereafter of (a) any serious or unexpected adverse effects on participants and any redress measures; (b) proposed changes in protocols; and (c) unforeseen events which might affect continued ethical acceptability of the project.

- At a minimum, an annual report on the progress of the project is required as well as at the conclusion (or abandonment) of the project. Information on project monitoring, self-audits and progress reports can be found at: http://www.research.swinburne.edu.au/ethics/human/monitoringReportingChanges/

- A duly authorised external or internal audit of the project may be undertaken at any time.

Please contact the Research Ethics Office if you have any queries about on-going ethics clearance, citing the SUHREC project number. Please retain a copy of this email as part of project record-keeping.

Best wishes for the project.

Yours sincerely,

---

Date: Friday, 21 February 2014 at 2:50:52 pm Australian Eastern Daylight Time

From: Keith Wilkins

To: Dr Maja Nedelevic, Ms Molly Fitzpatrick, FMAD

CC: Lucian Chaffey, RES Ethics

Subject: SUHREC Project 2013/269 Ethics Clearance
Appendix B: Ethics Adherence declaration

Declaration of Adherence to Ethical Standards

In submitting this thesis as a requirement for the Doctor of Philosophy (Clinical Psychology) program at Swinburne University of Technology, I declare that:

1. Ethical standards were upheld throughout the conduct of this research.

2. All conditions pertaining to ethics clearance were properly met.

3. All final reports to the Swinburne University Human Research Ethics Committee have been submitted.

Signed:

[Signature]

Name: Molly Fitzpatrick     Date: 30/4/17
# Appendix C: Ethics Applications for all Studies

**HUMAN RESEARCH ETHICS COMMITTEE**

**APPLICATION FOR ETHICS APPROVAL**

of a

**RESEARCH PROTOCOL**

**SECTION A: GENERAL INFORMATION**

[Nb This application form should not be used for research involving clinical trials or ionising radiation. See below.**]

<table>
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<th>RESPONSIBLE SWINBURNE FIRST INVESTIGATOR / SUPERVISOR</th>
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<tr>
<td>Name &amp; Title/Position: Dr. Maja Nedeljkovic</td>
</tr>
<tr>
<td>Tel No(s) (03) 9214 4428</td>
</tr>
<tr>
<td>Email: <a href="mailto:mnedeljkovic@swin.edu.au">mnedeljkovic@swin.edu.au</a></td>
</tr>
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<td>Faculty / School / Centre / Institute:</td>
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<td>Swinburne Status:</td>
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<td>Address for correspondence:</td>
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Main Student Investigator(s): Ms. Molly Fitzpatrick

| Email | mfitzpatrick@swin.edu.au |
| Tel No(s) | 0423906706 |
| Student ID Number | 2066521 |
| Degree Being Undertaken: Master of Clinical Psychology/PhD |

Proposed Period During Which Human Research Activity Requiring Ethics Approval is Needed:

| From | 01 | 12 | 2014 |
| To | 30 | 12 | 2016 |

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<td>Supervised Postgraduate Research</td>
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<td>Supervised Undergraduate Research</td>
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<td>Supervised Class</td>
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No of students involved: |  |

Broad Category of Research

Select one category box which best fits the application:

- [ ] Social/Cultural/Humanities
- [ ] Business/Management
- [ ] Education/Training/Program Evaluation
- [ ] Psychological/Brain/Neuro-sciences
- [ ] Health/Safety
- [ ] Engineering/Science/Technology
- [ ] Other (please specify) ........................................

**[** For research involving Clinical Trials or Ionising Radiation, please contact the Research Ethics Officer.**]**

**Official Use Only:**

- [ ] Higher Risk/Impact
- [ ] Minimal Risk/Low Impact Research Only
- [ ] SUHREC
- [ ] SHESC (HBS - A / B)
- [ ] SHESC (SBT - A / B)
- [ ] Other
- [ ] Notification Only

Human Research Risk/Review Classification (Nb Checking to be consistent with published risk criteria.)
To enable a determination as to whether prima facie your research activity is Minimal Risk and/or Low Impact, please clarify by selecting [X] any one or more boxes below as to whether your research activity involves:

(Double-click on YES /NO ‘check box’ to select X by entering in Default Value as Checked or leaving as Not Checked)

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<td>Vulnerable participants, children or those dependent on care*</td>
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<td>Indigenous Peoples* or Special Cultural/Ethnic groups</td>
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<td>Externally funded research requiring HREC-level clearance*</td>
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<td>Data access/use without an individual’s prior consent*</td>
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<td>Participation incentives, prizes or significant payments</td>
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<td>Research placing researchers/assistants at risk</td>
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PLEASE NOTE: If you have selected any one or more of the above boxes, your project will ordinarily be put for SUHREC ethical review. Items above marked * must be put to SUHREC proper. But in other cases, you may wish to put a case for expedited review by a SUHREC Sub-Committee (SHESC) in the (expandable) box below in relation to the criteria for determining risk/impact. If you put forward a case, then in the first instance your application will be put to the relevant SHESC; however, the relevant SHESC may still consider the project needs full SUHREC appraisal or SUHREC may review or override the SHESC decision.

E) Some of the questions asked may be of a sensitive and personal nature and thus may be experienced as confronting by some participants. To minimise such risks, the nature of the project and types of questions asked will be clearly described in the Consent Information Statement (CIS) – see highlighted statement on page 2. This statement will also inform participants that they are free to not answer any questions they do not feel comfortable answering or cease participation at any stage. All questionnaires used in the study have been utilised in previous research with no reported adverse effects. In fact, all of the participants would have completed most of the questionnaires as part of their participation in the group program. In addition, in the unlikely event that participants do experience distress, contact details of relevant services will be provided as part of the CIS.

Risk/Impact Checked with a Research & Ethics Advisor (REA)? Yes ☐ No ☐ REA Comment, Initials & Date:

………………………………………………………………………………………………………………………………………………………………………………
Hoarding disorder (HD) is a serious psychological condition associated with the acquisition of, and inability to discard, possessions of limited value, to a degree that precludes the appropriate use of living spaces and creates significant distress or impairment in functioning (Frost & Gross, 1993; Frost & Hartl, 1996). Recent investigations suggest that HD is a serious psychiatric problem that significantly disrupts the life of the hoarder and their family and friends (Frost, Steketee, Youngren, & Mallya, 1999). The accumulation of clutter may create risk of fire, falling, and sanitation problems, particularly among the elderly (Frost, Steketee, & Williams, 2000).

Cognitive Behavioural Therapy (CBT) has been found to be among the most effective evidence-based psychological treatment for HD (Muroff et al., 2010). The Psychology Clinic at Swinburne University offers a 12-week, face-to-face group cognitive-behavioural treatment (CBT) program specific to HD. In particular, the group program helps individuals improve their skills in organization and problem solving, so as to help with any difficulties with decision-making and categorization of possessions. An important element of treatment is what is termed “exposure with response prevention”, where individuals learn to confront situations they normally avoid in hoarding. In particular, this relates to aspects such as sorting decision, making decisions about possessions, overcoming worries about losing an opportunity, and so forth. Since its inception at Swinburne University in 2009, the program has been highly successful in providing a low cost, evidence-based treatment for people with HD (Moulding et al., 2014).

Maintaining motivation and CBT treatment adherence is known to be a significant problem for people with symptoms of HD (Steketee, Frost, Tolin, Rasmussen & Brown, 2010). And, while most clients from the group program report high satisfaction with treatment and improvements in their symptoms over the treatment period, approximately 60-75% of participants require follow up treatment as they still show clinically significant symptoms (Frost, Steketee & Tolin, 2011).

Therefore, as part of providing effective evidence-based treatment we would like to follow-up on participants progress since completion of the 12-week compulsive hoarding and acquiring group at Swinburne University. This follow-up data will be collected at 6-months, 1 year and 2 years post-treatment. The information obtained on follow-up will hopefully provide insight into what barriers were faced after completion of the group and whether more services may be required to enhance a better outcome.

It is anticipated that the information obtained on follow-up will lead to more insight into enhancing the treatment program to show improved medium and longer-term reduction in hoarding symptoms and hoarding-related beliefs as well as associated anxiety and depressive symptoms among the participants. The current research proposes to evaluate some of these outcomes.


The project to be undertaken is an evaluation study of a structured psychological (i.e., CBT) program targeting hoarding symptoms. The evaluation of treatment outcome at 12-month and 24 month intervals intends to examine what factors may lead to success in the treatment program and what other resources may be necessary for improving an individual’s outcome. In particular, hoarding is associated with a range of other conditions such as depression, social anxiety, obsessive-compulsive disorder, generalised anxiety disorder and Attention-Deficit symptoms (Muroff, Steketee, Frost & Tolin, 2013). It has been suggested that these conditions can play an influential role in an individual’s progress in treatment for hoarding disorder. A better understanding of predictors of success for better treatment outcomes in the
longer term can assist us in refining our current treatment program to integrate additional information aimed at common comorbidities.

The results of the present study are expected to facilitate further enhance our knowledge of treatment approaches to managing this disabling disorder and to understand predictors of success in maintaining improvements in the longer term.

HOW - PROCEDURES

Please detail clearly and sufficiently the proposed research/statistical method(s), procedures and instruments to be used in the project, including all screening and research ‘procedures’ to which the participants will be subjected, and asterisk those which may have adverse consequences.

Please include as appendices all screening instruments, questionnaires, interview protocols etc (at least in draft form if not finalised).

Participants will be recruited via the Swinburne Psychology Clinic. All participants will have completed the 12-week group CBT program for HD. All participants will have a diagnosis of HD as assessed via the the Mini International Neuropsychiatric Interview (MINI), sufficient English to complete treatment without translation, provide healthcare contact details, be able and willing to undergo home-based treatment, and consent to follow up.

Participants will be recruited in two stages:
Stage 1: A letter will be sent out detailing the study and informing the individual that they will be contacted over the next few weeks. The envelope will also contain a copy of the Consent Information statement to ensure participants have full understanding of the study. If the individual does not wish to be contacted, they have the option of tearing off the bottom of the letter and returning it to the Swinburne Psychology Clinic using a provided reply paid envelope or by contacting the clinic by phone.
Stage 2: The individuals that do wish to be contacted will be called and provided with further information about the study and a consent information and if they are still interested in participating, an interview date will be arranged. The interview will be conducted over the telephone. Participation in the research is completely voluntary and all research participants will be required to provide a verbal consent before questionnaire and interview data is collected. All participants will be advised that they are free to withdraw from their study and that their decision to not participate or withdraw from the study will in no way influence their relationship with the clinic.

So as to compare findings with international research, hoarding and depression severity will be measured with the current gold standard assessments. The measures below will be used at 6, 12 and 24 months.

Hoarding Symptom Measures

Savings Inventory-Revised* (SIR: Frost, Steketee, & Kyrios, 2001) is a 26 item self-report scale designed to measure severity of acquisition, amount of clutter, difficulties in discarding possessions, as well as distress and interference caused by these phenomena. The scale has been shown to have high internal consistency in clinical and non-clinical samples.

The Hoarding Rating Scale (HRS; Frost, Steketee, Tolin, & Kyrios, unpublished) is a 5 item screening instrument assessing the presence and severity of hoarding.

Clutter Image Rating (CIR; Frost, Steketee, Tolin, & Renaud, 2006) is a pictorial measure that includes nine pictures that vary in clutter. The measure is completed by both clients and clinicians and has been shown to be a reliable measure of degree of clutter.

OCD Symptom Measures

Yale-Brown Obsessive Compulsive Scale (Y-BOCS, Goodman, Price, Rasmussen, & Mazure, 1989) is a self-report measure including a checklist of symptoms and 12 items assessing severity of obsessive and compulsive symptoms (Baer, Brown-Beasley, Source, & Henriques, 1993). Five of the items refer to obsessions, five refer to compulsions with the two remaining questions measuring distress and neutralisation efforts associated with the symptoms. The scale has demonstrated reliability and validity and compares favourably to the interview measure standardly used to assess OCD symptoms in treatment outcome research (Steketee, Frost, & Bogart, 1996).

Depression and Anxiety Measures

Depression and Anxiety Stress Scale (DASS-21, Lovibond & Lovibond, 1995) is a measure that yields three psychometrically distinct subscales reflective of current symptoms. The 21 item version has also been found to have concurrent validity in the acceptable to excellent range (Antony, Bieling, Cox, Enns, & Swinson, 1998; Clara, Cox, & Enns, 2001)

Cognitive Measures

Savings Cognition Inventory-Revised* (SCI-R, Steketee, et al., 2001) is a 31 item measure of hoarding related beliefs, including memory concerns, perceived value, and sense of responsibility about and emotional attachment to possessions, and fears about losing control over possessions.

Other clinical measures:

Quality of Life Enjoyment and satisfaction Questionnaire is an 18 item short form (Ritsner et al., 2005) of the
Quality of life and Enjoyment Satisfaction Questionnaire (Q-LES-Q; Endicott et al., 1993) will measure satisfaction with life. The measure was developed specifically for use with individuals diagnosed with psychological disorders. It has satisfactory psychometric properties in both its long and short forms and has been recommended as an appropriate measure of QoL outcomes in both psychological and pharmaceutical trials (Bech, 2005; Gladis et al. 1999.).

A brief clinical interview (including Hoarding Interview and current symptom review) will be used to assess presence of symptoms of hoarding and co-morbid condition that may have changed since the group treatment.

References

A4 DESCRIBE ANY RISK THAT MAY ARISE TO THE PARTICIPANT / DONOR?
Risk to participants (and to researchers) can be real but does not need to be physical. Risk includes such as self esteem, regret, embarrassment, civil or criminal liability, disease, physical harm, loss of employment or professional standing, etc. Please consider such possibilities carefully.
Some research activities may put the participant at risk through what is being done or simply through their participation.
Please describe the risk you perceive and the protective measures to be taken.

The aims of the project will be clearly described and explained to the participants so it is not envisaged that there will be greater risk to participants than they would encounter in everyday life.
Some of the questions asked may be of a sensitive and personal nature and thus may be experienced as confronting by some participants. To minimise such risks, the nature of the project and types of questions asked will be clearly described in the Consent Information Statement (CIS). This statement will also inform participants that they are free to not answer any questions they do not feel comfortable answering or cease participation at any stage. All questionnaires used in the study have been utilised in previous research with no reported adverse effects. In fact, all of the participants would have completed most of the questionnaires as part of their participation in the group program. In addition, in the unlikely event that participants do experience distress, contact details of relevant services will be provided as part of the CIS.

A5 DESCRIBE ANY RISK THAT MAY ARISE TO THE RESEARCHER / ADMINISTRATOR?
Some research activities may put the researcher at risk through what is being done or simply through their participation.
Please describe the risk you perceive and the protective measures to be taken.

It is not envisaged that there will be greater risk to the psychologists or administrators than they would encounter in everyday life. Regular supervision and meetings will provide an opportunity to review progress, deal with project aims and to audit ethical procedures.

A6 WHAT BENEFITS ARE ANTICIPATED FROM THE PROJECT
Ethical principles would require that benefits flowed from the activities - but please avoid grandiose claims.
(a) To the Participant (what and how so)
This follow-up study will give the participants an opportunity to provide feedback on how the treatment was helpful and also assist with information regarding further support where this may be required.

(b) More generally (to society, profession, knowledge, understanding, etc, and how so.)
The current study will enable us to evaluate the effectiveness of this treatment program in the longer term and continue to provide high standard evidence-based specialised treatment for depressive and anxiety problems. In addition, considering the serious impact of the disorder, on the individual, the community and public health and safety (e.g., hygiene and fire hazards), the current study will assist in gaining greater insight into what additional support these individuals require to maintain changes in the longer term. Finally, this current study intends to investigate predictors that influence treatment outcome, which may inform clinical practice and treatment approaches.

A7 POTENTIAL PROBLEMS
From time to time in the course of a research project important information, such as an individual found to be at risk, or entirely unforeseen events may come to pass. What procedures are in place to handle unexpected or particularly significant personal or other information that may come to light through the project, eg, unknown medical/psychiatric condition, a particularly distressed participant, civil or criminal liability, etc.
All participants will be under the care of suitably qualified therapists who will receive regular supervision from Dr Nedeljkovic and Dr Moulding, and other senior clinical staff involved in the project.

A8 PROFESSIONAL/ETHICAL ABILITY & TRAINING (Researchers/Students/Assistants)
NS 1.15 Research must be conducted or supervised only by persons or teams with experience, qualifications and competence appropriate to the research ... using (appropriate) facilities ... (and with appropriate skills and resources for dealing with any contingencies...)

(a) Sufficiently detail what investigators/assistants will do in this project and their expertise/competence to do so.

Two of the investigators involved in the project are registered clinical psychologist with extensive experience in the treatment and research of HD and related disorders, with strong links to the community and relevant consumer groups (e.g., OCD foundation, Anxiety Recovery Victoria). They have multiple publications in the area, have extensively presented at national and international conferences, and been involved in the training and supervision of psychology trainees. The provisional psychologist involved in the treatment program is a doctorate level student involved in the HD research and group treatment program, and in particular in the coordination and co-facilitation of the standard CBT treatments for HD. The student involved in this program has extensive knowledge of HD gained through training and involvement in the research activities in the program. Also they are closely supervised by the senior clinician in the program.

The student will contact each participant and conduct a structured interview and assessment on their current difficulties in hoarding since being involved in the compulsive hoarding group at the Swinburne Psychology Clinic

(b) Sufficiently detail any further training/qualifications required for investigators/assistants to carry out the project.

Prior to starting the group the provisional psychologist will attend a training session with the clinical supervisors on the specifics of the treatment. The training will include presentation, discussion and brief exercises.

A9 FUTURE USE OF DATA
Will any of these data be used by yourself, your students or others for any purpose other than for this project as described in the protocol? If so please describe.

No

A10 EXTERNAL INVOLVEMENT
Is a body external to Swinburne involved in initiation or support of the project?

Yes □ Name of body/organisation.

If an external body is associated with the project you must provide the HREC with detail of the arrangements, including details of any funding or other resources being provided. A copy of relevant pages from the contractual arrangements should be attached.

□ No

A11 EXTERNAL APPROVALS
Projects involving other organisations or entities may require approval from other institutions or their ethics committees, etc. for such things as access to prospective participants, contact lists, data, facilities, etc. A copy of such approvals may be required to be provided to the HREC at the time of application or be made available as soon as possible. In which case, the project may not commence, until such evidence is provided.

Please indicate, as appropriate, if formal clearance/permission has been obtained or sought:
Institutional Yes □ Documentation Attached □ or to follow □
Next of Kin (for special groups) Yes □ Documentation Attached □ or to follow □
(estimate when likely to be obtained)

n/a

□ No (please explain)

n/a

A12 RESEARCHER / SPONSOR RELATIONSHIP
Is there any relationship or association between the sponsor and any of the researchers listed in Section A of this form, for example are any of the researchers directors, officers, employees, shareholders or promoters of the sponsor or do they receive any personal benefits from the sponsor under any other contracts or arrangements?

□ Yes (please explain the relationship(s), including how a vested or a conflict of interest situation does not arise.)
SECTION B: ETHICAL ISSUES OVERVIEW

ETHICAL ISSUES

[Double-click on YES/NO 'check box' to select box, then enter Default Value as Checked ☑ or leaving as Not Checked ☐]

YES ☑ NO ☐

(a) Non-/Limited Disclosure or Deception: Is any detail in relation to research purposes, methods or questions being withheld from participants? Or will deception of any kind be involved? Or any covert/undeclared observation? (Refer National Statement Chap 2.3)

(b) Does the data collection process involve access to confidential personal data (including access to data provided for a purpose other that this particular research project) without the prior consent of subjects?

(c) Will participants have pictures taken of them, e.g., photographs, video recordings?

(d) If "YES", please explain how you intend to retain confidentiality and ultimately dispose of the material.

(e) Will participants be asked to perform any acts or make statements which might compromise them, diminish self esteem or cause them embarrassment or regret (minimal, moderate or significant)?

(f) Might any aspect of your study reasonably be expected to place the participant at risk of criminal or civil liability (not just immediately or directly)?

(g) Might any aspect of your study reasonably be expected to place the participant at risk of damage to their professional/social/cultural/financial standing or employability?

(h) Will the research involve access to data banks subject to privacy legislation?* (NOTE: Annual reporting to Government may be required on this item. For info: please contact the Research Ethics Officer.)

(i) Will participants come into contact with any equipment which uses an electrical supply in any form e.g., audiometer, biofeedback, electrical stimulation, magnetic stimulation, etc.? If "YES", please outline below what safety precautions will be followed.

(j) Will any treatment be used with potentially unpleasant or harmful side effects?

(k) Does the research involve any stimuli, tasks, investigations or procedures which may be experienced by participants as stressful, noxious, aversive or unpleasant during or after the research procedures?

(l) Will the research involve the use of placebo control conditions or the withholding/substitution of treatment, programs or services (health, educational, commercial, other)?

(m) Will any samples of body fluid or body tissue be required specifically for the research which would not be required in the case of ordinary treatment?

(n) Will participants be fingerprinted or DNA "fingerprinted"?

(o) Are there in your opinion any other ethical issues involved in the research?

NOTE: If the answer to any of the above questions is "yes", please explain and justify below in sufficient clear detail. (The box below will expand to fit your response.)

---

SECTION C: PARTICIPANT DETAILS

C1 PARTICIPANT DETAILS

The composition of the participant group may, in some circumstances, distort and invalidate an outcome, and risks may arise through the composition of the participant group.

How many individual participants will be involved? (Number/number ranges for which approval is sought)

<table>
<thead>
<tr>
<th>Males:</th>
<th>Females:</th>
<th>Total participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>30</td>
<td>60</td>
</tr>
</tbody>
</table>

Over what range of ages?

From (youngest): 18 To (Oldest): 65+

If there is a gender or age imbalance in the number of participants please explain why.
C2 RECRUITMENT
How will participants be recruited/selected?
Please outline the process in sufficient detail how this is to occur.
Note: Where participants are obtained from or through schools, hospitals, prisons or other institutions, appropriate
institutional or other authority will probably be needed. If soliciting for participants by advertisement or poster please attach
proposed copies or text.
(See also Project Information Consent Statements and Signed Consent Forms info at the end of this application form.)

Participants will be recruited through the HD Treatment and Research Program conducted by Psychology
Clinic at Swinburne University.
To be eligible to participate in the study the participants will be required to:
• have a primary diagnosis of hoarding (see section A3)
• Have undergone a standard individual or group CBT program
Previous group participants will be provided with information about the research by mail and given a reply
paid envelope with the option to not be involved. Participation in the research is completely voluntary and all
research participants will be required to provide a verbal consent before any data is collected. All participants
will be advised that they are free to withdraw from their study and that their decision to not participate or
withdraw from the study will in no way influence their treatment.

C3 PRE-EXISTING CONDITIONS
In some situations an underlying medical or other significant condition of a participant may result in an otherwise relatively
innocuous situation causing excessive stress and exacerbate the condition. Researchers must, therefore, be alert to such
situations and be able to address the resulting issues.
Do participants have any medical or other significant condition of which you are aware, eg. diabetes, asthma, depression,
epilepsy? What steps are in place to handle any resulting problems (you may need to correlate with A3, A4 and A7 of this
form)?

All participants are carefully screened as part of their initial assessment for the group treatment program by
appropriately trained postgraduate provisional psychologists. Co-morbid conditions in a very severe range
(e.g., severe depression with suicidal tendencies), psychotic disorders, serious substance abuse difficulties
and neurological and developmental disorders (e.g., significant brain damage, autism) or high risk (e.g.,
suicide) are a part of the exclusion criteria for the group program, so all participants in the follow-up would
have been screened accordingly.

C4 DISCLOSURE AND INFORMED CONSENT
How will participants be informed about the project in order to give valid consent:
☐ Consent Information Statement(s)/Letter(s) and Signed Consent Form(s) will be used.
A copy must be attached to your application. A guide to consent instruments is given at the end of this form.
☐ Consent Information Statement(s)/Letter(s) and consent implied by return of anonymous questionnaire
☐ Verbal advice (Please explain how and why)
☐ Other (Please explain how and why)

Verbal consent can be given over the phone.

Copies of appropriate consent instruments must be attached to your application. Please consult the Guide to Human Research
Informed Consent Instruments in carefully preparing informed consent instruments.

C5 COMPENSATION
Consent to participate must be freely given and not induced through the level of reward, perceived reward, or power
relationships.
Provide details of any financial or other reward or inducement is being offered to subjects for participation. Indicate the source
of the funds.
The participants will not receive any compensatory payments for involvement in the telephone interview

C6 RELATIONSHIP TO INVESTIGATOR(S)
Free consent may be difficult to ensure if the participant is dependent upon the investigator for employment, assessments etc
Some relationships cause special ethical issues to arise
Are participants linked with the investigator through some particular relationship - eg. employees ultimately responsible to or
superiors of the investigator, students of investigator, family members, friends etc.

n/a

C7 INVOLVEMENT OF SPECIAL GROUPS
Particular issues of consent may arise where special groups of participants are to be involved. There may be, for example, a
need to obtain informed consent from persons other than the direct participant. Examples of such special groups include
special cultural groups - eg. indigenous Australians; children and young persons (Guidelines section 4.2); groups with special
circumstances - eg. persons with an intellectual or mental impairment (Guidelines s. 5)
Please identify and describe the nature of the groups and procedures used to obtain permission.
Note. Persons proposing research projects involving Indigenous Australians should consult with the relevant University manager of indigenous programs prior to finalising definition of the project.

C8 PRIVACY
The University is subject to the Victorian Information Privacy and Health Records Acts as well as the Commonwealth Privacy Act and, in particular, the Information/Health/National Privacy principles (IPPs/HPPs/NPPs) set out therein and is required to report annually on projects which relate to or utilise particular records.

Does the research involves access to data which was collected by an organisation for its own purposes (ie. not specifically collected for this project) such as student records, other data banks, human pathology or diagnostic specimens provided by an institution/s?
If yes, please indicate source/s.

C9 LOCATION OF STUDY
Please indicate where the research will be carried out. If the research will not be on University premises permission of owner / occupier may be required. If so, please indicate what authority or permission may be required and how will be obtained.

NB: Where required, please attach to this application evidence of authority obtained or provide the Secretary, HREC as soon as practicable.

SECTION D: DATA & PUBLICATION ARRANGEMENTS (Nb Section D Revised Aug 2007)
PLEASE CONSIDER CAREFULLY YOUR RESPONSES TO THIS SECTION. YOU NEED TO BE CLEAR AS TO WHAT IS OCCURRING WITH RESPECT TO DATA COLLECTION, RETENTION and DISPOSAL.
In your responses, you should demonstrate familiarity with National Statement requirements for confidentiality, relevant Privacy Principles and Swinburne's Policy on the Conduct of Research, eg, Sect 4, see URL: http://www.swinburne.edu.au/corporate/registrar/pdp/docs/PolicyontheConductofResearch.pdf).

D1 DATA COLLECTION/RECORDING (Nb Section D1 Revised Aug 2007)
Please note that, with any information or data collected/retained, if any individual can reasonably be identified, the information can be deemed “personal information” or “health information” under National/Health/Information Privacy Principles (NPPs/HPPs/IPPs).

(a) How or in what form will data be collected/recorded?
(eg, notes; verbatim, audio and/or video recordings; transcriptions of recordings; recorded or signed consents; etc)

Notes/verbatim answers that will recorded over the phone

As regards any individual, in relation to any data collection or retention, you need to acknowledge either or both of the following:
[ ] Double-click on 'check box' to select X by entering in Default Value as Checked [X] or leaving as Not Checked [ ]
[ ] An Individual can be identified OR is Potentially Identifiable / Re-Identifiable
(An individual can be identified at some point or by the very nature of the data collected/retained: at time of an interview, by signed consent form, identified or labelled voice or image recording, pen-and-paper questionnaire, on-line survey instruments, etc.
Whilst data may not have (explicit) identifiers, an individual's identity can still reasonably be worked out.
Or data may have (explicit) identifiers removed and replaced by codes that permit matching of an individual with the data collected/retained, in which case it is possible to identify or re-identify the person to whom the data relates.)
[ ] An Individual is Non- or Un-identifiable
(Data collected/retained anonymously and with no reasonable possibility of being identified.)
Your acknowledgement may require further explanation or clarification; if so, please include in the following box.

The participants will be identifiable during their participation in the project. However, only the researchers named in this application will have access to participant information and all data and information will be stored on password protected files and will be accessible only by the researchers. All potential identifiers will be removed once the complete data from each participant has been collected.

D2 DATA SECURITY (Nb Section D2 Revised Aug 2007)
Please note that “data must be held for sufficient time to allow reference. For data that is published this may be for as long as interest and discussion persists following publication. It is recommended that the minimum period for retention is at least 5 years from the date of publication but for specific types of research, such as clinical research, 15 years (or more) may be more appropriate.” (Sect 4.3 of Swinburne’s Policy on the Conduct of Research)

Please indicate how data (all types of data, including, eg, signed consent forms) will be securely retained (eg, electronic form in password-protected disk drive, locked filing cabinet, etc) and where? With more than one type of data, will the types be separately stored?
In your explanation, you will need to make clear how due confidentiality and/or anonymity will be maintained.

(a) During the study

The Chief Investigators will be responsible for the security of the data which will be on password protected files on the investigators' work and portable computers. All pen and paper data will be stored in locked filing cabinets on the 3rd floor of the ATC for a minimum period of 7 years from publication.

(b) Following completion of study

The data will be kept for a minimum of 7 years from the date of publication of the research and will be locked in a secure facility in the department. After 7 years, the data will be destroyed.

D3 PUBLICATION/OUTPUT (Nb Section D3 Revised Aug 2007)

Please explain in sufficient detail:

(a) What, if any, publication (conference, news media, academic journal, other journal, etc) is envisaged following on or in relation to this project, both in terms of data proper and/or analysis of data?

(b) Will participants be informed about any envisaged research publication/outcome? (This information is normally to be included in the information given prior to obtaining informed consent.)

(c) Would any participants be able to be identified through the publication of data proper or research findings? If so, explain why this is necessary.

(a) journal articles (all researchers have a well-established track record in publication in high impact journals), international research conferences.

(b) All participants will be advised in the CIS that any publications that may result from the current research will only refer to group results

(c) No participants will be identified through publication.

D4 INDIGENOUS ISSUES

Storage arrangements for data relating to research into Indigenous matters must be determined in compliance with the Policy on the Conduct of Research after consultation with the communities involved.

What consultation has taken place and what arrangements have been made.

n/a

D5 OTHER ISSUES (Nb Section D5 Revised Aug 2007)

Are there any other issue relating to data collection, retention, use or disclosure which the ethics committee should be made aware of and, if so, please explain how you are to deal with this.

(Eg, Research outcomes unduly impacting on any individual or group not directly participating, etc.)

n/a

SECTION E: SUBSTANCES & CLINICAL ISSUES

☐ No matters in this section are applicable to the study or

E1 ADMINISTRATION OF SUBSTANCES/AGENTS

Name of substance(s)

Dosage per administration

Frequency of administration

Total amounts to be administered

Anticipated effects:

NOTE: If the research involves administration of foreign substances or invasive procedures, please attach a statement accepting responsibility for those procedures by a medical or paramedical practitioner with Indemnity insurance.

☐ STATEMENT ATTACHED

E2 BODY FLUIDS OR TISSUE

What fluids or tissue? How will be samples be obtained?

Frequency and volume

How are samples to be stored?
How will samples be disposed of?

Who will take the samples?

What are their qualifications for doing so?

Do participants carry, as far as you know, the Hepatitis B or HIV virus? If so how will the risks be handled?

Do participants carry, as far as you know, any other contagious diseases or viruses? If so how will the risks be handled?

SECTION F Declarations for Signature

1. With respect to this project, I / We, the undersigned Investigator(s)/Assistant(s) agree:
   To undertake human research activity or handle data confidentially in accordance with Swinburne requirements, including any
   standard or special ethics clearance conditions, under the proper direction of the responsible Swinburne manager and/or
   principal Swinburne (or other) researcher/supervisor.

   NAME:  (block letters)  SIGNATURE:   DATE:  
   Maja Nedeljkovic
   Molly Fitzpatrick
   Richard Moulding
   Michael Kyrios

   All listed applicants must sign. The Chief Investigator/Supervisor is also responsible for personnel subsequently joining the
   project. Expand this table or duplicate this page as required. NB This information is subject to Swinburne or external audit.

2. Declaration of Compliance by Chief Investigator(s)/Student Supervisor(s).
   I declare that the above project has been developed and will be conducted in accordance with relevant Swinburne standards,
   policies and codes of practice, including any standard or special conditions for on-going ethics clearance. I further declare that
   all listed and subsequently appointed researchers or assistants involved in this project will be made aware of the conditions of
   ethics approval as communicated to me, including approved documentation and procedures.

   Signature & Date:  ..........................................................  
   Name of Signatory & Position:  ..........................................................

   (Optional) Form checked by a Research & Ethics Advisor (REA)?  Yes ☐  No ☐  REA Initials & Date:  

   ..............................
### HUMAN RESEARCH ETHICS COMMITTEE

**APPLICATION FOR ETHICS APPROVAL**

of a

**RESEARCH PROTOCOL**

**SECTION A: GENERAL INFORMATION**

(Nb This application form should not be used for research involving clinical trials or ionising radiation. See [Clinical trials](#) or [Ionising Radiation](#) for specific forms.)

<table>
<thead>
<tr>
<th>PROJECT FULL TITLE</th>
<th>Evaluation of the effectiveness of Individual Online Supplemental Therapy for Hoarding problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHORT TITLE (If applicable)</td>
<td>Effectiveness of Online Supplemental Therapy for Hoarding problems</td>
</tr>
</tbody>
</table>

**APPLICANT DETAILS**

**RESPONSIBLE SWINBURNE FIRST INVESTIGATOR / SUPERVISOR**

(Where project is part of student research degrees or dissertations, Senior Swinburne Supervisor must still be listed as the first investigator)

- Name & Title/Position: Dr Maja Nedeljkovic
- Tel No(s) (03) 9214 4428
- Email: MNedeljkovic@swin.edu.au
- Fax: (03) 9214 8823
- Faculty / School / Centre / Institute: ……………………………………
- Swinburne Status: ☑ Swinburne Staff Member ☑ Adjunct Staff Member
- Address for correspondence: ……………………………………

**Main Student Investigator(s):**

- Name & Title/Position: Ms Molly Fitzpatrick
- Email: mfitzpatrick@swin.edu.au
- Tel No(s) 0423906706
- Student ID Number 2066521
- Degree Being Undertaken: Masters of Clinical Psychology/PhD

**Institutional Address:** Swinburne University of Technology

- Tel No(s) 9214 4886

**List below the names of other Chief/Associate Investigators and Research Assistants (including those with access to identifiable data).**

<table>
<thead>
<tr>
<th>Name &amp; Title/Position</th>
<th>Institutional Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Michael Kyrios, Director of Brain and Psychological Sciences Centre (BPscC)</td>
<td>Swinburne University of Technology Tel No(s) 9214 4886</td>
</tr>
<tr>
<td>Dr Lucian Chaffey, research assistant</td>
<td>Swinburne University of Technology Tel No(s) 0411 254 006</td>
</tr>
</tbody>
</table>

**Proposed Period During Which Human Research Activity Requiring Ethics Approval is Needed:**

- From 31 10 2013 to 31 10 2014
- dd mm yyyy to dd Mm yyyy

**TYPE OF ACTIVITY** (Select as many boxes as applicable)

- ☑ Research by Staff Member
- ☑ Supervised Postgraduate Research
- ☑ Supervised Undergraduate Research
- ☑ Supervised Class

**No of students involved:**

- Subject Code & Short Title:

---

3. Endorsement of Head of Academic Unit (or Delegate) or Above.

I declare that this project: has been developed and will be conducted in accordance with relevant Swinburne standards, policies and codes of practice; and has research merit, adequate resourcing and appropriate leadership/supervision.

**Signature & Date:** ………………………………………………………………….………………

**Name of Signatory & Position:** ………………………………………………………………………….………

(Please note: This endorsement must be given by an authorised official who is not also a chief or co-investigator of the project and who is not also the supervisor of a student investigator with an interest in the project.)

---

**Date Received**

……………………………

**HREC No:**………
### Broad Category of Research

Select one category box which best fits the application:

- Social/Cultural/Humanities
- Business/Management
- Education/Training/Program Evaluation
- Psychological/Brain/Neuro-sciences
- Health/Safety
- Engineering/Science/Technology
- Other (please specify) ……………………………………………………

[* For research involving Clinical Trials or Ionising Radiation, please contact the Research Ethics Officer.]

#### Official Use Only:

<table>
<thead>
<tr>
<th>SUHREC</th>
<th>SHESC (HBS - A / B)</th>
<th>SHESC (SBT - A / B)</th>
<th>Other</th>
<th>Notification Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Higher Risk/Impact</td>
<td>☐ Minimal Risk/Low Impact Research Only</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Human Research Risk/Review Classification

To enable a determination as to whether prima facie your research activity is Minimal Risk and/or Low Impact, please clarify by selecting [X] any one or more boxes below as to whether your research activity involves:

- Vulnerable participants, children or those dependent on care
- Indigenous Peoples or Special Cultural/Ethnic groups
- Externally funded research requiring HREC-level clearance
- Multi-centre/Other sites requiring HREC-level approval
- Research conducted overseas
- Conflicts of interest or dual researcher-professional roles
- Data access/use without an individual’s prior consent
- Data access/use subject to statutory guidelines &/or reporting
- Identification of participant individuals/groups in research outcomes without full consent or there is unclear consent for this
- Sensitive information/issues vis-à-vis context/impact (legal*, regulatory compliance*, commercial, professional, cultural, etc)
- Personally intrusive/confronting or quite inconvenient/embarrassing questioning or other activity
- Physically confining/invasive techniques or significant physical contact/stimulation (TMS*, X-ray*, CT scan*, MRI*, clothing change, etc)
- Working in hazardous environments (asbestos dust*, infectious disease*, war or civil strife*, etc)
- Handling hazardous substances (eg, asbestos*, radioactive material*, explosives*, etc) or equipment
- Administration of medical/herbal substances*/treatments*
- Administration of other (non-medical) substances/treatments
- Health/medical diagnosis*/therapy*
- Non-minimal impact therapeutic or other devices*/activity*
- Screening for healthy participant inclusion/exclusion
- Medical or psychiatric assessment/conditions*
- Serious psychological profiling, investigation or exploration
- Withdrawal of treatment/services or use of placebo
- Withdrawal/substitution of educational/professional/commercial/recreational/other programs or services
- Deception or covert observation
- Limited or non-disclosure of research information/procedures
- Participant recruitment/selection via third party
- Human research activity commenced without clearance
- Participation incentives, prizes or significant payments
- Research placing researchers/assistants at risk

**Please note:** If you have selected any one or more of the above boxes, your project will ordinarily be put for SUHREC ethical review. Items above marked * must be put to SUHREC proper. But in other cases, you may wish to put a case for expedited review by a SUHREC Sub-Committee (SHESC) in the (expandable) box below in relation to the criteria for determining risk/impact. If you put forward a case, then in the first instance your application will be put to the relevant SHESC; however, the relevant SHESC may still consider the project needs full SUHREC appraisal or SUHREC may review or override the SHESC decision.

Some of the researchers involved in the project may also be involved in the treatment either in the group program or the follow-up treatment. For this reason, all potential participants will be initially contacted by Dr Chaffey who is not associated with the treatment, and she will be coordinating the access to the data.

#### Risk/Impact Checked with a Research & Ethics Advisor (REA)?

- [☐] Yes
- [☐] No

REA Comment, Initials & Date:

...………………………………………………………………………………………………………………..
The Australian National Statement on Ethical Conduct in Research Involving Humans - requires

1.13 Every research proposal must demonstrate that the research is justifiable in terms of its potential contribution to knowledge and is based on a thorough study of current literature as well as prior observation, approved previous studies, and where relevant, laboratory and animal studies.

1.14 All research proposals must be so designed as to ensure that any risks of discomfort or harm to participants are balanced by the likely benefit to be gained.

1.15 Research must be conducted or supervised only by persons or teams with experience, qualifications and competence appropriate to the research. Research must only be conducted using facilities appropriate for the research and where there are appropriate skills and resources for dealing with any contingencies that may affect participants.

A1 WHAT IS THE PROJECT TO BE UNDERTAKEN

Summarise in sufficient detail why the project is being undertaken. If references are quoted, full citations should be given. Include the educational and/or scientific aims of the project. (Boxes will expand for your text)

Hoarding disorder (HD) is a serious psychological condition associated with the acquisition of, and inability to discard, possessions of limited value, to a degree that precludes the appropriate use of living spaces and creates significant distress or impairment in functioning (Frost & Gross, 1993; Frost & Hartl, 1996). Recent investigations suggest that HD is a serious psychiatric problem that significantly disrupts the life of the hoarder and their family and friends (Frost, Steketee, Youngren, & Mallya, 1999). The accumulation of clutter may create risk of fire, falling, and sanitation problems, particularly among the elderly (Frost, Steketee, & Williams, 2000).

Cognitive Behavioural Therapy (CBT) has been found to be among the most effective evidence-based psychological treatment for HD (Muroff et al., 2010). The Psychology Clinic at Swinburne University offers a 12-week, face-to-face group cognitive-behavioural treatment (CBT) program specific to HD. In particular, the group program helps individuals improve their skills in organization and problem solving, so as to help with any difficulties with decision-making and categorization of possessions. An important element of treatment is what is termed “exposure with response prevention”, where individuals learn to confront situations that normally avoid in hoarding. In particular, this relates to aspects such as sorting decision, making decisions about possessions, overcoming worries about losing an opportunity, and so forth. Since its inception at Swinburne University in 2009, the program has been highly successful in providing a low cost, evidence-based treatment for people with HD (Nedeljkovic et al., 2013).

Maintaining motivation and CBT treatment adherence is known to be a significant problem for people with symptoms of HD (Steketee, Frost, Tolin, Rasmussen & Brown, 2010). And, while most clients from the group program report high satisfaction with treatment and improvements in their symptoms over the treatment period, approximately 60-75% of participants require follow up treatment as they still show clinically significant symptoms (Frost, Steketee & Tolin, 2011).

Therefore, as part of providing effective evidence-based treatment we have developed a supplemental 8-week online individual CBT therapy that will be offered to clients completing the 12-week face-to-face therapy for HD. The online supplemental treatment is aimed at maintaining motivation and treatment adherence following directly on from the 12-week group program.

It is anticipated that the supplemental treatment will lead to improved medium and longer-term reduction in hoarding symptoms and hoarding-related beliefs as well as associated anxiety and depressive symptoms among the participants. The current research proposes to evaluate some of these outcomes.


A2 WHAT - BRIEF DESCRIPTION OF PROJECT

In plain English

The project to be undertaken is an evaluation study of a structured psychological (i.e., CBT) program targeting hoarding symptoms. The 8-week online intervention is designed to support motivation and adherence to treatment for individuals with HD who have already undertaken a face-to-face group treatment program.

Clients undertaking the online program will be recruited to participate in the evaluation. The 8 online program modules have been developed to assist individuals in developing further self-efficacy to maintain their progress in reducing clutter. The modules aim to: reinforce key concepts addressed within the 12-week group therapy for HD (i.e., psychological interventions aimed at challenging maladaptive beliefs and behaviours contributing to hoarding symptoms); introduce...
psychological techniques to assist with anxiety and to address ambivalence about sorting; and assist individuals to maintain motivation. The intervention will also facilitate further support for the client through direct contact with the therapist (weekly email contact and one home visit by the therapist).

The study will assess clinically significant changes to hoarding symptoms and depression symptoms immediately following the supplemental intervention, at 9 weeks and at 12 months. This will allow us to measure the overall effectiveness of the intervention on long term treatment outcomes for people with HD, and to observe a range of measures likely to be significant in relation to treatment outcomes.

It is expected that the treatment will significantly improve treatment outcomes for these clients. As part of our commitment in providing effective evidence-based specialist care, the effectiveness of the program will be carefully assessed through monitoring levels of symptom change, degree of cognitive (i.e. thinking patterns) change and decrease in clutter and acquisition of items. Therefore, as part of their treatment, participants will be asked to complete a range of measures assessing their mood, levels of hoarding, depression and anxiety as well as degree of and conviction in hoarding-related maladaptive beliefs, as well as subjective and objective measures of clutter. The measures will be filled out before and after completion of treatment and some (i.e., levels of clutter) during the home visits and online using the Image Clutter Rating Scale (see below). These measures are regularly utilised in HD treatment to track client’s progress and assist the client in monitoring progress. While all participants the supplemental treatment program complete these questionnaires as part of their treatment, only results from those participants volunteering to participate in the research will be used as part of the evaluation study.

The results of the present study are expected to facilitate further fine tuning of treatment approaches to managing this disabling disorder and maintaining symptom reduction long term.

A3 HOW - PROCEDURES

Please detail clearly and sufficiently the proposed research/statistical method(s), procedures and instruments to be used in the project, including all screening and research ‘procedures’ to which the participants will be subjected, and asterisk those which may have adverse consequences.

Please include as appendices all screening instruments, questionnaires, interview protocols etc (at least in draft form if not finalised).

Participants will be recruited via the Swinburne Psychology Clinic. All participants will have completed the 12-week group CBT program for HD. All participants will have a diagnosis of HD as assessed via the the Mini International Neuropsychiatric Interview (MINI), sufficient English to complete treatment without translation, provide healthcare contact details, be able and willing to undergo home-based treatment, and consent to follow up.

Participants will be recruited in four staggered rounds, following completion of group programs.

Round 1: Group program starts 18/02/2014. Begin supplemental intervention 13/05/2014.

All participants will be issued with a computer tablet that they can use to access the online program and send emails and photographs to their support therapist. Tablets will be returned after completion of the program and retained by Swinburne University of Technology for use in future studies. Participants will have access to a training video which will be uploaded onto the tablet. It will outline how to use the tablet, for example, how to upload photos, how to use email etc. This will be configured to appear on the screen when the tablet has been turned on. Any questions from the participants will be directed to the e-therapist or researchers.

The supplemental intervention consists of an 8-week mindfulness-based CBT program aimed at improving and maintaining motivation and changing behaviours (specifically, reducing ambivalence about sorting and de-cluttering, and maintaining motivation). During the program, participants may take photographs of the problem areas in their home. The images will then be sent via email to the therapist and used in application of the image clutter rating scale (see below). This is a crucial aspect the treatment. Only the generic rating will be used in the research and no one but the therapist will have access to the photographs. So as to compare findings with international research, hoarding and depression severity will be measured with the current gold standard assessments. Ratings for adult attention deficit hyperactivity disorder (ADHD) have been included. Research has shown up to 28% of adults with HD also have symptoms of ADHD (Tolin, Frost, Steketee & Gray, 2008). Attention deficits are hypothesized as one of the information-processing problems underlying hoarding disorder (Frost, Steketee, Williams & Warren, 2000). If results from the present study are consistent with the emergent literature, this will be useful in modifying treatment content and presentation so as to improve adherence and motivation. Some of the measures below will be incorporated into the treatment as a self-assessment and progress-monitoring exercise, while others will be used only at commencement, completion, 9 weeks and 12 months.

The Hoarding Rating Scale (HRS; Frost, Steketee, Tolin, & Kyrios, unpublished) is a 5 item screening instrument assessing the acquisition, amount of clutter, difficulties in discarding possessions, as well as distress and interference caused by these phenomena. The scale has been shown to have high internal consistency in clinical and non-clinical samples.
Some research activities may put the participant at risk through what is being done or simply through their participation. Please describe any risk that may arise to the participant/donor and the protective measures to be taken.

Risk to participants (and to researchers) can be real but does not need to be physical. Risk includes such as self esteem, regret, embarrassment, civil or criminal liability, disease, physical harm, loss of employment or professional standing, etc. Please consider such possibilities carefully.

Some research activities may put the participant at risk through what is being done or simply through their participation. Please describe the risk you perceive and the protective measures to be taken.

The aims of the project will be clearly described and explained to the participants so it is not envisaged that there will be greater risk to participants than they would encounter in everyday life. Furthermore, almost all of the measures administered as part of the research program have been regularly used in the group treatment program that the participants have already been involved in, to monitor clients’ progress and changes in specific factors associated with the disorder. All participants in the current research program will be informed of the assessments undertaken and will be required to give an informed consent for their participation in the research trial. Of course, the data will be handled and stored with utmost care and in strict accordance with standard ethical procedures.

Clutter Image Rating (CIR; Frost, Steketee, Tolin, & Renaud, 2006) is a pictorial measure that includes nine pictures that vary in clutter. The measure is completed by both clients and clinicians and has been shown to be a reliable measure of degree of clutter.

OCD Symptom Measures
Yale-Brown Obsessive Compulsive Scale (Y-BOCS, Goodman, Price, Rasmussen, & Mazure, 1989) is a self-report measure including a checklist of symptoms and 12 items assessing severity of obsessive and compulsive symptoms (Baer, Brown-Beasley, Source, & Henriques, 1993). Five of the items refer to obsessions, five refer to compulsions with the two remaining questions measuring distress and neutralisation efforts associated with the symptoms. The scale has demonstrated reliability and validity and compares favourably to the interview measure standardly used to assess OCD symptoms in treatment outcome research (Steketee, Frost, & Bogart, 1996).

Depression and Anxiety Measures
Depression and Anxiety Stress Scale (DASS-21, Lovibond & Lovibond, 1995) is a measure that yields three psychometrically distinct subscales reflective of current symptoms. The 21 item version has also been found to have concurrent validity in the acceptable to excellent range (Antony, Bieling, Cox, Enns, & Swinson, 1998; Clara, Cox, & Enns, 2001).

Hamilton Depression scale. The Hamilton Depression Rating Scale (HAM-D-17, Hamilton, 1960) consists of 17-items rated on either a 3- or 5-point scale. Content includes cognitive symptoms and physiologic and behavioural factors associated with depression. The questionnaire takes 30 minutes to be administered.

Cognitive Measures
Savings Cognition Inventory-Revised* (SCI-R, Steketee, et al., 2001) is a 31 item measure of hoarding related beliefs, including memory concerns, perceived value, and sense of responsibility about and emotional attachment to possessions.

Attention Deficit Hyperactivity Disorder
The Attention Deficit/Hyperactivity Disorder Symptoms Scale (ADHDSS, Barkley & Murphy, 1998) is an 18-item self-report checklist of inattention and hyperactivity symptoms, derived from the (BAARS-IV). The items reflect DSM-IV symptom criteria, allowing diagnoses of inattention and hyperactivity ADHD in order to estimate comorbidities with HD. This scale has been used in other studies of comorbid ADHD and HD (Frost, Steketee & Tolin, 2011). (http://psychology-tools.com/adult-adhd-self-report-scale/).

Other clinical measures:
Quality of Life Enjoyment and satisfaction Questionnaire is an 18 item short form (Ritsner et al., 2005) of the Quality of life and Enjoyment Satisfaction Questionnaire (Q-LES-Q; Endicott et al., 1993) will measure satisfaction with life. The measure was developed specifically for use with individuals diagnosed with psychological disorders. It has satisfactory psychometric properties in both its long and short forms and has been recommended as an appropriate measure of QoL outcomes in both psychological and pharmaceutical trials (Bech, 2005; Gladis et al. 1999).

General Self Efficacy Scale (GSE) is a 10-item measure assessing one’s beliefs to cope with difficulties. It is a widely used and well validated measure.

Brief clinical interview (including Hoarding Interview and current symptom review) will be used to assess presence of symptoms of hoarding and co-morbid condition following the group treatment.

References


If you feel that it is necessary to include further material, please append.

A4 DESCRIBE ANY RISK THAT MAY ARISE TO THE PARTICIPANT / DONOR?

Risk to participants (and to researchers) can be real but does not need to be physical. Risk includes such as self esteem, regret, embarrassment, civil or criminal liability, disease, physical harm, loss of employment or professional standing, etc. Please consider such possibilities carefully.

Some research activities may put the participant at risk through what is being done or simply through their participation. Please describe the risk you perceive and the protective measures to be taken.
A5 DESCRIBE ANY RISK THAT MAY ARISE TO THE RESEARCHER / ADMINISTRATOR?

Some research activities may put the researcher at risk through what is being done or simply through their participation. Please describe the risk you perceive and the protective measures to be taken.

It is not envisaged that there will be greater risk to the psychologists or administrators than they would encounter in everyday life. Regular supervision and meetings will provide an opportunity to review progress, deal with project aims and to audit ethical procedures.

A6 WHAT BENEFITS ARE ANTICIPATED FROM THE PROJECT

Ethical principles would require that benefits flowed from the activities - but please avoid grandiose claims.

(a) To the Participant (what and how so)

The treatment program will provide access to low-cost specialised treatment for clients with hoarding difficulties, with the aim of improving long-term treatment outcomes. This will be of great benefit to the patients as, currently, no such treatments are available in Australia, with most clients receiving expensive individual treatment usually targeting OCD symptoms rather than specific hoarding symptoms. The 12-week group program at Swinburne Psychology Clinic, while known to be very effective, is nevertheless associated with relatively low adherence levels long term. It is hoped that the current treatment will lead to long term changes in hoarding behaviour, and resultant changes in depression and anxiety symptoms.

(b) More generally (to society, profession, knowledge, understanding, etc, and how so.)

The current study will enable us to evaluate the effectiveness of this treatment program and continue to provide high standard evidence-based specialised treatment for depressive and anxiety problems. In addition, considering the serious impact of the disorder, on the individual, the community and public health and safety (e.g., hygiene and fire hazards) the current program represents the only available follow-up care program addressing this growing problem, accessible and free.

In addition, examination of the changes in symptoms and various cognitive factor that occur over the treatment will enable us to gain further understanding in the cognitive and treatment processes associated with symptom change and its relationship to OCD. Ultimately this will further our understanding of the disorder and lead to further improvements in its treatment.

A7 POTENTIAL PROBLEMS

From time to time in the course of a research project important information, such as an individual found to be at risk, or entirely unforeseen events may come to pass. What procedures are in place to handle unexpected or particularly significant personal or other information that may come to light through the project, eg, unknown medical/psychiatric condition, a particularly distressed participant, civil or criminal liability, etc.

All participants will be under the care of suitably qualified therapists who will receive regular supervision from Dr Nedeljkovic and Professor Kyrios and other senior clinical staff involved in provision of online treatments.

A8 PROFESSIONAL/ETHICAL ABILITY & TRAINING (Researchers/Students/Assistants)

NS 1.15 Research must be conducted or supervised only by persons or teams with experience, qualifications and competence appropriate to the research … using (appropriate) facilities … (and with appropriate skills and resources for dealing with any contingencies…

(a) Sufficiently detail what investigators/assistants will do in this project and their expertise/competence to do so.

Two of the investigators involved in the project are registered clinical psychologists with extensive experience in the treatment and research of HD and related disorders, with strong links to the community and relevant consumer groups (e.g., OCD foundation, Anxiety Recovery Victoria). They have multiple publications in the area, have extensively presented at national and international conferences, and been involved in the training and supervision of psychology trainees. The provisional psychologist involved in the treatment program is a doctorate level student involved in the HD research and group treatment program, and in particular in the coordination and co-facilitation of the standard CBT treatments for HD. The student involved in this program has extensive knowledge of HD gained through training and involvement in the treatment and research activities in the program. Also they are closely supervised by the senior clinicians in the program. The RA involved in the program is experienced in working on online CBT treatments for anxiety-related disorders.

(b) Sufficiently detail any further training/qualifications required for investigators/assistants to carry out the project.

Prior to starting the group the provisional psychologist will attend a training session with the clinical supervisors on the specifics of the treatment. The training will include presentation, discussion and brief exercises.

A9 FUTURE USE OF DATA

Will any of these data be used by yourself, your students or others for any purpose other than for this project as described in the protocol? If so please describe.

The data from this project may be used in future studies exploring factors related to treatment in hoarding. In any such case the use will be consistent with the themes and purpose of the current project. The data will be de-identified and stored in accordance with Swinburne’s Privacy Policy. The participants will be informed of this in the CIS.

A10 EXTERNAL INVOLVEMENT

Is a body external to Swinburne involved in initiation or support of the project?

☐ Yes Name of body/organisation.
If an external body is associated with the project you must provide the HREC with detail of the arrangements, including details of any funding or other resources being provided. A copy of relevant pages from the contractual arrangements should be attached.

☐ No

A11 EXTERNAL APPROVALS
Projects involving other organisation/s or entities may require approval from other institutions or their ethics committees, etc. for such things as access to prospective participants, contact lists, data, facilities, etc. A copy of such approvals may be required to be provided to the HREC at the time of application or be made available as soon as possible. In which case, the project may not commence, until such evidence is provided.

Please indicate, as appropriate, if formal clearance/permission has been obtained or sought:

Institutional: ☐ Yes ☐ Documentation Attached or to follow

Next of Kin (for special groups): ☐ Yes ☐ Documentation Attached or to follow

(estimate when likely to be obtained)

☐ No (please explain)

A12 RESEARCHER / SPONSOR RELATIONSHIP
Is there any relationship or association between the sponsor and any of the researchers listed in Section A of this form, for example are any of the researchers directors, officers, employees, shareholders or promoters of the sponsor or do they receive any personal benefits from the sponsor under any other contracts or arrangements?

☐ No

☐ Yes (please explain the relationship(s), including how a vested or a conflict of interest situation does not arise.)

SECTION B: ETHICAL ISSUES OVERVIEW

B ETHICAL ISSUES

[Double-click on YES/NO ‘check box’ to select box, then enter Default Value as Checked ☑ or leaving as Not Checked ☐]

(a) Non-/Limited Disclosure or Deception: Is any detail in relation to research purposes, methods or questions being withheld from participants? Or will deception of any kind be involved? Or any covert/undeclared observation? (Refer National Statement Chap 17)

☐ Yes ☐ No

(b) Does the data collection process involve access to confidential personal data (including access to data provided for a purpose other that this particular research project) without the prior consent of subjects?

☐ Yes ☐ No

(c) Will participants have pictures taken of them, e.g., photographs, video recordings?

☐ Yes ☐ No

(d) If interviews are to be conducted, will they be record by electronic device?

☐ Yes ☐ No

(e) Will participants be asked to perform any acts or make statements which might compromise them, diminish self esteem or cause them embarrassment or regret (minimal, moderate or significant)?

☐ Yes ☐ No

(f) Might any aspect of your study reasonably be expected to place the participant at risk of criminal or civil liability (not just immediately or directly)?

☐ Yes ☐ No

(g) Might any aspect of your study reasonably be expected to place the participant at risk of damage to their professional/social/cultural/financial standing or employability?

☐ Yes ☐ No

(h) Will the research involve access to data banks subject to privacy legislation?* (NOTE: Annual reporting to Government may be required on this item. For info: please contact the Research Ethics Officer.)

☐ Yes ☐ No

(i) Will participants come into contact with any equipment which uses an electrical supply in any form e.g., audiometer, biofeedback, electrical stimulation, magnetic stimulation, etc.? If "YES”; please outline below what safety precautions will be followed.

☐ Yes ☐ No

(j) Will any treatment be used with potentially unpleasant or harmful side effects?

☐ Yes ☐ No

(k) Does the research involve any stimuli, tasks, investigations or procedures which may be experienced by participants as stressful, noxious, aversive or unpleasant during or after the research procedures?

☐ Yes ☐ No
The composition of the participant group may, in some circumstances, distort and invalidate an outcome, and risks may arise through the composition of the participant group. How many individual participants will be involved? (Number/number ranges for which approval is sought)

Males: 15
Females: 15
Total participants: 30

Over what range of ages?
From (youngest): 18
To (Oldest): 65+

If there is a gender or age imbalance in the number of participants please explain why.

None expected.

C2 RECRUITMENT
How will participants be recruited/selected?
Participants will be recruited through the HD Treatment and Research Program conducted by Psychology Clinic at Swinburne University. To be eligible to participate in the study the participants will be required to:

1. have a primary diagnosis of hoarding (see section A3)
2. have undergone a standard individual or group CBT program and be taking part on the follow-up online program.

After being determined eligible for participation in the research, group participants will be provided with information about the research by the RA who is not directly associated with the treatment. Participation in the research is completely voluntary and all research participants will be required to provide a written consent before their data is accessed for research purposes. All participants will be advised that they are free to withdraw from their study and that their decision to not participate or withdraw from the study will in no way influence their treatment.

C3 PRE-EXISTING CONDITIONS
In some situations an underlying medical or other significant condition of a participant may result in an otherwise relatively innocuous situation causing excessive stress and exacerbate the condition. Researchers must, therefore, be alert to such situations and be able to address the resulting issues.

Do participants have any medical or other significant condition of which you are aware, eg. diabetes, asthma, depression, epilepsy? What steps are in place to handle any resulting problems (you may need to correlate with A3, A4 and A7 of this form)?

All participants are carefully screened as part of their initial assessment for the group treatment program by appropriately trained postgraduate provisional psychologists. Co-morbid conditions in a very severe range (e.g., severe depression with suicidal tendencies), psychotic disorders, serious substance abuse difficulties and neurological and developmental disorders (e.g., significant brain damage, autism) or high risk (e.g., suicide) are a part of the exclusion criteria for the group program, so all participants in the follow-up would have been screened accordingly.

C4 DISCLOSURE AND INFORMED CONSENT
How will participants be informed about the project in order to give valid consent: [ ] Consent Information Statement(s)/Letter(s) and Signed Consent Form(s) will be used.
[ ] Consent Information Statement(s)/Letter(s) and consent implied by return of anonymous questionnaire
[ ] Verbal advice (Please explain how and why)
[ ] Other (Please explain how and why)
C5 COMPENSATION
Consent to participate must be freely given and not induced through the level of reward, perceived reward, or power relationships.

Provide details of any financial or other reward or inducement being offered to subjects for participation. Indicate the source of the funds.

All participants in the group treatment program will be required to pay the pre-set fee as it applies to standard group treatments irrelevant of their participation in the program. The participants will no receive any compensatory payments for involvement in the online maintenance modules.

C6 RELATIONSHIP TO INVESTIGATOR(S)
Free consent may be difficult to ensure if the participant is dependent upon the investigator for employment, assessments etc.

Are participants linked with the investigator through some particular relationship - e.g. employees ultimately responsible to or superiors of the investigator, students of investigator, family members, friends etc.

No

C7 INVOLVEMENT OF SPECIAL GROUPS
Particular issues of consent may arise where special groups of participants are to be involved. There may be, for example, a need to obtain informed consent from persons other than the direct participant. Examples of such special groups include special cultural groups - e.g. indigenous Australians; children and young persons (Guidelines section 4.2); groups with special circumstances - e.g. persons with an intellectual or mental impairment (Guidelines s. 5)

Please identify and describe the nature of the groups and procedures used to obtain permission.

N/A

C8 PRIVACY
The University is subject to the Victorian Information Privacy and Health Records Acts as well as the Commonwealth Privacy Act and, in particular, the Information/Health/National Privacy principles (IPPs/HPPs/NPPs) set out therein and is required to report annually on projects which relate to or utilise particular records.

Does the research involve access to data which was collected by an organisation for its own purposes (i.e. not specifically collected for this project) such as student records, other data banks, human pathology or diagnostic specimens provided by an institution(s)?

If yes, please indicate source/s.

N/A

C9 LOCATION OF STUDY
Please indicate where the research will be carried out. If the research will not be on University premises permission of owner/occupier may be required. If so, please indicate what authority or permission may be required and how will be obtained.
Data will be collected by the way of questionnaire and recorded on a data base which will be secure. Only the Chief Investigators and psychologists providing the treatment will be able to access the information.

As regards any individual, in relation to any data collection or retention, you need to acknowledge either or both of the following:

☐ An Individual can be identified OR is Potentially Identifiable / Re-Identifiable
(An individual can be identified at some point or by the very nature of the data collected/retained: at time of an interview, by signed consent form, identified or labelled voice or image recording, pen-and-paper questionnaire, on-line survey instruments, etc.

Whist data may not have (explicit) identifiers, an individual’s identity can still reasonably be worked out.
Or data may have (explicit) identifiers removed and replaced by codes that permit matching of an individual with the data collected/retained, in which case it is possible to identify or re-identify the person to whom the data relates.)

☐ An Individual is Non- or Un-identifiable
(Data collected/retained anonymously and with no reasonable possibility of being identified.)

Your acknowledgement may require further explanation or clarification; if so, please include in the following box.

The participants will be identifiable during their participation in the project. However, only the researchers named in this application will have access to participant information and all data and information will be stored on password protected files and will be accessible only by the researchers. All potential identifiers will be removed once the complete data from each participant has been collected.

D2 DATA SECURITY (Nb Section D2 Revised Aug 2007)
Please note that “data must be held for sufficient time to allow reference. For data that is published this may be for as long as interest and discussion persists following publication. It is recommended that the minimum period for retention is at least 5 years from the date of publication but for specific types of research, such as clinical research, 15 years (or more) may be more appropriate.” (Sect 4.3 of Swinburne’s Policy on the Conduct of Research)

Please indicate how data (all types of data, including, eg, signed consent forms) will be securely retained (eg, electronic form in password-protected disk drive, locked filing cabinet, etc) and where? With more than one type of data, will the types be separately stored?
In your explanation, you will need to make clear how due confidentiality and/or anonymity will be maintained.

(a) During the study

The Chief Investigators will be responsible for the security of the data which will be on password protected files on the investigators work and portable computers.

(b) Following completion of study

The data will be kept for a minimum of 7 years from the date of publication of the research and will be locked in a secure facility in the department.

D3 PUBLICATION/OUTPUT (Nb Section D3 Revised Aug 2007)
Please explain in sufficient detail:
(a) What, if any, publication (conference, news media, academic journal, other journal, etc) is envisaged following on or in relation to this project, both in terms of data proper and/or analysis of data?
(b) Will participants be informed about any envisaged research publication/outcome? (This information is normally to be included in the information given prior to obtaining informed consent.)
(c) Would any participants be able to be identified through the publication of data proper or research findings? If so, explain why this is necessary.

(a) journal articles (all researchers have a well established track record in publication in high impact journals), international research conferences.
(b) All participants will be advised in the CIS that any publications that may result from the current research will only refer to group results
(c) No participants will be identified through publication.

D4 INDIGENOUS ISSUES
Storage arrangements for data relating to research into Indigenous matters must be determined in compliance with the Policy on the Conduct of Research after consultation with the communities involved.
What consultation has taken place and what arrangements have been made.

n/a

D5 OTHER ISSUES (Nb Section D5 Revised Aug 2007)
Are there any other issue relating to data collection, retention, use or disclosure which the ethics committee should be made aware of and, if so, please explain how you are to deal with this.
(Eg, Research outcomes unduly impacting on any individual or group not directly participating, etc.)
There are no other issues that have not been addressed that relate to data collection, retention, use or disclosure, which the ethics committee should be made aware of.

SECTION E: SUBSTANCES & CLINICAL ISSUES

E1 ADMINISTRATION OF SUBSTANCES/AGENTS

| Name of substance(s) | Dosage per administration | Frequency of administration | Total amounts to be administered |

Anticipated effects:

NOTE: If the research involves administration of foreign substances or invasive procedures, please attach a statement accepting responsibility for those procedures by a medical or paramedical practitioner with Indemnity insurance.

STATEMENT ATTACHED

E2 BODY FLUIDS OR TISSUE

What fluids or tissue? How will be samples be obtained?

Frequency and volume

How are samples to be stored?

How will samples be disposed of?

Who will take the samples?

What are their qualifications for doing so?

Do participants carry, as far as you know, the Hepatitis B or HIV virus? If so how will the risks be handled

Do participants carry, as far as you know, any other contagious diseases or viruses? If so how will the risks be handled

SECTION F DECLARATIONS

With respect to this project, I / We, the undersigned Investigator(s)/Assistant(s) agree:

To undertake human research activity or handle data confidentially in accordance with Swinburne requirements, including any standard or special ethics clearance conditions, under the proper direction of the responsible Swinburne manager and/or principal Swinburne (or other) researcher/supervisor.

<table>
<thead>
<tr>
<th>NAME: (block letters)</th>
<th>SIGNATURE:</th>
<th>DATE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Maja Nedeljkovic</td>
<td></td>
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<tr>
<td>Prof. Michael Kyrios</td>
<td></td>
<td></td>
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<tr>
<td>Ms Molly Fitzpatrick</td>
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</tr>
</tbody>
</table>
Dr Lucian Chaffey

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All listed applicants must sign. The Chief Investigator/Supervisor is also responsible for personnel subsequently joining the project. Expand this table or duplicate this page as required. NB This information is subject to Swinburne or external audit.

**** Please note that ****

PROJECTS MUST NOT COMMENCE WITHOUT PRIOR WRITTEN APPROVAL from the Human Research Ethics Committee (SUHREC) or its appropriate Subcommittee (SHESC)

**Declaration of Compliance by Chief Investigator(s)/Student Supervisor(s).**

I declare that the above project has been developed and will be conducted in accordance with relevant Swinburne standards, policies and codes of practice, including any standard or special conditions for on-going ethics clearance. I further declare that all listed and subsequently appointed researchers or assistants involved in this project will be made aware of the conditions of ethics approval as communicated to me, including approved documentation and procedures.

Signature & Date: 

Name of Signatory & Position:

---

Form checked by a Research & Ethics Advisor (REA)? Yes ☐ No ☐ REA Initials & Date: 

---

Endorsement of Head of Academic Unit (or Delegate) or Above.

I declare that this project: has been developed and will be conducted in accordance with relevant Swinburne standards, policies and codes of practice; and has research merit, adequate resourcing and appropriate leadership/supervision.

Signature & Date: 

Name of Signatory & Position:

(Please note: This endorsement must be given by an authorised official who is not also a chief or co-investigator of the project and who is not also the supervisor of a student investigator with an interest in the project.)
Appendix D: Consent Information Statement Study 2

Project Title
Longer term follow-up of a CBT-based Group Treatment for Hoarding Problems

Investigators
Dr. Maja Nedeljkovic
Faculty of Health, Arts & Design, Swinburne University of Technology.

Dr. Richard Moulding
Faculty of Health, Deakin University

Dr. Jo-Anne Abbott
Faculty of Health, Arts & Design, Swinburne University of Technology.

Student Investigator
Ms. Molly Fitzpatrick
Faculty of Health, Arts & Design, Swinburne University of Technology.

Introduction to Project and Invitation to Participate
This Consent Information Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project before you decide whether or not to take part in it.

Once you understand what the project is about and if you agree to take part in it you will be asked to sign the consent form. By signing the consent form you do not give up your legal rights, but you indicate that you understand the information and that you give your consent to participate in the research project. You are free to withdraw from the project at any time.

You will be given a copy of the Consent Information Statement and Consent Form to keep as a record.

What this project is about and why it is being undertaken
Compulsive Hoarding is a serious psychological condition that often involves the excessive acquisition of, and the inability to discard, possessions of limited value. These behaviours often result in severe cluttering of one’s home to the extent that the mess prevents the appropriate use of living spaces and creates significant distress or impairment in one’s work and social life. In this study we are aiming to formally evaluate the long-term effectiveness of the 10/12-week group treatment for Compulsive Hoarding, and to evaluate predictors of the success of treatment (e.g., age, gender, beliefs etc.).

Project and researcher interests
The project aims to extend research conducted into the treatment of hoarding. The data may also be used as part of a project conducted in partial requirement of a Doctor of Philosophy (Clinical Psychology) for Ms Fitzpatrick.

What participation will involve
As part of the follow-up evaluation of the hoarding treatment program, you will be sent a letter inviting you to participate in the project. You will be given the opportunity to respond to the letter if you do not want to participate. If we do not hear from you, you will be contacted by telephone and given the opportunity to have more information about the study. If after receiving this information you are interested in participating, you will be invited to partake in a telephone interview or given the option of a
face-to-face interview at Swinburne University. During this time, you will be asked a range of questions that assess levels of hoarding and Obsessive-Compulsive Disorder (OCD) symptoms, depression symptoms, mood and beliefs to assist us in examining the effectiveness of the treatment program over a long term period. You will also be asked about your experience whilst participating in the group and what you found beneficial. We would also like to ask you for your permission to access the responses you have provided to most of these measures at the start and completion of treatment. There is no compensatory payment for participation in this research.

Participant rights and interests – Risks & Benefits/Contingencies/Back-up Support
The questionnaires used as part of the research program are regularly used in our treatments to monitor clients’ progress and changes in specific factors associated with the disorder. In fact, you would have completed most of them as part of your participation in the group program. Hence, it is anticipated that completing these questionnaires will pose no greater risk to you than you would encounter in everyday life. In no circumstance will you be required to perform any acts that you are not willing to take part in. If you are experiencing any personal distress resulting from participation in the study, contact the co-ordinating researcher. If you feel any concern or personal distress resulting from the study that is not dealt with by the researcher, you can discuss matters with the Investigators, or other counsellors at the Swinburne Psychology Clinic, 34 Wakefield Street, Hawthorn (03) 9214 8653. Swinburne Psychology Clinic provides a range of low-cost psychological services to the general community. Alternatively, should you become distressed after-hours you can contact the 24-hour emergency crisis help-line Life Line on 13 11 14.

Participant rights and interests Privacy & Confidentiality
It is important that you understand that your participation in this study must be voluntary. If you do not wish to take part in the study, you are under no obligation to do so. You can choose not to answer questions you are uncomfortable answering. Also if you decide to take part but later change your mind, you are free to withdraw from the study at any stage. Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with Swinburne University of Technology or with your therapist or group. Furthermore, if participation in the study is thought to be having adverse effects on you, participation will be terminated.

Confidentiality of the data and the anonymity of the participants will be maintained at all times, subject to legal limitations. The only people with access to the data and records are the above mentioned investigators. In addition, your data will only be accessed at the end of treatment for this research to ensure that you receive a non-biased treatment. Any study information that may be published will only refer to findings related to the group and at no time will individual participants be identified. All information relating to this project (e.g. questionnaire results, computer files etc.) will be destroyed according to departmental procedures, i.e. after the minimum period of seven years. (See also Swinburne’s Privacy Policy http://policies.swinburne.edu.au/ppdonline/)

Research output
It is anticipated that group results will be published in peer-review journals and presented at national or international conferences. Individual participants will not be identified, and only group results will be published. You may wish to obtain copies of written reports based on these findings. If so, please notify the researcher in writing using the details below (no additional costs will be involved).

Further information about the project – who to contact
If you would like further information about the project, please do not hesitate to contact:

Ms. Molly Fitzpatrick                        Email: mfitzpatrick@swin.edu.au
Swinburne Psychology Clinic                      Phone: (03) 9214 8268
The George Swinburne Bldg
Swinburne University
34 Wakefield St
Hawthorn

Ethical Concerns/complaints about the project – who to contact:
This project has been approved by or on behalf of Swinburne’s Human Research Ethics Committee (SUHREC) in line with the National Statement on Ethical Conduct in Human Research. If you have any concerns or complaints about the conduct of this project, you can contact:

Research Ethics Officer, Swinburne Research (H68),
Swinburne University of Technology, P O Box 218, HAWTHORN VIC 3122.
Tel (03) 9214 5218 or +61 3 9214 5218 or resethics@swin.edu.au
CONSENT FORM

Swinburne University of Technology

Project Title: Longer term follow-up of a CBT-based Group Treatment for Hoarding Problems

Investigator(s): Dr. Maja Nedeljkovic
Dr. Richard Moulding

Student Investigator(s): Ms Molly Fitzpatrick

1. I consent to participate in the project named above. I have been provided a copy of the project information statement and this consent form and any questions I have asked have been answered to my satisfaction.

2. Please circle your response to the following:
   § I agree for my questionnaires to be used for research purposes as described on the Information sheet  Yes  No
   § I agree to the outcome of my diagnostic interview being used for research purposes as described on the information sheet  Yes  No
   § I agree to provide additional information regarding demographics and medication use as described on the information sheet  Yes  No

3. I acknowledge that:
   (a) my participation is voluntary and that I am free to withdraw from the project at any time without explanation;
   (b) the project is for the purpose of research and not for profit;
   (c) any personal or health information about me which is gathered in the course of and as the result of my participating in this project will be (i) collected and retained for the purpose of this project and (ii) accessed and analysed by the researcher(s) for the purpose of conducting this project;
   (d) my anonymity is preserved and I will not be identified in publications or otherwise without my express written consent.

4. I acknowledge that:
   a) information obtained about me in this study may be used for future research investigating factors relating to understanding and treatment of hoarding disorder.

   Yes  No

By signing this document I agree to participate in this project.

Name of Participant: ……………………………………………………………………………………

Signature & Date: ……………………………………………………………
Appendix E: Consent Information Statement Study three

Consent Information Statement

Project Title
Evaluation of Online Treatment for Hoarding Problems

Investigators
Dr Maja Nedeljkovic; Prof Michael Kyrios; Ms Molly Fitzpatrick; Dr Lucian Chaffey

Faculty of Life and Social Sciences, Swinburne University of Technology.

Introduction to Project and Invitation to Participate
This Consent Information Statement contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project before you decide whether or not to take part in it.

Once you understand what the project is about and if you agree to take part in it, you will be asked to sign the consent form. By signing the consent form you do not give up your legal rights, but you indicate that you understand the information and that you give your consent to participate in the research project. You are free to withdraw from the project at any time.

You will be given a copy of the Consent Information Statement and Consent Form to keep as a record.

What this project is about and why it is being undertaken
Compulsive Hoarding is a serious psychological condition that often involves the excessive acquisition of, and the inability to discard, possessions of limited value. These behaviours often result in severe cluttering of one’s home to the extent that the mess prevents the appropriate use of living spaces and creates significant distress or impairment in one’s work and social life. In this study we are aiming to formally evaluate the effectiveness of the online treatment for Compulsive Hoarding over time, and to evaluate predictors of the success of treatment (e.g., age, gender, beliefs etc.).

Project and researcher interests
The project aims to extend research conducted into the treatment of hoarding. The data may also be used as part of a project conducted in partial requirement of a Master of Psychology (Clinical)/PhD for Ms Fitzpatrick.

What participation will involve
As part of the online hoarding treatment program, before and after treatment, you will be asked to complete a set of questionnaires that measure hoarding and Obsessive-Compulsive Disorder (OCD) symptoms, depression symptoms, attention deficit hyperactivity disorder symptoms, clutter ratings and photographs, mood and beliefs so as to help you and your therapist track your progress with the online program. In this research study we are asking for your permission to access the results of these measures. We also ask you to give some extra demographic and medication information. We will also access information from the interview and questionnaires you completed as part of the group treatment program for hoarding at Swinburne Psychology Clinic. Results would be analyzed to allow us to examine the effectiveness of the program, and predictors of success for individuals taking part in the program. There is no compensatory payment for participation in this part of the research.

To assist you in completing the program you will be loaned a computer tablet that you can use to access the online program and send emails and photographs to the support therapist. There will be a training video available to teach you how to use the tablet, including information of how to email, how to upload photos to send to your therapist, and how to access the modules. Tablets are to be returned after completion of the program and retained by Swinburne University of Technology.
Based on the results from a pilot study and ongoing participant feedback, it is expected that the current treatment will lead to long term changes in hoarding behaviour, and resultant changes in depression and anxiety symptoms.

The questionnaires used as part of the research program are regularly used in our treatments to monitor clients’ progress and changes in specific factors associated with the disorder. In fact, you would have completed most of them as part of your participation in the group program. Hence, it is anticipated that completing these questionnaires will pose no greater risk to you than you would encounter in everyday life. In no circumstance will you be required to perform any acts that you are not willing to take part in. If you are experiencing any personal distress resulting from participation in the study, contact the e-therapist.

If you feel any concern or personal distress resulting from the study that is not dealt with by the researcher, you can discuss matters with the Investigators, or other counsellors at the Swinburne Psychology Clinic, 34 Wakefield Street, Hawthorn (03) 9214 8653. Swinburne Psychology Clinic provides a range of low-cost psychological services to the general community. Alternatively, should you become distressed after-hours you can contact the 24-hour emergency crisis help-line Life Line on 13 11 14.

**Participant rights and interests Privacy & Confidentiality**

It is important that you understand that your participation in this study must be voluntary. If you do not wish to take part in the study, you are under no obligation to do so. You can choose not to answer questions you are uncomfortable answering. Also if you decide to take part but later change your mind, you are free to withdraw from the study at any stage. Your decision whether to take part or not to take part, or to take part and then withdraw, will not affect your relationship with Swinburne University of Technology or with your therapist or group. Furthermore, if participation in the study is thought to be having adverse effects on you, participation will be terminated.

Confidentiality of the data and the anonymity of the participants will be maintained at all times, subject to legal limitations. The only people with access to the data and records are the above mentioned investigators. In addition, your data will only be accessed at the end of treatment for this research to ensure that you receive a non-biased treatment. Any study information that may be published will only refer to findings related to the group and at no time will individual participants be identified. All information relating to this project (e.g. questionnaire results, computer files etc.) will be destroyed according to departmental procedures, i.e. after the minimum period of seven years. (See also Swinburne’s Privacy Policy http://policies.swinburne.edu.au/ppdonline/)

Signed consent forms will be obtained, but will be stored in a separate locked filing cabinet to the questionnaires, with only the above named researchers having access.

**Research output**

It is anticipated that group results will be published in peer-review journals and presented at national or international conferences. Individual participants will not be identified, and only group results will be published. You may wish to obtain copies of written reports based on these findings. If so, please notify the researcher in writing using the details below (no additional costs will be involved).

**Further information about the project – who to contact**

If you would like further information about the project, please do not hesitate to contact:

**Dr Maja Nedeljkovic**, Senior Lecturer, Psychological Sciences and Statistics, Faculty of Life and Social Sciences, Swinburne University of Technology Email: mnedeljkovic@swin.edu.au
Tel (03) 9214 4428

**Ethical Concerns/complaints about the project – who to contact:**

This project has been approved by or on behalf of Swinburne’s Human Research Ethics Committee (SUHREC) in line with the National Statement on Ethical Conduct in Human Research. If you have any concerns or complaints about the conduct of this project, you can contact:

Research Ethics Officer, Swinburne Research (H68), Swinburne University of Technology, P O Box 218, HAWTHORN VIC 3122. Tel (03) 9214 5218 or +61 3 9214 5218 or resethics@swin.edu.au
CONSENT FORM

Swinburne University of Technology

Project Title: Evaluation of Online Treatment for Hoarding Problems

Investigator(s): Dr Maja Nedeljkovic
                Prof Michael Kyrios
                Dr Lucian Chaffey
                Ms Molly Fitzpatrick

1. I consent to participate in the project named above. I have been provided a copy of the project information statement and this consent form and any questions I have asked have been answered to my satisfaction.

2. Please circle your response to the following:

   § I agree for my questionnaires to be used for research purposes as described on the Information sheet
      Yes  No

   § I agree to the outcome of my diagnostic interview being used for research purposes as described on the information sheet
      Yes  No

   § I agree to provide additional information regarding demographics and medication use as described on the information sheet
      Yes  No

3. I acknowledge that:

   (a) my participation is voluntary and that I am free to withdraw from the project at any time without explanation;

   (b) the project is for the purpose of research and not for profit;

   (c) any personal or health information about me which is gathered in the course of and as the result of my participating in this project will be (i) collected and retained for the purpose of this project and (ii) accessed and analysed by the researcher(s) for the purpose of conducting this project;

   (d) my anonymity is preserved and I will not be identified in publications or otherwise without my express written consent.

4. I acknowledge that:

   a) information obtained about me in this study may be used for future research investigating factors relating to understanding and treatment of hoarding disorder.
      Yes  No

By signing this document I agree to participate in this project.

Name of Participant: …………………………………………………………………………………

Signature & Date: …………………………………………………………………………………
Appendix F: Proforma for Studies two and three

Hoard Group Assessment Performa

Name: ___________________ Age: ___________________
Date of Birth: ______/____/____ Marital Status: ___________________
Gender: Male / Female Occupation: ___________________
Employment Status: ___________ Highest Level of Education: ___________

4) Ethnic Background of your-
Mother: ___________________
Father: ___________________

Have you previously sought counselling for a mental health issue? (please circle) yes / no
If yes, please briefly outline (how many sessions/individual or group/reason for seeking counselling)

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Are you currently on taking any medication to treat a mental health difficulty?
(please circle) yes / no
If yes please briefly outline (what is prescribed/how long have you been taking this dosage etc.)

__________________________________________________________________________
__________________________________________________________________________

SUMMARY FOR FACILITATORS TO COMPLETE

<table>
<thead>
<tr>
<th>DASS</th>
<th>SI-R</th>
<th>SL</th>
<th>HrDS</th>
<th>PADUA</th>
<th>SCI-R</th>
<th>OBQ-44</th>
<th>FNES</th>
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<tr>
<td>MACCS</td>
<td>MRQ</td>
<td>CFS</td>
<td>PVS</td>
<td>YBOCS</td>
<td>FIS</td>
<td>EDII</td>
<td>Q-LES-Q</td>
</tr>
<tr>
<td>OCI-18</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>
**DASS21**

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of the time
3 Applied to me very much, or most of the time

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I found it hard to wind down</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I was aware of dryness of my mouth</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I couldn't seem to experience any positive feeling at all</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>I found it difficult to work up the initiative to do things</td>
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<td></td>
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<tr>
<td>6</td>
<td>I tended to over-react to situations</td>
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<td></td>
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<tr>
<td>7</td>
<td>I experienced trembling (eg, in the hands)</td>
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<tr>
<td>8</td>
<td>I felt that I was using a lot of nervous energy</td>
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<tr>
<td>9</td>
<td>I was worried about situations in which I might panic and make a fool of myself</td>
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<td></td>
<td></td>
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<tr>
<td>10</td>
<td>I felt that I had nothing to look forward to</td>
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<td></td>
<td></td>
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<tr>
<td>11</td>
<td>I found myself getting agitated</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12</td>
<td>I found it difficult to relax</td>
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<td></td>
<td></td>
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<tr>
<td>13</td>
<td>I felt down-hearted and blue</td>
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<td></td>
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<tr>
<td>14</td>
<td>I was intolerant of anything that kept me from getting on with what I was doing</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>15</td>
<td>I felt I was close to panic</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>16</td>
<td>I was unable to become enthusiastic about anything</td>
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<tr>
<td>17</td>
<td>I felt I wasn't worth much as a person</td>
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<tr>
<td>18</td>
<td>I felt that I was rather touchy</td>
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<td></td>
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</tr>
<tr>
<td>19</td>
<td>I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>I felt scared without any good reason</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>21</td>
<td>I felt that life was meaningless</td>
<td></td>
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<td></td>
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</tbody>
</table>
Savings Inventory – Revised.

(Please circle the response that is most appropriate.)

1. To what extent do you have difficulty throwing things away?
   0 = Not at all
   1 = To a mild extent
   2 = To a moderate extent.
   3 = To a considerable extent.
   4 = Very much so

2. How distressing do you find the task of throwing things away?
   0 = No distress.
   1 = Mild distress.
   2 = Moderate distress.
   3 = Severe distress.
   4 = Extreme distress.

3. To what extent do you have so many things that your room(s) are cluttered?
   0 = Not at all
   1 = To a mild extent
   2 = To a moderate extent.
   3 = To a considerable extent.
   4 = Very much so

4. How often do you avoid trying to discard possessions because it is too stressful or time-consuming?
   0 = Never avoid, easily able to discard items
   1 = Rarely avoid, can discard with little difficulty.
   2 = Sometimes avoid
   3 = Frequently avoid, can discard items occasionally.
   4 = Almost always avoid, rarely able to discard items.

5. How distressed or uncomfortable would you feel if you could not acquire something you wanted?
   0 = Not at all
   1 = Mild, only slightly anxious.
   2 = Moderate, distress would mount but remain manageable
   3 = Severe, prominent and very disturbing increase in distress
   4 = Extreme, incapacitating discomfort from any such effort.
6. How much of the living area in your home is cluttered with possessions? (Consider the amount of clutter in your kitchen, living room, dining room, hallways, bedrooms, bathrooms or other rooms.)

   0 = None of the living area is cluttered
   1 = Some of the living area is cluttered
   2 = Much of the living area is cluttered
   3 = Most of the living area is cluttered
   4 = All or almost all of the living area is cluttered

7. How much does the clutter in your home interfere with your social, work or everyday functioning?
   Think about things that you don’t do because of clutter.

   0 = Not at all
   1 = Mild, slight interference, but overall functioning not impaired
   2 = Moderate, definite interference, but still manageable
   3 = Severe, causes substantial interference
   4 = Extreme, incapacitating

8. How often do you feel compelled to acquire something you see (e.g., when shopping or offered free things)?

   0 = Never feel compelled
   1 = Rarely feel compelled
   2 = Sometimes feel compelled
   3 = Frequently feel compelled
   4 = Almost always feel compelled

9. How strong is your urge to buy or acquire free things for which you have no immediate use?

   0 = Urge is not at all strong
   1 = Mild urge
   2 = Moderate urge
   3 = Strong urge
   4 = Very strong urge

10. How much control do you have over your urges to acquire possessions?

    0 = Complete control
    1 = Much control, usually able to control urges to acquire
    2 = Some control, can control urges to acquire only with difficulty
    3 = Little control, can only delay urges to acquire only with great difficulty
    4 = No control, unable to stop urges to acquire possessions
11. How often do you decide to keep things you do not need and have little space for?
   0 = Never keep such things
   1 = Rarely
   2 = Occasionally
   3 = Frequently
   4 = Almost always keep such possessions

12. To what extent does clutter prevent you from using parts of your home?
   0 = All parts of the home are usable
   1 = A few parts of the home are not usable
   2 = Some parts of the home are not usable
   3 = Many parts of the home are not usable
   4 = Nearly all parts of the home are not usable

13. To what extent does the clutter in your home cause you distress?
   0 = No feelings of distress or discomfort
   1 = Mild feelings of distress or discomfort
   2 = Moderate feelings of distress or discomfort
   3 = Severe feelings of distress or discomfort
   4 = Extreme feelings of distress or discomfort

14. How frequently does the clutter in your home prevent you from inviting people to visit?
   0 = Not at all
   1 = Rarely
   2 = Sometimes
   3 = Often
   4 = Very often or nearly always

15. How often do you actually buy (or acquire for free) things for which you have no immediate use or need?
   0 = Never
   1 = Rarely
   2 = Sometimes
   3 = Often
   4 = Almost always

16. How strong is your urge to save something you know you may never use?
   0 = Urge is not at all strong
   1 = Mild urge
   2 = Moderate urge
   3 = Strong urge
   4 = Very strong urge
17. How much control do you have over your urges to save possessions?
   0 = Complete control
   1 = Much control, usually able to control urges to save
   2 = Some control, can control urges to save only with difficulty
   3 = Little control, can only stop urges with great difficulty
   4 = No control, unable to stop urges to save possessions

18. How much of your home is difficult to walk through because of clutter?
   0 = None of it is difficult to walk through
   1 = Some of it is difficult to walk through
   2 = Much of it is difficult to walk through
   3 = Most of it is difficult to walk through
   4 = All or nearly all of it is difficult to walk through

19. How upset or distressed do you feel about your acquiring habits?
   0 = Not at all upset
   1 = Mildly upset.
   2 = Moderately upset
   3 = Severely upset
   4 = Extreme embarrassment.

20. To what extent does the clutter in your home prevent you from using parts of your home for their intended purpose? For example, cooking, using furniture, washing dishes, cleaning, etc.?)
   0 = Never
   1 = Rarely
   2 = Sometimes
   3 = Often
   4 = Almost always

21. To what extent do you feel unable to control the clutter in your home?
   0 = Not at all
   1 = To a mild extent
   2 = To a moderate extent.
   3 = To a considerable extent.
   4 = Very much so

22. To what extent has your saving or compulsive buying resulted in financial difficulties for you?
   0 = Not at all
   1 = A little financial difficulty
   2 = Some financial difficulty
3 = Quite a lot of financial difficulty
4 = An extreme amount of financial difficulty

23. How often are you unable to discard a possession you would like to get rid of?

0 = Never have a problem discarding possessions
1 = Rarely
2 = Occasionally
3 = Frequently
4 = Almost always unable to discard possessions
Hoarding-related Diagnostic Scale

1. Because of the clutter or number of possessions, how difficult is it for you to use the rooms in your home?

   0 1 2 3 4 5 6 7 8
   Not at all  Mild  Moderate  Severe  Extremely
                  Difficult

2. To what extent do you have difficulty discarding (or recycling, selling, giving away) ordinary things that other people would get rid of?

   0 1 2 3 4 5 6 7 8
   No  Mild  Moderate  Severe  Extreme
       difficulty                    Difficulty

3. To what extent do you currently have a problem with collecting free things or buying more things than you need or can use or can afford?

   0 1 2 3 4 5 6 7 8
   None  Occasionally  Regularly  Frequently  Very often
         less than weekly  once or twice weekly  several times weekly  daily per week

4. To what extent do you experience emotional distress because of clutter, difficulty discarding or problems with buying or acquiring things?

   0 1 2 3 4 5 6 7 8
   None/ Not at all  Mild  Moderate  Severe  Extreme

5. To what extent do you experience impairment in your life (daily routine, job / school, social activities, family activities, financial difficulties) because of clutter, difficulty discarding, or problems with buying or acquiring things?

   0 1 2 3 4 5 6 7 8
   None/ Not at all  Mild  Moderate  Severe  Extreme
SCI-R

Using the following scale please indicate the extent to which you have each thought when you are deciding whether to throw something away:

Rate your replies as follows:

<table>
<thead>
<tr>
<th>Not At All</th>
<th>Sometimes</th>
<th>very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

1. I could not tolerate it if I were to get rid of this. 1 2 3 4 5 6 7
2. Throwing this away means wasting a valuable opportunity. 1 2 3 4 5 6 7
3. Throwing away this possession is like throwing away a part of me. 1 2 3 4 5 6 7
4. Saving this means I don’t have to rely on my memory. 1 2 3 4 5 6 7
5. It upsets me when someone throws something of mine away without my permission. 1 2 3 4 5 6 7
6. Losing this possession is like losing a friend. 1 2 3 4 5 6 7
7. If someone touches or uses this, I will lose it or lose track of it. 1 2 3 4 5 6 7
8. Throwing some things away would feel like abandoning a loved one. 1 2 3 4 5 6 7
9. Throwing this away means losing a part of my life. 1 2 3 4 5 6 7
10. I see my belongings as extensions of myself; they are part of who I am. 1 2 3 4 5 6 7
11. I am responsible for the well-being of this possession. 1 2 3 4 5 6 7
12. If this possession may be of use to someone else, I am responsible for saving it for them. 1 2 3 4 5 6 7
13. This possession is equivalent to the feelings I associate with it. 1 2 3 4 5 6 7
14. My memory is so bad I must leave this in sight or I’ll forget about it. 1 2 3 4 5 6 7
15. I am responsible for finding a use for this possession. 1 2 3 4 5 6 7
16. Throwing some things away would feel like part of me dying. 1 2 3 4 5 6 7
17. If I put this into a filing system, I’ll forget about it completely. 1 2 3 4 5 6 7
18. I like to maintain sole control over my things. 1 2 3 4 5 6 7
19. I’m ashamed when I don’t have something like this when I need it. 1 2 3 4 5 6 7
20. I must remember something about this, and I can’t if I throw this away 1 2 3 4 5 6 7
21. If I discard this without extracting all the important information from it, I will lose something. 1 2 3 4 5 6 7
22. This possession provides me with emotional comfort. 1 2 3 4 5 6 7
23. I love some of my belongings the way I love some people. 1 2 3 4 5 6 7
24. No one has the right to touch my possessions. 1 2 3 4 5 6 7
The OBQ-44

This inventory lists different attitudes or beliefs that people sometimes hold. Read each statement carefully and decide how much you agree or disagree with it. For each statement, choose the number matching the answer that best describes how you think. Because people are different, there are no right or wrong answers. To decide whether a given statement is typical of your way of looking at things, simple keep in mind what you are like most of the time. Use the following scale.

Rate your replies as follows:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree Very Much</td>
<td>Disagree Moderately</td>
<td>Disagree a little</td>
<td>Neither agree nor disagree</td>
<td>Agree a little</td>
<td>Agree moderately</td>
<td>Agree very much</td>
</tr>
</tbody>
</table>

6. I think things around me are unsafe. 1 2 3 4 5 6 7

10. If I'm not absolutely sure, I'm bound to make a mistake. 1 2 3 4 5 6 7

13. Things should be perfect according to my own standards. 1 2 3 4 5 6 7

19. To be a worthwhile person, I must be perfect at everything I do. 1 2 3 4 5 6 7

20. When I see the opportunity to do so, I must prevent bad things from happening. 1 2 3 4 5 6 7

23. Even if harm is very unlikely, I should try to prevent it at any cost. 1 2 3 4 5 6 7

24. For me, having bad urges is as bad as actually carrying them out. 1 2 3 4 5 6 7

27. If I don't act when I foresee danger, then I am to blame for consequences. 1 2 3 4 5 6 7

28. If I can't do something perfectly, I shouldn't do it at all 1 2 3 4 5 6 7

31. I must work to my full potential at all times. 1 2 3 4 5 6 7

32. It's essential for me to consider all possible outcomes of a situation. 1 2 3 4 5 6 7

33. Even minor mistakes mean a job is not complete. 1 2 3 4 5 6 7

34. If I have aggressive thoughts or impulses about my loved ones, this means I may secretly want to hurt them. 1 2 3 4 5 6 7

35. I must be certain of my decisions. 1 2 3 4 5 6 7

38. In all kinds of daily situations, failing to prevent harm is just as bad as deliberately causing it. 1 2 3 4 5 6 7
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>39. Avoiding serious problems (for example, illness or accidents) requires constant effort on my part.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>41. For me, not preventing harm is as bad as causing harm.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>42. I should be upset if I make a mistake.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>43. I should make sure others are protected from negative consequences of my decisions or actions.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>45. For me, things are not right if they are not perfect.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>46. Having nasty thoughts means I’m a terrible person.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>50. If I do not take extra precautions, I am more likely than others to have or cause a serious disaster.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>53. In order to feel safe, I have to be prepared as possible for anything that could go wrong.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>55. I should not have bizarre or disgusting thoughts.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>56. For me, making a mistake is as bad as failing completely.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>57. It is essential for everything to be clear cut, even minor matters.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>58. Having a blasphemous thought is a sinful as committing a sacrilegious act.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>59. I should be able to rid my mind of unwanted thoughts.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>61. I am more likely than other people to accidentally cause harm to myself or to others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>64. Having bad thoughts means I am weird or abnormal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>65. I must be the best at things that are important to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>66. Having an unwanted sexual thought or image means I really want to do it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>67. If my actions could have even a small effect on a potential misfortune, I am responsible for the outcome.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>1 Disagree</td>
<td>2 Disagree</td>
<td>3 Disagree</td>
<td>4 Neither agree nor disagree</td>
<td>5 Agree a little</td>
<td>6 Agree moderate</td>
<td>7 Agree very much</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>68.</td>
<td>Even when I am careful, I often think bad things will happen.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>69.</td>
<td>Having intrusive thoughts means I’m out of control.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>72.</td>
<td>Harmful events will happen unless I’m careful.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>74.</td>
<td>I must keep working until it’s done exactly right.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76.</td>
<td>Having violent thoughts means I will lose control and become violent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>77.</td>
<td>To me, failing to prevent disaster is as bad as causing it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>78.</td>
<td>If I don’t do a job perfectly, people won’t respect me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>79.</td>
<td>Even ordinary experiences in my life are full of risk.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>83.</td>
<td>Having a bad thought is morally no different than doing a bad deed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>84.</td>
<td>No matter what I do, it won’t be good enough.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>86.</td>
<td>If I don’t control my thoughts, I’ll be punished.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
macs

This questionnaire is concerned with beliefs that you have about your own memory, planning, concentration, decision-making abilities, and your confidence in these abilities. Read each statement below, and circle the response that most accurately describes how strongly you agree or disagree with each statement. Please respond to all items even though some may seem repetitive. There are no right or wrong answers.

<table>
<thead>
<tr>
<th>Number</th>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have a poor memory.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I expect myself to be 100% certain about the way I plan things.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I experience many doubts after making a decision.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I often doubt my memory for having completed tasks.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I have little confidence in my memory generally.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I perform well at memory tests.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I am easily distracted.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I find it difficult to making decisions on the spot.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>My poor concentration interferes with my ability to plan things effectively.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I have doubts about my memory.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>I don’t feel that I make good decisions.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>I have difficulty keeping my mind focused on one task until it is completed.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>My memory can mislead me at times.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>I have little confidence in my memory for actions.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>I am never certain about my memory.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>I have little confidence in my memory for words and names.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>I have little confidence in my ability to remember how I performed on particular tasks.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>I have doubts about my decision-making ability.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>I expect myself to be 100% certain about my decisions.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>I often doubt my memory for having done things properly.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>I have difficulty knowing if I have actually done something, or imagined it.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>I have a poor concentration ability.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>I often feel that my memory misleads me.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>I have little confidence in my decision-making ability.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>I have little confidence in my ability to remember what I did in particular situations.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>I try so hard to remember things that I end up forgetting everything.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>I put a lot of pressure on myself to do well on even small tasks.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>I insist on performing tasks perfectly.</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>
Yale-Brown Obsessive-Compulsive Scale

Recent research has shown that obsessions and compulsions occur quite commonly among normal people. While completing the inventories below, please keep in mind our definitions of obsessions and compulsions.

**OBSESSIONS** are unwelcome and distressing ideas, thoughts, or impulses that repeatedly enter your mind. They may seem to occur against your will. They may be repugnant to you, you may recognise them as senseless, and they may not fit your personality.

Examples of an obsession are the recurrent thought or impulse to do serious harm to your children even though you never would and the idea that house hold cleansers may lead to contamination and serious illness.

Obsessions differ from worries in that worries are about possible negative things related to life problems that you are afraid might happen. For example, you may worry about failing an exam, about finances, health, or personal relationships. In contrast to obsessions, your worries don’t usually seem totally senseless, repugnant, or inconsistent with your personality.

**COMPULSIONS** on the other hand, are behaviours or acts that you feel driven to perform although you may recognise them as senseless or excessive. Usually compulsions are performed in response to an obsession, or according to certain rules or in a stereotype fashion. At times, you may try to resist doing them but this may prove difficult. You may experience discomfort that does not diminish until the behaviour is completed.

Examples of a compulsion are the need to repeatedly check appliances, water faucets, and the lock on the front door before you can leave the house and repeated hand washing. While most compulsions are observable behaviours, some are unobservable mental acts, such as silent checking or having to recite nonsense phrases to yourself each time you have a bad thought.

Compulsions, as we define them here, are not to be confused with other kinds of compulsive behaviour such as overeating, gambling, drinking alcohol, overshopping, or other “addictive behaviours”.


Now, please remember these definitions of obsessions and compulsions, and circle the appropriate number from 0 to 4 under each of the following questions.

**OBSESSIVE THOUGHTS**

Please think about the last seven days (including today), and circle one answer for each question.

1. How much of your time was occupied by obsessive thoughts? How frequently do the obsessive thought occur?

   0 = None—If you checked this answer, also check 0 for questions 2, 3, 4 and 5 and proceed to question 6.

   1 = Less than 1 hour per day, or occasional intrusions (occur no more than 8 times a day).

   2 = 1 to 3 hours per day, or frequent intrusions (occur more than 8 times a day, but most hours of the day are free of obsessions.)

   3 = More than 3 hours and up to 8 hours per day, or very frequent intrusions (occur more than 8 times a day and during most hours of the day).

   4 = More than 8 hours per day, or near-constant intrusions (too numerous to count, and an hour rarely passes without several obsessions occurring).

2. How much did your obsessive thoughts interfere with your social or work functioning? (If you are currently not working, please think about how much the obsessions interfered with your everyday activities.) (In answering this question, please consider whether there was anything that you didn’t do, or that you did less, because of the obsessions.)

   0 = No interference.

   1 = Mild, slight interference with social or occupational performance, but still performance not impaired.

   2 = Moderate, definitive interference with social or occupational performance, but still manageable.

   3 = Severe interference, causes substantial impairment in social or occupational performance.

   4 = Extreme, incapacitating interference.

3. How much distress do your obsessive thoughts cause you?

   0 = None.

   1 = Mild, infrequent, and not too disturbing distress.

   2 = Moderate, frequent, and disturbing distress, but still manageable.

   3 = Severe, very frequent, and very disturbing distress.

   4 = Extreme, near constant, and disabling distress.
COMPULSIONS

Please think about the last seven days (including today), and check one answer for each question.

6. How much time did you spend performing compulsive behaviour? How frequently did you perform compulsions? (If your rituals involved daily living activities, please consider how much longer it took you to complete routine activities because of your rituals).

0 = None. If you checked this answer, then also check 0 for questions 7,8,9, and 10 then answer 11 an 12.

1 = Less than 1 hour per day was spent performing compulsions, or occasional performance of compulsive behaviours (no more than 8 times a day).

2 = 1 to 3 hours per day was spent performing compulsions, or frequent performance of compulsive behaviours (more than 8 times a day, but most hours were free of compulsions).

3 = More than 3 hours and up to 8 hours per day were spent performing compulsions, or very frequent performance of compulsive behaviours (more than 8 times a day and during most hours of the day).

4 = More than 8 hours per day were spent performing compulsions, or near-constant performance of compulsive behaviours (too numerous to count, and an hour rarely passes without several compulsions being performed).

7. How much did you compulsive behaviours interfere with your social or work functioning? (If you are not currently working, please think about your everyday activities.)

0 = No interference.

1 = Mild, slight interference with social or occupational performance, but still performance not impaired.

2 = Moderate, definitive interference with social or occupational performance, but still manageable.

3 = Severe interference, causes substantial impairment in social or occupational performance.

4 = Extreme, incapacitating interference.

8. How would you have felt if prevented from performing your compulsion(s)? How anxious would you have become?

0 = Not at all anxious.

1 = Only slightly anxious if compulsions prevented.

2 = Anxiety would mount but remain manageable if compulsions prevented.

3 = Prominent and very disturbing increase in anxiety if compulsions interrupted.

4 = Extreme, incapacitating anxiety from any intervention aimed at reducing the compulsions.
9. How much of an effort did you make to resist the compulsions? Or how often did you try to stop the compulsions? (Rate only how often or how much you tried to resist your compulsions, not how successful you actually were in stopping them.)

0 = I made an effort to always resist (or the symptoms were so minimal that there was no need to actively resist them).
1 = I tried to resist most of the time (i.e., more than half the time)
2 = I made some effort to resist
3 = I yielded to almost all compulsions without attempting to control them, but I did so with some reluctance.
4 = I completely and willingly yield to all compulsions.

10. How much control did you have over the compulsive behaviour? How successful were you in stopping the rituals (s)? (If you rarely tried to resist, please think about those rare occasions in which you did try to stop the compulsions, in order to answer this question.)

0 = I had complete control.
1 = Usually I could stop compulsions or rituals with some effort and willpower.
2 = Sometimes I could stop compulsive behaviour but only with difficulty.
3 = I could only delay the compulsive behaviour, but eventually it had to be carried out to completion.
4 = I was rarely able to even momentarily delay performing the compulsive behaviour.

11. Do you think your obsessions of compulsions are reasonable or rational? Would there by anything besides anxiety to worry about if you resisted them? Do you think something would really happen?

0 = I think my obsessions or compulsions are unreasonable or excessive.
1 = I think my obsessions or compulsions are unreasonable or excessive, but I’m not completely convinced that they aren’t necessary.
2 = I think my obsessions or compulsions may be unreasonable or excessive.
3 = I don’t think my obsessions or compulsions are unreasonable or excessive.
4 = I am sure my obsessions or compulsions are reasonable, no matter what anyone says.

12. Have you been avoiding doing anything, going any place, or being with anyone because of your obsessional thoughts or because you were afraid you would perform compulsions?

0 = I haven’t been avoiding anything
1 = I have been avoiding doing a few important things
2 = I have been avoiding some important things
3 = I have been avoiding many important things
4 = I have been avoiding doing most everything
# Q-LES-Q

Please rate each statement by putting a circle around the number that best describes how much the statement is true of you. Please answer every item without spending too much time on any particular item.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not at all/never</th>
<th>All the time/often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Felt in at least very good physical health</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Been free of worry about your physical health</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Felt good physically?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Felt full of pep and vitality?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Felt satisfied with your life?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Felt happy or cheerful?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Felt able to communicate with others?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Felt able to travel about to get things done when needed?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Felt able to take care of yourself?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>How often did you enjoy leisure activities?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>How often did you concentrate on the leisure activities and pay attention to them?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>If a problem arose in your leisure activities, how often did you solve it or deal with it without undue stress?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Looked forward to getting together with friends or relatives?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Enjoyed talking with co-workers or neighbours?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Felt affection toward one or more people?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Joked or laughed with other people?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Felt you met the needs of friends or relatives?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Satisfaction with medication</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Social relationships?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Ability to function in daily life?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Economic status?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Overall sense of well being?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>How would you rate your overall life satisfaction and contentment during the past week?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>
# Adult ADHD self report scale

Please answer the questions below, rating yourself on each of the criteria shown using the scale on the right side of the page. As you answer each question, tick the box that best describes how you have felt and conducted yourself over the past 6 months.

### Part A

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?</td>
<td></td>
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<tr>
<td>2. How often do you have difficulty getting things in order when you have to do a task that requires organization?</td>
<td></td>
<td></td>
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<tr>
<td>3. How often do you have problems remembering appointments or obligations?</td>
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<tr>
<td>4. When you have a task that requires a lot of thought, how often do you avoid or delay getting started?</td>
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<tr>
<td>5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?</td>
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<tr>
<td>6. How often do you feel overly active and compelled to do things, like you were driven by a motor?</td>
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### Part B

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<th>Often</th>
<th>Very often</th>
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<tr>
<td>7. How often do you make careless mistakes when you have to work on a boring or difficult project?</td>
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<td>8. How often do you have difficulty keeping your attention when you are doing boring or</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9. How often do you have difficulty concentrating on what people say to you, even when they are speaking to you directly?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10. How often do you misplace or have difficulty finding things at home or at work?</td>
<td></td>
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<tr>
<td>11. How often are you distracted by activity or noise around you?</td>
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<tr>
<td>12. How often do you leave your seat in meetings or other situations in which you are expected to remain seated?</td>
<td></td>
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<tr>
<td>13. How often do you feel restless or fidgety?</td>
<td></td>
<td></td>
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<tr>
<td>14. How often do you have difficulty unwinding and relaxing when you have time to yourself?</td>
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<tr>
<td>15. How often do you find yourself talking too much when you are in social situations?</td>
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<td></td>
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<tr>
<td>16. When you’re in a conversation, how often do you find yourself finishing the sentences of the people you are talking to, before they can finish them themselves?</td>
<td></td>
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<tr>
<td>17. How often do you have difficulty waiting your turn in situations when turn taking is required?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>18. How often do you interrupt others when they are busy?</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
AA1. Since adolescence or early adulthood:

a. Do you often get so caught up with the details of something you can lose sight of the goal?  NO   YES

b. Do you often not finish a job because you spend so much time trying to get things exactly right? Would you consider yourself a perfectionist?  NO   YES

c. Do you often have trouble getting things done because you can’t decide what to do first? Do you often not get things done on time because you get caught up in deciding how to start?  NO   YES

**SUMMARY OF AA1: ARE 2 OR MORE AA1 ANSWERS CODED YES**  NO   YES

AA2. Are you so devoted to your work that you have hardly any time left for friends, family, or just having fun? Have friends or family members complained that you are spending too much time at work?  NO   YES

Do you worry a lot about whether you might have done something morally wrong? Do you find yourself worried about relatively minor things you may have done wrong? Do you consider yourself more moral than most people?  NO   YES

Do you have trouble throwing things away because they might come in handy some day? Are these things of sentimental value, or are they really not very important at all?  NO   YES

Do you tend to be stubborn about insisting that other people do things exactly the way you want? If they do an okay job but don’t do it your way, does that bother you?  NO   YES

Do you often do things yourself because you know that no one else will do them exactly right?  NO   YES

Are you the kind of person who likes to “save for a rainy day”?  NO   YES

**SUMMARY OF AA2: ARE 4 OR MORE AA2 ANSWERS CODED YES**  NO   YES
NOTE
This Authorship Indication form is a statement detailing the percentage of the contribution of each author in each associated ‘paper’. This form must be signed by each co-author and the Principal Coordinating Supervisor. This form must be added to the publication of your final thesis as an appendix. Please fill out a separate form for each associated paper to be included in your thesis.

DECLARATION
We hereby declare our contribution to the publication of the ‘paper’ entitled:

______________________________________________________________________________________________________

First Author
Name: Molly Anne Fitzpatrick
Percentage of contribution: 85 %
Signature: [Signature]
Date: __/__/____
Brief description of contribution to the ‘paper’ and your central responsibilities/role on project:

Second Author
Name: Dr. Maja Nedeljkovic
Percentage of contribution: 8 %
Signature: [Signature]
Date: __/__/____
Brief description of your contribution to the ‘paper’:

Third Author
Name: Dr. Richard Moulding
Percentage of contribution: 5 %
Signature: [Signature]
Date: __/__/____
Brief description of your contribution to the ‘paper’:

Fourth Author
Name: Professor Michael Kyrios
Percentage of contribution: 2 %
Signature: [Signature]
Date: __/__/____
Brief description of your contribution to the ‘paper’:

Principal Coordinating Supervisor: Name: ___________________________ Signature: ___________________________
Date: __/__/____
In the case of more than four authors please attach another sheet with the names, signatures and contribution of the authors.
NOTE
This Authorship Indication form is a statement detailing the percentage of the contribution of each author in each associated 'paper'. This form must be signed by each co-author and the Principal Coordinating Supervisor. This form must be added to the publication of your final thesis as an appendix. Please fill out a separate form for each associated paper to be included in your thesis.

DECLARATION
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______________________________________________________________________________________________________

First Author
Name: Molly Anne Fitzpatrick
Signature: 
Percentage of contribution: 85%  
Date: _ _ / _ _ / _ _ _ _

Brief description of contribution to the 'paper' and your central responsibilities/role on project:

Second Author
Name: Dr. Maja Nedeljkovic
Signature: 
Percentage of contribution: 5%  
Date: _ _ / _ _ / _ _ _ _

Brief description of your contribution to the 'paper':

Third Author
Name: Dr. Richard Moulding
Signature: 
Percentage of contribution: 5%  
Date: _ _ / _ _ / _ _ _ _

Brief description of your contribution to the 'paper':

Fourth Author
Name: Dr. Jo-Anne Abbott
Signature: 
Percentage of contribution: 5%  
Date: _ _ / _ _ / _ _ _ _

Brief description of your contribution to the 'paper':

Principal Coordinating Supervisor: Name:  
Signature:  
Date: _ _ / _ _ / _ _ _ _

In the case of more than four authors please attach another sheet with the names, signatures and contribution of the authors.
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First Author

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Brief description of contribution to the ‘paper’ and your central responsibilities/role on project:

Second Author

Name: Dr. Maja Nedeljkovic \[Signature: \]
Percentage of contribution: \(5\%\) \[Date: \_\_\_/\_\_/\_\_/\_\_\_

Brief description of your contribution to the ‘paper’:

Third Author

Name: Dr. Jo-Anne Abbott \[Signature: \]
Percentage of contribution: \(5\%\) \[Date: \_\_\_/\_\_/\_\_/\_\_\_

Brief description of your contribution to the ‘paper’:

Fourth Author

Name: Professor Michael Kyrios \[Signature: \]
Percentage of contribution: \(2.5\%\) \[Date: \_\_\_/\_\_/\_\_/\_\_\_

Brief description of your contribution to the ‘paper’:

Dr Richard Moulding - contribution 2.5% \[Signature: \]

Principal Coordinating Supervisor: Name: \[Signature: \]
Date: \_\_\_/\_\_/\_\_/\_\_\_

In the case of more than four authors please attach another sheet with the names, signatures and contribution of the authors.
Appendix H: Supplementary Figures and Tables from Meta-analysis

Figure 4. Forest plot of within group analysis for overall hoarding severity

<table>
<thead>
<tr>
<th>Study name</th>
<th>Outcome</th>
<th>SMD diff in mean</th>
<th>Standard error</th>
<th>Variance</th>
<th>Lower limit</th>
<th>Z Value</th>
<th>Upper limit</th>
<th>p-value</th>
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Figure 5. Forest plot within group analysis for clutter

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Figure 6. Forest plot within group analysis for difficulty discarding

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Figure 7. Forest plot within group analysis for acquisition
Figure 8. Forest plot of within groups analysis for savings cognition inventory revised

Figure 9. Forest plot of within groups analysis for anxiety

Figure 10. Forest plot of within groups analysis for depression
Figure 11. Forest plot of within groups analysis for overall functioning

<table>
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<tr>
<th>Study name</th>
<th>Outcome</th>
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<th>Variance</th>
<th>Lower limit</th>
<th>Z-Value</th>
<th>Upper limit</th>
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Hedges’s g and 95% CI

Figure 12. Scatterplot for the meta-regression of mean number of in-home sessions.

Figure 13. Scatterplot for the meta-regression of mean age.
Figure 14. Scatterplot for the meta-regression of mean hours of therapy

Figure 15. Scatterplot for the meta-regression of treatment duration
Regression of Hedges's g on Treatment Duration

![Graph showing the regression of Hedges's g on Treatment Duration. The x-axis represents Treatment Duration ranging from 10.0 to 28.0, and the y-axis represents Hedges's g ranging from 0.00 to 2.00. The data points are scattered with a trend line indicating a positive correlation.]