The implications of psychological inflexibility on difficulty discarding in hoarding disorder: A structural equation modelling approach

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed. I acknowledge the support I have received for my research through the provision of an Australian Government Research Training Program Scholarship.

Jan Eppingstall

16/03/18
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<td>AAQ</td>
<td>Acceptance and action questionnaire</td>
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<tr>
<td>ACT</td>
<td>Acceptance and commitment therapy</td>
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<tr>
<td>ADHD</td>
<td>Attention deficit hyperactivity disorder</td>
</tr>
<tr>
<td>ADL-H</td>
<td>Activities of daily living scale</td>
</tr>
<tr>
<td>BEAQ</td>
<td>Brief experiential avoidance questionnaire</td>
</tr>
<tr>
<td>BIT</td>
<td>Buried in treasures</td>
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<tr>
<td>C-B</td>
<td>Cognitive-behavioural</td>
</tr>
<tr>
<td>CB</td>
<td>Compulsive buying</td>
</tr>
<tr>
<td>CBT</td>
<td>Cognitive-behavioural therapy</td>
</tr>
<tr>
<td>CFA</td>
<td>Confirmatory factor analysis</td>
</tr>
<tr>
<td>CFI</td>
<td>Comparative fit indices</td>
</tr>
<tr>
<td>CFQ</td>
<td>Cognitive fusion questionnaire</td>
</tr>
<tr>
<td>CGI-IS</td>
<td>Clinical global impression–illness severity</td>
</tr>
<tr>
<td>CIR</td>
<td>Clutter image rating</td>
</tr>
<tr>
<td>CMIN/DF</td>
<td>Chi square to degrees of freedom ratio</td>
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<tr>
<td>CRT</td>
<td>Cognitive rehabilitation therapy</td>
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<tr>
<td>CT</td>
<td>Cognitive therapy</td>
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<tr>
<td>DASS</td>
<td>Depression, anxiety, stress scale</td>
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<tr>
<td>DSM</td>
<td>Diagnostic and Statistical Manual</td>
</tr>
<tr>
<td>ER</td>
<td>Emotion regulation</td>
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<tr>
<td>FFMQ-SF</td>
<td>Five-facet mindfulness questionnaire–short form</td>
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<tr>
<td>fMRI</td>
<td>Functional magnetic resonance imaging</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>GCBT</td>
<td>Group cognitive-behavioural therapy</td>
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<td>HD</td>
<td>Hoarding disorder</td>
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<td>HEI</td>
<td>Home Environment Index</td>
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<td>HRS</td>
<td>Hoarding rating scale</td>
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<td>iHACT</td>
<td>Individual hoarding acceptance and commitment therapy</td>
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<td>MANCOVA</td>
<td>Multivariate analysis of covariance</td>
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<tr>
<td>MANOVA</td>
<td>Multivariate analysis of variance</td>
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<td>MEE</td>
<td>Mere-exposure effect</td>
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<tr>
<td>OCD</td>
<td>Obsessive-compulsive disorder</td>
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<td>OVI</td>
<td>Overvalued ideation</td>
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<td>RFT</td>
<td>Relational frame theory</td>
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<td>RSI</td>
<td>Relationship between Self and Items measure</td>
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<td>RMSEA</td>
<td>Root mean square error of approximation</td>
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<td>SACS</td>
<td>Self-as-context scale</td>
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<tr>
<td>SCI</td>
<td>Saving cognitions inventory</td>
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<td>SEM</td>
<td>Structural equation modelling</td>
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<td>SI–R</td>
<td>Saving inventory–revised</td>
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<tr>
<td>SSRI</td>
<td>Selective serotonin reuptake inhibitor</td>
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<tr>
<td>VLQ</td>
<td>Valued living questionnaire</td>
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Abstract

Hoarding Disorder (HD) is defined as the persistent difficulty discarding or parting with belongings regardless of their monetary value due to an overwhelming need to avoid the presupposed intolerable emotional and physiological distress of discarding (American Psychiatric Association, 2013). The result of this pathological saving behaviour is congestive disorganised clutter which renders living spaces unusable or, if the spaces are uncluttered, are so only due to a third party’s intervention (APA, 2013). For a clinical diagnosis, the hoarding must cause significant distress or impairment in social, occupational, or other important areas of functioning including the health and safety of the sufferer and others (APA, 2013).

Australian prevalence rates for hoarding are unknown currently; however, research indicates a lower-bound prevalence of 1.5% (Nordsletten, Reichenberg, et al., 2013) and an upper-bound prevalence of 4.6% (Mueller, Mitchell, Crosby, Glaesmer, & de Zwaan, 2009) in British and German samples.

Unfortunately, hoarding is considered difficult to treat (Abramowitz, Franklin, Schwartz, & Furr, 2003; Mataix-Cols, Marks, Greist, Kobak, & Baer, 2002). Indeed, a recent meta-analysis of treatment evaluations indicated that HD-specific gold standard cognitive behavioural therapy (CBT) is ineffective in approximately 65% of cases (Tolin, Frost, Steketee, & Muroff, 2015). Evidence suggests the treatment-resistant nature of HD could be due to factors inherent in the disorder itself that make it incompatible with particular CBT techniques such as cognitive reappraisal. In fact, cognitive reappraisal (Frost, Ong, Steketee, & Tolin, 2016) may be rendered ineffectual in the presence of comorbidity (Hall, Tolin, Frost, & Steketee, 2013), cognitive impairment (Woody, Kellman-McFarlane, & Welsted, 2014), lack of insight
(Frost, Tolin, & Maltby, 2010), and emotion dysregulation (Tolin, Levy, Wootton, Hallion, & Stevens, 2018) commonly found in HD.

Recent research has looked towards potential treatment alternatives to the key CBT technique of cognitive reappraisal currently used in CBT for HD (Frost et al., 2016; Tolin et al., 2018). In fact, preliminary evidence suggests that a cognitive distancing method used in acceptance-based treatment programs known as thought listing may be more effective in reducing both saving, a behavioural symptom of HD, and emotional attachment to possessions that leads to saving (Frost et al., 2016).

In order to develop more efficacious treatments for HD, the exploration of alternate theoretical approaches, particularly those based on acceptance and mindfulness practices, is necessary to augment the current CBT protocol. Like CBT, the efficacy of Acceptance and Commitment Therapy (ACT) is empirically supported by randomised-controlled trials (A-Tjak et al., 2015) and emerging evidence suggests it is an effective treatment for a broad range of psychopathologies. ACT offers a theoretical approach suited to explicate the avoidance behaviours of saving and acquiring that are used as a method of emotion regulation by hoarding sufferers. ACT has therefore been chosen in this thesis as a theoretical lens through which to view the development and maintenance of HD.

The aim of the current research project was to reconceptualise the Frost and Hartl (1996) cognitive-behavioural theoretical model of HD through the lens of ACT and test the impact of ACT components on the difficulty discarding phase of the proposed model in a community sample. Difficulty discarding is the primary maladaptive process in HD and it is the key pattern of behaviour responsible for disorganised clutter reaching clinical levels in HD. Significantly improving the rate
of discarding through effective intervention appears central to achieving clinically significant change for more individuals who hoard. Consequently, techniques that target emotional aspects that contribute to the distress experienced by hoarding sufferers and that offer an alternative emotion regulation strategy to habitual avoidance of discarding possessions could be key to improved treatment outcomes. The current project is the first attempt, at the time of writing, to develop a novel acceptance-based emotion regulation model for HD and to test the psychological inflexibility difficulty discarding phase in a community sample, with oversampled clinical-level HD participants, using structural equation modelling path analyses.

**Thesis overview**

This thesis contains eight chapters, including this overview (Chapter 1). Initially, a literature review (Chapter 2) was conducted assessing the efficacy of any HD psychosocial treatment studies including case series, pilot studies, and open and randomised controlled trials (RCT), which have been published in peer-reviewed journals up to July 2016.

The applicability of ACT to HD is detailed in Chapter 3 and concludes that key behaviours and cognitions typical in HD can be usefully re-examined through an ACT lens. In order to reconceptualise the Frost and Hartl (1996) C-B model of HD based on the underlying theory and philosophy of ACT, a review of the evidence supporting the elements included in the current model was conducted (see Chapter 4).

Based on the review of evidence supporting the Frost and Hartl (1996) C-B model of HD and the assessment of the suitability of ACT for HD a new acceptance-based emotion regulation theoretical model is proposed in Chapter 5. The novel four-
phase hypothetical model detailed in Chapter 5 is an augmentation of the C-B model incorporating recent emotion regulation evidence from the HD literature.

Chapter 6 of this project presented Study 1, the aim of which was to establish if there were significant differences between psychological inflexibility scores for those reporting low levels of hoarding symptoms and those reporting high levels of hoarding symptoms, statistically supporting conclusions made in Chapter 3 as to the applicability of ACT for HD. Multivariate analyses of variance and covariance (controlling for general distress) were conducted to investigate the differences between the low and high severity hoarding group’s scores on cognitive fusion, experiential avoidance, inflexible attention, attachment to the conceptualised self, and valued action. A follow up post-hoc multivariate analysis of covariance was also conducted to assess the facets of inflexible attention, controlling for general levels of distress.

The process of difficulty discarding, the essence of disordered hoarding behaviours, was then tested using structural equation modelling techniques of confirmatory factor analyses and recursive path analyses in Chapter 7. The revised psychological inflexibility difficulty discarding model proposed paths from exogenous variables of anxiety, psychological inflexibility, and depression, to sequential mediators hoarding-specific cognitive fusion, and hoarding-specific experiential avoidance, ultimately estimating the overall impact of these variables on clutter.

Findings

The preliminary investigation of the six core processes of psychological inflexibility and HD in Study 1 found that overall, hoarding sufferers tend to be more
psychologically inflexible than non-hoarding sufferers even when controlling for general distress. Specifically, hoarding sufferers were less flexible, over and above negative affect, in the areas of general cognitive defusion and acceptance, acting with awareness and reacting to inner experiences, and taking committed action towards freely chosen values.

Based on the findings from Study 1, the psychological inflexibility difficulty discarding model was hypothesised. Study 2 results indicated that the variables and relationships were a good fit for the data. Overall, the psychological inflexibility model accounted for 69% of the variance in the dependent variable, clutter. Psychological inflexibility and anxiety contributed significantly to the variance in hoarding-specific cognitive fusion, which in turn significantly impacted hoarding-specific experiential avoidance, leading to the outcome variable, clutter as hypothesised. Furthermore, results indicated that psychological inflexibility contributed significantly more to the variance in cognitive fusion than anxiety. Conversely, depression did not significantly impact hoarding specific cognitive fusion as hypothesised. Instead, a path from depression to clutter directly and indirectly via hoarding specific experiential avoidance was significant.

The theoretical and practical implications of the novel acceptance-based emotion regulation model of HD and the findings from the multivariate analyses and path analyses are discussed in Chapter 8. Finally, a discussion of the limitations of the project, suggestions for future research, and a detailed discussion of the ways the novel treatment protocol, developed as part of this project, can assist clinicians treating hoarding suffers will be included.
Chapter 2

A Critical Evaluation of the Current Treatment Literature for HD

Hoarding Disorder is defined in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association [APA], 2013) as the persistent difficulty discarding or parting with belongings regardless of their monetary value due to an overwhelming need to avoid the presupposed intolerable emotional and physiological distress of discarding. The result of this pathological saving behaviour is congestive disorganised clutter which renders living spaces unusable or if the spaces are uncluttered it is only due to a third party’s intervention (APA, 2013). For a clinical diagnosis, the hoarding must cause significant distress or impairment in social, occupational, or other important areas of functioning, including the health and safety of the sufferer and others (APA, 2013).

Cognitive Behavioural Therapy (CBT) for Hoarding Disorder (HD), based on the Frost and Hartl (1996) cognitive-behavioural (C-B) model of hoarding disorder, has been considered the gold-standard treatment since the publication of Steketee and Frost’s (2007) Compulsive Hoarding and Acquiring: Therapists Guide. A review comparing therapy traditionally used to treat Obsessive Compulsive Disorder (OCD) and therapy developed specifically for hoarding (Williams & Viscusi, 2016), as well as a review of the elements of the C-B model and treatment protocol (Wheaton, 2016) have recently been published along with a meta-analysis combining treatment results for a selection of CBT studies. Results from these reviews indicate approximately 65% of participants did not achieve clinically significant change after completing the CBT for HD treatment program, a figure that indicates room for improvement. Notwithstanding, only a small number of treatment studies have been conducted to
date; thus, more research is required to confidently assess the efficacy of CBT for HD. However, insights into potential improvements to the current CBT for HD can be gleaned from a closer inspection of available treatment efficacy studies published at this time.

The aim of this chapter was to critically assess the efficacy of all empirically-validated HD treatments, and compare the key features and, where possible, each mode of delivery including but not limited to: individual face-to-face (f2f) clinician-delivered therapy, group f2f clinician delivered therapy, support groups, bibliotherapy, on-line support groups, family therapy, and community interventions. Although the majority of studies have assessed the results from gold standard CBT for HD interventions, other treatment protocols were compared and contrasted in this review.

**Types of studies for inclusion.**

Case series, pilot studies, open and randomised controlled trials (RCT) were included in the critical review.

**Participants.**

The review included studies of adult participants who either self-reported or were clinically assessed as meeting the *DSM–5* criteria for clinically significant HD, namely: (a) Persistent difficulty discarding; (b) This difficulty is due to the need to save and there is distress associated with discarding; (c) Congested clutter is present in active living spaces; (d) the hoarding causes clinically significant distress/impairment in social functioning, occupational functioning and/or safety; (e) The hoarding is not attributable to another medical condition (such as Prader-Willi Syndrome, brain injury, or cerebrovascular disease); and (f) the hoarding is not better accounted for by the symptoms of another mental disorder (e.g. obsessions in
obsessive compulsive disorder, or delusions in schizophrenia). In accordance with the DSM–5 criteria, studies reporting hoarding in the context of neurological conditions or psychiatric conditions were excluded (e.g., dementia, organic brain injuries etc.).

Interventions.

Any psychosocial treatment protocol that had been empirically evaluated and published in a peer reviewed journal were considered eligible for review, excluding those using pharmacological treatments in the study unless the drug was not an independent variable but a covariate (e.g. SSRI’s used for co-morbid depression, but depression is measured at all time points in order to statistically remove the covariate’s impact on the dependent variable). Dissertation abstracts and book chapters were excluded.

Outcome measures.

Only studies utilising the Saving Inventory – Revised (SI-R; Steketee & Frost, 2007) or the Hoarding Rating Scale (HRS; Tolin, Frost, & Steketee, 2010) (as a minimum) were considered in this review. Publications utilising the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) as an outcome measure were excluded due to the insufficient statistical reliability and validity of this scale, as there are only two hoarding items (Frost & Steketee, 2014).

Information sources.

Studies were identified by searching electronic databases including but not limited to: PsycINFO, MEDLINE, PubMED, and Scopus.
Search strategy.

Electronic databases were searched utilizing the broad terms “hoard*”, “intervention”, “trial”, and “treatment” to ensure all relevant papers were identified. The publication of the *Oxford Handbook of Hoarding and Acquiring* (Frost & Steketee, 2014) was the first volume to collect the empirical research on hoarding with contributions from all key researchers in the area. This summary text included, amongst others, a section on assessment and intervention, which reviewed the hoarding intervention research at the time of publishing and the corresponding reference list for these chapters (specifically chapters 20, 21, 23, and 24) were cross-checked with search results to ensure all relevant peer-reviewed articles were included. A final electronic database search was conducted in February 2016.

Risk of bias across studies.

The 13 papers meeting the inclusion criteria for this critical review were conducted between 2007 and 2016, with a total of 394 participants. The majority of studies (11) were conducted in the United States of America, with a single study conducted in Melbourne Australia, and an online support group study that was, due to the methodology used, geographically ambiguous. Of the 11 studies conducted in the United States, 9 recruited participants from adjacent eastern states —Massachusetts and Connecticut, in and around the author’s universities. The remaining 2 \((n = 23)\) studies were conducted in San Diego County on the West Coast of the United States. The participants with known geographical locations totaled 288, and of these, 77.78% were from a small geographical area \((41,693 \text{ km}^2)\) and as a consequence there is the possibility of unidentified socioeconomic, cultural, geographical, and climactic variables that may bias results.
Women were disproportionately represented in the collected data with an average of 87.6% of participants identifying as female across studies. Consequently, this gender bias limits the generalisability of treatment results to men suffering from HD. Indeed, evidence suggests men are equally likely to suffer from hoarding disorder (Mathews, Delucchi, Cath, Willemsen, & Boomsma, 2014; Mueller et al., 2009) and could behave differently to women (Samuels, Bienvenu, Pinto, et al., 2008); therefore, this gender disparity in the treatment literature must be addressed.

With only two randomised controlled trials (Muroff, Steketee, Bratiotis, & Ross, 2012; Steketee, Frost, Tolin, Rasmussen, & Brown, 2010) and one control trial (Frost, Ruby, & Shuer, 2012) conducted for HD between 2007 and 2016, a scarcity of gold-standard evidence renders definitive conclusions about the efficacy of any psycho-social treatment protocols injudicious. However, this dearth in HD RCT research is understandable given a great deal of time and resources has been channeled into research aimed at validating hoarding as a distinct disorder over the past 5 to 7 years (see Mataix-Cols et al., 2010; Timpano, Exner, et al., 2011 for a discussion). Indeed, with the criteria for the diagnosis of HD now agreed upon, it is expected that an increase in treatment research will follow.

**Critical Review of HD Treatment Studies**

Despite the lack of comparable RCT’s, interpreting the contribution HD treatment studies have made to our understanding of HD is both valuable and instructive. Overall, a total of thirteen studies met the criteria set for this review and will be discussed in detail. Studies have been separated into those reporting results of individual cognitive behavioural therapy (CBT), individual cognitive rehabilitation therapy (CRT), and group CBT (GCBT); within those groups studies have been
arranged chronologically.

**Studies reporting on the results of individual CBT.**

According to the criteria set for this critical review, four individual CBT for HD studies have been published in the literature. An initial open trial (Tolin, Frost, & Steketee, 2007a) was followed by the only randomized controlled trial for individual HD treatment to date (Steketee et al., 2010). Two further studies using geriatric samples were published; the first a case series and the second an accelerated version of the standard 26-session protocol (Steketee & Frost, 2007). Each will be critically reviewed in turn (see Table 1 for a summary of results).

**Tolin, Frost, and Steketee (2007a).**

The first empirical exploration into the efficacy of the CBT protocol (see Table 2) developed specifically for HD was conducted by Tolin, Frost and Steketee (2007a) in a small sample of 14 adult, female, compulsive hoarding outpatients ($M = 49$ years of age; $SD = 15.0$ years). This was the first study to use the Savings Inventory –Revised (SI-R; Frost et al., 2004) and the Clutter Image Rating (Frost, Steketee, Tolin, & Renaud, 2008) to test the novel CBT protocol developed by the same group. PhD psychologists, advanced psychology graduate students, or master’s level social workers conducted 26 individual therapy sessions, typically of one to one and a half hours in length, and 10 of the 14 participants completed the full treatment program. The majority of sessions (75%) were held in the therapist’s office where almost daily homework tasks were assigned between sessions. The balance remaining sessions were in-home, hands-on sorting sessions conducted by the therapist and student assistants, with 2 of the 10 participants receiving “marathon” home de-cluttering (sorting, organizing, and discarding) visits of two-and-a-half to three hours.
Table 1
Characteristics and results of HD treatment studies included in the critical evaluation

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention type</th>
<th>Number of sessions (in-home)</th>
<th>Study design (control group)</th>
<th>Hoarding outcome pre-post intervention (SI-R / HRS/ CIR / UHSS)</th>
<th>% of clinically significant change (method of definition)</th>
<th>Effect size (pre-post)</th>
<th>Gains maintained at follow-up</th>
<th>Functional impairment improved</th>
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</thead>
<tbody>
<tr>
<td>Tolin, Frost, &amp; Steketee (2007a)</td>
<td>Individual CBT</td>
<td>26 (7 sessions in-home)</td>
<td>No</td>
<td>Significant improvements on SI-R (28% reduction) and CIR (31% reduction).</td>
<td>60% clinically significant change at post (using Jacobson and Truax, 1991, criteria)</td>
<td>SI-R (d = 1.62) CIR (d = 0.83)</td>
<td>n/a</td>
<td>n/a</td>
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<td>Steketee, Frost, Tolin, Rasmussen, &amp; Brown (2010) And Muroff, Steketee, Frost, &amp; Tolin (2013)</td>
<td>Individual CBT</td>
<td>26 (7 sessions in-home)</td>
<td>Yes (WL)</td>
<td>Significant improvements on SI-R and HRS Treatment groups showed 15% average reduction in total SI-R. WL control group also showed significant improvement but CBT group significantly more.</td>
<td>41% of completers were considered clinically significantly improved on the SI-R and HRS (using Jacobson and Truax, 1991, criteria)</td>
<td>SI-R (d = 1.81) HRS (d = 2.29)</td>
<td>Gains maintained at 1 year follow up. 83% remained treatment responders</td>
<td>n/a</td>
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<tr>
<td>Turner, Steketee, &amp; Nauth (2010)</td>
<td>Individual CBT</td>
<td>28-41 (m = 35) (majority of sessions in-home)</td>
<td>No</td>
<td>Significant improvements on CIR (average 28% reduction in clutter). No significant reduction on HRS.</td>
<td>Not reported</td>
<td>CIR (d = 1.05)</td>
<td>n/a</td>
<td>Reductions in difficulty with ADL’s after treatment, representing a 24% improvement in ability to function.</td>
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<tr>
<td>Ayers, Wetherell, Gloshan, &amp; Saxena (2011)</td>
<td>Individual CBT</td>
<td>26 (7 sessions in-home)</td>
<td>No</td>
<td>Significant improvement on SI-R and UHSS. 14-20% reduction in hoarding severity over HD measures. No significant change in CIR.</td>
<td>25% of participants made clinically significant changes (defined as a 35% reduction in both primary outcome measures of hoarding severity and a &quot;minimally improved&quot; or better score on the Clinician Global Impression Scale (CGI; Guy, 1976).)</td>
<td>SI-R $d = 0.96$ UHSS $d = 0.99$</td>
<td>Overall gains maintained but some individuals ($n = 2, 16%$) considered to have ‘relapsed’ by 6-month follow up.</td>
<td>No significant differences</td>
</tr>
<tr>
<td>Ayers, Saxena, Esperjo, Twamley, Granholm, &amp; Wetherell (2014)</td>
<td>Cognitive Rehabilitation and Behavioural Therapy</td>
<td>24 (3-6 sessions in-home)</td>
<td>No</td>
<td>Significant improvement on SI-R (8.36% reduction), UHSS (40.86% reduction) and CIR (25.96% reduction).</td>
<td>73% made clinically significant change. (method of classification not reported).</td>
<td>SI-R $d = 1.02$ UHSS $d = 1.51$ CIR $d = 0.41$</td>
<td>n/a</td>
<td>n/a</td>
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<tr>
<td>Muroff, Steketee, Rasmussen, Gibson, Bratiotis, &amp; Sorrentino (2009)</td>
<td>Group CBT + 2 individual sessions</td>
<td>16-20 (m = 17) (no in-home sessions)</td>
<td>No</td>
<td>Significant improvements on SI-R and CIR (average 14% reductions).</td>
<td>Not reported.</td>
<td>SI-R $d = 0.56$ CIR $d = 0.37$</td>
<td>n/a</td>
<td>n/a</td>
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<td>Muroff, Steketee, Himle, &amp; Frost (2010)</td>
<td>Online Group CBT / self-help</td>
<td>n/a</td>
<td>Yes (WL, non-randomised)</td>
<td>Participants with complete data (n = 23) made significant improvements on SI-R with an average 15.7% reduction. Significant improvement on the CIR (n = 22), mean 18.2% reduction. WL control also improved significantly on SI-R total over 6-month period.</td>
<td>Not reported.</td>
<td>Not reported for participants with full data only.</td>
<td>n/a</td>
<td>n/a</td>
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<tr>
<td>Gilliam, Norberg, Villavicencio, Morrison, Hannan, &amp; Tolin (2011)</td>
<td>Group CBT</td>
<td>16-20 (m = 18) (no in-home sessions)</td>
<td>No</td>
<td>Significant improvements on SI-R (average 27% reduction).</td>
<td>Not reported.</td>
<td>SI-R $d = 0.56$  CIR $d = 0.37$</td>
<td>n/a</td>
<td>Improvement in ADL's and disability.</td>
</tr>
<tr>
<td>Frost, Pekareva-Kochergina, &amp; Maxner (2011) Study 1</td>
<td>CBT-based bibliotherapy support groups</td>
<td>13 (in-home session for assessment only)</td>
<td>No</td>
<td>Significant improvement on SI-R (average 23%) and CIR (average 22%)</td>
<td>47% clinically significant change (using Jacobson and Truax, 1991) at post-treatment, and 59% at follow-up.</td>
<td>SI-R $d = 1.31$  CIR $d = 0.69$</td>
<td>SI-R improvement maintained at 1-month follow up</td>
<td>Significant improvement in ADL.</td>
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<td>Frost, Pekareva-Kochergina, &amp; Maxner (2011) <em>Study 2</em></td>
<td>CBT-based bibliotherapy support groups</td>
<td>13 (in-home session for assessment only)</td>
<td>No</td>
<td>Significant improvement on SI-R (average 22%) HRS (average 26%) and CIR (average 26%).</td>
<td>36% clinically significant change (using Jacobson and Truax, 1991) at post-treatment, and 54% at follow-up.</td>
<td>SI-R ( d = 0.91 ) CIR ( d = 0.78 ) HRS ( d = 0.64 )</td>
<td>SI-R improvement maintained at 1-month follow up</td>
<td>Significant improvement in ADL.</td>
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<tr>
<td>Frost, Ruby, &amp; Shuer (2012)</td>
<td>CBT-based bibliotherapy support groups</td>
<td>13</td>
<td>Yes (waitlist)</td>
<td>Significant improvements on SI-R (average 27-35%) HRS (30%) and CIR (16%). All improved significantly more than control condition.</td>
<td>30% met criteria for clinically significant change (using Jacobson and Truax, 1991, criteria).</td>
<td>SI-R ( d = 1.97 ) HRS ( d = 2.45 ) CIR ( d = 1.91 )</td>
<td>n/a</td>
<td>Significant improvement in ADL's (30% compared to 2% in control condition).</td>
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<tr>
<td>Muroff, Steketee, Bratiotis, &amp; Ross (2012)</td>
<td>Group CBT with or without additional HA</td>
<td>20 + 4 in-home assistance</td>
<td>Yes (bibliotherapy)</td>
<td>Significant improvements for both group CBT conditions on SI-R (23.3-29.9% average reductions, compared to 9% in control group) and HRS (25.4-26.5% average, compared to 8.6% in control group.</td>
<td>Clinically significant changes in 7.7% of bibliotherapy control group, 21.4% for group CBT and 36.4% for group CBT plus home assistance (using Jacobson and Truax, 1991 criteria).</td>
<td>SI-R ( d = 2.00-3.36 ) HRS ( d = 2.00-2.14 )</td>
<td>n/a</td>
<td>Improvement in ADL's in group CBT conditions, compared to control.</td>
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<td>Tolin, Stevens, Nave, Villavicencio, &amp; Morrison (2012)</td>
<td>Group CBT</td>
<td>16</td>
<td>No</td>
<td>No significant changes on SI-R or HRS.</td>
<td>Not reported.</td>
<td>SI-R $d = 0.48$</td>
<td>Not reported for participants with full data only.</td>
<td>n/a</td>
</tr>
<tr>
<td>Moulding, Nedeljkovic, Kyrios, Osborne, &amp; Mogan (2016)</td>
<td>Group CBT</td>
<td>12</td>
<td>No</td>
<td>Significant differences between questionnaire completers and non-completers on SI-R post treatment</td>
<td>Clinically significant changes of 34% (defined as ≥ 14-point reduction in SI-R pre-post treatment, a pre-treatment score of 50 or above, and a post-treatment score below 50, 2 standard deviations from mean in nonclinical individuals Frost et al., 2004)</td>
<td>SI-R $d = 0.80$</td>
<td>Not reported</td>
<td>n/a</td>
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</table>

Unfortunately, the impact of marathon de-cluttering sessions on post-treatment scores of hoarding related symptoms was not isolated in this study.

Clinically significant change, established by using the formulas developed by Jacobson and Truax (1991), occurred in 60% of patients in this study, with more than half of participants reporting a post score of less than or equal to 50 (i.e., within two standard deviations of the normal range) on the SI-R and at least a 14 point improvement from pre to post scores. Clinicians rated 40% of patients as “much improved” or “very much improved” mid-way through the treatment, which increased to 50% post treatment. Adherence to homework tasks was an indicator of treatment outcomes for this group and those who did show “good adherence” showed more improvement in hoarding related symptoms of excessive acquiring, difficulty saving and clutter (Tolin et al., 2007a). The four participants who discontinued treatment prematurely did so due to a variety of problems engaging with the program including discontent with the assigned therapist and treatment protocol, serious marital conflict, and refusal to complete homework tasks.

Despite limited generalisability due to small sample size, lack of control group, non-standardised in-home sessions, and gender bias, this study took the first step towards the establishment of a tailored evidence-based treatment for HD which previously appeared treatment resistant to techniques typically successful in OCD populations (Abramowitz, Franklin, Schwartz, & Furr, 2003; Steketee & Frost, 2003). It can be concluded, from this single open trial, that the CBT for HD protocol appeared highly effective under specific conditions for the duration of the 26-week study for the target population when administered in a flexible way. However, evidence regarding the durability of results was absent as no follow up data was
collected, and future replication using a comparison control condition and random assignment was considered necessary to make any clear statements about the efficacy of the CBT for HD protocol.
Table 2
Overview of CBT for Hoarding Disorder Protocol

Assessment
- Complete assessment measures (SI-R, SCI, ADL-H)
- Conduct home visit
- Help client identify family member/friend to be coach

Case Formulation & Psycho-Education
- Personal and family vulnerabilities
- Information processing problems
- Meaning of possessions/thoughts, beliefs, and attachment to possessions
- Emotional reactions

Treatment Planning
- Establish treatment goals and set rules for treatment
- Complete visualisation exercise
- Use problem-solving methods to troubleshoot barriers to progress

Enhancing Motivation (where necessary)
- Use motivational interviewing techniques with ambivalent clients

Skills Training
- Problem-solving
- Organising skills
- Implement a Personal Organising Plan
- Paper organisation – creating a filing system

Exposure
- Create exposure hierarchy for sorting, discarding, and acquiring
- Graduated exposure exercises

Cognitive Strategies
- Identify errors in thinking
- Application of cognitive therapy techniques during behavioural exposures

Relapse Prevention
- Progress review
- Develop strategies for setbacks/lapses

The first, and only, randomly assigned waitlist-controlled trial using the Steketee and Frost (2007) manualised treatment protocol followed on from Tolin and colleagues open trial (2007). After minor modifications to the original protocol, Steketee and colleagues randomly assigned participants to either the treatment or the waitlist condition with 36 treatment participants (26 sessions of CBT) and 40 waitlist participants completing the program (75% female). Participants in the treatment condition were to complete 12 weeks of CBT for HD while those randomly assigned to the waitlist group would begin 26 weeks therapy after a 12 week wait.

Large between-group differences were reported after 12 sessions particularly in self-reported overall hoarding behaviours (SI-R total), and 70% of participants improved based on therapist-rated clinical global improvement. However, only 24% of participants were rated in the highest category by clinicians (“very much improved”) and clinically significant improvement was reported by 41% of the sample - which is considerably lower when compared to 60% in the Tolin open trial and in treatment studies of OCD (Abramowitz et al., 2003).

Results improved further with an overall reduction of 27% in the self-report SI-R from pre-treatment to post-treatment and clinician-rated reduction (as measured by the HRS) of 39% after the full 26 session protocol was administered, with these reductions sustained over 6 to 12 months for 31 of the 41 (84%) participants (Steketee, 2014). This study is the benchmark for individual CBT treatment for HD following the protocol developed by Steketee & Frost (2007) and is yet to be replicated.
Turner, Steketee, and Nauth (2010).

Recognising the significant physical health and safety risks faced by elderly hoarding disorder sufferers living in clutter congested environments with poor access for emergency services, Turner and colleagues (2010) attempted to deliver a flexible CBT for HD program to a small number of elderly, community referred, individuals. Highlighting the current fragmented approach to the treatment of elderly hoarding sufferers, which is often only prompted when problems become acute, researchers piloted a program using the Steketee and Frost (2007) evidence-based manual of CBT for HD by initiating the first test of the protocol in a geriatric population. Individuals were included if they had a rating of four or above on the pictorial Clutter Imaging Rating (CIR) as determined by the caseworker or mental health clinician assigned to them, and/or reported at least moderate difficulty discarding possessions (as per scores on the first 3 items of the Hoarding Rating Scale (HRS; Tolin, Frost, et al., 2010)). Individuals with a history of serious mental illness were not excluded from the study as the exclusion criteria were intentionally flexible. Caseworkers and mental health clinicians who were trained in CBT methods delivered the HD treatment to six individuals (five females) averaging 72.3 years of age (range 56 to 87 years) in at least 26 sessions (between 28 and 41) over a period of 11 to 13 months. Sessions were conducted weekly for one and a half to two hours each, and the majority of sessions were conducted in participant’s homes.

Overall, results indicated that acquiring behaviours improved the most followed by difficulty discarding. All six participant’s clutter levels were reduced during the intervention (some as much as 36%) while others improved moderately (e.g. 17% and 25%). However, the range of hoarding severity across the group pre-intervention must be noted. Participants varied substantially in the severity of clutter
at the outset, with two of the six individuals having pretest CIR scores below the predetermined clinical cut off of four (3.67 and 2.50).

Methodologically this case series has a number of limitations. Most participants were taking psychotropic medication, making it impossible to determine if CBT treatment alone was efficacious. Hoarding severity was also unclear for one third of the participants. Also, the number of sessions varied greatly between participants, and it was not clear how many sessions were completed in the home versus in the office. Thus, the significant result in this pilot trial must therefore be interpreted cautiously.


Noting that geriatric hoarding studies were few, aside from a small number of case series and reports such as Turner et al., (2010), Ayers and colleagues (2011) investigated the over 65’s population by conducting an intensive one-on-one CBT program with a sample of 12 adults (seven women and five men) with an average age of 73.66 years (SD = 6.54 years; range 66-87 years). The standard 26-session protocol (Steketee & Frost, 2007) was delivered over 17 weeks, with the first 20 sessions occurring twice a week and the balance once a week. Participants were required to be cognitively intact, although researchers acknowledged the likelihood of mild geriatric cognitive decline in the sample. Whilst predicting clinically significant decreases in hoarding severity, mood, anxiety, and disability, Ayers and colleagues acknowledged the mixed results of CBT in geriatric populations with other psychological disorders such as anxiety.

Overall the improvements in hoarding severity were similar to those found in middle age samples, with no improvements in anxiety, disability and amount of clutter. Overall, two participants experienced an increase of hoarding symptoms over
the course of treatment. Using the same formula to calculate clinically significant change as Tolin, Frost, and Steketee (2007), three of the twelve participants (25%) responded to treatment.

These results once again cannot be generalised due to the small sample size, lack of control group, and homogeneity of therapy delivered by a single clinician; however, what the results do indicate is that the manualised treatment currently in use for HD may not be effective in producing clinically significant durable change for a large majority of geriatric hoarding disorder sufferers. Further, the acceleration in treatment delivery by increasing the frequency of sessions from once to twice a week did not have the desired effect of improving treatment response for the majority of participants. The exceptions were three participants who could be differentiated from the rest of the sample by the fact that they had received CBT treatment before, were younger on average, and completed 75% of homework tasks.

**Study reporting on the results of cognitive rehabilitation therapy.**

The database search conducted for this critical review of the treatment literature uncovered a single study that utilised an alternative protocol to the CBT for HD (see Figure 1) developed by Steketee and Frost (2007). Cognitive rehabilitation was investigated based on previous work completed by Ayers and colleagues (2011) that examined the question of whether cognitive impairment impacted the efficacy of psychosocial therapy in the geriatric HD population.

*Ayers, Saxena, Espejo, Twamley, Granholm, and Wetherell (2014).*

In an attempt to improve treatment responsiveness, researchers combined cognitive rehabilitation with exposure therapy for HD sufferers over 60 years of age. This pilot study found that combining cognitive rehabilitation with exposure-based
treatment was both clinically and statistically effective in reducing hoarding severity in a small sample ($N = 11$, 9 females) of geriatric HD sufferers ($M = 66$ years) and was potentially superior to CBT alone. Prospective memory, (that is calendar use, to do lists, prioritising), categorisation/organisation, problem solving, and cognitive flexibility (all activities targeting executive function) (Twamley, Jak, Delis, Bondi, & Lohr, 2014) when coupled with exposure to discarding and non-acquiring resulted in significant large main effects of time on HD and illness severity measures. These findings suggest the manualised cognitive rehabilitation and exposure program significantly reduced hoarding severity, measured by the SI-R and the UCLA Hoarding Severity Scale (UHSS; Saxena, Brody, Maidment, & Baxter, 2007), from baseline levels to post-treatment.

Whilst the Steketee and Frost (2007) manual recommended three one-hour sessions focused on problem solving and organisational skills, Ayers et al. dedicated six in-person sessions to the compensatory cognitive training. Following the intensive cognitive training sessions (2 per week), 16 exposure sessions (first 8 sessions weekly, final 8 sessions fortnightly) focusing on discarding and acquiring behaviours were conducted. Finally, relapse prevention was the focus of the final two sessions of the program. A total of 24 sessions were delivered.

Response rates in this cognitive rehabilitation exposure program were impressive with 72% ($n = 8$) of participants achieving clinically significant change (Jacobson & Truax, 1991) on the self-report SI-R, while the remaining participants who reported severe HD symptoms at baseline, (SI-R: 75, 71, 67), were partial treatment responders and only narrowly missed full response criteria. Long-term follow-up to gauge the durability of the treatment responses of this recent pilot study is yet to be reported, and further replication in larger sample using a CBT treatment
comparison group and an active control group is needed. Nonetheless, it does point towards the potential for this type of cognitive training to be tested in other HD populations and potentially integrated into the gold standard treatment protocol.

**Studies reporting on the results of Group CBT.**

The relative expense of individual CBT programs with in-home visits, together with the shortage of specialist clinicians, has lead HD researchers to investigate the efficacy of group CBT (GCBT) programs. A total of eight studies utilising various delivery methods of GCBT, including face-to-face, facilitator-led, and online support groups met the criteria for the critical review of HD psychosocial treatments.

*Muroff, Steketee, Rasmussen, Gibson, Bratiotis, and Sorrentino (2009).*

When compared with OCD, researchers have reported that the treatment of HD has required both more sessions and the addition of home visits (Abramowitz & Schwartz, 2003; Tolin et al., 2007a). Therefore, after the initial trial conducted to test the efficacy of individual CBT for HD, a preliminary trial of group CBT for HD was conducted in order to control treatment costs and also potentially overcome motivational issues through the use of group dynamics. This trial utilised a hybrid approach including a majority of group office sessions and a limited number of individual home visits. A total of 32 individuals were allocated into treatment groups after being screened using the Anxiety Disorders Interview Schedule (ADIS). A rating of moderate (4 or above) for the first three questions of the HRS pertaining to acquiring, discarding, and clutter was required for inclusion.

The mean age of the 32 individuals was 53 years (range = 38-65 years), and 65.6% of participants were female. Five CBT hoarding treatment groups were set up,
each with five to eight members, meeting once a week for a two-hour session over 16 weeks for four of the five groups \((n = 27)\) and 20 weeks for a single group \((n = 5)\), with an average number of sessions across all groups of 16.6 sessions. Two 90-minute individual in home sessions occurred on approximately week three and week 12 for all group members.

The aim of this study was to compare results from the previous individual study conducted by Tolin and colleagues \((2007)\) with all of the group treatment results from this intervention, and to make a third comparison with the final, more rigorously controlled, group CBT program. This more rigorously controlled study included eight individuals over 16 weeks of group therapy with a more detailed and structured program including a tailored workbook developed specifically for group treatment of HD.

In order to compare the previous open trial of individual CBT with the group results from this study, the mean difference between baseline and post treatment self-rated SI-R scores was used. After 26 individual sessions and approximately seven home visits, individuals in Tolin and colleagues \((2007)\) open trial reported an 18.7-point reduction in hoarding severity (measured by the SI-R). Using a group CBT intervention, individuals overall hoarding severity dropped by 8.64 points. However, when the most recent more formalised groups results were considered separately, results for this group indicated a 14.25-point drop in severity.

From this, the conclusion was made that a more formalised and strict approach to the delivery of the group sessions was more efficacious for hoarding sufferers—though not as effective as individualised treatment. It was further noted that strict screening for co-morbid mental disorders that could potentially impact group cohesion and progress should be conducted.
In this novel study, Muroff and colleagues attempted to examine the impact of a web-based, CBT self-help intervention on hoarding severity in a study called the Delivery of Internet Treatment for Compulsive Hoarding or the acronym D.I.T.C.H. Investigators suggested the recent success of group therapy for hoarding (Muroff et al., 2009), together with the home-based nature of the disorder, may make this type of flexible intervention ideal for hoarding disorder sufferers. Utilising an established online CBT-based group developed to help self-identified hoarding sufferers, while concomitantly taking advantage of the individuals on the waitlist to join the group, researchers compared active members to those on the waitlist over a 15-month period. The intervention group was further divided into “recent” members who had joined from three months prior to the first measurement of hoarding symptoms and “long-term” members who had been part of the group for more than three months before the first survey was completed, enabling researchers to isolate treatment effects of the current intervention eliminating the issue of the floor effect for longer term members.

Using an asynchronous approach, participants were able to engage in the treatment on their own time and were required to post updates including behavioural goals, action activities, or progress towards these at least once a month on the site. Action activities included sorting and discarding of specified areas, non-acquisition trips, maintaining cleared flat surfaces and areas as well as completing thought records or other CBT exercises using the standard protocol developed by Steketee and Frost (2007). Members and leaders were encouraged to join in on the chat-group, support one another, and respectfully challenge faulty beliefs using the downward arrow and other C-B tools made available electronically for participants. Measures were taken on five occasions three months apart.
One hundred and six members participated in the treatment condition and 155 individuals were in the waitlist control group. Demographic information suggests the sample was primarily Caucasian ($M=93.8\%$) and female ($M=94.8\%$) with an average age between 49.50 and 54.34 years across the three groups of waitlists, recent, and long-term members, with long-term members being significantly older than either waitlist or recent members ($t(94) = 2.53 \ p < .05$). As predicted, web-group participants showed significantly more improvement in hoarding-related symptoms over time when compared to waitlist controls. However, these improvements were modest when compared to previous results reported in individual and group therapy studies and also unverifiable due to the lack of clinician ratings. Results also indicated that online interventions might not affect hoarding symptoms consistently, for example in this sample, improvements in clutter exceeded those in acquisition, implying the online support group intervention encourage discarding, however reducing acquiring behaviours may require alternative strategies.

*Gilliam, Norberg, Villavicencio, Morrison, Hannan, and Tolin* (Gilliam et al., 2011).

The aim of the study conducted by Gilliam et al. was to continue to gather evidentiary support for GCBT for HD utilising a more stringent protocol delivery to improve treatment response. The study also aimed to test the hypothesis that GCBT without in-home visits was an effective alternative to individual therapy with discarding sessions in-situ. Participants completed between 16 and 20 weekly sessions of GCBT in groups of between 4 and 12 members.

Nineteen of the 30 treatment completers rated themselves as much or very much improved on the CGI-I, with the reduction of self-reported hoarding symptoms of 37\% (SI-R) and visual hoarding severity of 26\% (CIR). A total of 8 participants
met the criteria for clinically significant change (Jacobson & Truax, 1991). Results were comparable to individual trials previously published, however, the reliance on self-report make this less rigorous research than previous studies. Further research is required to compare group and individual CBT directly, including an attempt to gauge the impact of group processes on outcomes.

**Frost, Pekareva-Kochergina, and Maxner (2011).**

Frost and colleagues tested the efficacy of a structured non-professionally facilitated biblio-based group using the *Buried in Treasures* (BIT) self-help manual (Tolin, Frost, & Steketee, 2007b). Two studies were conducted under similar conditions to provide evidence to support the continued investigation of facilitated biblio-based self-help groups without the engagement of trained clinicians or home visits.

Across two studies, a total of 28 (15 females) self-identified clinical hoarding patients participated in 13 non-professionally facilitated sessions of two hours in length in small groups of approximately nine individuals. Homework tasks were set after the fifth session of sorting and discarding daily for a minimum of 30 minutes.

Hoarding symptoms were reduced by 23-28% through the biblio-support group program with 61% (17 of 28) of participants assessing themselves as “much” or “very much” improved (CGI-S). The decrease in mean hoarding severity scores (SI-R) in the two studies was slightly greater than those in Muroff et al.’s (2009) 16 session group treatment and slightly less than the results from 26 individual CBT sessions (Steketee et al., 2010; Tolin et al., 2007a). Overall, clinically significant change measured at follow-up at 54 - 59% was comparable to those achieved in individual studies, however 19 of the 28 individuals still scored in the clinical range for overall hoarding symptoms.
This type of bibliotheca-support group facilitated by non-professionals offers an opportunity to treat more hoarding sufferers than is currently possible. Lack of funding and shortages of trained professionals reduces treatment availability for many clients, however the value of community run bibliotheca-support groups to reduce isolation and distress for this population should not be underestimated. Without a control group or clinical assessment this study was followed up with a more rigorous investigation.


As an extension to the positive findings of structured non-professionally facilitated self-help groups for HD (Frost, Pekareva-Kochergina, et al., 2011), this study compared a 13 session Buried in Treasures workshop group with a waitlist control. Thirty-eight participants, recruited by hoarding task forces in the Western Massachusetts region, were randomly assigned to a treatment (n = 18) or a waitlist (n = 20) group and were given a copy of the self-help book: Buried in treasures: Help for compulsive acquiring, saving, and hoarding (BIT; Tolin et al., 2007b). A variety of self-report, interview, and in-home assessments were conducted in order to improve upon the empirical rigorousness of earlier work conducted by this group.

Results indicated overall hoarding symptoms, saving, and acquisition improved between 25 and 31% however reductions in clutter and the ability to conduct daily activities (ADL-H) were more moderate (10-19%). This study included clinician assessments of CGI (Busner & Targum, 2007) with 62% of participants rated as “much” or very “much improved” on the CGI-Improvement by clinicians compared to 84% self-rating their improvement similarly indicating a mismatch between professional assessments and self-report of perceived symptom improvement. The discrepancy between self and clinician ratings in this study must
be taken into consideration when evaluating the results of previous less rigorous studies (Frost, Pekareva-Kochergina, et al., 2011) as the tendency for sufferers to inflate treatment gains is evident.

**Muroff, Steketee, Bratiotis, and Ross (2012).**

Muroff and colleagues (2012) sought to establish the efficacy of GCBT for hoarding compared with an active Bibliotherapy (BIB) control. In addition, the trial investigated whether extra home assistance, over and above clinician visits enhanced the efficacy of the GCBT protocol for HD. Data was collected at three points: pre-test, mid-test and post-test and participants \( N = 38 \) were randomised into one of three conditions: GCBT with non-clinical home assistants (GCBT+HA; \( n = 11 \)), GCBT without home assistants (GCBT; \( n = 14 \)), and the control condition bibliotherapy only (BIB; \( n = 13 \)). The GCBT+HA received 20 weekly two-hour group sessions, four home visits from a clinician and an additional four home visits, with a trained undergraduate student. The GCBT condition received the same sessions without the home assistance. The third condition, acting as a control group, was given a copy of the self-help book: *Buried in treasures: Help for compulsive acquiring, saving, and hoarding* (BIT; Tolin et al., 2007b) and were encouraged to work through the exercises unassisted over the twenty week period.

The results of this randomised control trial suggest GCBT is significantly more effective in treating HD than bibliotherapy, as hypothesised, with the improvements in hoarding symptoms comparable to those found in individual CBT treatment. Extra in-home sessions did not make a significant difference in hoarding symptoms, however clinically significant change in the two groups favoured the additional home assistance (21% GCBT vs. 36% GCBT+HA). Researchers found that whilst bibliotherapy was limited in its effectiveness, it did in fact positively
impact hoarding symptoms and may be cost effective as the first stage in a stepped care approach to the treatment of HD.

*Tolin, Stevens, Nave, Villavicencio, and Morrison (2012).*

In order to investigate the impact of GCBT on impairment while concurrently examine the effect of treatment on the neural function of clinical hoarders, Tolin and colleagues recruited six HD participants to complete a 16-session single group CBT intervention in an open trial with a matched group of health controls for comparison. The therapeutic group sessions were 90 minutes and followed the treatment manuals used in previous group studies (Gilliam et al., 2011; Muroff et al., 2009). Post treatment results indicated hoarding symptoms, as measured by the SI-R, were reduced; however, these reductions did not reach statistical significance after the short intervention. The lack of statistical significance was attributed to the lack of power inherent in such small sample sizes. Yet effect size estimates indicated an overall clinical improvement in HD symptoms. Interestingly reductions in the SI-R discarding subscale had the smallest effect size, although a decrease in discarding response time, not usually measured in standard treatment studies, had the largest effect and was statistically significant. This finding perhaps indicates there are changes occurring in the individual’s ability to discard that the SI-R is not sensitive enough to measure.

*Moulding, Nedeljkovic, Kyrios, Osborne, and Mogan (2016).*

Taking advantage of a publicly rebated mental health initiative, investigators conducted a naturalistic study of 77 hoarding disorder sufferers over a three-year period. Of the 77 participants referred by primary care physicians, mental health professionals, or self-referral, 41 voluntarily completed pre and post intervention
questionnaires and consented to the use of their data in the aggregated results. All participants were screened for hoarding behaviours and twenty-one participants received a home assessment by a clinical psychologist during the course of the treatment. In groups of six to eight, treatment sessions of 1.5 to 1.75 hours in length were conducted weekly. The intervention protocol was based on the group manual published by Muroff et al. (2014). However, sessions were condensed from 20 to 12 sessions to align with the government mental health rebate.

Results from this naturalistic study indicated that a short-term group CBT treatment was effective in treating hoarding symptoms. Participants in this study were demographically similar to those included in previous treatment studies, and as expected, large reductions in hoarding symptoms from pre-treatment to post-treatment were reported. Clinically significant change in hoarding symptoms was 34% (Jacobson & Truax, 1991), and 27% of the sample had post-treatment scores of 42 or below on the SI-R, (the recommend half-way point between the means of a clinical and nonclinical population; Gilliam et al., 2011). This finding is comparable to similar studies conducted over a longer time frame, which is highly encouraging.

**Summary of Current Treatment Literature for HD**

This review of psychosocial treatment studies for HD reveals that whilst the majority of studies have tested the CBT for HD protocol (Steketee & Frost, 2007), each trial has deviated in more than one way from the original methodological approach used in the pilot trial and the follow-up randomly assigned waitlist-controlled trial in format, professional guidance, number and location of sessions.

Four of the 13 studies utilised one-on-one delivery of the CBT for HD and a single study explored the efficacy of cognitive rehabilitation combined with
behavioural interventions (exposure) to discarding and not acquiring (Ayers, Saxena, et al., 2014). The balance of treatment trials utilised a group format to deliver the CBT for HD, with a single exception; a novel online group using guided CBT, with access to a members-only chat group (Muroff et al., 2010).

Unfortunately, no one method has been tested and replicated. Furthermore, each study focused on a different sample population with delivery methods as diverse as self-help groups with peer facilitators to individual therapy sessions with a trained psychologist.

A small number of open trials and two randomised controlled trials have been conducted utilising Steketee and Frost’s protocol as a framework for intervention analysis. However, systematic adaptations of the protocol have not been tested. Dismantling analyses to establish how much the various techniques used in the CBT for HD treatment contribute to the overall results have also not been conducted, with the exception of cognitive reappraisal and thought listing (Frost et al., 2016).

Additionally, without replication in more heterogeneous samples (that is gender, race, and socioeconomically diverse), the generalisability of these treatment results is limited.

In addition to the descriptions of individual studies and the various modalities used in past HD treatment evaluations and the impact on hoarding behaviours, the ability to statistically compare the results across delivery methods would assist in directing future intervention research. Indeed, a statistical synthesis of CBT for HD treatment outcomes has been published in the form of a recent meta-analysis (Tolin et al., 2015). Albeit excluding non-CBT studies such as the Ayers et al. (2014) cognitive rehabilitation intervention included in this critical evaluation (\( N = 11 \)), and a subsequently published CBT naturalistic treatment outcome study by Moulding et al.
(2016) $N = 41$), this meta-analysis offers some preliminary indications of which delivery method of CBT for HD is most effective.

The meta-analytic study examined the overall strength of effect of the tailored cognitive behavioural therapy (CBT) protocol on HD and the component symptoms: clutter, difficulty discarding, and the specifier acquiring, in a total of 12 distinct HD samples (Tolin et al., 2015). Results indicated the strongest effects were in difficulty discarding, the core behavioural feature of HD that is the primary focus of the CBT intervention, followed by clutter and acquiring. Whilst overall HD symptom severity decreased significantly with a large effect size across studies, this was statistically significant but not clinically significant for the majority of participants. Results indicated, in most cases, that participant’s post-treatment scores remained closer to the HD range than to the normal range (Tolin et al., 2015). A minority of individuals met both reliable and clinically significant change with CBT for HD reducing overall severity in 35% of cases and effective in a little more than quarter of cases in reducing clutter, the physical contributor to impairment, enough for participants to be considered subclinical at the end of the treatment (total HD severity 35.28%, clutter 25.44%, discarding 34.04%, acquiring 39.81% and impairment 40.12%) (Tolin et al., 2015).

In summary, the meta-analysis indicated the CBT for HD protocol appears to favour treatment seeking younger middle aged women who have access to more therapy sessions both in the office and at home, and who are receiving some form of psychopharmacotherapy (Tolin et al., 2015). Those less likely to respond to CBT for HD are elderly males with limited access to treatment. Researchers did not anticipate the relationship between gender and CBT outcomes and further investigations into the reason men did not improve as much as women across these samples are certainly
warranted. In addition, results indicated that the more in-home sessions the greater the improvement in discarding. This outcome is likely a reflection of the increased opportunity for exposure practice in situ (Tolin et al., 2015), and again warrants important consideration for future treatment development.

Interestingly, moderation analyses conducted in this CBT meta-analysis found no significant differences between the involvement of a professional therapist compared to a peer leader, individual versus group format, or severity of depression.

These analyses, although underpowered, suggest the clinical experience of the therapist and the session format were not moderating factors and it is likely peer support groups with a trained facilitator offer HD sufferers equivalent outcomes to one-on-one CBT delivered by a clinical psychologist. The potential for other less costly and more accessible treatment modalities such as community and web-based support groups utilising peer facilitators is evident (Muroff, 2014). A stepped care approach, involving the application of the least invasive treatment first, with bibliotherapy using the BIT self-help manual (Tolin, Frost, & Steketee, 2014) as the first stage followed by participation in a facilitated online support group, and then a face-to-face peer support group with a trained facilitator may be effective for some HD sufferers.

While clinically significant change of hoarding severity using the CBT for HD protocol is estimated at around 35%, the treatment inhibitors responsible for the non-adherence of 65% of participants in treatment trials are statistically unsubstantiated at this stage. Tolin et al. (2015) hypothesised comorbidity, impaired cognitive function, and poor insight, as potential treatment inhibitors which will now be discussed in turn.
**Potential Treatment Inhibitors**

While reasons for low response rates in the HD population are currently indeterminate, researchers have implicated comorbidity, compromised cognitive function, and poor insight as potential treatment inhibitors (Tolin et al., 2015). Taken together, these factors may specifically interfere with the cognitive tactics employed in the treatment of HD thereby reducing the effectiveness of the CBT for HD protocol. Cognitive reappraisal, also known as cognitive restructuring, is the mental challenging of one’s negative appraisal of a given emotional stimulus and either act to reduce the severity of the response or exchange the negative appraisal for a more positive one. Indeed, cognitive impairment and what presents as poor insight in HD patients may in fact form part of the reason for the majority of HD participants remaining in the clinical range after receiving CBT (Frost et al., 2016; Tolin et al., 2015). How the factors of comorbidity, compromised cognitive function, and poor insight might reduce the efficacy of central C-B strategies will be expanded upon. Additionally, emotion dysregulation will be introduced as an emerging factor implicated in HD treatment resistance.

**Co-morbidity.**

The impact of comorbid conditions on the treatment of HD has been highlighted by researchers as an important area for continued research (Wheaton & Van Meter, 2014). A latent class analysis study into comorbidity in HD suggests sufferers without co-occurring depression or ADHD–inattentive type may be the individuals who are most likely to achieve clinically significant change after undertaking the CBT for HD protocol (Hall et al., 2013 refer fig. 2). Hall et al. (2013) found three distinct classes of HD sufferers based on psychopathological comorbidity:
the “non-comorbid” group (42% of the sample), the “comorbid depression” group (42%), and the “comorbid depression and inattention” group (16%). The latent analysis percentage for the non-comorbid hoarding class closely aligns with the percentage result of clinically significant change found in the meta-analysis conducted by Tolin et al. (2015). It is probable “pure” hoarders are the group most likely to respond to CBT for HD treatment because of complications that are likely to occur due to the co-occurrence of depression and/or ADHD–inattentive type present in the other groups. Further, HD individuals with co-occurring depression are likely to display more severe HD symptoms (e.g. Abramowitz, Wheaton, & Storch, 2008; Coles, Frost, Heimberg, & Steketee, 2003; Wheaton, Timpano, LaSalle-Ricci, & Murphy, 2008) and it is likely that symptoms such as lack of motivation and volition experienced in depression may make the discarding of possessions even more difficult (Wheaton & Van Meter, 2014). Those individuals in the ADHD-inattentive-depressed co-morbidity group are likely to struggle the most with organizing and discarding (Grisham, Brown, Savage, Steketee, & Barlow, 2007; Hartl et al., 2004; Wincze, Steketee, & Frost, 2007), staying on task, and completing homework tasks set, which has been associated with poorer treatment outcomes (Tolin et al., 2007a).

Unfortunately, this study was based on self-report data and not on clinically diagnosed participants (B. J. Hall et al., 2013). Whether there is an overlap between hoarding disorder and attention deficit symptoms (i.e., symptoms of hoarding include attentional problems that present like ADHD-inattentive type) or these disorders are indeed comorbid is yet to be fully investigated. Cognitive function in HD, however, has received a great deal of attention in the literature.

Compromised cognitive function.

Information processing deficits in HD (reviewed in further detail in Chapter 4)
are considered substantial contributing factors to pathological saving and acquisition in the original C-B model (Frost & Hartl, 1996). Results from one of the few qualitative treatment suitability studies conducted in the HD population suggested geriatric patients preferred a de-emphasis on cognitive reappraisal. Additionally, therapists reported cognitive strategies (e.g. cognitive restructuring techniques) and case formulations were ineffectual in this geriatric sample (Ayers, Bratiotis, Saxena, & Wetherell, 2012). Instead, direct exposure exercises were seen by both patients and therapists to be the most helpful component of treatment, indicating a preference for behavioural rather than cognitive interventions (Ayers et al., 2012). It was these findings that led to a cognitive rehabilitation pilot trial (Ayers, Saxena, et al., 2014 summary above) with a remarkable 72% of participants reaching clinically significant change after receiving cognitive rehabilitation. Taking into consideration the participants negative opinions regarding the efficacy and face validity of cognitive strategies, it seems unwise to dismiss these results as specific to the geriatric HD population and highlights the need to investigate other populations.

Regardless of age, HD sufferers may also not respond well to cognitive reappraisal techniques used in the current treatment protocol because of specific neuropsychological difficulties. HD sufferers’ reduced capacity to engage frontal regions of the brain such as the anterior cingulate cortex, medial frontal cortex, and lateral orbitofrontal cortex may negatively impact the efficacy of CBT for HD (Saxena et al., 2004; Tolin, Stevens, Villavicencio, et al., 2012; Tolin, Kiehl, Worhunsky, Book, & Maltby, 2009; Tolin, Stevens, Nave, et al., 2012). The brain’s frontal regions have been linked to cognitive reappraisal (Frost et al., 2016), which means HD sufferers may find cognitive reappraisal interventions extremely challenging to engage with and are thus ineffective in bringing about behavioural
change in such individuals. The level of acceptance or insight with respect to the negative impact of habitual hoarding behaviours is also considered a further impediment to change.

**Insight.**

HD sufferers’ lack of insight into the problematic nature of saving and acquiring behaviours is often suggested to be another key reason for HD’s treatment resistance (De Berardis et al., 2005; Samuels et al., 2002; Samuels, Bienvenu, Pinto, et al., 2008). However, with no valid and reliable measure of insight, understanding how to counteract its impact on patient outcomes is challenging (Steketee & Frost, 2014a). Insight has been described as a multidimensional aspect of HD pathology with at least three meanings that can overlap and interact with one another. *Anosognosia* (lack of awareness of the existence of illness or indifference to the consequences of illness), *overvalued ideation* (fixed, inflexible beliefs), or *defensiveness* (denial and argument to resist the influence of others) have been identified as the three types of poor insight observed in therapy (Frost et al., 2010).

Some hoarding sufferers are not delusional regarding their problem and the consequences (thus not exhibiting anosognosia); however strongly held beliefs or overvalued ideas (discussed further in Chapter 3) about responsibility for possessions or the opportunity they hold make it extremely difficult for them to discard items (Frost et al., 2010). Cognitive reappraisal involves therapists actively challenging hoarding sufferer’s overvalued ideas which may be interpreted as attempts to control and oppress autonomy leading to denial and defensiveness (Frost et al., 2016). The value congruent or ego-syntonic nature of saving and acquiring (Frost et al., 2010; Steketee & Frost, 2003) and the hoarded possessions that are considered an extension of self (Kings, Moulding, & Knight, 2017), may also render cognitive reappraisal
ineffectual. Thought modification relies on the intolerance of cognitive dissonance—the mental discomfort experience when one simultaneously holds two or more contradictory thoughts, ideas or values—and as with other ego-syntonic mental illnesses, for example eating disorders, evidence suggests behavioural alternatives to CBT may be more suitable (Juarascio, Shaw, Forman, Timko, Herbert, Butryn, & Lowe, 2013; Juarascio, Shaw, Forman, Timko, Herbert, Butryn, Bunnell, et al., 2013; Manlick, Cochran, & Koon, 2012).

HD researchers are aware of the need to understand the mechanism behind difficulty discarding in order to significantly improve treatment efficacy. The original C-B model of HD, proposed by Frost and Hartl (1996) (reviewed in Chapter 4 of this thesis), points to cognitive impairment of executive function, leading to difficulty making discarding decisions. In turn, affective factors of both anxiety and sadness, possibly driven by inflexible beliefs about the value and nature of possessions, influence the way saving may be used to regulate emotions in the HD population. In order to understand difficulty discarding, HD research has turned towards the multidimensional construct of emotion regulation, which is the ability to down regulate negative affect and/or upregulate positive emotions in an adaptive way (Gross, 2014). Emotion regulation and HD will be reviewed in detail in Chapter 5 to support the proposed theoretical model, however, it is important to consider briefly how emotion dysregulation may render cognitive challenging ineffective as a technique to reduce HD sufferer’s difficulty with discarding possessions.

**Emotion dysregulation.**

A final factor, namely emotion dysregulation, has also been implicated in treatment nonadherence. Interestingly, the impact of emotions and internal experiences in hoarding disorder, detailed in the Frost and Hartl (1996) cognitive-
behavioural model, has received less attention in the HD literature until recently. Anxiety sensitivity, generally known as “the fear of fear”, is key to HD due to its role in behavioural avoidance (Timpano, Buckner, Richey, Murphy, & Schmidt, 2009). The C-B model of HD suggests that the behavioural symptoms of saving, acquiring, and clutter are all forms of distress avoidance (Frost & Hartl, 1996). The avoidance of distress by saving, acquiring, and not organising (resulting in disorganised clutter) prevents exposure to fear-inducing situations and negatively reinforces maladaptive avoidance behaviours (Timpano et al., 2009). Anxiety sensitivity has been identified as a vulnerability factor for HD (Medley, Capron, Korte, & Schmidt, 2013; Phung, Moulding, Taylor, & Nedeljkovic, 2015; Shaw, Llabre, & Timpano, 2015; Timpano et al., 2009; Timpano, Keough, Traeger, & Schmidt, 2011). An anxiety treatment efficacy study has highlighted the possible moderating impact anxiety sensitivity may have on treatment outcomes. CBT and acceptance and commitment therapy (ACT) for anxiety disorders were compared and results indicated anxiety sensitivity at both low and high baseline levels could render CBT ineffective (Wolitzky-Taylor, Arch, Rosenfield, & Craske, 2012). At high baseline levels (1 SD above the mean), anxiety sensitivity was associated with unfavourable outcomes from CBT potentially due to highly inflexible beliefs about anxiety symptoms that may be more difficult to modify through CBT strategies or perhaps a fear of the dangerous nature of physical manifestations of anxiety may reduce the likelihood of patients engaging in homework exposure exercises. Those with comorbid mood disorders were more likely to respond better to ACT than CBT in this group. As previously noted it is known that homework compliance is generally poor in treatment resistant HD cases (Tolin et al., 2007a), and inflexible beliefs are part of the fabric of HD (Frost et al., 2010). Although this efficacy study was for anxiety disorders, and HD is now
considered a distinct disorder in the *DSM–5* (APA, 2013), the impact of anxiety sensitivity, inflexible beliefs, and poor homework compliance on the efficacy of CBT of HD makes testing alternative treatment techniques to cognitive restructuring necessary.

It is encouraging to discover alternatives to cognitive reinterpretation may be more effective in reducing emotional attachment to possessions and improve discarding in hoarding disorder (Frost et al., 2016). Acknowledging the relevance of emotion dysregulation to HD, Frost and colleagues (2016) sought to determine whether the emotion regulation strategy of *distancing*, which involves creating psychological space between stimulus and response in order to, in the case of HD, mentally detaching from possessions, would be more efficacious when compared to the traditional cognitive therapy strategy of cognitive reinterpretation. Thought listing, which is identifying and attending to one’s thoughts and mentally detaching from them without debate or judgment is a therapeutic tool not generally used in traditional cognitive therapy but is a practice used in acceptance–and mindfulness–based treatments such as ACT (Hayes, Strosahl, & Wilson, 2012) and dialectical behavioural therapy (DBT; Linehan, 1993). Results indicated that thought listing not only improved discarding in HD compared with cognitive reappraisal, it also reduced emotional attachment to possessions more than cognitive reappraisal techniques (Frost et al., 2016).

**Conclusion**

This review offers some relevant insights for the development of a stepped care model of CBT for HD treatment. The evidence suggests that the majority of CBT for HD trial participants were still classified as clinical HD cases after having undertaken
between 13 and 36 sessions of treatment. It is possible that comorbidity and other
treatment inhibitors such as cognitive deficits, insight, and emotion dysregulation are
negatively impacting the efficacy of CBT—particularly the technique cognitive
reappraisal—in this population. Evidence suggests treatment response rates may be
improved in the HD population by utilising alternative acceptance and mindfulness-
based techniques to cognitive reappraisal central to CBT for HD (Frost et al., 2016).
In order to make suggestions as to which alternative techniques and more widely,
which theoretical framework could be applied to HD in order to improve treatment
outcomes and to prevent HD behaviours (Rodriguez, Simpson, Liu, Levinson, &
Blanco, 2013), it is necessary to investigate the available alternatives to traditional
Beckian cognitive theory (Hofmann, Asmundson, & Beck, 2013). To this end,
chapter 3 will offer a rationale for the use of acceptance and commitment therapy
(ACT) as both theoretical framework and treatment for HD.
Chapter 3

Rationale for the Use of Acceptance and Commitment Therapy for HD

As reviewed in Chapter 2, research indicates that CBT therapy is only moderately effective at reducing saving behaviours, clutter and overall hoarding severity to sub-clinical levels. A recent meta-analysis showed that approximately 65% of patients had post-treatment scores closer to the HD range than the normal range of disordered behaviours (Tolin et al., 2015). When considering the results of the meta-analysis, CBT for HD was somewhat effective in reducing the number of possessions entering the home (acquiring behaviours reduced by 40%) (Tolin et al., 2015). Additionally, CBT for HD reduced impairment, measured by the Activities of Daily Living – Hoarding Scale (ADL-H; Frost, Hristova, Steketee, & Tolin, 2013), by 40% indicating an improvement in the participants’ ability to perform everyday tasks such as cooking, washing, sleeping, and accessing the home (Tolin et al., 2015). Further, the results indicated clutter (25%) and discarding (34%) were not reduced to the same degree as acquiring and impairment (Tolin et al., 2015).

Taken together, it may be inferred that CBT for HD was more effective at reducing the number of items entering the home and improving access within the home to important areas such as the entrance, kitchen, bathroom, and bed. However, discarding of possessions and reductions in clutter was less successful. Perhaps the CBT interventions encouraged the moving of possessions from one location to another in the home to ease the difficulty of performing simple daily activities in a hoarded environment; yet, were less effective in promoting the permanent discarding of possessions. Unfortunately, the paucity of replicated randomised controlled trials makes any firm conclusions about the efficacy of CBT interventions imprudent.
A follow up study found the typical hoard was relatively stable and unlikely to reduce further after treatment discontinuation up to 12-months after completion of CBT for HD therapy (Muroff, Steketee, Frost, & Tolin, 2013). This evidence intimates that the 26-week HD treatment protocol may not promote the permanent behavioural change required for symptom remission, and more specifically difficulty discarding, for some types of hoarding sufferers.

As detailed in Chapter 2, factors that impact on treatment effectiveness such as comorbidity, compromised cognitive function, insight, and emotion dysregulation may impede the efficacy of cognitive reappraisal, the central mechanism of change in CBT. Based on this evidence, veteran HD researchers have begun to investigate alternative treatment techniques. Preliminary evidence has suggested that a cognitive distancing method known as thought listing may be more effective in increasing discarding behaviour and reducing attachment to possessions than cognitive reappraisal in clinical level HD (Frost, Ong, Steketee, & Tolin, 2016). Cognitive distancing is an emotion regulation strategy that involves creating psychological space between stimulus and response, which in HD involves the mental detachment from possessions, thoughts, and emotions and is used in acceptance and mindfulness-based treatments. Importantly, thought listing was shown to be able to reduce both behavioural (difficulty discarding) and emotional consequences (attachment to possessions) in HD, making it an effective supplemental technique to the CBT for HD protocol (Frost et al., 2016).

Investigating other techniques, and more generally applying the theoretical assumptions of alternative approaches, may be beneficial in deepening our understanding of HD aetiology and maintenance, and importantly improve treatment outcomes.
Thus, it is appropriate to consider a well-developed acceptance-based theory of psychology that offers a unified model of human functioning and adaptability, and that was developed to understand the underlying processes that influence how people interact with their environment (Hayes et al., 2012). Acceptance and commitment therapy (ACT) is such a theory and the applicability of this alternative lens through which to view HD phenomenology will be investigated in this chapter.

Firstly, the background of ACT and the psychological flexibility model will be introduced; secondly, relevant research investigating the relationship between ACT concepts and HD to date will be reviewed. Thirdly, the philosophical and theoretical underpinning of ACT including psychological flexibility, relational frame theory, and derived relational responding will be described.

Fourthly, following the establishment of the theoretical framework, each of the six ACT processes of psychological inflexibility: cognitive fusion, experiential avoidance, inflexible attention, attachment to the conceptualised self, disruption of values, and inaction will be defined and used to conceptualise hoarding psychopathology in an ACT framework, supported by pertinent research. Specific ACT treatment techniques will be suggested that may supplement the CBT for HD protocol (see Figure 1) to improve clinically significant change for HD sufferers.

**Acceptance and commitment therapy overview.**

Acceptance and Commitment Therapy (ACT) is perhaps the most developed theory and philosophy of the acceptance and mindfulness-based models (Hayes et al., 2012). Like traditional CBT, on which the original C-B model of HD was based, ACT and the language theory underlying ACT, relational frame theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001), has emerging empirical support including experimental testing of RFT processes and controlled ACT studies (see Hayes et al.,
The unified model of human functioning proposed by ACT researchers is a set of six interrelated core processes that are broadly responsible for human adaptability (psychological flexibility) and inversely, human suffering (psychological inflexibility) (Hayes et al., 2012). Rather than focusing on individual symptoms of particular psychological syndromes and disorders, the unified ACT model proposes to describe the processes that control human functioning. As a model of psychopathology, psychological health, and psychological intervention, ACT suggests psychological flexibility is essential to a healthy, adaptable mind that is able to cope and adjust to changing life experiences and this flexibility allows one to live a fulfilling life (see Hayes et al., 2012, pp. 3–26).

Meta-analytic data of randomised controlled trials (A-Tjak et al., 2015) indicate ACT is effective across a breadth of psychological disorders including anxiety, depression, psychosis, borderline personality disorder, workplace stress and burnout, pain, substance use, and smoking, therefore psychological flexibility be considered a unified and transdiagnostic model. Certainly, it is the empirical evidence supporting the efficacy of ACT across a broad range of psychopathologies, especially those requiring behavioural interventions (e.g. smoking and substance abuse), and the fact that ACT is considered “part of the larger CBT family” (Hayes, 2008) that has led to the application of ACT theory to hoarding disorder in this thesis. Indeed, it has been suggested that the efficacy of CBT approaches enhanced with acceptance-based strategies should be examined (Hofmann & Asmundson, 2008).

Interestingly, despite the behavioural symptoms present in HD and the potential of ACT as an efficacious treatment for the psychopathology, investigations in the literature are currently limited to the psychological inflexibility process of
Evidence gathered to date on the relationship between experiential avoidance, psychological inflexibility, and HD.

The applicability of theoretical constructs integral to ACT to hoarding disorder has so far only been investigated in relation to what researchers refer to as “experiential avoidance”, as measured by the Acceptance and Action Questionnaire Version II (AAQ-II; Bond et al., 2011). Experiential avoidance is defined as the direct attempts of people to avoid and escape unpleasant emotions, thoughts and sensations, because of an intolerance of negative internal states (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Despite being used to measure experiential avoidance across a number of HD studies testing this construct’s relationship to HD symptoms, (Abramowitz, Lackey, & Wheaton, 2009; Ayers, Castriotta, Dozier, Espejo, & Porter, 2014; Fernández de la Cruz et al., 2013; Wheaton, Abramowitz, Franklin, Berman, & Fabricant, 2011; Wheaton, Fabricant, Berman, & Abramowitz, 2013; Williams, 2012), the authors of the AAQ-II describe the instrument as a measure of the “construct referred to as, variously, acceptance, experiential avoidance, and psychological inflexibility” (Bond et al., 2011, p. 676). This description extends beyond the scope of experiential avoidance and ostensibly taps into broader concepts of non-acceptance of distress and interference with values (Gámez, Chmielewski, Kotov, Ruggero, & Watson, 2011; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Notwithstanding, the results of these HD and psychological inflexibility correlational studies have been mixed (Ayers et al., 2014; Wheaton et al., 2011 vs. Fernández de la Cruz et al., 2013; Wheaton et al., 2013). Indeed, Wheaton et al. (2013) attempted to replicate their previous findings of psychological inflexibility (as measured by AAQ-II) predicting hoarding symptoms above and
beyond general distress and hoarding related beliefs (1% of variance) in a clinical HD sample (Wheaton et al., 2011), but were unsuccessful. This is unsurprising given that the authors of the AAQ-II predicted psychological inflexibility will correlate highly with depressive, anxiety, and stress related measures as well as overall psychological ill health (Bond et al., 2011). Additionally, the small sample size ($n = 33$) in the Wheaton et al. (2013) study may have negatively impacted the power of the regression analyses to detect a small effect size, as was hypothesised in this study (Tabachnick & Fidell, 2013). Ayers et al. (2014) found a significant predictive relationship between experiential avoidance (as measured by AAQ-II) and hoarding severity; conversely, Fernández de la Cruz et al. (2013) found no such relationship. Again, sample size may be implicated in the mixed results given Ayers et al.’s sample size ($N = 66$) was able to detect a significant relationship between avoidance and hoarding and Fernández de la Cruz et al. ($N = 43$, HD without OCD $n = 25$, $n = 19$ HD with OCD) was not.

Additionally, it is perhaps not unexpected that results have been inconsistent due to the difficulty in interpreting the AAQ-II, which is a measure attempting to capture a “dynamic and shifting psychological process with a static and global self-report measure” (Wolgast, 2014, p. 838). Indeed, a measure that appears to lack discriminant validity, of which the AAQ-II has been accused (Gámez et al., 2014, 2011; Wolgast, 2014), appears to be empirically redundant. However, Hayes and colleagues (2012) suggest psychological inflexibility is a vulnerability factor that predicts longitudinal psychological difficulty and should be considered a mediator or moderator rather than a simple correlate. Indeed, experiential avoidance and psychological flexibility have been found to mediate the impact of various emotion regulation strategies (Tull & Gratz, 2008). For example, a recent study found
compulsive buying (CB) to be moderately associated with experiential avoidance (as measured using the AAQ-I) and in turn experiential avoidance was associated with low distress tolerance (Williams, 2012). It is therefore valid to theorise and investigate how the key processes of psychological inflexibility might in fact act as vulnerability factors, not merely as direct predictors of psychopathology, and mediate the relationship between emotions and hoarding sufferers’ maladaptive behaviours of difficulty discarding and excessive acquiring.

ACT is based on relational frame theory (RFT; Hayes et al., 2001), which attempts to explain both humanity’s evolutionary advancement and its psychological suffering through the study of human language and cognition (Hayes et al., 2012). In order to understand the way in which language and cognition can cause psychological suffering, and more specifically suffering in HD, it is necessary to consider, in enough detail as to be instructive, the theory of relational frames.

**Relational frame theory.**

Humans think relationally, responding to one event in terms of another (Hayes & Smith, 2005). The ability to arbitrarily relate objects in the environment—objects being thoughts, feelings, behavioural predispositions, actions, and physical possessions—to other objects in a myriad of ways allows the conscious analysis of ones surroundings (Hayes et al., 2012). Words are symbols and they are treated much the same as the objects to which they refer by the brain (Hayes et al., 2001). Once symbols are visually interpreted, a seemingly limitless relational network akin to an extensive mind-map is added to and continues to expand throughout life making new relations and reinforcing old ones constantly. For example, children learn a particular small furry mammal is called a “cat”, and later learn the letters C – A – T spells cat. Further, children add to this network of things related to the furry mammal, such as
the sounds it makes are “meow” and “purr”. Subsequently, if children are scratched by a “cat” and cry a new emotional relation is learned between the cat and pain. This ability to use symbols such as letters to create words that are then meaningfully related to objects, psychological events, and physical actions is both beneficial and restricting (Hayes et al., 2012).

Beneficially, language and cognition allow humans to learn new things without direct experience, which is helpful when interacting in the physical world. Children learn to be careful around hot objects through relational learning and the application of verbal rules. For example, the relationship between the word “hot”, the object “kettle”, and the sensation “ouch” can be taught and become a verbal rule without the child physically being burnt. This is known as derived relational responding (Blackledge, 2003). A learned operant behaviour that develops in infancy (Lipkens, Hayes, & Hayes, 1993), the process of relational framing must be taught and reinforced (Hayes et al., 2001). If one learns that in a certain context A relates to B in a particular way, then the reverse of this, B relates to A, is derived. For example, children learn that mothers are love and the reverse of this, love are mothers is derived not explicitly taught. According to RFT, learning that relations in one direction also relate in the opposite direction is known as mutual entailment (Hayes et al., 2012), the simplest form of which is naming, and begins to emerge during early toddlerhood, age 14-16 months (Lipkens et al., 1993). Combinatorial entailment is the unification of mutual relations such that where there is a relationship between A and B (the reverse of this is also understood), and B relates to C in a particular way, an entailment in both directions between A and C is derived. This combining of all reverse relations becomes possible at around 22-24 months of age (Lipkens et al., 1993). For example, children learn that mother is love; therefore, the opposite of this is derived.
Subsequently, children learn that the softness of mother is like a soft object that is in the cot when they sleep and the reverse of this—the soft object is like mother—is also understood. When the combination of all these reverse relations is known, children derive love and comfort from a soft object and the soft object is love and comfort like their mother (see Figure 3).

Relational frames can be comparative and evaluative such as “better than”, “more than”, or “smarter than”. They may be temporal or causal frames such as “before and after”, “if/then”, or “cause of” or frames of coordination such as “same as”, “like” or “similar”. Many other types of relational frames exist; nevertheless, the prescient detail is that these types of frames allow one to think about the future, make plans, evaluate, and compare outcomes (Hayes & Smith, 2005). Paradoxically, it is this ability to use relational frames to compare and evaluate that can be psychologically restrictive.

*Transformation of stimulus function.*

When verbal relations form between objects A, B, and C and a positive or negative event is paired with one of these, all events then become related to the new event without additional training; this is known as a *transformation of stimulus functions* (Dymond & Rehfeldt, 2000). For example, an aversive event will lead to an emotional reaction; this reaction is noticed, and both the aversive event and emotional results are labelled “bad”. In the future, aversive events will be avoided to correspondingly avoid the emotional reaction (Hayes & Smith, 2005). To illustrate using a hoarding example, Emily may have a favourite teddy bear that has been introduced as a transitional object (see Chapter 5 for further details regarding this concept) and has come to offer a sense of safety and security while gaining independence from her mother. Subsequently, the teddy bear is taken without her
permission. This aversive event, the removal of the favourite toy, results in an emotional reaction of loss and anxiety so both the absence of the possession and the accompanying emotions are labelled “bad” and to be avoided (Hayes et al., 2001). A common cognition in HD is “Throwing some things away would feel like part of me is dying” (SCI; Steketee & Frost, 2014b, p. 218), which demonstrates the transformation of stimulus functions described in the example; the function of the stimulus is now related to loss (Hayes et al., 2001). From this moment on, the mere contemplation of letting go of some possessions evokes feelings of loss and anxiety as if the possession has been thrown out, thus leading to avoidance of discarding in the future.

Conversely the saving cognition “I love some of my belongings the way I love some people” (SCI; Steketee & Frost, 2014b, p. 218) represents the transformation of stimulus functions of a positive event. For example, Jack, whose beloved mother was a seamstress, loves his mother’s dressmaking scissors in the same way he loves his mother because of a particular happy memory involving his mother and the scissors. The feeling of love and happiness when the possession is present leads to the object being considered equivalent to the beloved owner and accordingly evokes positive emotions thus must be saved. This positively reinforcing response links back to the previous saving cognition “Throwing some things away would feel like part of me is dying”; in this case throwing away the scissors would be considered the equivalent of throwing away the person to which the scissors are emotionally related.

Taken together, deriving relations between events, joining them into vast relational networks, and transferring functions between events is known as relational framing (Harris, 2009). Derived relational responding occurs when relational frames
become verbal rules that control behaviours without reference to changes in the environment (Hayes et al., 2012, p. 53).

**Derived relational responding.**

It is important to reiterate that it is not necessary for relational frames to be based on real world interactions; verbal stimuli can be combined into elaborate verbal rules that have the power to control behaviour without direct contact with experiences (Hayes et al., 2012). For example, a learned relational frame may be that collecting useful objects is like being useful oneself. Perhaps this relational frame developed from repeated exposure to the verbal rule that certain types of items are useful and must be retained for some future unspecified need. There are many contexts in which this relation might develop, however, the thought process that: “This object is useful for something. What if I need it and I don’t have it? I’d feel ashamed. I should keep it, just in case” (Steketee, Frost, & Kyrios, 2003) may come about through parental or social interactions. Indeed, it is possible that the collecting of useful items did not start from directly experiencing the shame of not having an item when it was needed but from a memory of a parent always having just the right thing for the job. Alternatively, witnessing a parent’s embarrassment when not having just the right item available, despite obsessively saving, may also lead to derived relational responding. Accordingly, saving all items believed to be useful to follow inflexible verbal rules without considering how many similar items are already saved is an example of derived responding.

It is important to mention that RFT and subsequently ACT does not consider any thought, feeling, or memory as fundamentally dysfunctional or pathological and in need of reinterpretation. Rather, it is the context of the private experience that is important. In the case of hoarding sufferers, the inflexible rules of saving all useful
items is not necessarily problematic, however if the purpose of the saving behaviour is to avoid the anxiety of uncertainty perhaps, then the function of the behaviour is maladaptive.

While the original C-B model of HD hypothesised rigid beliefs about the nature and value of possessions are central to the maintenance of the disorder, RFT and ACT offers a potential theory, based on the six core processes of psychological flexibility, for how these complex relationships between individuals and their possessions develop and is supported by a treatment program, ACT, that is based on the six core processes of psychological flexibility.

**Psychological flexibility.**

Hayes and colleagues (2012, pp. 96–97) define psychological flexibility as being in contact with the present moment fully, as a conscious human being, without unnecessary defence and persisting with behavioural change in accordance with ones chosen values. The six interrelated processes proposed by ACT theory to contribute to human adaptability are: defusion, acceptance, being present in the moment, self-as-context, values, and committed action respectively. Their opposites: cognitive fusion, experiential avoidance, inflexible attention, attachment to the conceptualised self, disruption of values, and inaction contribute to human suffering which leads to psychopathology. Disparity in any or all of these core processes is thought to lead to psychological rigidity, that is the inability to persist with behavioural change that is congruent with ones chosen values (see Hofmann & Asmundson, 2008 for a review). As a mindfulness-based behavioural therapy, ACT encourages the acceptance of that which is outside of one’s control and the taking of “mindful” actions that move one in a valued direction towards a richer, fuller life (Hayes et al., 2012, p. 64).
The applicability of psychological inflexibility to HD.

As discussed, correlational results investigating the relationship between psychological inflexibility and HD, are mixed. However, ACT researchers suggest investigations should focus on mediation and/or moderation when analysing the relationship as the unified model of psychological flexibility is measure of the way in which individuals engage with life and should be treated as a vulnerability factor (Hayes et al., 2012, p. 367).

Cognitive fusion.

As previously established, constant engagement in verbal or cognitive activities of reasoning, comparing, evaluating, categorising, and planning, help humans navigate their social environment (Hayes et al., 2012). Highly functional when making decisions and problem solving in the physical world, these relational frames permit applied comparisons. For example, one type of insurance policy may be evaluated as similar or better than another policy allowing an informed choice to be made. Unfortunately, when these relational frames are turned inwards and applied to thoughts and psychological experiences, language offers the capacity to cause mental distress (Hayes et al., 2001).

Unfortunately, it is difficult to stop the mind from problem solving, and verbal relations require very little conscious effort or environmental support to maintain because sense making is effectively built into language and cognition (Hayes et al., 2012). Making sense of aversive events by problem solving tends to lead to avoiding, denying or suppressing aversive stimuli (Hayes et al., 2012).

Cognitive fusion, one of the key processes of psychological inflexibility, is present when verbal events dominate over actual experiences and behavioural
regulation is controlled not by direct experience but by mental constructions. In ACT, the thought is not considered problematic. Instead, it is the *involuntary fusion* with it, that is, believing it is “true” or “real”, and the resulting avoidance of the anxious reaction that is problematic. When verbal rules guide behaviour, humans tend to track changes in the environment less closely leading to experiential insensitivity; this results in continuing to behave in a way that directly contradicts negative consequences. Even the extinction of derived relational responses (e.g. through attempts to consciously change behavioural responses) may resurge if a particular new behaviour becomes ineffective; consequently, one falls back on old habits without conscious effort (Wilson & Hayes, 1996).

Early attempts to understand the underlying cognitions shared by hoarding sufferers led investigators to create a self-report measure, the Saving Cognitions Inventory (SCI; Steketee et al., 2003), with four subscales of emotional attachment, responsibility, memory, and need for control over possessions. The SCI correlates highly with the behavioural aspects of HD, Saving Inventory Revised (Steketee et al., 2003) and has been found to mediate the relationship between insecure attachment, via loneliness, and HD behaviours (Eppingstall, 2013). Saving cognitions are essentially core “stories” that are consistently expressed by hoarding sufferers and can be conceptualised in ACT parlance as hoarding specific cognitive fusion.

Considering the items included in the SCI from ACT perspective, these common HD beliefs have come about through predictions and comparisons rather than what is experienced in the moment. These shared savings beliefs, captured by the SCI, function as verbal rules and when thoughts are considered “true” and are abided by despite evidence to the contrary, result in cognitive fusion. Over-valued ideas (OVI), often diagnosed as poor insight, are unreasonable and sustained beliefs that are
held strongly with less than delusional intensity (Frost, Tolin, & Maltby, 2010; Veale, 2002). OVI include perfectionism specifically evaluative concerns, which is characterised by worry about making mistakes or experiencing failure (Burgess, Frost, Marani, & Gabrielson, 2017). This inflexibly held perfectionistic attitude, which is commonly found in HD, leads to pathological decision-making avoidance (Frost & Gross, 1993; Frost & Shows, 1993). Researchers have identified OVIs as an indicator of treatment resistance in a number of psychopathologies, including HD (Veale, 2002). The common beliefs about attachment, responsibility, memory, and control that are observed in HD are not considered abnormal; however the degree of conviction in their truth is considered extreme (Frost et al., 2010). Additionally, hoarding sufferers often evaluate the outcome of not behaving according to their strict rules about possessions (e.g. not recycling a soda can) as catastrophic (the environment is doomed) (Frost et al., 2010).

Anthropomorphism, bestowing human-like qualities upon inanimate objects, has been identified as a factor impacting HD symptoms severity (Neave, Jackson, Saxton, & Hönekopp, 2015; Neave, Tyson, McInnes, & Hamilton, 2016) and can be conceptualised as an over-valued idea common in HD. It is likely that believing an inanimate object is human-like and not only represents the person it refers to (via derived stimulus relations and transformation of stimulus functions) but is actually a direct substitute for the person, makes it considerably more difficult to discard the possession (Timpano & Shaw, 2013). Believing objects once owned by a loved one can be hurt like a loved one may lead to possessions being related to much like an important human relationship (Timpano & Shaw, 2013). Hoarding sufferers who hold over-valued anthropomorphic ideas about possessions may tend to behave in ways that avoid “upsetting” objects by saving them. Findings indicate
anthropomorphism is related to acquiring new items (Timpano & Shaw, 2013) and hoarding sufferers have described an urge to “adopt” objects to prevent items from experiencing loneliness or shame (Kellett, Greenhalgh, Beail, & Ridgway, 2010). Indeed, research suggests anthropomorphic tendencies predict the level of emotional attachment towards novel items and a strong wish to acquire them (Timpano & Shaw, 2013).

Evidence of cognitive fusion in HD is seen in strongly held beliefs about the nature and value of possessions, measured by the SCI, and distinctly illustrated by over-valued ideas such as anthropomorphism.

ACT suggests fusion narrows one’s responses in certain contexts, cutting one off from experience by judging distressing, unwanted internal experiences and behaving as if they are “real”. “Defusion” is an ACT neologism that refers to the intentional separation of ongoing cognitive processes from cognitive products (Hayes et al., 2012). The goal of defusion is to step back from the meaning of verbal processes and begin to witness them from the point of view of an observer (Hayes et al., 2012). This allows one to observe when fusion is problematic and recognise the negative impact of believing and following these verbal rules. Defusion is not about suppression of thoughts or deciding whether thoughts are right or wrong, but instead is about accepting them by moving forward towards one’s values in spite of them.

As described in Chapter 2, recent experimental research has found the defusion technique of thought listing (talking about thoughts as thoughts) was more effective at improving discarding and reducing emotional attachment to possessions than the traditional C-B technique of cognitive reappraisal (Frost et al., 2016).

Other defusion techniques that may be applicable to HD are the mind watching *Leaves on a Stream* or *Watching the Mind Train* exercises (Hayes et al.,
2012, pp. 255–256), which are techniques that encourage the “letting go” of thoughts in order to observe them naturally come and go.

ACT theorists describe cognitive fusion and experiential avoidance as one of three process pairs of response styles in the psychological inflexibility model (Harris, 2009). Specifically, when fusion and avoidance are evident, a “closed” response style predominates where rigid rules lead to avoidance behaviours.

**Experiential avoidance and emotion regulation.**

Experiential avoidance is defined as the direct attempt to avoid unpleasant emotions, thoughts and sensations, as a result of an intolerance of negative internal states (Hayes et al., 2012). In the C-B model of HD (Frost & Hartl, 1996), avoidance behaviours are considered critical in maintaining the symptoms of HD. Recent research into this relationship suggests experiential avoidance leads to behavioural avoidance in the form of disengagement (saving) and self-distraction (acquiring), which uniquely predicts clutter (Ayers, Castriotta, et al., 2014).

Whilst experiential avoidance is an ACT process, by definition the avoidance of negative internal states is consistent with maladaptive emotion regulation strategies (Hayes et al., 2004, 2012). In fact, experiential avoidance can be considered the attempt to regulate emotions through avoidance. Therefore, it is relevant to review recent investigations into emotion regulation and HD in order to assess the applicability of this key ACT process to hoarding behaviours.

Broadly emotion regulation is the management of emotions in order to achieve a conscious or non-conscious goal by starting, stopping or modulating the course of an emotion, is triggered when the emotional reaction is perceived, valued, and action is deemed necessary to achieve a better outcome for the individual (Etkin, Büchel, & Gross, 2015).
The relationships between HD and a range of emotion regulation concepts including: anxiety sensitivity and distress tolerance (Mathes et al., 2017; Timpano et al., 2009), affect intolerance (Shaw, Llabre, et al., 2015), emotional tolerance and intensity (Timpano, Shaw, Cougle, & Fitch, 2014), general life stress (Timpano, Keough, et al., 2011), and perceived control (Raines, Oglesby, Unruh, Capron, & Schmidt, 2014) have recently been investigated. Accordingly, these findings offer a broader understanding of the way emotions play a part in both the development and reinforcement of hoarding behaviours.

Considering the impact of general life stress on hoarding symptoms, Timpano et al. (2011) found every-day negative life events such as poor examination performance or disagreements with close friends or family members, were significantly linked to increased saving, acquiring and clutter. Saving behaviours have been associated with the emotions of fear and anxiety and hoarding sufferers found to be intolerant of distressing emotions (Timpano et al., 2009). Specifically HD sufferers feel absorbed by the distress, indeed overwhelmed and completely engrossed by the experience, which impacts their ability to focus attentional resources on behaviours or thoughts outside the situation (Timpano et al., 2009). Anxiety sensitivity, known as “the fear of fear”, amplifies anxious reactions, and may even increase the conditionability of fear-related responding, which in turn drives avoidance behaviours (Reiss, 1991; Taylor, Koch, & McNally, 1992). Interestingly, findings indicate hoarding sufferers tend to be highly sensitive to the physical symptoms of anxiety, that is the racing heartbeat, sweaty palms, and chest tightening; furthermore, HD sufferers fear that these sensations are life threatening (Timpano et al., 2009). Additionally, hoarding behaviours are moderated by the degree to which distressing emotions and sensations are tolerated particularly when they are feared.
Findings indicated that those hoarding sufferers with low distress tolerance and high anxiety sensitivity, taken together to represent the regulatory mechanism of emotional tolerance, were more vulnerable to hoarding behaviours (Timpano et al., 2009).

Emotional tolerance has been found to be a bidirectional mediator between general life stress and hoarding symptoms, where both stress and emotional intolerance had a significant direct effect on HD (Timpano, Keough, et al., 2011). Furthermore, recent experimental emotional tolerance work suggests that those with more severe levels of hoarding also reported feeling emotions more intensely after mood inducing activities, and saving and acquiring were associated with emotion dysregulation factors of distress tolerance and emotional intensity, but not clutter (Timpano, Shaw, et al., 2014).

Perceived control over imminent threat is strongly associated with anxious arousal and anxiety related distress (see Brown et al., 2004). Hoarding sufferers reported that during efforts to address the symptoms of the disorder, they attempted to avoid the arousal of frightening events as a way to circumvent unpleasant physiological states and subsequently saved items (Medley et al., 2013; Timpano et al., 2009). Perceived control was assessed in a community sample and the threat control subscale, which represents the belief that the occurrence of or escape from a frightening event is ultimately out of one's control, was significantly associated with greater hoarding severity after controlling for general negative affect (Raines et al., 2014).

Taken together, the results of these emotion regulation studies suggest avoidance behaviours in HD are exacerbated by low emotional tolerance (high anxiety sensitivity and low distress tolerance), general life stress, and a lack of
perceived control over anxiety related distress. Essentially, hoarding sufferers report feeling emotions more intensely and do not believe they can successfully control or escape from negative emotional states and resort to emotional avoidance strategies such as saving possessions and compulsive acquisition.

Experiential avoidance (measured by the AAQ-II) has been found to uniquely predict acquisition and saving behaviours (measured SI–R subscales) in a HD sample (Ayers, Castriotta, et al., 2014). While compulsive acquisition is not listed as a symptom in the DSM–5 criteria for HD, it is a specifier for the disorder (APA, 2013). Consequently, when clinicians diagnose HD sufferers, they must specify if clients present with compulsive acquisition symptoms. Indeed, research indicates that between 60 and 85% of participants meeting the criteria for HD also reported issues with compulsive acquisition (Frost, Rosenfield, Steketee, & Tolin, 2013; Frost, Tolin, Steketee, Fitch, & Selbo-Bruns, 2009). In addition, two types of compulsive acquisition, buying and acquiring free items, appear to influence hoarding severity independently, thus indicating there is a broader construct of acquisitiveness involved in HD (Frost et al., 2009). Literature indicates buying may be used as an emotion regulation strategy to improving mood (Alemis & Yap, 2013) and the belief that buying could “compensate, reward, or neutralise negative feelings” (Kyrios, Frost, & Steketee, 2004, p. 254) has been found to predict compulsive buying behaviours. It is also possible that acquiring is a way for hoarding sufferers to distract themselves from negative experiences and thus avoid anxiety (Ayers, Castriotta, et al., 2014).

The avoidance of negative internal experiences (i.e. thoughts, memories, feelings, urges, images, sensations) is considered in ACT to increase psychological suffering because once avoided, these experiences are likely to rebound, and become more distressing and dominant than before (Hayes et al., 1996). When characterised
in terms of ACT theory, attempts to control or banish negative emotions often lead to significantly less contact with life experiences and in HD the avoidance of anxiety leads to pathological saving behaviour. Indeed, saving and acquiring can be conceptualised as hoarding specific experiential avoidance. Disorganised clutter, the physical manifestation of HD, may stop sufferers from inviting friends to visit, can result in less time available to engage in meaningful activities, cooking nutritious meals, and in extreme cases can form an impenetrable barrier between them and the world.

The central treatment techniques for experiential avoidance promote acceptance or willingness to remain in contact with negative private experiences. Efficacy studies of ACT treatment techniques to reduce experiential avoidance in the form of saving have not been empirically tested; however, the motivational interviewing technique “rolling with resistance”, included in the CBT protocol (Stekete & Frost, 2007, p. 74) is similar to ACT techniques of “allowing” (Harris, 2009). Allowing is defined as accepting the feelings, or “turning off the struggle switch” which involves letting go of the battle with negative internal experiences and being willing to accept and be in contact with those negative states (Harris, 2009, p. 146).

Avoiding the present moment and allowing past stories and future anxieties about one’s ability to tolerate negative experiences is indicative of inflexible attention and can be seen in HD behaviours.

**Inflexible attention.**

Hoarding sufferers are between 6 and 9.5 times more likely to exhibit ADHD-inattentive type symptoms (Fullana et al., 2013; Sheppard et al., 2010). It is possible that hoarding sufferers have objective attentional deficits particularly when attempting
to follow a project through to completion; however, no significant difference was found for sustained attention when hoarding sufferers results were compared with standardised norms (Grisham et al., 2007).

Alternatively, being inflexible and fusing with emotional thoughts may present as inattentive-type symptoms. A focus on problem solving means less focus on the present moment as it involves considering how the past led to the present, in order to produce a preferred future (Hayes et al., 2012). In the case of HD, sufferers may live in a constant state of rumination about past mistakes or anxiously try to predict the future, so they may be prepared and in control. Individuals who hoard, report keeping items because they feel uncertain about future needs or a fear of making a mistake - “I might need it” or “It might be worth something someday” (Burgess et al., 2017; Oglesby et al., 2013). Hoarding sufferers often acquire purely because they are not sure if they are ever going to see that item again and decide to make the purchase “just in case” and worry “what if” they fail to acquire it and need it in the future. This inability to cope with uncertain situations further reduces the hoarding sufferer’s tolerance in stressful situations and leads to both discarding and acquiring, which in turn significantly impacts clutter (Oglesby et al., 2013). This “what if” mentality is an indicator of inflexible attention and as hoarding sufferers focus on unspecified future needs or ruminate over past failure to be prepared, they are unable to flexibly shift their attention to the present and acknowledge the chaotic, dysfunctional conditions in which they are living (Frost, Steketee, Tolin, Sinopoli, & Ruby, 2015). Being unaware of the level of clutter in their homes is common in HD and is colloquially known as “clutter blindness”. In fact it has been reported that some hoarding sufferers are only able to finally recognise the extent of problem when viewing the hoard through another person’s eyes or through the lens of a camera,
possibly indicating habituation or some type of cognitive avoidance is present in HD (Frost et al., 2010).

It is also common for hoarding sufferers to report high levels of distractibility when engaging in sorting and discarding tasks (Frost & Steketee, 2010). It is possible that this distractibility and inability to stay focused on discarding is experiential avoidance, where focus drifts from emotionally difficult decision-making on to other less challenging tasks (Hayes et al., 2012). Indeed, one of the challenges in HD is related to the attention and importance given to individual items, versus the lack of attention given to the gestalt of the hoard and being unable to move between the two levels of focus (Frost et al., 2010). Attentional flexibility is the ability to consciously attend to aspects in the internal and external environment and freely move from absolute focus to broad awareness of the present, as circumstances require (Harris, 2009). Attentional flexibility can be learned (Baer, 2003). However, traditional mindfulness activities that encourage close observation of the aesthetic and sensory aspects of objects, such as the mindfully eating the raisin exercise, may not be appropriate for HD (Harris, 2009, pp. 163–164) as they may bring hoarding sufferers back in contact with the reasons why they acquired or saved the items initially (Frost & Steketee, 1998). In a discarding exposure exercise, ACT clinicians may use a technique like dropping the anchor (Harris, 2009, pp. 166–167), which involves grounding clients in the room, with their feet on the floor, noticing their breath, and widening their focus from the individual possessions to the present state of the cluttered space.

*Attachment to conceptualised self.*

Self-concept in HD is inextricably tied to possessions (Belk, 1988; Csikszentmihalyi & Rochberg-Halton, 1981; James, 1890; Kings et al., 2017; Veale,
Research suggests that HD sufferers tend to have many common “stories” or over-valued ideas about how important their possessions are in their lives and these narratives restrict their ability to change maladaptive behaviours (Steketee et al., 2003). The ACT concept of an attachment to the conceptualised self occurs as a result of the process of self-analysis, categorisation, comparison, and evaluation of “who I am”. These judgements combine to create a narrative or self-story based on “facts” and in an attempt to remain congruent with these stories, behaviours are not based on experience (Hayes et al., 2012). Common stories such as “my possessions are an extension of me”, “I must protect my possessions” and “I need all of this to be successful” require hoarding sufferers to save items in order for their behaviours to match their self-concept (Frost et al., 2010). Behaving in a way that is inconsistent with tightly held self-stories might appear life threatening to hoarding sufferers because often their identity is defined through their possessions (Kings et al., 2017). Consequently, decisions and behaviours appear paradoxically self-defeating. For example, Veale (2002) reported a hoarding sufferer suggested she would rather die in a fire with her possessions than escape and survive without them, because without them she was nothing (Veale, 2002).

An interesting study recently conducted by Dozier et al. (2017) considered HD as fundamentally a relational disorder where the connection between one’s self and one’s possessions becomes pathological and this interconnectedness leads to functional impairment and/or distress. This is not a new idea and the relationship between the self and possessions has been considered by many including early psychologists such as James (1890) who suggested “between what a man calls me and what he simply calls mine, the line is difficult to draw”. However, conceptualising hoarding as a relational disorder is novel (Dozier et al., 2017). A new scale, known as
the Relationship between Self and Items (RSI; Dozier et al., 2017), was developed to measure interpersonal closeness between a hoarding sufferer and their possessions. With the use of a one-item pictorial measure adapted from the Inclusion of Other in Self scale (Aron, Aron, Elaine, & Smollan, 1992) respondents select the picture that best describes their relationship with possessions from a set of seven Venn-like diagrams each representing different degrees of overlap of two circles. The degree of overlap of the two circles represents one’s perceived relationship between the self and one’s possessions. Results indicated that the RSI was able to predict hoarding severity and was unrelated to levels of anxiety and depression. As a visual tool, the RSI may tap into deeper, self-item relatedness and may measure a distinct construct to emotional attachment to possessions as measured by the SCI (Dozier & Ayers, 2017).

Whilst this study was preliminary and underpowered \((n = 20)\), findings provide initial support for the RSI as a single item, pictorial screening tool for hoarding severity and offers a way to assess how close the relationship is between possessions and self, which to date has been unidentified.

Particular types of possessions tend to become symbolic manifestations of the self when they reflect values upon which one bases one’s self-worth (Ferraro, Escalas, & Bettman, 2011). For example, HD sufferers often describe themselves as creative or artistic and are fused with the self-story—“I am an artist”. Accumulation of huge stores of art and craft supplies and other random objects that could be turned into something beautiful, provide hoarding sufferers with the “opportunity to vicariously experience an identity (they) crave—as an artist” (Frost et al., 2010, p. 408), without ever actually creating any art. Objects that offer the opportunity to achieve an ideal identity are acquired and saved by hoarding sufferers because possessing them is like being the person they believe they are.
Treatment techniques that allow hoarding sufferers to take a new perspective and see that these self-beliefs, thoughts, judgments, images, and memories are impermanent and do not define them or the way they behave is likely to help hoarding sufferers observe their possessions as merely “things” not an integral part of the self. Defusion exercises such as workability, or pragmatism (Harris, 2009, p. 124), which involve clients questioning the ability for these objects-as-self beliefs to help them take effective action are potentially effective for over-valued ideas (as discussed in the cognitive fusion section) and attachment to conceptualised self. “Does this thought help me to be who I want to be?” does not question the validity of the thought that, for example, “my possessions are me”, it taps into whether using this belief to dictate behaviours is going to be useful in taking clients in the direction of their values.

Disruption of values.

Losing connection with one’s life direction can significantly diminish feelings of connectedness and engagement resulting in a lack of vitality and wellbeing (Schwartz et al., 2012). ACT’s focus on values is one of the ways it differs from other C-B therapies; nonetheless, the CBT for HD protocol does include values work as a way to motivate ambivalent hoarding clients using motivational interviewing techniques (Steketee & Frost, 2014b, pp. 64–81).

Values are freely chosen verbalised patterns of behaviour that allow one to live and act in a meaningful way (Hayes et al., 2012). Unlike goals, which entail are specific desired achievements, values are “principles on which one will not yield and are not subject to empirical testing” (Veale, 2002). In order to live a vital, meaningful life it is essential to engage in activities that support ones’ values. A range of competing values, some of the more common being family, intimate relationships, parenting, and friendships, are likely to be differentially important and will determine
client’s specific goals and intentional actions in the direction of those values.

No specific research has been conducted to investigate the typical values held by average hoarding sufferers or how they interact with these values. Interestingly, however there is anecdotal evidence of idealised values in HD (Frost et al., 2010; Veale, 2002). Related to over-valued ideas (OVI), previously discussed with respect to cognitive fusion, idealised values for hoarding sufferers are unlike the values espoused in ACT. Idealised values are those that are inflexibly held and will not cede even if the result of acting on the values leads to negative consequences (Veale, 2002). Reported to hold idealised values of being unwasteful, individuals may refuse to throw out items that might have some vague use in the future, for example, ice cream containers are saved ostensibly because they are *handy* for storage. The value of being unwasteful becomes a functional handicap when there is no room to cook in the kitchen due to the excessive number of empty ice cream containers. Indeed, HD sufferers are more highly motivated to acquire and save possessions to avoid waste than motives of emotional attachment or aesthetic appreciation (Frost, Steketee, Tolin, Sinopoli, & Ruby, 2015).

Whilst little is known about common values in HD, ACT suggests, regardless of the value, it is important to assess the factors that influence clients value choices. In ACT parlance, values may be “pliant” or easily influenced by factors such as cultural norms of acceptable behaviour, parental approval, or past negative experiences (Hayes et al., 2012, p. 53). According to ACT, those values that are verbalised as “musts” such as “I must not be wasteful”, are indicative of fusion with rigid rules and are therefore acting as idealised values. The motivational interviewing techniques used in CBT for HD ostensibly seek out idealised values held by clients in order to establish the level of functional disability caused by this rigid adherence to
values (Steketee & Frost, 2014b, p. 67).

Certainly, idealised values in hoarding psychopathology appear to offer an important treatment target. It has been suggested that CBT may be more effective in treating disorders with over-valued ideas, such as HD, if values are the target of treatment rather than beliefs (Veale, 2002). The central tenant of CBT is to challenge faulty thinking patterns using cognitive reinterpretation techniques, which essentially target over-valued beliefs; however, questioning the functionality of idealised values and identifying the logic behind their adoption is potentially more effective in treating HD than challenging beliefs about possessions (Veale, 2002).

**Inaction / impulsivity.**

The result of fusion, avoidance, and the disruption of values is behavioural rigidity, which may manifest as behavioural avoidance or behavioural excesses. In the case of HD, saving behaviour can be conceptualised as hoarding specific experiential avoidance. Additionally, excessive acquisition is the way many HD sufferers manage their emotions and distract them from psychological pain (Kyrios et al., 2004). Strong attachment to solving the emotional problem means individuals are focused on fighting with the disorder daily by engaging in behaviours, such as avoidance, denial, distraction, and suppression, that they believe will quickly reduce or eliminate aversive emotional states (Hayes et al., 2012). Hoarding sufferers may deny their behaviour is a problem and continue saving to avoid anxiety and acquire to improve their mood. Indeed, the ineffectual or inflexible responding to changing circumstances according to ACT is inaction, not the absence of action (Hayes et al., 2012).

Inaction is continuing to save and acquire even after an eviction notice has been served, for example, and can be conceptualised as inaction or avoidant
persistence. Additionally, impulsivity in ACT refers to behaviours that are intended to numb aversive emotional states such as drinking, bingeing, or shopping (Hayes et al., 2012). Excessive acquisition (buying, free things, and stealing) is present in more than two thirds of hoarding cases (Timpano, Exner, et al., 2011) and compared to controls, compulsive buyers with hoarding reported higher levels of general impulsivity than compulsive buyers without hoarding (Vogt, Hunger, Pietrowsky, & Gerlach, 2015). This implies that perhaps both acquiring and saving decisions are made impulsively by hoarding sufferers with little thought given to the long-term consequences of these actions in order to dull present negative emotional experiences.

ACT sees committed action as an extension of freely chosen values (Hayes et al., 2012). Considered the cornerstone of psychological flexibility, committed action is the “capacity to engage in highly organised and purposeful behaviour that is sensitive to contingencies” (Hayes et al., 2012, p. 96). Committed action is the ability to direct behaviours towards freely chosen values and redirect behaviours when they diverge from the path towards chosen values (Hayes et al., 2012, p. 96).

As previously discussed, establishment of values that lead to goals to be achieved by committed actions is central to the treatment of HD. Further, committed action is the culmination of defusion, acceptance, flexible attention, and self-as-context.

*Psychological inflexibility and HD in action.*

Firstly, this chapter aimed to assess the suitability of applying ACT and its underlying theory, RFT, to HD. Secondly, the chapter considered the ACT psychological inflexibility elements of cognitive fusion, experiential avoidance, inflexible attention, attachment to the conceptualised self, disruption of values and
inaction and how these may apply to HD. In order to illustrate RFT and ACT psychological inflexibility an example will be used to demonstrate how the interrelated elements can be successfully applied to the phenomenology of HD.

**Example of HD reconceptualised according to ACT.**

Emily and her teddy bear, described above, will be used for this example linking the background theory of RFT with the six core processes of psychological inflexibility in a hypothetical hoarding sufferer.

**RFT.**

When Emily’s teddy bear was taken from her, Emily felt an acute sense of loss and grief. To a toddler, this adverse event was highly memorable, and Emily does not wish to experience the painful loss again. Thereafter, when similar events occur, such as an older sibling damaging her favourite toys or her parents removing toys as punishment or giving them away to those “worthier”, Emily becomes conditioned to avoid these feeling of loss by vigilantly monitoring and protecting her possessions.

**Cognitive fusion.**

Consequently, as she matures Emily develops rules or stories about her possessions and what will happen if she does not maintain control over them. Without stepping outside her thoughts, Emily behaves as if these rules are true, believing she will feel like she is dying if she lost or let go of one of her possession. Indeed, Emily does not test these truths but continues to behave according to inflexible rules by protecting her possessions.

Like many hoarding sufferers, Emily feels a deep connection to her possessions believing they have feelings and other human-like qualities. Accordingly,
her possessions are not only important to her they are valuable in their own right and can be hurt. Thus, Emily feels an extreme sense of responsible for them.

**Experiential avoidance.**

In order to protect herself and her possessions from acute anxiety, Emily lives her life following her strict rules, which assist her to avoid even the possibility of facing negative experiences. Keeping all her possessions means Emily will not feel the grief again. Equally, Emily feels she has little control over threatening event and saving is the only way to protect herself. In fact, avoiding all circumstances that might expose her to anxiety is her chosen emotion regulation strategy.

Memories of having her precious possessions taken or damaged occupy her mind and rule her behaviour. When asked, Emily is unlikely to identify these previous experiences as being responsible for her behaviour today because she is conditioned to accept her thoughts as the truth. If Emily is uncertain about something like a new friendship or experience, she is likely to refer to her self-stories and rigid rules to guide her. Consequently, she avoids any unfamiliar situation and her engagement with life stagnates.

**Inflexible attention.**

When amongst her possessions, Emily doesn’t “see” the piles of possessions. Her focus is on how much her possessions have comforted her in the past. Likewise, she may catch herself admiring the colour and unique design of an ornament she “adopted” at the charity store and feels a rush of joy. Meanwhile, Emily ignores or blocks out the dozens of very similar ornaments crowded on the mantelpiece. At work, Emily has no problems concentrating on tasks or following projects through to completion. In fact, there is little evidence of the cluttered state of her home from her
appearance or behaviours in the workplace.

**Attachment to the conceptualised self.**

As an adult, Emily sees herself as a “crafty” “collector”. Emily’s life centres on finding and collecting anything “cute” that takes her fancy. At least three times a week Emily drops into her favourite charity shop after work. Staff set aside things they think she will like and, because she believes possessions have feelings, she never refuses to buy them, that would be cruel. Work is merely a way to acquire more cute things.

**Disruption of values.**

As a child, Emily dreamed of having children–especially a girl. She has even collected a large number of girl’s baby clothes somewhere in the spare room.

Recently a work colleague asked Emily out on a date. Before she gave her answer, Emily’s anxieties about uncertainty and losing control rose up and overwhelmed her. Consequently, to be safe, Emily turned her co-worker down. Immediately she felt better, however, since then Emily has been thinking about her dreams of being a wife and mother and living in a beautifully decorated house in the suburbs.

**Inaction.**

Whilst Emily could have said yes to the date it would invite uncertainty into her home. Eventually she would have had to give up her privacy and control that have protected her from bad feelings all her life. Emily concludes it is safer to keep behaving as she has always done and not risk her dreaded anxieties.
Conclusion.

As illustrated herein the current chapter, HD behaviours and cognitions can be successfully conceptualised in ACT terms. Fusion with verbal rules, avoidance of negative experiences, attachment to the conceptualised self-concept, and idealised values satisfactorily describes the inflexible way hoarding sufferers engage with both their internal and external environments.

At this point, research supports the presence of cognitive fusion, in the form of saving cognitions in HD, and it has been found to correlate highly with hoarding behaviours of saving, acquiring. Furthermore, saving and acquiring behaviour can be considered hoarding specific experiential avoidance, offering a way for hoarding sufferers to regulate negative emotions.

However, the remaining psychological inflexibility core processes of attachment to the conceptualised self, inflexible attention, idealised values, and inaction have substantially less empirical support.

To date investigation into hoarding of possessions and self-concept has been inadequate (Kings et al., 2017). This is surprising given the earliest descriptions of hoarding disorder highlighted the powerful link between hoarded possessions and sense of self (Greenberg, 1987; Warren & Ostrom, 1988). Certainly, changes in this relationship has the ability to reduce saving and acquiring in hoarding; however, currently the nature of the connection is unclear.

Inflexible attention in HD has been investigated in executive function studies and will be discussed in detail in Chapter 4. Alternatively, mindfulness, that is the ability to attend to experience in the present moment without judgement (Grecucci, Pappaianni, Siugzdaite, Theuninck, & Job, 2015), has to date received little, if any, attention in the published HD literature.
Idealised values, that is those that are pliant or rigid and are unlikely to be freely chosen, are discussed in the therapist’s guides for HD (Steketee & Frost, 2007, 2014b); however, no empirical investigations into the nature of values and committed action towards those values has been published in the HD literature.

In order to take preliminary steps towards assessing the suitability of ACT’s six core psychological inflexibility processes to HD an exploratory investigation was conducted. This analysis, presented in Chapter 6 of the thesis, investigates the statistical differences between participants reporting high levels of hoarding behaviours and those reporting low levels of hoarding severity in self-reported cognitive fusion, experiential avoidance, attachment to the conceptualised self, inflexible attention, inflexible values, and inaction.

Subsequently, before applying the ACT psychological inflexibility concepts discussed in this chapter in a reconceptualised model of HD, it is necessary to critically review the biological, cognitive, behavioural, and emotional factors included in the Frost and Hartl (1996) model of HD to identify gaps that may be addressed with a more emotion-focused lens.
Chapter 4

A Critical Evaluation of the Frost and Hartl Model of HD

After reviewing the psychosocial treatment efficacy literature (see Chapter 2) and the potential synergies of hoarding disorders typical behavioural expression within the ACT and emotion regulation theoretical framework (see Chapter 3), the hypothesised elements in the Frost and Hartl (1996) Cognitive-Behavioural (C-B) model will be reviewed in this chapter. When taking on the task of reconceptualising a theoretical model of a psychological disorder, as is the goal of this thesis, it is necessary to critically evaluate the supporting evidence gathered for the current, widely accepted theoretical perspective and consider how this evidence may or may not support the components of an alternate theoretical approach. In this chapter, each of the hypothesised cognitive and behavioural elements originally included in the model of hoarding disorder initially outlined by Frost and Hartl (1996) and those subsequently added to the diagrammatic depiction of hoarding phenomenology by Steketee and Frost (2007), will be considered in turn.

Four key elements of the original HD biopsychosocial model were hypothesised to influence hoarding behaviours of difficulty discarding, excessive acquiring, and disorganised clutter (Steketee, 2014). The first element, vulnerabilities, was biosocial in nature and included genetic predisposition and early childhood environment which were factors observed during initial investigations of HD (Frost & Gross, 1993; Frost & Hartl, 1996).

The second key element proposed in the C-B model was cognitive deficits such as decision-making, attention, memory, and problem solving. These deficits in
information processing were hypothetically influenced by the first key element, genetic and environmental vulnerabilities (Steketee, 2014).

The third element was inflexible beliefs about the value and meaning of possessions. This psychological factor was implicated in both the development and maintenance of HD and was predicted to be directly influence by the first and second elements of the model; vulnerabilities and information processing deficits (Frost & Gross, 1993; Frost & Hartl, 1996; Steketee & Frost, 2003).

The fourth and final elements in the Frost and Hartl (1996) model were positive and negative emotions, ostensibly impacted by inflexible beliefs, that were considered maintaining factors reinforcing the maladaptive behaviours of saving and acquiring in HD (Steketee, 2014).

At the time of the publication of the Frost and Hartl C-B theoretical model, the investigation into the nature of HD could only be described as embryonic and the relationships between the four key elements proposed in the model, hypothetical. It was the authors’ intention that the model be a “framework for the development, refinement and testing of hypotheses relevant to the study of compulsive hoarding. It (was) not meant to be an exhaustive list of relevant variables” (Frost & Hartl, 1996, p. 349). It can also be inferred that Frost and Hartl did not intend to consider the relationships between the four elements as fixed either given the nascence of the research. Consequently, the variables or elements reviewed in this chapter were not included in the theoretical model based on solid empirical investigation but from observations and self-report data. Nevertheless, these original hypothesised factors and relationships, proposed in the first theoretical model of HD, have provided substantial heuristic value in the development of effective treatment interventions (Kyrios, 2014).
In order to appreciate the contribution, the Frost and Hartl (1996) cognitive-behavioural model has made to the understanding and treatment of HD over the past 20 years it is interesting to briefly describe how the model was first proposed.

**Origin of the cognitive-behavioural model of HD.**

The original C-B model of hoarding disorder was developed subsequent to the first empirical study of hoarding disorder published in 1993 (Frost & Gross, 1993). Prior to this date, hoarding psychopathology had been outlined in a small number of case studies (e.g. Greenberg, 1987; Greenberg, Witztum, & Levy, 1990); however, it was an article published in the popular media that described the phenomenon of hoarding in some detail based on the authors’ personal experience and informal questioning of friends and colleagues (Warren & Ostrom, 1988). Consequently, the experiences described in the magazine article formed the basis of the first cross-sectional investigation of hoarding disorder (then known as compulsive hoarding) (Frost & Gross, 1993). In addition, the formal definition of HD was proposed in the second published article on the topic by Frost and Hartl (1996, p. 341) as:

… (1) the acquisition of, and failure to discard a large number of possessions that appear to be useless or of limited value; (2) living spaces sufficiently cluttered so as to preclude activities for which those spaces were designed; and (3) significant distress or impairment in functioning caused by the hoarding.

This definition formed the basis of the *DSM–5* criteria for HD (APA, 2013).

Frost and Hartl (1996), in their description of the factors influencing HD, took a phenomenological approach, outlining a number of experiential and behavioural features associated with hoarding but making no assumptions about how these features emerged (Frost & Steketee, 1998). According to the Frost and Hartl (1996)
C-B model, the typical symptoms of hoarding disorder, namely excessive acquisition, difficultly discarding, and clutter, were a result of hoarding sufferers’ problems in processing information, the forming of emotional attachments, behavioural avoidance, and beliefs about possessions. Specifically, the typical hoarding sufferers encountered difficulties, due to cognitive deficits, when making decisions to discard and organise their possessions. These deficits led to behavioural and cognitive challenges in the area of memory, decision-making, prioritising, organising, and categorising (Frost & Hartl, 1996). Further, core beliefs about the nature of possessions and emotional attachment to them led to additional conditioned emotional responses, which were negatively and or positively reinforced. The resulting emotion regulation response that then ensued included approach and avoidance behaviours of excessive acquisition and pathological saving, with clutter being the physical manifestation of disorder (Grisham & Barlow, 2005).

The original C-B model was later expanded to include additional biological factors namely genetic inheritance, biochemistry, and neurological structures, and psychosocial vulnerabilities such as family background, experiences, personality, and mood as etiological elements (Steketee & Frost, 2007).

**Review of the cognitive-behavioural model of HD**

In order to assess the empirical support for the original C-B model for HD, a review of the evidence gathered to date in the key areas hypothesised by of vulnerabilities, information processing deficits, beliefs about and meaning of possessions, emotional responses and behaviour patterns in HD has been conducted. Accordingly, each element proposed in the original C-B model (Figure 1) will be discussed in turn detailing relevant findings and relating those findings to treatment outcomes.
Figure 1. Frost and Hartl cognitive behavioural model of HD


Vulnerabilities.

The C-B model of HD (Figure 1) proposed heritable factors, based on observations of a potential familial link in the development of HD (Frost & Gross, 1993). Additionally, traumatic life events and material deprivation were proposed as possible experiential and environmental causes of HD.
Due to the recent nosological changes and the inclusion of HD as a stand-alone disorder in the *DSM-5* (APA, 2013), previous research using samples with a primary diagnosis of hoarding disorder is limited (see Hirschtritt & Mathews, 2014 for a review). Both epidemiological approaches, looking at whether the traits found in hoarding disorder are in fact passed down in families, and molecular genetic susceptibility studies will likely follow using the *DSM-5* criteria of hoarding disorder. Unfortunately, use of OCD samples predominate, with some evidence of the heritability of the hoarding subtype within this population; however only a handful of case-based family studies have investigated rates of hoarding in first degree relatives and fewer still have compared these rates against controls (Frost & Gross, 1993; Pertusa et al., 2008; Samuels et al., 2002; Samuels et al., 2007). Results from these studies suggest the odds of an individual with hoarding disorder having a first degree relative with the disorder also are between 1.2 and 1.6 when compared with controls.

Multiplex family studies, (‘multiplex’ refers to families with at least two generations that have multiple family members expressing hoarding symptoms) offer further support for a genetic component, with heritability estimated to be between 35% and 71% (Alsobrook II, Leckman, Goodman, Rasmussen, & Pauls, 1999; Carol A. Mathews et al., 2007). However, the use of different hoarding phenotype definitions, due to these investigations being conducted prior to HD becoming a recognised disorder separate from OCD, make definitive conclusions imprudent.

More recent twin studies, using independent hoarding samples rather than investigations of samples with other primary psychological diagnoses, have concluded that, in this specific sample, unique genetic influences accounted for more than half of
the variance in the hoarding phenotype (Iervolino et al., 2009; Nordsletten, Monzani, et al., 2013).

Based on the available research it does seem that there is no clear-cut chromosomal defect or set of specific genes that can be isolated and targeted in hoarding disorder (Riddle et al., 2016; Samuels, Yin, et al., 2007), therefore behavioural interventions will continue to be at the forefront of treatment for the disorder.

Traumatic and stressful life events.

Frost and Hartl, (1996), reported that hoarding sufferers seemed to rely on their possessions to offer a sense of security and comfort and being amongst the hoard signalled a safe environment. Taking an evolutionary perspective, Kellett (2007) developed a site-security model of HD, conceptualising the disorder in terms of biological drives to “larder hoard”, that is to hoard items (not only food) in a single location similar to animals such as hamsters.

In contrast, the restoration of safety hypothesis of HD was proposed suggesting that in order to return a feeling of safety and security after an extremely stressful or traumatic life event, hoarding sufferers may tend to gather possessions and save them to signal a safe environment (Hartl, Duffany, Allen, Steketee, & Frost, 2005). A number of studies appear to support the link between some hoarding symptoms and stressful or traumatic life events, further clarifying the type of experiences that are most often reported by hoarding sufferers (Hartl et al., 2005; Landau et al., 2011; Przeworski, Cain, & Dunbeck, 2014; Samuels, Bienvenu, Grados, et al., 2008; Shaw, Wicraft, & Timpano, 2016; Timpano, Keough, et al., 2011). Disaster-related trauma, including natural or man-made disasters and actual or feared injury or death of the self or others was reported more frequently by hoarding
sufferers (both with and without comorbid OCD) than controls or individuals with OCD (Landau et al., 2011). Those who reported childhood adversities, specifically excessive physical discipline and home break-ins, were four times more likely to be hoarding sufferers in a community sample (Samuels, Bienvenu, Grados, et al., 2008). Retrospective reports of traumatic life events indicated hoarding sufferers were more likely to have had something taken from them by force, been physically manhandled, and forced into sexual activity/intercourse before the age of 18 than controls (Hartl et al., 2005). Timpano and colleagues (2011) found stressful life events, especially interpersonal stress, were most robustly related to acquiring and clutter and emotional intolerance mediated the relationship. Shaw and colleagues (Shaw et al., 2016) found frequent traumatic experiences, especially of a physical/sexual nature, were linked to acquiring in an experimental study of non-clinical participants, while finding no specific type of trauma significantly correlated with saving tendencies begging further investigation in larger clinical samples. Similarly, traumatic experiences including childhood sexual and physical abuse, the destruction of all personal possessions, and having to suppress emotions in response to these adverse childhood experiences was reported in a qualitative study (Kellett et al., 2010). Recently, Przeworski, Cain and Dunbeck (2014) reported evidence of cumulative trauma in hoarding with severity positively associated with the number of traumatic events occurring prior to symptom onset and found physical assault and transportation accidents were higher in hoarding sufferers than in OCD sufferers prior to the onset of the disorder.

Unreliable memory recall due to cognitive biases (such as false memory, or reminiscence bump) in these types of retrospective studies needs to be considered when interpreting findings that a specific traumatic event precedes the onset of hoarding disorder. Nevertheless, early traumatic life experiences have been linked to
comorbidity of psychological disorders (Kessler, Sonnega, Bronet, Hughes, & Nelson, 1995), which, as discussed in Chapter 2, impacts the efficacy of HD psychosocial interventions.

Material deprivation.

Material deprivation was investigated in the initial study by Frost and Gross (1993) as a potential antecedent for HD, as it seemed likely that living through lean financial times could cause the pathological acquiring and saving of material goods seen in HD sufferers. Research has not supported this hypothesis finding hoarding sufferers no more likely to have suffered material deprivation, that is limited financial resources or impoverishment, than non-hoarding individuals (Frost & Gross, 1993; Landau et al., 2011). However, no longitudinal research is available to confirm these self-reports.

Interestingly, hoarding sufferers were more likely to report having personal possessions taken from them against their will (usually by a family member) and nearly 1 in 5 hoarding sufferers reported experiences of inadequate shelter over their lifetime (Landau et al., 2011). Additionally, experience of eviction or the threat of eviction was reported by 8-12% of hoarding sufferers in a large sample (Tolin, Frost, Steketee, Gray, & Fitch, 2008). Indeed, the direction of causality in this circumstance is pertinent as eviction may be a cause or result of hoarding behaviours and this was not investigated (Tolin et al., 2008).

Thus, while financial hardship may not be a contributing factor to the emergence of HD, a theme of loss of possessions can be traced through both the traumatic and stressful life events. Stressors including inadequate shelter as a result of natural or man-made disaster (Landau et al., 2011), home break-ins (Samuels, Bienvenu, Grados, et al., 2008), property taken by force (Hartl et al., 2005; Kellett et
al., 2010; Landau et al., 2011), and eviction (Tolin et al., 2008) are described more often in hoarding samples. Sexual assault (Hartl et al., 2005; Kellett et al., 2010) and excessive use of physical punishment during childhood (Samuels, Bienvenu, Grados, et al., 2008) also suggests a loss of personal control which may be relevant to the restoration of safety hypothesis put forward by Hartl et al. (2005).

A recent review of the aetiology of hoarding suggests the most likely course of HD onset is a gene-environment correlation whereby those individuals who are genetically predisposed to hoarding are more likely to be born into saving homes where hoarding behaviours are modelled and maladaptive beliefs develop (Dozier & Ayers, 2017). Certainly, further research is needed to better understand the aetiology of HD; nevertheless, psychosocial interventions remain relevant to the treatment of HD regardless of the causes of the disorder.

Compromised information processing pathways have been suggested to contribute to the development of hoarding behaviours and in the chronically disorganised clutter found in clinical hoarding cases.

**Original information processing deficits included in the C-B model of HD.**

Within the Frost and Hartl (1996) model, cognitive factors have received the most empirical attention to date due to their hypothesised prominence in the development of the disorder within the broader C-B framework (Steketee & Frost, 2003). Observations and self-reported difficulties with processing information in the HD population led to the proposition that objective cognitive deficits may have a role to play in the aetiology of HD (Hartl et al., 2004). Initial cognitive factors of decision-making, categorising, and memory were considered to be instrumental in both the development and maintenance of the disorder, and particularly relevant to the clutter and disorganisation evident in hoarding (Frost & Hartl, 1996). Further
investigation broadened these factors to include attention and working memory (Hartl et al., 2005), planning and perceptual organisation (Grisham et al., 2007), inhibitory control (Grisham et al., 2007), and cognitive flexibility (Tolin, Villavicencio, Umbach, & Kurtz, 2011).

Both the early cognitive factors of decision-making, categorisation, and memory and the subsequently included executive functions of attention and working memory, planning and perceptual organisation, and cognitive flexibility will be critically evaluated in light of currently available HD research.

Decision-making.

One key cognitive component, indecisiveness, was identified as a hallmark of hoarding disorder during early empirical investigations (Frost & Steketee, 1998) and was linked to perfectionism in the form of excessive concern over mistakes (Frost & Gross, 1993; Frost & Hartl, 1996). For example, hoarding sufferers feel the need to assess all the possible consequences of discarding an object in order to make the perfect decision and avoid all mistakes (Frost & Steketee, 1999). According to the C-B model, uncertainty about the probability of needing objects later has been linked to indecision, and hoarding sufferers are likely to have higher thresholds for discarding (Frost & Hartl, 1996) such that items need to be more worn out or damaged for them to be discarded. These initial observations were the impetus for further exploration of the nature of decision-making in HD.

In order to experimentally test indecision during discarding, and identify any neural regions specific to hoarding disorder, Tolin and colleagues (2012; 2009) conducted real-time binding decision-making tasks using reaction times as proxies for measuring problematic decision-making along with in-the-moment ratings of emotions (anxiety, indecisiveness, sadness, and “not just right” feelings), whilst
capturing neural activity using functional magnetic resonance imaging (fMRI). Two types of stimuli were presented: participant’s possessions (physical paper items) and experimenter’s possessions (matched in volume and type to the participants possessions) in order to test if HD indecision was content specific as hypothesised in the original C-B framework (Frost & Steketee, 1998). The hoarding group discarded significantly less of their own possessions than did the obsessive compulsive or healthy control groups and were more anxious (Tolin, Stevens, Villavicencio, et al., 2012; Tolin et al., 2009), indecisive, and sad than controls whilst undertaking this task (Tolin, Stevens, Villavicencio, et al., 2012). Hoarding sufferers also took significantly longer to decide to discard their own possessions (Tolin et al., 2009).

Interestingly, whilst reporting indecisiveness, hoarding sufferers have also been found to be unimpaired when performing some decision-making tasks which do not involve emotional content (Grisham, Norberg, Williams, Certoma, & Kadib, 2010), particularly gambling (Grisham et al., 2007) or tasks of a non-personal nature. Such findings further highlight the need to investigate the important role of emotion in decision-making when specifically related to personal artefacts.

Neural images identified that regions of the anterior cingulate cortex (ACC), commonly associated with error monitoring under conditions of uncertainty, and the mid-to-anterior insula regions, thought to be associated with perception of unpleasant feeling states, salience of stimuli, error monitoring, risk assessment, and emotion-driven decision, were abnormal in hoarding patients (Tolin, Stevens, Villavicencio, et al., 2012). When working together these neural regions are thought to form part of a network used by the brain to identify the emotional significance of stimuli, generate emotional responses, and regulate affective states (Menon & Uddin, 2010). Accordingly, the emotional attachment that hoarding sufferers feel for their
possessions has the potential to interfere with the decision-making process due to these abnormalities in the ACC and mid-to-anterior insular regions. This is likely to inflate the emotional significance of the objects and perhaps lead to the heightened anxious emotional response hoarding sufferers experience when attempting to discard.

The salience network, believed to be the ACC and insula working in tandem, is associated with emotion regulation and emotionally significant decision-making (Menon & Uddin, 2010). Indeed, the finding of abnormal biphasic pattern of activity in the ACC and insula in a hoarding sample (hypoactive when deciding about experimenter items and hyperactive when deciding about their own items) certainly warrants further investigation as it is not clear what the impact of this combination has for decision-making within the context of HD (Tolin, Stevens, Villavicencio, et al., 2012).

Hyperactivity in the salience network is thought to obstruct the decision-making process by increasing the hoarding sufferer’s sense of outcome uncertainty. This is consistent with the correlations between subjective indecisiveness and “not just right” feelings in Tolin et al.’s (2012) second experimental study. The sense that the wrong decision is being made and needs to be avoided is perhaps behind the longer decision latency times, when hoarding sufferers have to decide about their own possessions and may also explain the lower percentage of personal items discarded by the hoarding sample compared to the OCD and HC groups (Tolin et al., 2012).

Alternatively, hypoactivity in the salience network, as opposed to hyperactivity, has been implicated in autism spectrum disorder, which may be suggestive of decreased attention to social stimuli that is a hallmark of autism (see Menon & Uddin, 2010 for a review). Why this hypoactivity may occur in hoarding
sufferers when making decisions about discarding items belonging to someone else is also yet to be determined.

Taken together, such findings have significant implications for treatment of HD as the abnormal functioning of salience network during discarding activities will unleash the domino effect increasing the emotional significance of possessions, leading to increased anxious arousal, followed by saving which is ostensibly avoidance of decision-making. Awareness of this unconscious emotional chain reaction when making decisions in uncertain circumstances must be explored in HD treatment so it may be recognised and overcome.

Linked to decision-making, difficulties organising and categorising possessions has been observed in HD and thwarts the discarding progress.

Categorising / organising.

A second key cognitive component highlighted in the initial CB model refers to the observation that hoarding sufferers tend to use additional categorises to organise items with fewer members per category than healthy controls (Frost & Hartl, 1996). The narrow category boundaries observed in HD are also seen in OCD populations and are known as “under-inclusion” This relates to hoarding sufferers’ core beliefs regarding the unique and irreplaceable qualities of their possessions. Indeed, research indicates hoarding sufferers tend to use more fine-grained, complicated concepts to define group membership, thus ending up with a smaller number of items and more categories (Wincze et al., 2007). As categorisation is a way for stimuli to be divided into behaviourally and cognitively accessible collections and allows mental shortcuts when extracting information from the environment, this observed deficit has been hypothesised to be a potential contributing factor in hoarding neuropsychopathology (Grisham et al., 2010).
Indeed, Wincze et al., (2007) found clinical hoarding participants took more
time, created more categories, and experienced more anxiety than healthy controls,
compared to obsessive compulsive disorder (OCD) sufferers, when sorting personally
relevant items listed on index cards. This did not occur when hoarding participants
sorted actual common household items of no personal relevance. However, in a
similar study Luchian et al. (2007) found non-clinical self-identified “pack-rats” took
almost twice as long, created more piles, and found the process more difficult than
healthy controls when categorising objects of no personal relevance. These
conflicting results regarding the emotional relevance of items suggest idiographic
unstandardized sorting task may lack the internal validity to be instructive.

In an attempt to resolve conflicting results regarding the nature of
categorisation difficulties for hoarding sufferers, Grisham and colleagues (Grisham et
al., 2010) focused on the hypothesis that these difficulties are linked to more general
executive function deficits in the hoarding population. Using both physical items and
index cards of personal and non-personal objects, Grisham et al. (Grisham et al.,
2010) replicated Wincze et al. study (2007) and compared hoarding sufferers with
clinical and non-clinical controls. Results were consistent with previous findings
regarding speed of categorising personal possessions with hoarding participants
taking almost twice as long as non-clinical controls. Worth noting was the increase in
time taken to sort personal index cards and the increase in anxiety from pre-to post
sorting reported by hoarding participants that was not evident when dealing with the
actual items (Grisham et al., 2010). The lack of visual aids and therefore the need to
use visual memory may have contributed to the sorting difficulty and post sorting
anxiety for hoarding sufferers (Mackin et al., 2016).
Using an alternative methodology to the unvalidated sorting tasks previously described, Mackin and colleagues (Mackin et al., 2016; Mackin, Areán, Delucchi, & Mathews, 2011) employed The Delis-Kaplan Executive Function System (Delis, 2001), which is a measure of visual categorisation and problem solving. Results found hoarding participants made fewer correct responses and took longer to complete the sorting task when compared to individuals with late life depression (Mackin et al., 2011). The second study also found hoarding sufferers performed significantly worse than healthy controls, making fewer correct sorts, and the ratio of correct sorts to attempted sorts was also significantly lower for the hoarding group (Mackin et al., 2016). When considering these results from a more cognitively global perspective, Mackin et al. (2016) found a pattern of relative visual processing (memory and categorisation) deficits in the HD sample which were compensated for by strong abstract reasoning skills.

While these studies are informative, we still know little about how hoarding sufferers categorise items except that they appear to exhibit under-inclusion. As an illustration, when non-hoarders sort and categorise possessions for the purposes of de-cluttering there is a tendency to simply categorise items according to the action, such as “trash”, “keep”, “donate”, “return”, and perhaps “repair”. When, observing hoarding sufferers sorting possessions, categorisation appears to be based on their “stories” or rigid beliefs about objects, which results in separate categories for each, such as “sentimental kids’ stuff”, “gifts kept out of guilt”, “gifts bought but never given”, “abandoned hobby”, “useful craft items” “upcyclables”, even “used envelopes for lists” piles. Without open space to sort, so many fine-grained categories, and piles to keep track of hoarding sufferers become overwhelmed and avoid the decision-making. Perhaps the compensatory abstract reasoning skills found by
Mackin et al. (2016) enables hoarding sufferers to develop more theories about the nature of their possessions and ideas for their use. Indeed, perhaps this explains the numerous categories the author has observed when working with HD clients. Accordingly, understanding the thought process underlying sufferers’ categorisation criteria may improve treatment efficacy.

A mix of important and unimportant possessions throughout the hoard is thought to be due to the subjective value of possessions which lacks a rational hierarchy, suggesting that hoarding sufferers have difficulties with prioritisation (Frost & Steketee, 1998). Moreover, this phenomenon of mixed piles of possessions could be indicative of a conscious effort to keep important items “top of mind” by keeping them on top of the piles. Consequently, the final cognitive factor observed by early HD researchers, and included in the original C-B model was a lack of confidence in memory.

Memory.

The initial C-B model focused on metacognitions when discussing the role memory plays in the development and maintenance of hoarding disorder. Metacognitions are higher order thinking skills that allow one to think about one’s thinking. Rather than objective memory deficits Frost and Hartl (1996) suggested HD sufferers believed their memory was poor. Specifically, lack of confidence in memory, an overestimation of the importance of remembering or recording information, and a tendency to expect negative consequences of forgetting as more likely or severe were hypothesised to be implicated in HD (Frost & Hartl, 1996). A fear of making mistakes in the form of forgetting details of a possession was also noted. Subsequent research has supported the hypothesis that hoarding sufferers report significantly less confidence in their memory, more concerns about
catastrophic consequences of forgetting, stronger belief in the importance of remembering their possessions and information, and more often think their possessions needed to be in view to aid their memory that healthy controls (Hartl et al., 2004).

Regardless of whether perceived memory problems are accurate and objective, deficits observable in the hoarding population warrant further attention, particularly since findings have been contradictory. Indeed, inconsistent results between studies with respect to verbal and nonverbal memory (Hartl et al., 2004; Mackin et al., 2016; Tolin, Villavicencio, et al., 2011) have not offered clear support for objective memory deficits in the hoarding population. Cognitive impairment in visual memory has been reported, with 24% of hoarding sufferers demonstrating scores 1.5 standard deviations below age-matched normative data (Mackin et al., 2016). Visual memory span (VMS; Wechsler, 1987) has been tested in a study of neuropsychological impairment comparing a hoarding disorder group with mixed clinical and nonclinical community control groups; spatial attention performance (VMS forward) was found to be significantly worse in the hoarding group, even after controlling for depression or non-hoarding OCD symptoms (Grisham et al., 2007).

Visuospatial learning and memory, has been tested using the Rey-Osterrieth Complex Figure Test–delayed recall subtest (see Shin, Park, Park, Seol, & Kwon, 2006 for clinical applications) in hoarding samples with conflicting results (Hartl et al., 2004 versus Tolin et al., 2011). While group differences were found in the Brief Visuospatial Memory Test–Revised delayed recall task (BVMT-R; Benedict, 1997) compared to healthy controls (Mackin et al., 2016) they were not found when compared to a late-life depression control group (Mackin et al., 2011) suggesting
perhaps visuospatial deficits are not hoarding specific and are due to depression related symptomatology.

However, considerable divergence between subjective and objective memory deficits have been reported, with hoarding participants believing their verbal and nonverbal memory is significantly worse than standard neurological assessments indicate (Moshier et al., 2016). Taken together, this group of studies suggests that the specific pathways leading to memory deficits remain unclear but may in fact be metacognitive in nature, as originally theorised by Frost and Hartl (1996).

Additional executive function components incorporated into C-B model.

While decision making, categorisation, organisation, and memory were the original focus of the cognitive behavioural model proposed by Frost and Hartl (1996), researchers noted that organising is in fact a complex process. In order to categorise belongings one needs to attend to the task, make decisions about keeping or discarding items, problem solve where items should go, and adapt plans and strategies when recognising those in use have become ineffective (McMillan, Rees, & Pestell, 2013). This complex cognitive control implicates the group of top-down mental processes that make up executive function (Diamond, 2013). As a result, the cognitive factors implicated in hoarding disorder were extended to include executive functions of: attention and working memory, inhibitory control, cognitive flexibility, and planning and perceptual organisation and included in the C-B model of HD.

Attention and working memory.

A newer executive function component, attention/working memory, was later added to the existing CB model, with Hartl et al. (2005) observing that many hoarding sufferers have co-morbid ADHD diagnoses, particularly Type I–inattention, with self-
reported inattention significantly predicting clutter severity, difficulty discarding, and acquiring (Tolin & Villavicencio, 2011). Hoarding sufferers appear to be unable to concentrate on an organising task and follow it through to completion. These self-reported attentional difficulties have been postulated to overlap with difficulty categorising and decision-making because of the broad attention span required for these cognitive processes (Hartl et al., 2005).

Two OCD symptom domain epidemiological studies have shown that hoarding sufferers are 6 times or 9.5 times more likely to also exhibit ADHD–inattentive symptoms (Fullana et al., 2013; Sheppard et al., 2010). Nevertheless, research to date has not clarified whether HD and ADHD inattention co-occur or if they simply share similar symptoms (Sheppard et al., 2010). This has implications for treatment HD as ADHD symptoms effecting executive function may improve with pharmacological therapy (Hale et al., 2011) consequently improving psychosocial intervention outcomes (Grisham et al., 2007).

Interestingly, when sustained attention was tested using a highly sensitive objective neuropsychological instrument, the digit span subtest of the Wechsler Adult Intelligence Scales–Third Edition (WAIS-III; Wechsler, 1997), Grisham et al. (2007) found no significant differences in the ability of hoarding sufferers to establish and sustain auditory attention when repeating orally presented number sequences both forward and backward. The lack of objective deficits in sustained attention found in this study supports the theory that attention and working memory issues in hoarding samples may be activity specific as with decision-making and only present in contexts when emotionally significant decisions are required.

Comparatively, Grisham et al. (2007) found hoarding suffers performed significantly worse than clinical and community controls on the visual memory span
forwards, a visual-spatial attention task (a subtest of the Wechsler Memory Scales, WMS-R; Wechsler, 1987) where participants must touch the same blocks in the same order, repeating the sequence demonstrated by the examiner both forwards and backwards. No significant differences between groups were found for the visual memory span backwards. However, McMillan et al. (2013) found no significant difference between scores of hoarding sufferers and population norms in the visual memory span forward. In contrast, it was found that hoarding participants scored significantly better than population norms on the spatial span-backward while Grisham et al. found no significant difference between clinical and community control groups. Spatial span backward is a measure of visual working memory and researchers theorised the results in this study may indicate superior visual spatial working memory in hoarding sufferers to compensate for or enhance this cognitive ability due to cluttered living circumstances (McMillan et al., 2013). Replication of this finding is required in a larger sample with comparisons to clinical controls before conclusions can be drawn; nevertheless, current evidence points to factors other than objective deficits in attention and working memory in HD.

Inhibitory control.

A second cognitive component also later added to the existing CB model, namely inhibitory control, has been proposed as an additional factor influencing acquisition and saving in HD (Grisham et al., 2007). Considered one of the core executive functions, inhibitory control is required to run attentional interference by directing attention away from distracting stimuli and allow the follow through of planned actions towards goal-directed behaviours (Diamond, 2013). Similarly cognitive inhibition is the ability to suppress mental representations including unwanted thoughts and memories and in order to follow through with intentional
As with other executive functions, results to date have been mixed regarding objective deficits in inhibitory control in HD making conclusions difficult (Mackin et al., 2011 vs; Tolin, Villavicencio, et al., 2011). It is however, worthy of further investigation in the hoarding population. As it is integral to other executive functions such as cognitive flexibility and planning and perceptual organisation, deficits in inhibitory control could significantly impact HD treatment efficacy especially due to the focus and follow-through required to discard and reduce clutter.

The need to react flexibly when circumstances change builds on both inhibitory control and attention and is a cognitive function of interest to HD researchers.

*Cognitive flexibility.*

A third executive function, cognitive flexibility, is the ability to see things from a different perspective, both spatially and interpersonally and it builds on inhibitory control and working memory (Diamond, 2013). When circumstances and priorities change, cognitive flexibility (also known as set shifting) is the executive function that allows for mental and behavioural adjustments when needed to avoid problems or take advantage of opportunities (Diamond, 2013).

Set shifting is a broader executive function that is hypothesised to be in deficit in HD, leading to problems planning and sorting possessions (Tolin, Villavicencio, et al., 2011). The Wisconsin Card Sorting Test (WCST; Berg, 1948) is the neurocognitive assessment often used to measure cognitive flexibility in the face of changing rules and reinforcement. A number of outcome indicators can be derived for the WCST including perseverative errors, categories complete, failure to maintain set, and trials to first category.
Most interesting for HD is the perseverative errors that occur when participants continue to use the “old” rule after a rule shift, and the number of sorting categories completed (where “completed” refers to the number of 10 correct responses in a row). Both the perseverative errors and categories complete are indicative of an individual’s ability to plan strategically and search in an organised way. Additionally, the WCST assesses the ability to utilise environmental feedback to shift cognitive sets in order to achieve desired goals by directing behaviour. For hoarding sufferers, the inability to flexibly react to changes in context and environment by changing behaviours has been suggested to be relevant to the disorder and has been examined in the HD literature; albeit cursorily.

Two studies have considered cognitive flexibility in hoarding disorder using the WCST with contradictory results. Tolin et al. (2011) found no significant differences for total perseverance errors on the WCST when comparing HD (no OCD), OCD (no HD), and healthy control groups, however McMillan et al. (2013) found HD participants made significantly more perseverative errors and completed fewer categories than age-adjusted norms. The methodological differences in these two studies, specifically related to the use of control groups compared with population norms, potentially contributed to the opposing findings. Indeed, the used of OCD and healthy control groups (Tolin et al., 2011) compared with only a norm data comparison (McMillan et al., 2013) may render firm conclusions unwise. Consequently, the theory that cognitive flexibility is a potential cause of difficulty staying on task and “churning” possessions (picking up an item from one pile and placing it on a new pile) while sorting in the HD population appears plausible (Frost & Steketee, 2010; Hartl et al., 2005).
In order to investigate whether emotionally relevant stimuli plays a role in heightening cognitive flexibility deficits in HD, Carbonella and Timpano (2016) utilised a novel eye-tracking task to more precisely isolate the ability to inhibit irrelevant material and stay on task in a sample of undergraduates ($N = 69$, 73.9% female; mean age = 19.4, $SD = 3.2$, range = 17-48). The concept “affective flexibility” coined and defined by Malooly et al. (2013) is “a subset of cognitive flexibility that involves the more specific ability to switch between emotion-focused and non-emotional cognitive sets”. Unlike the WCST, the novel eye-tracking task does not require additional executive functioning processes (e.g. learning implicit rules), which may obscure the nature of impairment. Distracting material presented in the study included hoarding-relevant images (Mataix-Cols, Lawrence, Wooderson, Speckens, & Phillips, 2009), non-hoarding nature image and a blank control. Based on whether their score on the SI–R-saving subscale fell below or above the mean of the overall sample, participants were categorised into a low or high hoarding group. Results from this study indicate individuals high on self-reported difficulty discarding consistently exhibited more cognitive inflexibility when compared to the low hoarding group (Carbonella & Timpano, 2016).

Contrary to their hypothesis, researchers found participants in the high hoarding group were not more easily distracted by hoarding-related stimuli indicating that perhaps hoarding sufferers experience a global difficulty inhibiting irrelevant material and shifting attention between cues in the environment. This study was considered an informative first step and researchers highlighted a number of limitations including the nature of the undergraduate sample with relatively low levels of self-reported hoarding behaviours, and the possibility that the test was not difficult enough to adequately reflect a range in individual differences in cognitive flexibility.
Further, the hoarding-specific distractor images may not be personal enough to elicit affective inflexibility; the use of personal items may improve outcomes.

Despite the methodological shortfalls of the Carbonella and Timpano (2016) study and the contradictory results in Tolin et al. (2011) and McMillan et al. (2013), these cognitive flexibility investigations, take steps towards a promising line of neurocognitive and affective investigation that may improve treatment efficacy and early detection of HD. However, future research into the nature of cognitive flexibility in the hoarding population should aim at clarifying whether the deficit is specific to hoarding behaviours or is a more global impairment.

Finally, the link between cognitive flexibility and planning and perceptual organisation as components of executive control is also highly relevant to HD.

Planning and perceptual organisation.

A fourth cognitive component, planning and perceptual organisation, was also later added to the existing C-B model. Once again, HD researchers considered self-reported planning and organising difficulties when dealing with possessions (Frost & Hartl, 1996). Indeed, Grisham and colleagues (2007) proposed that hoarding disorder symptoms arise, in part, from an inability to plan and execute complex goal-directed motor responses while controlling interference from environmental distractors and emotional responses. Spatial planning and problem solving (objectively tested using either The Tower of London Task (Shallice, 1982), or various computerized equivalents) are highly complex executive processes that test forward-thinking abilities. In terms of possession organisation, this involves being able to create a mental representation of the current situation in the home and the goal situation and then mentally search through potential solutions to go from “here” to “there” considering the constraints of the task. It was hypothesised that this complex
process of forward-thinking and use of mental representations would be more difficult for hoarding sufferers than for clinical and non-clinical controls (Grisham et al., 2010). However, once again the evidence is contradictory (Grisham et al., 2010; Tolin, Villavicencio, et al., 2011). Results in a study designed to test categorisation and planning skills in a hoarding sample partially supported this hypothesis, finding hoarding participants were not impaired on most emotionally neutral neuropsychological tasks (response inhibition, decision-making, and cognitive flexibility), when compared with clinical and non-clinical control groups except when completing a computerised adaptation of the TOL planning task (Grisham et al., 2010). Conversely, Tolin et al. (2011) found no such significant difference when comparing hoarding participants to OCD and healthy controls. Like cognitive flexibility, planning and perceptual organisation merits additional investigation particularly with respect to their relationship with emotion regulation and their role in top-down control of thoughts and actions (Malooly et al., 2013) and the impact this is likely to have on treatment outcomes.

**Summary of information processing deficits.**

In summary, tests of cognitive function in HD have typically been administered two to three times in clinical and non-clinical populations, however the results have not allowed for unanimous conclusions of at least a medium effect size (Woody et al., 2014). Methodological differences including inclusion criteria, diagnostic methods, and the reporting of different indicators for these functional tests have made comparison difficult. It is clear, however, that this lack of consistency in cognitive abilities in the HD population holds in question objective impairment or at least HD-specific cognitive difficulties (Moshier et al., 2016). The possibility that HD symptoms arise from the compounding effects of several cognitive deficits acting
together must also be considered (Grisham & Baldwin, 2015) as should be the potential for different HD subtypes arising from differing combinations of cognitive deficits (e.g. Hall et al., 2013).

It has been suggested that psychotropic and other medications such as mood stabilisers, including serotonin reuptake inhibitors, and benzodiazepines that are known to affect neurocognitive performance, may interfere with the cognitive function of HD sufferers (Sumner et al., 2015). A recent study specifically testing neurocognitive functioning in clinically diagnosed, medication-free HD sufferers found no differences in the areas of verbal memory, attention or executive functioning (including response inhibition, planning, organising, memory, and decision making) compared to controls (Sumner et al., 2015). Similarly, untreated depression and anxiety can impact many of the cognitive processes said to be deficit in the hoarding population and some of the cognitive performance studies did not control for the impact of these co-morbidities (see Woody et al., 2014 for a summary). Before HD specific cognitive deficits are identified further research is needed that has been carefully designed to overcome these confounds.

Based on neurocognitive studies conducted to date, it appears executive functions of inhibitory control, cognitive flexibility, and planning and perceptual organisation may relate to key behaviours of churn and keeping possessions “in sight” identified by Frost and Hartl (1996) in their early research. Working with HD sufferers led Frost and Hartl (1996) to identify the concept of “churn” that occurred during decision-making process and the strive to have possessions in sight. Churning is characterised by hoarding sufferers picking up an item, not knowing what to do with it and as a result adding it to a new pile in a different location (Frost & Hartl, 1996). Individuals who hoard then treat the possession, now touched and placed in
view, differently and its relative importance or value appears increased (Frost & Hartl, 1996). Consequently, hoarding sufferers indicated they found discarding these items considerably more difficult and touching the object elicited feelings of being without the possession and subsequently needing it. It is possible that having possessions in sight maintains HD over time (Frost & Hartl, 1996). However, exactly what happens cognitively and emotionally when possessions are picked up, considered and returned to the top of a new pile is currently unknown. Accordingly, as suggested by Carbonella and Timpano (2016), the ability to inhibit irrelevant emotional stimuli and shift attention towards goal-directed future planning needs to be examined more closely in HD populations, specifically in regards to churn and decision-making.

The Frost and Hartl C-B model theorises that genetic and environmental vulnerabilities interact with information processing deficits and lead to maladaptive beliefs concerning the nature and purpose of possessions (Steketee & Frost, 2007). Research to date has primarily been focused on identifying cognitive deficits in HD through neuroimaging and neurocognitive testing with less focus on the impact of emotions on executive functioning.

Certainly, neural imaging studies offer a snapshot of the hoarding brain, which differ significantly in some important ways to the non-hoarding brain, as previously discussed in this chapter. However, neurostructural or neurofunctional research needs to take into consideration plasticity and the amazing ability of the brain to respond and react to the environment that cannot be captured in an fMRI. The limitations of neuroimaging technology and what it can confidently conclude about the brain (see Logothetis, 2008 for a review) mean that phenomenological investigation remains important to understand the lived experience in HD and how intervention might improve the lives of hoarding sufferers.
At this juncture, research in the area of beliefs about possessions, and particularly emotional attachment to objects, is nascent. Currently there is a lack of clarity regarding the exact construct under investigation and a call for further research to improve object attachment measurement is germane (Kellett & Holden, 2014; Kings et al., 2017). Following is a brief review of the current state of investigation into beliefs about possession and object attachment in HD.

**Beliefs and meaning of possessions.**

Deriving a sense of identity via one’s possessions has long been observed in the psychological literature (Belk, 1988; Csikszentmihalyi & Rochberg-Halton, 1981; Furby, 1978; James, 1890), while the relevance of possessions as an extension of the self, in a disorder such as HD, has received little attention (Kellett & Holden, 2014; Kings et al., 2017). Attachment to material possessions has been investigated in the consumer psychology (Ball & Tasaki, 1992; Kleine & Baker, 2004; Kleine, Kleine III, & Allen, 1995) and the developmental literature (Winnicott, 1953), however research into its relationship to HD has been superficial to date (Kellett & Holden, 2014; Kings et al., 2017).

The original C-B model of hoarding disorder (Frost & Hartl, 1996; Frost & Steketee, 1998) hypothesised that excessive attachment to possessions or “hyper-sentimentality” and erroneous beliefs about the nature of material objects were cognitions that perpetuated hoarding behaviours. It was proposed that emotional attachment to possessions was of two types sentimental attachment, where objects are considered part of the self and represent past experiences; and emotional attachment to objects because of their safety signal value (Frost & Hartl, 1996). The later type of safety emotional attachment (as discussed above) was theorised to be a reaction to an uncertain and threatening environment. Specifically, objects offer security whilst
discarding them provokes anxiety, and saving avoids this anxiety (Frost & Hartl, 1996).

Aside from beliefs about what possessions symbolise in the form of emotional attachment and safety, cognitions about the nature of hoarders’ relationship with possessions was proposed (Frost & Hartl, 1996). It was observed that hoarding sufferers demonstrate disproportionate concern vis-à-vis maintaining control over their possessions, an inflated sense of responsibility to be prepared to meet future needs by acquiring and saving useful items; additionally, a sense of duty to protect the well-being of the items themselves. Misgivings about the quality of their memory and a tendency to catastrophise the consequences of forgetting, were also beliefs implicated in the original C-B model (Frost & Hartl, 1996).

Frost et al. (1998) found preliminary evidence for the presence of these hoarding specific beliefs in a study designed to assess reasons for saving. Hoarding sufferers generated more reasons to save magazines or newspapers they had purchased and partly read (e.g. “I might lose something important by throwing it away”), than reasons to part with possessions (e.g. “To keep this would require too much room”).

A nomothetic measure—the Saving Cognitions Inventory (SCI; Steketee et al., 2003)—was developed to quantify the cognitive beliefs considered central to hoarding including: emotional attachment to possessions, concerns about memory, responsibility for possessions, and the need to control possessions. A sample of self-reported hoarding sufferers \( n = 95 \) categorised as such based on scores of at least one standard deviation above the mean of the Saving Inventory–Revised (SI-R) or equivalent in use at time were recruited through other similar HD studies (Steketee et al., 2003). The five factors of HD beliefs, together, accounted for 54.1% of the
variance in hoarding behaviours with the emotional attachment factor accounted for the majority (33.4%) of variance explained in the initial exploratory factor analysis.

The SCI has become the most widely used measure of hoarding attitudes and beliefs. Despite the development of alternative measures of emotional attachment to possession in HD, the lack of essential psychometric validation of these other non-standardised questionnaires makes the SCI–Possession Attachment the preferred measure for emotional attachment to possessions (see Kellett & Holden, 2014; Kings et al., 2017) and the only validated measure of control, responsibility, and memory in HD. Results indicate, when anxiety and depression (common co-morbid psychopathologies) are controlled, total SCI is strongly associated with hoarding symptoms of acquiring, saving, and clutter as measured by the SI-R (Hartl et al., 2004; Reid et al., 2011; Steketee et al., 2003; Wheaton et al., 2011, 2013).

In a review of the psychological models of hoarding, Kyrios (2014) suggests the maladaptive beliefs measured in the SCI play a causal role in hoarding specific behaviours. Excessive acquiring occurs because of a perceived uniqueness or attachment to possessions, difficulty discarding is attributable to the belief of responsibility and aversion for wastefulness, and the inability to organise clutter is caused by objects remaining in view to act as a memory aid (Kyrios, 2014). However, at this stage in the HD literature, such causal roles have not been explicated due to the empirical focus on neuropsychological factors that are hypothesised to drive core beliefs in hoarding (Steketee, 2014). Consequently, more investigation is needed to understand the possible moderating and mediating effects of hoarding beliefs on hoarding behaviours. Nonetheless, some interesting work has been done recently to understand the nature of this relationship.
A hypothesis that possessions act as a substitute for primary caregiver attachment (Mikulincer & Shaver, 2010) has been proposed (Nedelisky & Steele, 2009), and a recent study found that attachment anxiety (not avoidance) significantly moderated the relationship between social support and hoarding behaviours (Medard & Kellett, 2014). As attachment anxiety increased, the inverse relationship between perceived social support and hoarding became stronger. It was concluded that the more hoarding sufferers have disturbed relationships with people the more disturbed their relationship is with possessions. In a similar study, focusing on loneliness, attachment and hoarding, findings indicated a relational path whereby those reporting insecure (both anxious and avoidant) relationship attachments, who were lonely, and believed possessions represent their identity and their connection to the world (as measured by the SCI–Attachment subscale) were more likely to engage in pathological hoarding behaviours (Eppingstall, 2013). Grisham et al. (2009) found hoarding related beliefs and behaviours uniquely predicted initial attachment to possessions. Taken together, these results give us some understanding of the fundamental relationships between hoarding behaviours, caregiver attachment, and object attachment. Attachment research should be extended to improve insight into this defining characteristic of HD in the hopes of improving early diagnosis and treatment outcomes.

Finally, according to the C-B model of HD, emotional conditioned responses directly impact avoidance and approach behaviours of saving and acquiring (Grisham & Barlow, 2005). Accordingly, the current state of the emotional response and behaviour pattern research for HD are reviewed below.
Emotional responses and behaviour patterns.

The Frost and Hartl (1996) C-B model of HD suggested that hoarding related beliefs lead to strong emotional responses that in turn initiate maladaptive behaviours. Further refinement of the Frost and Hartl C-B model detailed contexts in which distress and subsequent avoidance behaviours may occur (Steketee & Frost, 2003). This view of hoarding is consistent with the theory that HD is an anxiety disorder and more specifically classified as an obsessive-compulsive and related disorder (APA, 2013) and this has been agreed upon in the DSM-5. In situations where decision-making is required, HD sufferers have been observed experiencing marked anxiety often with feelings of grief and loss when considering discarding an owned item or not purchasing a desired item (Steketee & Frost, 2003). These negative emotions are not only experienced when making discarding and acquiring decisions but also when simply sorting possessions (Wincze et al., 2007). Experimental research has demonstrated that discarding exercises elicit extreme negative emotions in HD sufferers, while the inability to endure the negative emotions leads directly to the avoidance behaviours of saving and acquiring (An et al., 2009).

How hoarding sufferers regulate their emotions when faced with discarding or resisting acquiring has also received noteworthy attention recently. Indeed, research to date investigating HD and a range of emotion regulation concepts, has been reviewed in Chapter 3 and will be elaborated upon further in the new theoretical model for HD to be presented in Chapter 5. However, it is important to note that in the majority of studies, avoidance of anxiety in hoarding (measured by saving behaviour) has been investigated. Nonetheless, in certain contexts both avoidance and approach behaviours are involved. The pleasure and pride hoarding patients experience as a result of acquiring, collecting, and saving possessions is not found in
other anxiety disorders, and has led to posturing about the classification of HD as a behavioural addiction similar to, for example, pathological gambling or kleptomania (Grisham, Williams, & Kadib, 2011). It is likely the rush of delight at finding a unique object at a charity store, that has been observed in compulsive buying, is equally expected in hoarding acquisition, however feelings of pleasure are more difficult to explain in terms of saving behaviour.

Positive emotions have been researched in the compulsive buying literature (see Kellett & Bolton, 2009 for a review) with acquisition serving as an emotion regulation tactic that rapidly changes negative moods into positive ones; purchasing is used by compulsive buyers to intentionally improve their mood (Alemis & Yap, 2013). It is possible the appetitive feature observed in HD is due to overlapping compulsive buying symptoms as a large proportion (at least 60%) of hoarding sufferers also compulsively buy or acquire (Frost, Tolin, Steketee, Fitch, & Selbo-Bruns, 2009; Mueller, Mitchell, Crosby, Glaesmer, & de Zwaan, 2009; Timpano, Exner, et al., 2011).

Unlike negative emotions, the positive emotions of joy, pride, and pleasure experienced when hoarding sufferers are amongst and in touch with their possessions, observed by Frost and Hartl (1996), have not been investigated in the literature to date. Previous research has been unable to account for the positive affective state experienced by hoarding sufferers when amongst their hoard other than hypothesising that reconnecting with the items brings back fond memories, and joy and pleasure in the “collection” (Grisham & Barlow, 2005). However, an interesting thesis suggested by (Kellett & Holden, 2014), to account for these positive feelings outside of acquiring, involves the robust paradigm of the mere-repeated-exposure effect (Zajonc, 2001). The “mere exposure” of individuals to a stimulus is enough to enhance their
attitude towards it (Zajonc, 1968), and to prefer the object, or those objects of similar form or material that are presented after the stimulus, over novel objects. This effect is not attributable to recognition memory or perceptual fluency and has been shown to occur even when the stimuli is presented subliminally, outside of conscious awareness (Zajonc, 2001).

The mere-repeated-exposure effect is a strong influence on preference and offers insight into why similar and sometimes even the same items are acquired repeatedly by hoarding sufferers. The positive affect produced by merely retaining possessions is likely to increase hoarding sufferers' attachment to possessions and make discarding more difficult as a result. Thus, without cognitive mediation or physical interaction with objects, merely having possessions around the home leads to positive feelings and a preference for these objects (or very similar items) over novel items.

Having items in sight, churn, large collections of comparable items, as well as the positive emotions felt by HD sufferers when they are amongst their hoard could be explained by the mere-repeated-exposure effect therefore experimental research could illuminate the relevance of this thesis to the maintenance and treatment of HD.

Conclusion

In summary, information processing problems observed in HD have been the main focus of research in hoarding due to their emphasis in the initial C-B model developed by Frost and Hartl (1996). However, many findings remain unreplicated (Woody et al., 2014). Research to date has also failed to demonstrate causal relationships between many of the elements of the C-B model (Steketee, 2014).
Investigations have tended to be correlational and cross-sectional and no longitudinal studies have been reported on to date.

The bond between executive functioning and flexible emotion regulation processes, that has been demonstrated in social cognitive and affective neuroscience (SCAN) studies (DeYoung, Peterson, & Higgins, 2005; Kalisch et al., 2005; Ochsner & Gross, 2008), has largely been overlooked in the hoarding literature. Cognitive functions such as attentional capacity and decision-making capabilities are narrowed by poor distress tolerance and subsequent experiential avoidance (Kashdan & Rottenberg, 2010). The C-B model (Figure 1) does not suggest a relationship between executive function deficits and emotion dysregulation in HD.

In light of the inconclusive results from executive function research and the recent exploration into emotion regulation factors (see Chapter 3), it may be appropriate to flip the C-B model for HD with the intention of reconceptualisation and greater emphasis on the larger role emotion dysregulation appears to play in the maintenance of HD. Indeed, this new weight on emotion regulation could help clarify the origins of observed executive function deficits in HD. Additionally, it seems relevant to consider alternative theoretical constructs to further understand the emotion dysregulation found in HD and explore the aetiology of hoarding related beliefs about the meaning and value of possessions.

Based on the critical examination of the treatment efficacy evidence (Chapter 2), the theoretical application of ACT psychological inflexibility to the phenomenology of HD (Chapter 3), and the review of supporting evidence for the elements of the original C-B model of HD here, the reconceptualised model of HD will be proposed.
Following, Chapter 5 will integrate the resulting evidence from these evaluations into the proposed acceptance-based emotion regulation model of HD.
Chapter 5

A Reconceptualised Acceptance-Based Emotion Regulation Model of HD

The theoretical model described in this chapter attempts to offer a representation of both the etiological and maintenance factors in HD. Firstly, it offers a brief review of the genetic bases for HD currently known. It then expands on the C-B model’s early experiences of HD sufferers that included trauma and parental personalities and practices to include early transitional object attachments and how early experiences potentially impact the way HD sufferers relate to events, both psychological and experiential, in the future. Further, how HD sufferers tend to behave when interacting with agents and reacting to events is reconceptualised to emphasise the integral role of emotion dysregulation in maintaining hoarding behaviours over time. Indeed, in the current reconceptualised model, saving one’s possessions offers a way to avoid making decisions about discarding items that the HD sufferer may feel emotionally attached to, responsible for, in control of, or reminded of. Likewise, saving is a way to postpone the imagined pain of loss; thus, discarding is seen as something to be avoided in order to maintain a sense of emotional equilibrium.

Difficulty discarding is the defining feature of HD as categorised in the DSM–5 (APA, 2013) and it is this process that will be tested statistically, from an emotion regulation psychological flexibility perspective, firstly using multivariate analyses of variance and covariance followed by Structural Equation Modelling path analyses which is the focus of Chapter 7.
The current reconceptualised acceptance-based emotion regulation model of hoarding disorder is based on the recent findings in the literature linking emotion regulation to HD and the conceptual alignment of mindfulness and acceptance based cognitive-behavioural theories that have emerged over the past 20 years since the development of the original C-B hoarding model.

Multiple iterations of the C-B model of HD have been published, each offering a slightly different perspectives from which to view the key psychological factors in the disorder (Grisham & Barlow, 2005; Kyrios, 2014; Steketee, 2014; Steketee & Frost, 2007, 2014b). However, all iterations largely agree on the elements: vulnerability factors, beliefs about and attachment to possessions, and positive and negative emotional reactions involved in the development and maintenance of the hoarding behaviours of difficulty discarding, saving, acquiring and clutter.
The model proposed here attempts to encapsulate both the aetiology and phenomenology of HD in order to offer potential points of future investigation in the area of antecedents which may assist in earlier detection of hoarding behaviours, and to reconceptualise the maintenance model from an emotion regulation perspective, using an acceptance and commitment therapy (ACT) lens. Four interrelated phases, (1) antecedents, (2) emotion regulation, (3) difficulty discarding and (4) decision-making will be discussed in detail followed by a description of the model in action.

**Phase I: Antecedent factors.**

Whilst the aetiology of hoarding disorder has been cursorily investigated due to researchers focusing their attention on tractable factors, some evidence does point to genetic and specific environmental factors including early stressful or traumatic experiences and learned schemas or core beliefs as potential reasons for psychopathological onset (see Chapter 4 for a review).

It must be noted that the central purpose of this thesis is to present an acceptance-based emotion regulation model of HD and focus particularly on the process aspects involved in maintaining the disorder. With this in mind, the inclusion of aetiological factors in the model is primarily in aid of comprehensiveness. Consequently, the antecedents suggested in this section of the proposed model are in no way exhaustive and are discussed here to signpost areas of potential investigation that theoretically align with an acceptance-based approach to HD.

**Genetic influences.**

The review of genetic influences in HD, detailed in chapter 4, suggested that there is no evidence to date of a chromosomal defect or specific genes that are responsible for the development of HD. Evidence hints to a genetic element that,
under certain environmental circumstances, may be triggered leading to the expression of hoarding behaviours including saving possessions difficulty discarding, organising, and managing possessions (Hirschtritt & Mathews, 2014). As with many psychopathologies, an epigenetic reaction, that is the interaction of certain genes, specific environmental factors, and chance leading to the turning on or failing to turn on certain genetic switches is hypothesised for HD (Dozier & Ayers, 2017). The advancement of genetic research in future decades may lead to the identification of epigenetic pathways and the development of drugs that could treat HD. Indeed, early detection of HD via reliable epigenetic markers in vulnerable individuals could allow for early treatment intervention before hoarding behaviours become chronic (see Hall & Kelley, 2014 for an example).

**Early experiences.**

The early childhood experiences of HD sufferers that may interact with genetic predispositions has received some attention in the literature, predominantly focused on traumatic and stressful life events (see chapter 4 for a review). Trauma and hoarding appear to have a complicated relationship worthy of further investigation; acquisition appears to have a link with physical/sexual trauma with emotional intolerance as a moderator (Shaw et al., 2016). In addition, there may be intervening mediating and or moderating factors yet to be identified to explain the relationship between trauma and saving in hoarding disorder. Further research is required into the relationship between trauma and hoarding particularly with respect to the context in which these traumatic experiences occur.

Contextual factors of family environment and social support in early childhood are potential intervening factors that may offer early detection and potential treatment targets. Research into the area of adverse childhood experiences and their
effect on adult HD is limited, however, there is clear theoretical merit in considering how the family context may impact the development and maintenance of HD, particularly in terms of how HD sufferers learn to interact with their possessions. In the following section, these potential factors related to family environment and attachment disturbances of: (1) parental attachment, (2) transitional object attachment, (3) maternal personality and object attachment, and (4) anthropomorphism will be introduced as potential antecedents in HD. Available supporting evidence will be reviewed and a hypothesis as to how they may be involved in the development of hoarding behaviours will be detailed as part of the proposed acceptance-based emotion regulation model.

Family environment and attachment disturbances.

Researchers have theorised that of the early developmental experiences, those that involve inanimate possessions are of particular relevance to HD (Chapter 4). A tentative hypothesis suggested by early researchers is that trauma, disturbances in relationships with primary caregivers, and experiences of deprivation and loss during early childhood development leads to maladaptive possession attachments (Frost & Hartl, 1996). Specifically, the substitution of objects for people and the imbuing of inanimate objects with human-like qualities in order to meet attachment needs has been suggested (Frost & Hartl, 1996). Investigation of the emergence of possession attachment during early childhood may offer some insight into the development of “hypersentimentality” (Frost & Hartl, 1996, p. 347) or extreme attachment to possessions in hoarding disorder.

Early childhood attachment to inanimate objects has not been discussed in detail in relation to hoarding behaviours, however the discipline of developmental
psychology has investigated “transitional object attachments” (Winnicott, 1953) and how these may interact with primary caregiver attachment and parental personality.

**Parental attachment.**

Attachment theory (Bowlby, 1982; Mikulincer & Shaver, 2010) hypothesises that humans form strong enduring emotional bonds with their primary caregivers from birth and in times of threat or need, seek them out for comfort and security as a “safe-haven”, and use them as a “secure base” to explore and gain new skills (Mikulincer & Shaver, 2008). The experience of unreliable or inconsistent interactions with attachment figures or the experience of repeated rejection or punishment by attachment figures can lead to insecure attachment, that may endure into adulthood and impact important close relationships (Hazan & Shaver, 1987). Attachment insecurity has been linked empirically to various forms of psychopathology and is generally related to negative cognitions about self-worth and an unstable identity (Mikulincer & Shaver, 2010). It has been suggested that having a parent that hoards is analogous to an attachment trauma, which is known to lead to long-term mental health problems (see Mikulincer & Shaver, 2010 for a review). A recent study found that having at least one parent with hoarding tendencies was related to higher severity of hoarding symptoms and earlier onset (Dozier, Porter, & Ayers, 2015).

Experimental research has shown non-hoarding individuals demonstrate an increase in attachment to inanimate objects when close others seem unreliable (Keefer, Landau, Rothschild, & Sullivan, 2012). Consequently, non-human entities may be substituted for human relationships as they are perceived as less frustrating or disappointing (Keefer et al., 2012). This substitution hypothesis of hoarding disorder has been touched on in the literature. Hoarding sufferers have been found to have significantly higher levels of over-involvement with objects and lower levels of
emotional involvement with people (Nedelisky & Steele, 2009) and may also become emotionally attached to objects at first sight, even before owning them (Grisham et al., 2009). A relational path whereby those with insecure relationship attachments who were lonely and believe objects represent their identity and their connection to the world were more likely to engage in hoarding behaviours (Eppingstall, 2013). Similarly, hoarding sufferers have been found to experience lower levels of social support and as attachment anxiety increases the inverse relationship between perceived social support and hoarding becomes stronger, indicated that the more disturbed hoarding sufferers’ relationships are with people the more disturb their relationship are with possessions (Medard & Kellett, 2014).

Indeed, there does appear to be initial evidence to suggest a substitution of inanimate objects for human relationships may be occurring in HD in the insecurely attached. Nonetheless, this research does not explain how hoarding sufferers become so emotionally attached to possessions.

Transitional object attachment.

Considering the use of transitional attachment objects by young children may offer insight into how possessions are used and how hoarding sufferers have perhaps learned to relate to inanimate objects.

A transitional object has been described as the first treasured possession that a child finds soothing and comforting and has been considered to stand for the primary caregiver, usually the mother and will be referred to as such from here on in the service of clarity. Rather than a replacement for the mother, a transitional object is intermediate between internal and external reality for the infant (Winnicott, 1953) that is a step on the path to independence from the mother. Not a cross-cultural phenomenon (Hong & Townes, 1976), it is estimated that approximately 60% of pre-
schoolers in western cultures become attached to a soft object such as a blanket, pillow or soft toy (Donate-Bartfield & Passman, 2004). Learning theory suggests the physical similarities between soft objects and the mother lead to the inanimate object becoming the discriminant stimulus and conditioned reinforcer (Donate-Bartfield & Passman, 2004; Passman, 1987). Donate-Bartfield and Passman (2004) hypothesised that children become attached to blankets as a compensation for unmet attachment needs and investigated whether the security of the attachment to the mother was related to the transitional object attachment to a blanket and how the children utilised objects when put in novel situations. Interestingly, findings suggested attachment to the object and attachment to the mother develop independently; consequently, soft objects were not used as substitutes for primary caregivers (Donate-Bartfield & Passman, 2004). However, this research did offer insight into how the transitional object is used by those who are insecure and securely attached. Insecure toddlers who had an attachment to a blanket would use the blanket instead of seeking out the mother in novel environments (Donate-Bartfield & Passman, 2004). Transitional object attachment did not impact securely attached toddlers who sought out their mother regardless of their attachment to an inanimate object. This does indicate that the transitional object offers some comfort to those who are insecurely attached to their primary caregiver in strange situations but not for the substitution of object for mother, rather a symbol of the union between mother and child (Winnicott, 1964).

In the HD literature O’Connor (2016) considered six motive-related themes of HD and described one he calls the “compensatory hoard”. O’Connor suggests hoarding is a “kind of transitional object relation, where the hoarded things represent or stand in for links to others and the way to a fuller relationship with the other”
(O’Connor, 2016, p. 66). Indeed, this relational thesis, agrees in principal with relational frame theory (see Chapter 3).

Although transitional object attachment and relations have not been investigated in HD, it may be of assistance with early detection of HD and increase our understanding of the formation of hyper-attachment to possessions. In addition, the relationship between a mother’s personality and a child’s attachment to transitional objects may be indicative of future maladaptive attachment to possessions and hoarding symptoms.

**Maternal personality and object attachment.**

The goodness of fit between child temperament and maternal personality has been investigated in relation to inanimate object attachment (Steir & Lehman, 2000) and is also able to offer some insight into the potential antecedents for hyper-attachment to possessions in hoarding disorder. Mothers who saw themselves as more traditional, strict, and controlling were more likely to have toddlers with strong soft-object attachments possibly due to more demands on the child to behave in an approved way (Steir & Lehman, 2000). Inflexible mothers were also more likely to encourage attachment to objects and create appropriate rules in collaboration with the child ostensibly, it was theorised, to help manage stress and rely less on the mother for emotional support and regulation (Steir & Lehman, 2000). These findings support the notion that soft object attachments are not necessarily substitutes for the mother but operate as a stress management tool. Low activity toddlers (those who sat and engaged in quiet play during observations), when coupled with mothers who saw themselves as more extroverted, socially effective and accomplished, were more likely to have strong attachments to transitional objects. It was suggested that perhaps mothers who saw themselves as more sociable may spend more time apart from their
children who, being quiet and low activity, may seek out non-social attachments to self-soothe. Additionally, it was suggested that extroverted mothers may demand more independence from their children because this is a characteristic that they value in themselves (Steir & Lehman, 2000). Thus, self-efficacy and self-reliance are learned through parental interactions and the use of transitional objects are encouraged and reinforced.

In the hoarding literature, parental interactions have been cursorily considered with perceived low familial emotional warmth partially predicted hoarding symptoms (Alonso et al., 2004; Kyrios et al., 2017). Although, contradictory results were also reported in an all-female private college sample (Frost, Kyrios, McCarthy, & Matthews, 2007). A qualitative study conducted to detail the lived experience of hoarding sufferers highlights one superordinate theme among four of the childhood factors including parental relationships, attachment, and abuse across a sample of 11 hoarding individuals (Kellett et al., 2010). Participants in this qualitative study articulated experiencing strict, rejecting and authoritarian parental interactions and in reaction to this, they learned to suppress their own emotions (Kellett et al., 2010). Interestingly, this qualitative study reported two sub-themes regarding the relationship between hoarded items and the hoarding sufferers; anthropomorphising objects and a “sense of fusion between the hoarder and their possessions” (Kellett et al., 2010), which is a concept that was supported in a recent novel study of object interconnectedness and HD (Dozier et al., 2017).

**Anthropomorphism.**

In the initial C-B model, Frost and Hartl (1996) identified anthropomorphism as an indicator of hoarding severity and a possible explanation for the unusually strong attachment hoarding sufferers have to their possessions. Anthropomorphism,
“attributing human form or human mind to the agent” (Waytz, Cacioppo, & Epley, 2010), can fulfil individuals’ needs for control and allow them to make sense of their surroundings by enabling explanations and predictions of their environment (Epley, Waytz, Akalis, & Cacioppo, 2008; Waytz et al., 2010). Winnicott (Winnicott, 1953) believed that transitional objects allow for the “initiation of a relationship between the child and the world”, and particularly those with eyes and fur such as soft toys are endowed with lifelike qualities and roles, which allow the child to play out social interactions and daily experiences and learn from them (Coppolillo, 1976).

Loneliness and lack of social support increases the tendency to anthropomorphise inanimate objects ostensibly to compensate for lack of human connection (Epley, Akalis, Waytz, & Cacioppo, 2008) and greater hoarding symptoms are associated with the tendency to anthropomorphise in undergraduate (Timpano & Shaw, 2013) and non-clinical samples (Neave et al., 2015). Similarly, a strong positive relationship between hoarding behaviours and cognitions, object and interpersonal attachment, and the tendency to anthropomorphise inanimate objects has also been reported in a non-clinical sample (Neave et al., 2016).

Anthropomorphism may be a predictive factor that is targetable by psychosocial intervention in hoarding disorder; however, there is a need to understand the relationships between attachments and anthropomorphism in HD beyond simple correlational associations.

Summary of family environment and attachment disturbances.

Taken together, these results across family environment and early childhood experiences do not specifically support the notion that objects are a direct substitute for people or a way to compensate for unmet attachment needs in HD as suggested in the original C-B model (Frost & Hartl, 1996). With that said, insecure attachment
potentially plays a crucial role in HD where the lack of assistance given in the
development of adaptive emotion regulation tactics (see Shaver & Mikulincer, 2014
for a review) possibly leads HD sufferers to use possessions as a maladaptive emotion
regulation strategy. Additionally, the very first attachment to a special inanimate
object in childhood has been found to be an emotion regulation tool for the insecurely
attached. Furthermore, those with a poor goodness of fit between child temperament
and maternal personality tend to use transitional objects to self-soothe. These
findings lead us to a theory of not only emotion regulation but also the development
of extreme emotional attachment to possessions in hoarding disorder. Yet, to
extrapolate from early transitional object attachment, emotion regulation, and
anthropomorphism to pathological attachment and saving as seen in HD, there is a
need to consider the way in which these relations might spread from a small number
of special objects to the majority of possessions currently owned.

In view of this, the application of a theoretical approach that presents a
behavioural account of human cognition and language offers a new way to
conceptualise HD phenomenology in order to explicate interconnectedness to
possessions. Relational Frame Theory (RFT) (briefly mentioned in Chapter 3) is the
theoretical underpinnings of ACT and can offer a new way to view possession
interrelatedness and attachment and offer novel treatment approaches (Hayes et al.,
2012). Following is more detailed elaboration of the theory and its relationship to
HD.

*Learned conditioned responses - Relational frames.*

It has been suggested that stressful life events such as eviction, becoming
homeless, redundancy, death of a close family member, end of a relationship, and
divorce are all “losses” of a home, a job, a loved one, or a relationship and may
precede the escalation of hoarding symptoms (Landau et al., 2011). From a psychoanalytic perspective, hoarding has been described as a “deeply-initiated refusal to deal with the pain and finality of loss” (O’Connor, 2014, p. 105). This loss-avoidance leads to the hoarded possessions symbolising the lost object (defining objects in the broadest sense, e.g. relationships or people). Hoarding sufferers have been described as those that are sensitive to “relating and the projection of meaning into objects” (O’Connor, 2014, p. 105). RFT (Hayes et al., 2001) described in Chapter 3, is able to offer an approach to language and cognition that proposes an explanation for this projection of meaning into objects and the resulting hyper-emotional attachment seen in hoarding cases.

Maladaptive relational frames are reinforced through parental interactions from toddlerhood and it is possible that the use of possessions as a means of punishment and reward (Richins & Chaplin, 2015) and the encouragement of transitional objects as emotion regulators (Steir & Lehman, 2000) influence the development of HD beliefs. The fact that HD sufferers report such similar beliefs about and attachment to possessions offers some support for the notion that cognitions possibly emerge from specific genetic and environmental origins (Steketee et al., 2003). Developmental psychology suggested that at approximately the same time as a toddler becomes aware that there is more than just “me”, there is “mother”, things related to mother begin to offer a sense of safety, comfort and certainty (Winnicott, 1964). If, at this point, an emotional event leads to the relations between object and comfort and safety and loss that is a transformation of stimulus functions (see Chapter 3).

Due to early childhood experiences—in all probability during the time transitional object attachment emerges—children learn that having a special object can
offer comfort and control when life is chaotic, uncertain, and frightening. Equally, children learn that the loss of an inanimate object is emotionally painful and must be avoided. It has been hypothesised that a series of traumas such as physical abuse, lack of maternal warmth, or insensitive, forceful removal of possessions— but not necessarily extreme trauma such that leads to post traumatic stress disorder—are the catalyst for extreme attachment to possessions (Przeworski et al., 2014).

It is no coincidence that around the same time toddlers are able to reverse learned relations (Figure 3.b), 14-16 months (Hayes et al., 2012), they begin to become attached to objects that are soft (Passman, 1987) as they are considered similar to their mother who provides love, comfort, and safety.

![Relational Learning and Derived Relations](image)

**Figure 3.** Relational Learning and Derived Relations

At 22-24 months toddlers are able to combine reverse learned relations (Figure 3.c) (Hayes et al., 2012) and this coincides with a rapid increase in their attachment to soft objects (Passman, 1987). For example, children may learn that when they feel upset their mother helps them manage their emotions, and they have
already learned that their special objects is similar to their mothers (Winnicott, 1953). Combining these relations leads children to learn that their special objects can also help them manage their emotions when their mothers are absent or behaving inconsistently.

It is hypothesised in Phase I of the current reconceptualised model that extreme attachment to inanimate objects and anthropomorphism (the belief that inanimate objects have human-like qualities) are likely to originate in toddlerhood. Special transitional objects come to represent (through relational frames, derived stimulus relations, and transformation of stimulus functions (as previously described) control over one’s environment in times of uncertainty and a way to manage emotions and self-soothe (Passman, 1987). Repeated experiences of loss in an uncertain environment and the discovery that special possessions improve affect by merely being available to sensory input (Zajonc, 2001), creates neural pathways that lead directly to behavioural predispositions present in HD.

It is when these attachments and beliefs about possessions are taken to be true and predominate over direct experience that HD sufferers experience cognitive fusion—the inability to distance oneself from thoughts, memories, beliefs (Gillanders et al., 2014).

Cognitive fusion, a maladaptive process described in ACT (refer to chapter 3), is allowing the prioritisation of cognitions over direct experiences. HD sufferers have been found to “buy” into HD beliefs and attachment to possessions believing that inanimate objects are vital to their emotional wellbeing (Phung et al., 2015). Consequently, the belief that possessions are necessary for emotional health is treated as a “fact”, and the HD sufferer will become emotionally bereft if they no longer have their possessions.
The reason hoarding sufferers feel such a sense of loss is the persistent memory of experiencing overwhelming pain and anxiety when they lost an object once or imagining the pain they witnessed in someone close to them as if it actually occurred to them and the mind has treated this as a “real” experience. The transformation of stimulus function, as previously described in Chapter 3, leads the HD sufferer to assess the potential absence of a possession as intolerable—“If I throw this object away then I will feel like I am dying”—and the avoidance of anticipated negative physiological arousal results in saving objects. It has also been suggested that resisting the urge to acquire desired items is also avoided due to the fusion with the thought that “If I do not acquire this item I will regret it because I will never find it again”. It is possible that only possessions that reflect a central “me-ness” are considered as vital to wellbeing (Ferraro et al., 2011), which is evidence of the interconnectedness between the hoarder and possessions (see attachment to the conceptualised self in chapter 3).

To summarise, the antecedent phase in the proposed model hypothesises that the epigenetic interaction between genetic predisposition, early childhood experiences, and psychosocial environmental factors lead to the development of HD specific beliefs and conditioned behavioural responses when faced with intense emotions. The inflexible beliefs hoarding sufferers hold about the nature of possessions and their function as emotion regulation tools, dictate behaviours without experiential engagement.

**Phase II: Emotion regulation.**

In recent decades, increased theoretical and empirical interest in the study of emotion regulation (ER; Gross, 2014) has led to a proliferation of diverse theoretical perspectives regarding causal mechanisms, definitions of both emotions and ER, and methodological approaches to empirical research across multiple psychological sub-disciplines (Gross, 1998). The process model of ER is perhaps the most widely used
in the literature (Gross, 2011). Emotions are helpful when they, for example, direct our attention to key features of our environment, facilitate emotional interactions, or enable decision-making. However, in certain circumstances emotions that are too intense, enduring or inappropriate may be more harmful than helpful (Gross, 2014).

Emotion regulation is the management of emotions in order to achieve a conscious or non-conscious goal by starting, stopping or modulating the course of an emotion, and is triggered when the emotional reaction is perceived, valued, and action is deemed necessary to achieve a better outcome for the individual (Etkin et al., 2015). The better outcome sought by the action of regulating emotions is, as described by Etkin et al. (2015) as either a “good for me” or “less bad for me” state. For example, happiness leads to the repetition of the action and fear motivates the avoidance of dangerous situations.

Bowlby (1982) suggested that the early attachment experiences of insecure individuals (whether anxious, avoidant or both) often include inadequate and unstable distress regulation strategies especially during prolonged, highly challenging stressful incidences, and this fundamentally interferes with the development of inner resources needed for managing stressors successfully in the future (Shaver & Mikulincer, 2014).

We have evidence to suggest insecure attachment is a vulnerability factor in HD (Eppingstall, 2013; Medard & Kellett, 2014) and as previously noted, in childhood, transitional inanimate objects may be used to manage emotions by the insecurely attached under novel (mildly stressful) conditions (Donate-Bartfield & Passman, 2004). This underdeveloped ability to manage emotions, resulting from a highly stressful event or series of events, offers a potential explanation for the distress intolerance (Shaw & Timpano, 2016; Williams, 2012) and emotion regulation difficulties in HD (Fernández de la Cruz et al., 2013; Tolin et al., 2018). Indeed,
trauma and stressful life events have been positively associated with severity of hoarding symptomatology (Cromer, Schmidt, & Murphy, 2007).

Certainly, emotion regulation difficulties are evident in various psychopathologies; however, Sheppes (2014) suggests that the success of regulation strategies depends on context. Kashdan and Rottenberg (2010) argue different psychopathologies can be differentiated by the various ways in which particular strategies are used to regulate emotions and growing evidence supports the theory that the inflexible employment of avoidance responses in anxiety disorders lead to avoidance becoming the default behavioural response, which maintains disorders over time (Hayes et al., 2012). This inflexible application of avoidance responses appears to occur in HD where habitual saving allows sufferers to circumvent negative internal states. Indeed, recent research supports the hypothesis that hoarding sufferers have greater difficulty regulating emotions than healthy controls and use both saving and acquiring as maladaptive emotion regulation strategies (Tolin et al., 2018). The process hypothesised in Phase II of the acceptance-based emotion regulation model, diagrammatically detailed in Figure 2, will be described to illustrate how hoarding sufferers use saving and acquiring to regulate their emotions.

**Emotion regulation process.**

The original C-B model proposes that saving and acquiring are maladaptive behaviours used to regulate emotions (Frost & Hartl, 1996). Indeed, this is convergent with the hypothesised relationship in the proposed acceptance-based emotion regulation model of HD. However, in classically Beckian style (Hofmann et al., 2013), the original C-B model suggests that the typical saving cognitions of attachment, memory, responsibility, and control, are catalysts for positive and negative emotions experienced by hoarding sufferers. Subsequently, the
overwhelming feelings lead to behaviours of saving and acquiring to manage these emotions. To be specific, the original C-B model suggests cognitions are the cause of emotions. Not wishing to engage in the straw man fallacy, it must be noted that traditional cognitive therapy (CT) does not suggest the relationship between cognitions and emotions is uni-directional. Rather, it is acknowledged that the relationship is bi-directional, with the “CT model simply build(ing) on the fact that emotions are strongly, and causally, influenced by the perception of events or situations.” (Hofmann et al., 2013, p. 200). Nonetheless, the C-B model of HD does follow the theoretical lead set out by traditional CT, suggesting cognitions cause emotional reactions.

It is at this stage where the proposed theoretical model based on ACT, begins to differ from the original C-B model of Hoarding and, in contrast, hypothesises that emotions precede behaviour. Rather than beliefs and meanings of possessions leading to conditioned emotional responses concerning possessions (Grisham & Barlow, 2005) it is argued here that cognitions follow emotions and lead to maladaptive behaviours.

Viewed from an ACT perspective, emotions are evolutionary adaptations and are likely to emerge spontaneously through interactions with the internal and external environment and behaviours follow to manage these emotions (Hayes et al., 2012).

If the ACT theoretical framework is to be used to reconceptualise the phenomenological model of HD alternative assumptions must be engaged than those used in the C-B model (Hayes, 1995). The use of different assumptions does not nullify the alternative perspectives; however, it does mean the original model must change to reflect the new assumptions.
The emotion regulation phase of the acceptance-based model proposes that during the early development of hoarding disorder, saving and acquiring occur unchecked. Accordingly, self-conscious appraisal of the long term consequences of hoarding behaviours are not addressed due to the prioritisation of short-term goals; ostensibly the immediate relief from negative internal states (Aldao, Sheppes, & Gross, 2015).

Saving and acquiring are the behaviours hoarding sufferers use to regulate emotions (Tolin et al., 2018). Saving is a way to avoid any negative experiences related to loss that emerge day-to-day and experimental research supports that when intense negative emotions are induced, discarding is more difficult (Shaw, 2017). Indeed, saving may in part be due to difficulty accepting negative emotions (Tolin et al., 2018).

It is not only saving that increases in the face of intense negative emotions; acquiring is used as a way for hoarding sufferers to improve negative moods (Frost, Rosenfield, et al., 2013). Additionally, acquiring can be used to enhance and prolong intense positive emotions (Kellett & Bolton, 2009).

Consequently, it is hypothesised in this acceptance-based emotion-regulation model, that saving is primarily experiential avoidance and both saving and acquiring are maladaptive emotion regulation strategies used by hoarding sufferers to down-regulate negative emotions and amplify positive emotions. In addition, being surrounded by possessions, even when they are not focused on, increase positive affect due to the repeated exposure effect.

**Mere repeated exposure effect.**

Early observations of hoarded environments found sufferers tend to keep possessions in sight reasoning that they would forget the items if they were put away
(Frost & Hartl, 1996). However, Kellett and Holden (2014) propose that the cognitive paradigm known as the mere exposure effect (MEE)–a well-researched robust phenomenon (Zajonc, 1968)–offers a useful explanation for hoarding sufferers’ retention of large volumes of similar objects and feeling happy amongst their possessions. In his words, Zajonc (2001) explains:

> The repeated-exposure paradigm consists of no more than making a stimulus accessible to the individual’s sensory receptors. There is no requirement for the individual to engage in any sort of behaviour, nor is he or she offered positive or negative reinforcement. The exposures themselves are sometimes so degraded that the individual is not aware of their occurrence. Their effects are measured by the resulting changes in preference for the object.

The repeated exposure to a particular object in the home, even outside of the hoarding sufferer’s awareness, leads to a preference for similar items. Merely retaining objects and having them in sight can produce positive affective states. Once in this state, it is possible hoarding sufferers could become attached to similar items they are exposed to immediately after. At this stage, no studies appear to have tested the mere-exposure-effect in HD. Nonetheless, the mere-exposure paradigm potentially offers an explanation for a number of behavioural conundrums mentioned in early research such as items kept in sight, large collections of similar items, and churn (Frost & Hartl, 1996; Frost & Steketee, 1998).

This proposed theoretical model includes the robust psychological phenomenon of the mere-repeated-exposure effect in the emotion regulation phase, as it has been suggested by Kellett and Holden (2014) to be a potential explanation for
the positive affective states experienced by hoarding sufferers. Simply retaining objects in the home, available for repeated sensory exposure can increase positive affect (Zajonc, 2001). Subliminal exposure to stimuli can result in preference judgments somewhat like unconscious memory (Elliott & Dolan, 1998), hence just being among possessions repeatedly, without consciously engaging with objects is likely to make hoarding sufferers feel comfortable and happy without understanding why. Unlike simply becoming habituated to the home environment, as occurs with clutter blindness, MEE is capable of positively impacting mood. Being surrounded by familiar possessions and feeling comfortable and content could lead to extreme possession attachment. Indeed, something that can reliably elicit positive feelings will be relied upon as an emotion regulation tool. Consequently, discarding these items becomes extremely difficult for hoarding sufferers. Having the possessions is equated with happiness; conversely, not having them is predicted to be sadness.

In summary, Phase II of the hypothesised model is emotion regulation. Learned conditioned responses about the nature and meaning of possessions previously described lead to the use of acquiring and saving. This emotion regulation process is cyclical and is likely to continue unchanged unless some external catalyst leads to the contemplation of large scale discarding. Intense negative emotions lead to saving as a way to avoid the anxiety and due to the positive affect induced by MEE. Acquiring occurs in response to both negative and positive emotions to down regulate negative moods and boost positive moods. Additionally, having possessions on display, available to sensory perception, leads to positive feelings and a preference for similar objects, which in turn leads to more acquiring.

The chronic nature of the disorder means that the physical manifestation of hoarding can slowly increase even when saving and acquiring behaviours remain
consistent. This means that the hoarding disorder is not any worse; acquiring and saving levels remain stable. However, clutter, which is the consequence of saving and acquiring, is increasing. In some cases, the increase in clutter may be a slow and steady process, in line with well-practiced emotion regulation strategies. For example, when feeling down, acquiring from the charity store is “retail therapy” used to boost positive affect and when positive events occur acquiring is used as a reward. All the while, having the possessions around the house, even if they are not interacted with makes it difficult to discard because their mere presence is rewarded with positive affect. The clutter problem might not even seem particularly concerning and may be contained to certain areas of the home like the basement, spare room, garage, or shed. Unfortunately, possessions have their limits and are not effective emotion regulators under high levels of arousal (Passman, 1987).

Life is complicated and new challenges can render habitual emotion regulation strategies ineffective. For the hoarding sufferer, acquiring to up-regulate and saving to down-regulate emotions is unlikely to manage acute emotions successfully and clutter will increase and significantly impact every day activities. Crisis point, when clutter becomes an impediment to functioning in the home and life, is the point when hoarding sufferers are forced to recognise the extent of their hoarding impairment and seriously contemplate discarding large numbers of possessions.

**Phase III: Difficulty discarding.**

When life becomes challenging, and a major life event occurs (divorce, death of a spouse, etc.), the usual emotion regulation strategies are likely to be inadequate. In an attempt to cope, hoarding sufferers will use acquiring and saving more frequently at higher levels, because strategies that were successful before are no longer effective, similar to drug tolerance in addiction (Grisham et al., 2011). This is
particularly true of acquiring because not only does bringing new possessions home increase affect, the interaction with shop staff and the sense of accomplishment and skill at “scoring a bargain” can feed into the emotion regulation process and positively reinforce the behaviour (Kyrios et al., 2004).

Anecdotal reports of significant loss as the catalyst for a sudden exponential increase in saving and acquiring could be due to an increase in avoidance and approach behaviours to try to manage escalating stressful circumstances. Untreated, hoarding is unlikely to improve spontaneously, and the chronic nature of HD means clutter will become problematic without intervention (Tolin, Meunier, Frost, & Steketee, 2010).

After many years, possibly decades, of managing emotions and avoiding anxiety by saving and acquiring possessions (Phase II of the proposed model), hoarding sufferers are faced with threats (e.g. moving to a new house, eviction, divorce, removal of dependents) or positive catalysts (e.g. romantic relationship, marriage, children, grandchildren) that trigger the contemplation of large scale discarding. Indeed, hoarding sufferers may be contemplating the negative consequences of their saving and acquiring habits for the first time in their lives.

The brain processes mental images of discarding precious possessions, which arise due to stressful triggers, as if they have occurred. Accordingly, the internal aversive experience leads to an intense, anxious reaction –especially physiological symptoms such as racing heartbeat, sweating, and nausea (Timpano et al., 2009).

The way in which hoarding sufferers behave in response to these anxious reactions to thoughts of discarding is characterised in the C-B Model of HD to be because of the influence of biopsychosocial factors (see Chapter 4). Genetic predisposition and early childhood experiences were predicted to influence
information processing performance in hoarding sufferers, in turn leading to maladaptive cognitions about the meaning of value of possessions. Because of these beliefs, hoarding sufferers feel intense anxiety. To manage the negative internal experiences, hoarding sufferers are predicted to engage in avoidance behaviours, specifically acquiring and saving, to escape from the anxiety.

It is hypothesised here that in response to powerful negative internal experiences, hoarding sufferers will attempt to make sense of their feelings. ACT theory posits that anxiety and distress are overwhelming, automatic private experiences that appear to be problems to be solved and controlled (Hayes et al., 2012). In order to problem solve private experiences like one would other real-world problems, the hoarding sufferer looks to make sense of their emotional distress using well-worn self-stories that function like “metarules” (Hayes et al., 2012, p. 259) dictating patterns of behaviours in particular contexts. Being unable to flexibly relate to these verbal rules, that is step back from them and recognise they are merely thoughts and not reality, is instrumental in perpetuating avoidance behaviours. Subsequently, hoarding sufferers react inflexibly. Without referring to the environment for cues, old habits of avoidance are involuntarily engaged. Subsequently, psychological inflexibility perpetuates the symptoms of HD.

Based on current research related to hoarding cognitions and hoarding behaviours, when viewing HD through the prism of ACT it is generally proposed negative emotions induce problem solving and sense making known as cognitive fusion followed by experiential avoidance. However, it is hypothesised that other psychological inflexibility core processes are at work and should be included as factors in difficulty discarding.
Psychological flexibility is defined as being in contact with the present moment fully, as a conscious human being, without unnecessary defence and persisting with behavioural change in accordance with one's chosen values (Hayes et al., 2012, pp. 96–97). As described in detail in Chapter 3, ACT theory considers six interrelated processes that contribute to psychological adaptability. The opposites of these processes lead to psychological rigidity, that is, the inability to persist with behavioural change that is congruent with one's chosen values.

How these six processes of psychological inflexibility relate to one another in hoarding disorder is hypothetical currently. Indeed, as this is the first investigation conducted to explore the nature of the relationship between cognitive fusion, experiential avoidance, inflexible attention, attachment to the conceptualised self, disrupted values, and inaction, within difficulty discarding, predictions are based on what is currently understood about the phenomenology of the disorder. Considering each psychological inflexibility process and its applicability to HD (as was discussed in Chapter 3) has led to the proposed difficulty discarding model, phase III in the acceptance-based emotion regulation model of HD.

The model proposed in Figure 2 is comprised of four measured tiers. After the cue or threat induces images of discarding, the first level of the model is automatic negative private experiences; in HD these is hypothesised to be stress and anxiety.

The second level of the model, which is influenced by negative emotions, includes cognitive fusion, inflexible attention, and attachment to the conceptualised self. How these processes relate to each other and to saving cognitions (SCI) is currently unknown. However, it is hypothesised these elements of psychological inflexibility will influence the third level of the model, experiential avoidance in the form of behavioural avoidance, procrastination, distraction, repression, and saving.
This avoidance behaviour leads to the fourth and final level of the model, which is clutter, the physical consequence of avoidance.

In a model of HD, it would be remiss to exclude decision-making from the lived experience of HD sufferers. As reviewed in detail in Chapter 4, veteran HD researchers consider indecision as the hallmark of the disorder. The original C-B model of HD suggested indecision was the result of information processing deficits that impacted hoarding sufferers’ beliefs about the meaning and value of possessions. However, as suggested by Wheaton (2016) and concluded in Chapter 4, difficulty making decisions, and other executive function deficits for that matter, are more likely to affect clutter directly than impacting saving cognitions. To that end, the final phase in the proposed acceptance-based emotion regulation model is phase IV, decision-making.

**Phase IV: Decision-Making.**

As discussed previously, large scale discarding of possessions is likely to be prompted by a threat or catalyst that brings into focus the level of disorganised clutter and its impact on functioning.

If threats or catalysts are potent, they may induce hoarding sufferers to tolerate the anxiety without attempting to problem solve feelings and ignore strict rules that habitually govern their behaviour. Indeed, crises are a strong motivator to seek treatment. ACT interventions targeting psychological inflexibility are hypothesised here to be effective in bringing about acceptance of anxiety and ultimately living according to freely chosen values. For example, having dependents removed from hoarded homes due to threats to their safety brings into focus true values of family and parenthood and is likely to lead to treatment seeking. Alternatively, hoarding behaviours can jeopardise new relationships or marriages when households must
merge. These times of crisis are the fork in the road for HD sufferers to either seek help or remain “stuck” (Hayes & Smith, 2005).

Nevertheless, even if ACT treatment is able to improve hoarding sufferers’ psychological flexibility, decision-making remains an obstacle. Attempts to make decisions regarding possessions are hampered by a number of elements. Without tackling these factors implicated in decision-making difficulty in HD, frustration and abandonment of discarding are probable for hoarding clients.

Following is a discussion of a number of factors linked to indecision in HD. This is not intended to be an exhaustive list nor a critical review, however, it is indicative of the problems facing clients even after they have shown significant improvement in psychological flexibility.

Hoarding is a complex disorder and its intricacies are only now becoming known and quantified. More research is needed in all areas of hoarding disorder to replicate findings including those detailed here with respect to decision-making. Nonetheless, this phase of the hoarding disorder process is central to treatment success. The endowment effect, intolerance of uncertainty, perfectionism, lack of decision-making experience, metacognitions, and objective cognitive deficits are discussed as factors leading to churn in disorganised clutter.

**Endowment effect.**

Research investigating hoarding from a natural resource allocation perspective offers a way to view HD not as a pathology but as an adaptive behaviour (Vickers & Preston, 2014). Approximately normally distributed, hoarding disorder occurs to some degree across the population and is essentially an economic decision process (Preston, Muroff, & Wengrovitz, 2009).
The “endowment effect” is a phenomenon in behavioural economics put forward as an explanation for possession attachment and over-valued ideation (see Chapter 3) in HD (Vickers & Preston, 2014). The endowment effect is when individuals value their personal possessions over items they do not own (Thaler, 1980) and intensifies when negative moods are anticipated (Zhang & Fishbach, 2005). Attachment (Kellett & Holden, 2014) and over involvement with possessions (Nedelisky & Steele, 2009) have been associated with hoarding disorder and are also linked to the endowment effect (Saqib, Frohlich, & Bruning, 2010). Although observed often in HD, evidence of the endowment effect in HD is mixed and research is ongoing (see Vickers & Preston, 2014 for a review). Nevertheless, neural research can assist in the identification and management of choice and decision-making.

**Intolerance of uncertainty.**

As previously demonstrated, avoidance behaviours are particularly relevant in HD. One of the key factors in decision-making avoidance for hoarding sufferers is the intolerance of uncertainty (Oglesby et al., 2013). Intolerance of uncertainty has been significantly related to hoarding severity in a large community sample even after controlling for general levels of depression and anxiety (Oglesby et al., 2013). In particular, Factor 1 of the Intolerance of Uncertainty Scale (IUS; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994) pertaining to uncertainty resulting negative behaviour and self-referent implications that is, being uncertain reflects badly on a person (Oglesby et al., 2013). Results indicated that both saving and acquiring were positively related to intolerance of uncertainty. These findings suggest attempts to gain control over ambiguous and potentially threatening situations leads to avoidance behaviours of saving and acquiring items “just-in-case” ostensibly to avoid making mistakes (Oglesby et al., 2013). Feeling uncertain about future needs can be thought
of in terms of cognitive biases related to the endowment effect such as loss aversion where avoiding losses is preferred to acquiring identical gains (Kahneman, Knetsch, & Thaler, 1991). Saving possessions avoids those losses even when gains can be made by discarding; thus, freeing up space in the home.

Additionally, the fear of making mistakes when either discarding or failing to acquire an item may be due to intolerance of uncertainty. Equally, fear of making mistakes indicates perfectionistic personality traits, which was observed in hoarding sufferers in the initial investigations into the disorder (Frost & Gross, 1993; Frost & Hartl, 1996; Frost & Shows, 1993).

**Perfectionism.**

In layman’s terms, perfectionism is equated with striving for high personal standards. However, perfectionism is defined in the literature as a bi-dimensional construct (Frost, Marten, Lahart, & Rosenblate, 1990). Not only is perfectionism defined in terms of high personal standards, it is also delineated in terms of concerns about critical performance evaluation (Frost et al., 1990). It is the evaluative concerns construct, which includes worry about making mistakes and experiencing failure that has been found in the HD population (Burgess et al., 2017). Interestingly, recent findings indicate evaluative concerns were related to hoarding behaviours through its influence on decision-making (Burgess et al., 2017). Indeed, there were no direct effects of evaluative concerns on any hoarding symptoms. Decisional procrastination and indecisiveness (anxiety and regret) were both intermediaries between evaluative concerns and difficulty discarding (Burgess et al., 2017). Consequently, evaluative concerns are likely to lead to delayed decision-making to avoid making mistakes or experiencing failure and result in difficulty discarding.
Taken together with intolerance of uncertainty and cognitive biases like the endowment effect, this research into evaluative concerns returns to decision-making problems leading to avoidance behaviours. With such high levels of avoidance in HD, a paucity of experience making decisions and evaluating the outcomes of those decisions is inevitable (Woody et al., 2014).

Lack of decision-making experience.

When avoiding decision-making and delaying discarding, hoarding sufferers are relying on their memory of previous discarding experiences to predict how they would feel if they were to make a mistake. Kahneman (2012) suggests “The remembering self is sometimes wrong, but it is the one that keeps score and governs what we learn from living, and it is the one that makes decisions.” Memory has evolved to remember the most intense moments of pleasure or pain and emotions effect how our memories are stored and recalled (Phelps, 2004). Lack of decision-making experience in relation to possessions may reduce HD sufferer’s confidence in making the right choice and in the face of uncertainty lead to delaying decision-making and saving. Exposure to discarding has been central to the treatment of HD (see Steketee & Frost, 2007) and this may improve decision-making confidence, however, the role of emotions and the regulation of those emotions plays in decision-making cannot be understated.

Beliefs about one’s thoughts can also impact cognitive functioning and may impact decision-making behaviours in HD.

Meta-cognitions.

Hoarders have been found to think about their own thoughts in specific ways (metacognitions) and have less cognitive confidence in attention and
memory and more need to control their thoughts (Timpano, Rasmussen, Exner, Rief, & Wilhelm, 2014). It has been suggested that beliefs about cognition can drive cognitive processes and may add to or reinforce actual dysfunctional processing (Wells & Matthews, 1996); that is, some actual attention deficits exist but deficits are generalised to all areas of executive function. In support of these findings, an investigation into the relationship between emotional reactivity and hoarding found the cognitive factor of confidence in memory was a moderator and significantly interacted with total hoarding severity and acquisition (Shaw, Timpano, Steketee, Tolin, & Frost, 2015). In the same study, general emotional reactivity interacted with fear of decision-making to significantly predict overall hoarding severity and difficulty discarding.

As previously reviewed in Chapter 4, the research to date regarding objective cognitive deficits in HD requires further clarification and replication particularly with regarding to decision-making. Similarly, the interaction of metacognitions with objective cognitive deficits is worthy of investigation. Further, the impact of emotions on executive function in HD may offer new treatment opportunities especially when the areas of psychology, neuroscience and behavioural economics are integrated (Vickers & Preston, 2014).

Conclusion

While it is tempting to consider these decision-making factors exclusive to HD or similar psychopathologies, elements discussed here are applicable to the broader population. Equally, it is important to acknowledge that emotions influence choice in numerous and crucial ways (see Kahneman, 2012 for details). Those individuals who use maladaptive or inadequate strategies to regulate emotions like hoarding sufferers
are expected to make risk-averse decisions with respect to material consumption when feeling anxious, sad, stressed, socially rejected, or uncertain (Vickers & Preston, 2014, pp. 223–225). Indeed, evidence suggests adaptive emotion regulation techniques can reduce loss aversion, where avoiding losses is preferred to acquiring identical gains, and change assessment of value (Sokol-Hessner, Camerer, & Phelps, 2013). Accordingly, treatment aimed at adaptive emotion regulation strategies like acceptance-based interventions, can be beneficial for decision-making in HD. Awareness of cognitive biases impacting choice and recognising them in everyday life decisions may significantly improve hoarding sufferer’s ability to choose to follow their values.

The insights that can be gained from considering decision theory and its applicability for HD is vast and an opportunity exists to use the available evidence to experimental test these theories and improve HD treatment efficacy.

**Hypotheses.**

Based on this proposed acceptance-based emotion regulation model of HD, two statistical investigations were conducted.

**Study 1.**

A MANOVA was conducted to explore the difference between levels of the psychological inflexibility factors of cognitive fusion, experiential avoidance, inflexible attention, attachment to the conceptualised self, and valued living a group reporting low levels of HD severity with a group reporting high levels of HD severity. It was predicted that there would be a significant difference between the low HD and high HD groups on all measures of psychological inflexibility. As this study
was exploratory, the effect size and direction of the difference between groups was not hypothesised.

Subsequently a MANCOVA was conducted with the same measures and groupings, however, controlling for depression, anxiety, and stress. Once again, it was predicted that there would be a significant difference between the low and high HD groups on measures of experiential avoidance, inflexible attention, attachment to the conceptualised self, and valued living. However, based on evidence to suggest strong correlations between the cognitive fusion measure and depression and rumination were likely in samples with clinically significant depression (see Gillanders et al., 2014 for details) it was hypothesised there would be no significant difference between groups for the cognitive fusion measure after controlling for depression, anxiety and stress.

**Study 2.**

In order to test the hypothesised model of difficulty discarding (Figure 4), a fully latent structural equation model using AMOS® (Version 24) was conducted to assess the appropriateness of the model for the data.
Figure 4. Hypothesised Fully Latent Difficulty Discarding Model of HD

The following chapters describes the outcomes of these analyses.
Chapter 6

Predictors of Hoarding: The Impact of Psychological inflexibility

Psychological inflexibility and its applicability to HD was explored theoretically in Chapter 3 of this thesis. Evidence of the relationship between overall psychological inflexibility, using the Acceptance and Action Questionnaire–Version II (AAQ-II), and HD is limited and results to date have been mixed (see Chapter 3). However, there are no published studies investigating the relationship between the individual core processes of psychological inflexibility and HD.

To this end, Study 1 was conducted to investigate if there were significant differences between those participants reporting high levels of hoarding behaviours and those reporting low levels of hoarding severity on measures of the six core psychological inflexibility processes: cognitive fusion, experiential avoidance, inflexible attention, attachment to the conceptualised self, disruption of values, and inaction.

This chapter will firstly describe the overall method, materials, and procedure employed for the entire sample. Secondly, demographic comparisons of participants reporting clinically significant hoarding (based on the optimal SI-R cut off scores established by Tolin, Meunier, Frost, & Steketee, 2011) with those reporting non-significant levels of hoarding behaviours will be presented. Thirdly, descriptive statistics and internal consistency scores for the entire sample across all measures will be detailed in Table 3 followed by a discussion of key findings.

Finally, Study 1 results of multivariate analyses conducted, including psychological inflexibility correlates and predictors across lower and upper quartiles of hoarding severity, will be presented and subsequently discussed.
Materials and method.

Participants.

In total, 626 adults completed the survey battery. Participants included in the analysis were predominantly female ($n = 504, 91.9\%$) and, on average, 45 years of age ($SD = 11$).

Recruitment and the use of oversampling.

Hoarding can be considered a rare disorder (Kalton, 2009) with estimates of clinical population levels between 2 to 5% (Nordsletten & Mataix-Cols, 2012; Timpano et al., 2013). As a result, in a community sample, there is the possibility that the clinical group (i.e., those with clinical levels of hoarding behaviours) could be too small to detect effects via mediation and moderation analyses. Indeed, it has been suggested that due to restrictions in the range of individual predictors with clusters of observations in the centre of the range rather than at the extremes, detecting mediation and moderation effects can be statistically difficult (McClelland & Judd, 1993). One solution to this statistical conundrum is oversampling. This technique increases the likelihood of a target subpopulation being included in the sample in a larger share of the survey sample than they do in the population (McClelland & Judd, 1993).

An oversampling method of recruitment was therefore used in the current study to ensure adequate numbers of participants with clinical-level hoarding symptoms were recruited. This was successfully achieved by targeting closed hoarding and cluttering Facebook groups in addition to online hoarding forums via the use of the snowball technique (Kalton, 2009). A Facebook group was also set up (Hoarding Disorder Research) with information about the current study and links to relevant hoarding research to passively recruit participants via a link on the page.
Procedure.

Following receipt of ethics approval from RMIT Human Research Ethics Committee (HREC/19427) data was collected using the online survey tool Qualtrics. Once potential participants clicked on the survey link, they were led to the Participant Information Sheet (PIS; see Appendix A), which outlined the scope and details of the study in plain language. Participants were asked to indicate their understanding of the study information and were asked to consent to voluntary participation in the anonymous survey by clicking on the “yes” button at the bottom of the PIS. Subsequently, participants were asked to indicate their eligibility for the adult survey by selecting a “tick” to confirm they were aged 18+ years. Following this, participants were directed to the online questionnaire portal Qualtrics.

Measures.

All measures used in both Study 1 and Study 2 are detailed here. The construct each measure is attempting to measure is detailed below. If the measure is used in both studies a description of the way it was interpreted in each study is detailed. A battery of questionnaires (see Appendix B), beginning with demographic questions, was presented to participants including the following measures:

Saving Inventory–Revised (SI–R).

Hoardng behaviour was measured using the Saving Inventory–Revised (SI–R; Frost, Steketee, & Grisham, 2004), a 23-item questionnaire with three subscales, the saving subscale (seven questions measure the severity of discarding problems), the clutter subscale (five questions measure physical clutter) and the acquisition subscale (seven questions measure the level of acquisition). Self-rated, using a five-point Likert-type scale from 0 to 4 (0 = “none/not at all/never” to
4 = “Almost all/complete/ extreme/very often”) the SI-R assesses the frequency or severity of the behaviour and its impact (“To what extent do you have difficulty throwing things away?”). Scores on all 23 questions were summed to create an overall score for each individual ranging from 0 – 92, higher scores indicate greater levels of hoarding behaviours. The convergent and divergent validity of the inventory has been demonstrated in both clinical (Frost et al., 2004) and normative samples (Coles et al., 2003) and internal consistency coefficients are reported as strong, for example $\alpha = .97 – .87$ (Timpano et al., 2013, p. 196). A recent taxometric exploration of the latent structure of hoarding has demonstrated hoarding is dimensional rather than categorical (Timpano et al., 2013). This supports the use of the SI–R and other measures such as the Saving Cognitions Inventory, with normative samples. In Study 1 the SI–R will be an indicator of hoarding severity. In Study 2 SI–R-saving represents hoarding specific experiential avoidance and SI–R-clutter the physical outcome variable.

**Saving Cognitions Inventory (SCI).**

Saving Cognitions Inventory (SCI; Steketee, Frost, & Kyrios, 2003) is a measure of the attitudes and beliefs associated with hoarding. In Study 2 the SCI will represent hoarding-specific cognitive fusion. This 24-item scale has four subscales; emotional attachment (10 items e.g. “Losing this possession is like losing a friend”), memory (five items e.g., “If I put this into a filing system, I’ll forget about it completely”), control (three items e.g., “No one has the right to touch my possessions”), and responsibility (six items e.g., “I am responsible for finding a use for this possession”). Items are rated on a seven-point Likert-type scale from 1 (“not at all”) to 7 (“very much”). This inventory has been used with both clinical (Steketee et al., 2003) and non-clinical samples (Timpano et al., 2013) and has shown excellent
internal consistency ($\alpha = .96$) and good convergent and divergent validity (Steketee et al., 2003). In this sample internal consistency for the scale was excellent ($\alpha = .96$).

**Depression Anxiety and Stress Scale Short Form (DASS-21).**

The Depression Anxiety Stress Scale Short Form (Lovibond & Lovibond, 1995), also known as the DASS-21 is a measure of negative affective states that asks participants to rate, on a four-point Likert-type scale from 0 (“did not apply to me at all” or “never”) to 4 (“applied to me very much, or most of the time or “almost always”) which statements applied to them over the past week. DASS-21 is a 21-item scale with three subscales; depression (seven items e.g. “I felt life was meaningless”), anxiety (seven items e.g. “I felt I was close to panic”), and stress (seven items e.g. “I found it difficult to relax”). A widely used measure in both clinical and non-clinical samples (Lovibond & Lovibond, 1995), this scale has shown good internal consistency, $\alpha = .93$ (Henry & Crawford, 2005), and good convergent and divergent validity (Lovibond & Lovibond, 1995). In this sample internal consistency for the scale was excellent ($\alpha = .95$). Based on evidence from a large scale normative sample, it is acceptable to use the DASS-21 subscales separately, remembering that the scales are a “blend of variance common to anxiety, depression, and stress and variance specific to these constructs.”(Henry & Crawford, 2005, p. 237). In Study 1 the DASS-21 is used as a single score to assess baseline negative affect. The separate subscales of DASS-anxiety and DASS-depression were used in Study 2 to indicate emotions triggered when discarding is imagined by hoarding sufferers.

**Acceptance and Action Questionnaire Version II (AAQ-II).**

The Acceptance and Action Questionnaire II (AAQ-II; Bond et al., 2011), is a self-report measure of general psychological inflexibility which is considered to be a
way of approaching life, and is defined as the inability to persist with behavioural change due to rigid automatic responses to internal experiences (Hayes et al., 2012, p. 96). The AAQ-II consists of seven items all negatively worded (e.g. “My painful experiences and memories make it difficult for me to live a life that I would value”) that are scored on a Likert-type scale of 1 (“never true”) to 7 (“always true”) with higher scores reflecting higher levels of psychological inflexibility. This scale has shown adequate internal consistency, $\alpha = .84$, as well as appropriate convergent, discriminant, and divergent validity (Bond et al., 2011). In this sample internal consistency was excellent ($\alpha = .95$). The AAQ-II will only be used in Study 2 as a general measure of psychological inflexibility.

*Cognitive Fusion Questionnaire (CFQ).*

The Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014) is a general measure of the level of dominance cognitive events have over behaviour and experience including reacting emotionally to thoughts and over-analysis of situations (Gillanders et al., 2014). The CFQ consists of seven negatively worded items (e.g. “I over-analyse situations to the point where it’s unhelpful to me” and “my thoughts cause me distress or emotional pain”) that are scored on a seven-point Likert-type scale from 1 (“never true”) to 7 (“always true”) (Gillanders et al., 2014). Higher scores on the CFQ indicate higher levels of pathology. This scale has shown good internal consistency ($\alpha = .88$) in a young adult sample, adequate divergent validity, incremental validity over and above psychological inflexibility and depressive symptoms, as well as adequate discriminant validity. The internal consistency in this sample was excellent ($\alpha = .97$).
**Brief Experiential Avoidance Questionnaire (BEAQ).**

The Brief Experiential Avoidance Questionnaire (BEAQ; Gález et al., 2014) was created as a practical clinical tool from the 62-item Multidimensional Experiential Avoidance Questionnaire (Gález et al., 2011). This brief experiential avoidance measure taps into the level of unwillingness to remain in touch with negative emotions, thoughts, memories, and physical sensations (Gález et al., 2014). The BEAQ is a 15-item measure with six subscales: behavioural avoidance (four items e.g. “I’m quick to leave any situation that makes me feel uneasy”), distraction/suppression (two items e.g. “When unpleasant memories come to me, I try to put them out of my mind”), procrastination (two items e.g. “I won’t do something until I absolutely have to”), distress aversion (four items e.g. “The key to a good life is never feeling any pain”), repression/denial (two items e.g. “I feel disconnected from my emotions”), and distress endurance (single item “Fear or anxiety won’t stop me from doing something important”). The 15-item scale is scored on a six-point Likert-type scale from 1 (“strongly disagree”) to 6 (“strongly agree”) (Gález et al., 2014).

Higher scores on the BEAQ indicate higher levels of experiential avoidant pathology. The BEAQ exhibited adequate internal consistency (α = .86) across both community and clinical samples, as well as strong convergent, discriminant, and divergent validity (Gález et al., 2014). The internal consistency in this sample for the BEAQ was also adequate (α = .84). The BEAQ is used to measure general experiential avoidance in Study 1.

**Five Facet Mindfulness Questionnaire–Short Form (FFMQ-SF).**

Mindfulness is generally defined as the ability to attend to experience in the present moment without judgement (Grecucci et al., 2015). The Five Facet Mindfulness Questionnaire–Short Form (FFMQ-SF; Bohlmeijer, ten Klooster,
Flederus, Veehof, & Baer, 2011) is a 24-item questionnaire scored on a five-point Likert-type scale from 1 (“never or very rarely true”) to 5 (“very often or always true”). The five facets or subscales of the FFMQ-SF are: describe (five items e.g. “I’m good at finding the words to describe my feelings”), observe (four items e.g. “I notice the smells and aromas of things”), non-reactivity to inner experiences (five items e.g. “I watch my feelings without getting carried away by them”), acting with awareness (five items all reverse scored e.g. “I rush through activities without being really attentive to them”), and non-judging of inner experiences (five items all reverse scored e.g. “I tell myself I shouldn’t be thinking the way I’m thinking”). Higher scores on the FFMQ-SF indicate higher levels of mindfulness. This scale is highly sensitive to change through intervention in patients with depressive symptomatology, is adequately reliable ($\alpha = .82$), with good convergent and discriminant validity. In this sample, internal consistency was good ($\alpha = .90$) for the FFMQ-SF total. The FFMQ-SF is used to measure inflexible attention in Study 1.

**Self-as-Context Scale (SACS).**

The Self-as-Context Scale (SACS; Gird & Zettle, 2013) is a recently developed measure that assesses how able one is to witness life experiences from a prevailing and unwavering perspective and is one of the six ACT psychological flexibility constructs (Gird & Zettle, 2013). The SACS is a seven-item positively-worded scale (e.g. “I am able to access a perspective from which I can notice my thoughts, feelings, and emotions”) that is scored on a seven-point Likert-type scale from 1 (“never true”) to 7 (“always true”). Higher scores on the SACS indicate better perspective taking abilities (Harris, 2009). Internal consistency for the SACS is adequate ($\alpha = .83$) in undergraduate samples, and also demonstrated good discriminant and convergent validity (Gird & Zettle, 2013). For this sample internal
consistency was also adequate ($\alpha = .86$). The SACS measures attachment to the conceptualised self in Study 1.

*Valued Living Questionnaire (VLQ).*

The Valued Living Questionnaire (VLQ; Wilson, Sandoz, Kitchens, & Roberts, 2010) is a two-part measure. The first part of the VLQ asks participants to indicate the level of importance of the 10 values listed (family relations, marriage/intimate relations, parenting, friendships/social relations, employment, education/training, recreation, spirituality, citizenship/community life, and physical wellbeing), by rating each from 1 (“not at all important”) to 10 (“extremely important”) based on their own personal sense of importance. The second part of the questionnaire is consistency, which measures how consistent the participants believe their actions have been with respect to each of the values, over the past week, on a 10-point Likert-type scale from 1 (“not at all consistent with my values”) to 10 (“completely consistent with my values”). The importance questionnaire and the consistency questionnaire allow for a valued living composite score to be calculated. This is done by calculating the product of consistency and importance ratings for each value domain with the mean of each product being the valued living composite for the domain (Wilson et al., 2010, p. 257). Subsequently, these are summed to create the total valued living composite with higher scores reflecting greater congruence between importance of values and actions taken towards those values in the past week. This scale has demonstrated adequate internal consistency ($\alpha = .77$) in a community sample, and in this sample the reliability of the scale was good ($\alpha = .84$). The VLQ is used in Study 1 to measure both disruption of values and inaction.
**Data analytic approach.**

Initial missing values, normality, and reliability for Study 1 and 2 and Study 1 analyses were conducted using IBM SPSS® (Version 24). AMOS® (Version 24) Structural Equation Modelling software was used for Study 2 analyses.

**Data screening.**

Six hundred and twenty-six participants complete the anonymous survey via the online link. A missing value analysis was then run using SPSS® 24 with results indicating missing values were random as Little’s MCAR Test was not significant ($\chi^2 (35, N = 626) = 50.89, p = .04$). Subsequently, cases with missing values of 30% or more were identified and deleted ($n = 94, 15.02\%$), leaving 532 complete cases (Tabachnick & Fidell, 2013). Internal consistency for all scales ranged from adequate to excellent (Table 3).

**Data analysis overview.**

Firstly, the demographics of the sample are presented and discussed. Due to the employment of an oversampling method (to increases the likelihood of the target subpopulation being included in a larger share of the survey sample than they do in the population,) the demographic analyses in Table 2 divided the total sample ($N = 532$) into non-clinical ($n = 310$) and clinical groups ($n = 222$). The clinical cut off score of 41 on the SI-R for total hoarding symptoms, was determined statistically using receiver operating characteristic (ROC) curves to assess the diagnostic ability of the cut-off point (41) to detect clinically significant hoarding symptoms (Steketee & Frost, 2014b; Tolin, Meunier, et al., 2011). Therefore, two groups were created to compare those who scored below the clinical cut off for HD (known as the non-
clinical group) and those who scored equal to or above the clinical cut off score (known as the clinical group).

Secondly, descriptive statistics for all measures and subscales for the entire sample ($N = 532$) are presented in Table 3. Total sample means and standard deviations were detailed rather than non-clinical, clinical groups separately as the major statistical analyses, presented in Chapter 7, will employ data for the entire sample.

Thirdly, the results of one-way between-groups analyses of variance and covariance are detailed. As there have been no studies to date investigating the relationship between the processes of psychological inflexibility and HD, Study 1 was conducted to explore these relationships prior to the employment of more complex statistical analyses. Consequently, understanding gleaned from the multivariate analyses of variance and covariance results investigating the relationships between these five psychological inflexibility variables informed the hypothesised acceptance-based difficulty discarding path model to be estimated in Study 2. As one of the aims of this research was to investigate the applicability and utility of ACT theory as a treatment approach to stimulate clinical change in HD, this initial investigation was essential to support the theoretically proposed relationships detailed in Chapter 5.

Hence, the aim of Study 1 was to explore significant differences between psychological inflexibility scores for those reporting low levels of hoarding symptoms and those reporting high levels of hoarding symptoms. Indeed, if no significant differences were found, psychological inflexibility and the core processes that make up the concept could not be used to predict HD severity and would not be a targetable construct in the treatment for this population.
To that end, Study 1 investigated the differences between scores on cognitive fusion (CFQ), experiential avoidance (BEAQ), inflexible attention (FFMQ-SF), attachment to the conceptualised self (SACS), and valued action (VLQ) for those reporting low levels of hoarding behaviours (SI–R) and those reporting high levels of hoarding behaviours. Although the theory of psychological flexibility describes six interrelated processes, only five were included in these analyses. This was due to the fact that the VLQ is a measure of how consistently one is living in accordance with one’s important values. Indeed, the values one has chosen are intrinsically irrelevant; rather it is whether one’s behaviours are actions in the direction of those values. Thus, the VLQ is “designed to measure self-assessment of the fit between the client’s actual activities and the valued behavioural pattern” (Wilson et al., 2010, p. 254).

Therefore, the composite measure of the VLQ encapsulates two core psychological flexibility processes of values and actions into one.

**Demographics.**

The demographical characteristics of the dichotomous groups – those reporting clinical levels of hoarding symptoms and those reporting non-clinical hoarding symptoms is reported in Table 3. As recommended in the literature and previously discussed, scores on the SI–R were used to determine non-clinical and clinical group membership with scores of 40 or below in the non-clinical group and scores of 41 or above in the clinical group. Although the multivariate analysis of variance and covariance analyses in Study 1 used upper and lower quartiles and structural equation modelling analyses in Study 2 included all participants, results from a statistical comparison of the non-clinical and clinical groups revealed differences that are important to note and can be compared to previous findings using the same group membership categorisation method.
In summary, results indicated that the average clinical profile corresponded with previous research in terms of age, education, employment, living arrangements, and relationship status (Frost et al., 2004; Grisham et al., 2009; Grisham, Frost, Steketee, Kim, & Hood, 2006; Steketee, Frost, & Kim, 2001). The clinical group were significantly older than the non-clinical group. This is in line with research indicating that although mild hoarding symptoms reportedly begin in the middle teens (Grisham et al., 2006), severity of hoarding symptoms increases over time (Dozier et al., 2015). Clinical hoarding sufferers were more likely to have commenced a university undergraduate degree without completing it compared to non-clinical participants, and 56.1% of participants who had commenced but failed to complete an undergraduate course were in the clinical range for hoarding. Whilst it is possible these participants were currently in the process of completing a bachelor’s degree, it may indicate compromised executive function (see Chapter 4 for review), which is a characteristic of hoarding, impacting on their ability to complete tertiary studies. Unfortunately, research has investigated work impairment in HD populations (Tolin et al., 2008) but not education, therefore the predominance of clinical range participants who commenced but did not completed tertiary education is untested at this stage. Interestingly, previous researchers have made the observation that hoarding sufferers were perhaps differentially intelligent (Tolin et al., 2007b, p. 34), however little data has been provided to support this claim.
Table 3
Demographic Properties for the Non-Clinical and Clinical Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Non-clinical</th>
<th></th>
<th>Clinical</th>
<th></th>
<th>Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>25</td>
<td>8.1</td>
<td>3</td>
<td>1.4</td>
<td>$\chi^2 = 11.69, p &lt; .001$</td>
</tr>
<tr>
<td>Female</td>
<td>285</td>
<td>91.9</td>
<td>219</td>
<td>98.6</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>44.75 (SD = 11.55)</td>
<td></td>
<td>49.17 (SD = 10.38)</td>
<td></td>
<td>$t = -4.53, p &lt; .001$</td>
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<td>Range</td>
<td>19-83</td>
<td></td>
<td>26-78</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$\chi^2 = 21.77, p &lt; .005, V = .20$</td>
</tr>
<tr>
<td>Some High School</td>
<td>14</td>
<td>4.5</td>
<td>9</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>High School Diploma</td>
<td>37</td>
<td>11.9</td>
<td>42</td>
<td>18.9</td>
<td></td>
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<tr>
<td>Incomplete Bachelor's Degree</td>
<td>25</td>
<td>8.1</td>
<td>32</td>
<td>14.4</td>
<td></td>
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<tr>
<td>Trade/Tech Training</td>
<td>22</td>
<td>7.1</td>
<td>28</td>
<td>12.6</td>
<td></td>
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<tr>
<td>Bachelor's Degree</td>
<td>112</td>
<td>36.1</td>
<td>58</td>
<td>26.1</td>
<td></td>
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<tr>
<td>Post Graduate Qualification</td>
<td>100</td>
<td>32.3</td>
<td>53</td>
<td>24.0</td>
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<tr>
<td><strong>Employment</strong></td>
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<td></td>
<td></td>
<td></td>
<td>$\chi^2 = 42.70, p &lt; .001, V = .28$</td>
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<tr>
<td>Full-time</td>
<td>109</td>
<td>35.2</td>
<td>65</td>
<td>29.3</td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td>41</td>
<td>13.2</td>
<td>32</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>Self-employed</td>
<td>61</td>
<td>19.7</td>
<td>19</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Out of work – looking</td>
<td>10</td>
<td>3.2</td>
<td>11</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Out of work – not looking</td>
<td>4</td>
<td>1.3</td>
<td>15</td>
<td>6.8</td>
<td></td>
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<tr>
<td>Full-time carer</td>
<td>28</td>
<td>9.0</td>
<td>22</td>
<td>9.9</td>
<td></td>
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<tr>
<td>Student</td>
<td>25</td>
<td>8.1</td>
<td>9</td>
<td>4.1</td>
<td></td>
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<tr>
<td>Retired</td>
<td>22</td>
<td>7.1</td>
<td>23</td>
<td>10.4</td>
<td></td>
</tr>
<tr>
<td>Unable to work</td>
<td>10</td>
<td>3.2</td>
<td>26</td>
<td>11.7</td>
<td></td>
</tr>
<tr>
<td><strong>Living</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$\chi^2 = 30.86, p &lt; .001, V = .24$</td>
</tr>
<tr>
<td>Alone</td>
<td>50</td>
<td>16.1</td>
<td>70</td>
<td>31.5</td>
<td></td>
</tr>
<tr>
<td>Share Accommodation</td>
<td>13</td>
<td>4.2</td>
<td>6</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>With partner</td>
<td>201</td>
<td>64.8</td>
<td>104</td>
<td>34.1</td>
<td></td>
</tr>
<tr>
<td>With parents</td>
<td>14</td>
<td>4.5</td>
<td>3</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>32</td>
<td>10.3</td>
<td>39</td>
<td>17.6</td>
<td></td>
</tr>
<tr>
<td><strong>Relationship Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$\chi^2 = 25.20, p &lt; .001, V = .22$</td>
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<tr>
<td>Single, never married</td>
<td>38</td>
<td>12.3</td>
<td>41</td>
<td>18.5</td>
<td></td>
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<tr>
<td>In a committed relationship</td>
<td>30</td>
<td>9.7</td>
<td>10</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Married/living together</td>
<td>195</td>
<td>62.9</td>
<td>112</td>
<td>50.5</td>
<td></td>
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<tr>
<td>Widowed</td>
<td>4</td>
<td>1.3</td>
<td>11</td>
<td>5.0</td>
<td></td>
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<tr>
<td>Divorced</td>
<td>27</td>
<td>8.7</td>
<td>38</td>
<td>17.1</td>
<td></td>
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<tr>
<td>Separated</td>
<td>16</td>
<td>5.2</td>
<td>10</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>1st degree relative with clutter problems</td>
<td>126</td>
<td>40.6</td>
<td>136</td>
<td>61.3</td>
<td>$\chi^2 = 22.00, p &lt; .001, V = -.20$</td>
</tr>
</tbody>
</table>

See Tolin, Meunier, Frost & Steketee, 2011, p.45 for details regarding the clinical cut-off score of 41 on SI-R.
Hoarders in the current sample were more likely to be out of work (both seeking and not seeking employment) and unable to work than those with lower levels of hoarding symptoms. This may be indicative of the symptoms of the disorder and other comorbid pathologies interfering with hoarding sufferers’ ability to engage in paid work such as depression, injury, or other illnesses (Timpano, Schmidt, Wheaton, Wendland, & Murphy, 2011). Hoarding sufferers were also less likely to be self-employed. Entrepreneurship inherently requires high levels of organization, motivation, and resilience, which may be difficult for hoarding sufferers due to the pervasive effect HD has on functioning (Ong, Pang, Sagayadevan, Chong, & Subramaniam, 2015).

In agreement with previous research, hoarding sufferers were also more likely to never have married and live alone and were also more likely to be divorced or widowed (Frost et al., 2004; Steketee et al., 2001). Directionality cannot be determined here; therefore, it is possible that isolation and loneliness could precipitate the symptoms of hoarding, or equally the physical nature of excessive clutter leads to a single life living alone. It is evident anecdotally that the physical symptoms of hoarding leads to relationship problems and divorce, however the likelihood of this requires further investigation. Indeed, it is also possible that divorced or widowed hoarding sufferers increase their hoarding behaviours because they are no longer being kept in check by their partners (Frost & Steketee, 2010, Chapter 11).

Having a first-degree relative with clutter problems was also significantly more likely for the clinical hoarding group (61.3%), indicating some familial connection be it genetic or learned behaviours. Such a finding is again consistent with the previous literature on hoarding populations (Tolin et al., 2008).
Table 4
Descriptive Statistics and Internal Consistency Values for Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Saving Inventory—Revised</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIR total</td>
<td>37.50</td>
<td>17.79</td>
<td>4–81</td>
<td>.97</td>
</tr>
<tr>
<td>SIR-s</td>
<td>12.04</td>
<td>6.39</td>
<td>0–28</td>
<td>.92</td>
</tr>
<tr>
<td>SIR-c</td>
<td>13.47</td>
<td>9.93</td>
<td>0–36</td>
<td>.96</td>
</tr>
<tr>
<td><strong>Saving Cognitions Inventory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCI total</td>
<td>60.89</td>
<td>27.64</td>
<td>23–159</td>
<td>.96</td>
</tr>
<tr>
<td>SCI-e</td>
<td>24.02</td>
<td>12.86</td>
<td>10–70</td>
<td>.95</td>
</tr>
<tr>
<td>SCI-c</td>
<td>11.56</td>
<td>4.97</td>
<td>3–21</td>
<td>.80</td>
</tr>
<tr>
<td>SCI-r</td>
<td>15.62</td>
<td>7.80</td>
<td>6–42</td>
<td>.87</td>
</tr>
<tr>
<td>SCI-m</td>
<td>12.66</td>
<td>6.67</td>
<td>5–35</td>
<td>.87</td>
</tr>
<tr>
<td><strong>Depression, Anxiety, and Stress Scale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DASS total</td>
<td>18.30</td>
<td>12.93</td>
<td>0–63</td>
<td>.95</td>
</tr>
<tr>
<td>DASS-a</td>
<td>4.40</td>
<td>4.25</td>
<td>0–21</td>
<td>.87</td>
</tr>
<tr>
<td>DASS-d</td>
<td>6.37</td>
<td>5.40</td>
<td>0–21</td>
<td>.93</td>
</tr>
<tr>
<td>DASS-s</td>
<td>7.53</td>
<td>4.59</td>
<td>0–21</td>
<td>.88</td>
</tr>
<tr>
<td><strong>Acceptance and Action Questionnaire—II</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Fusion Questionnaire</td>
<td>22.35</td>
<td>10.87</td>
<td>7–49</td>
<td>.95</td>
</tr>
<tr>
<td><strong>Brief Experiential Avoidance Questionnaire</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEAQ total</td>
<td>47.18</td>
<td>11.30</td>
<td>14–79</td>
<td>.84</td>
</tr>
<tr>
<td>BEAQ-ba</td>
<td>14.21</td>
<td>4.39</td>
<td>4–24</td>
<td>.79</td>
</tr>
<tr>
<td>BEAQ-ds</td>
<td>7.43</td>
<td>2.26</td>
<td>2–12</td>
<td>.60</td>
</tr>
<tr>
<td>BEAQ-da</td>
<td>8.95</td>
<td>3.15</td>
<td>3–18</td>
<td>.63</td>
</tr>
<tr>
<td>BEAQ-p</td>
<td>7.67</td>
<td>2.65</td>
<td>2–12</td>
<td>.76</td>
</tr>
<tr>
<td>BEAQ-rd</td>
<td>5.15</td>
<td>2.61</td>
<td>2–12</td>
<td>.75</td>
</tr>
<tr>
<td>BEAQ-de</td>
<td>3.78</td>
<td>1.61</td>
<td>1–6</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Five Factor Mindfulness Questionnaire—Short Form</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFMQ-SF total</td>
<td>78.37</td>
<td>13.66</td>
<td>36–111</td>
<td>.90</td>
</tr>
<tr>
<td>FFMQ-d</td>
<td>17.69</td>
<td>4.36</td>
<td>5–25</td>
<td>.88</td>
</tr>
<tr>
<td>FFMQ-nr</td>
<td>14.61</td>
<td>3.61</td>
<td>5–25</td>
<td>.78</td>
</tr>
<tr>
<td>FFMQ-o</td>
<td>14.89</td>
<td>3.17</td>
<td>6–20</td>
<td>.77</td>
</tr>
<tr>
<td>FFMQ-aa</td>
<td>15.50</td>
<td>4.09</td>
<td>5–25</td>
<td>.86</td>
</tr>
<tr>
<td>FFMQ-nj</td>
<td>15.68</td>
<td>4.40</td>
<td>5–25</td>
<td>.85</td>
</tr>
<tr>
<td><strong>Self as Context Scale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26.68</td>
<td>4.79</td>
<td>7–35</td>
<td>.86</td>
</tr>
<tr>
<td><strong>Valued Living Scale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60.33</td>
<td>16.30</td>
<td>10–99</td>
<td>.84</td>
</tr>
</tbody>
</table>

Note. SIR total = Saving Inventory—Revised; SIR-s = SIR saving subscale; SIR-c = SIR clutter subscale; SCI total = Saving Cognitions Inventory; SCI-e = SCI emotional attachment subscale; SCI-c = SCI control subscale; SCI-r = SCI responsibility subscale; SCI-m = SCI memory subscale; DASS-a = DASS anxiety subscale; DASS-d = DASS depression subscale; DASS-s = DASS stress subscale; BEAQ-ba = BEAQ behavioural avoidance; BEAQ-ds = distress suppression; BEAQ-da = BEAQ repression/denial subscale; BEAQ-rd = BEAQ reappraisal subscale; BEAQ-de = BEAQ distress endurance subscale (* single item); FFMQ-d = FFMQ-SF describe subscale; FFMQ-nr = FFMQ-SF non-react subscale; FFMQ-aa = FFMQ-SF act aware subscale; FFMQ-nj = FFMQ-SF non-judge subscale.
Study 1

**Results.**

A one-way between-groups multivariate analysis of variance (MANOVA) was performed to investigate hoarding severity and psychological inflexibility. This analysis compared individuals in the lower quartile (i.e., those scoring 22 or below) with those in the upper quartile (i.e. those scoring 50.75 or above) of hoarding severity as measured by the total scores on the SI-R. Individuals in these two quartiles (i.e. lower and upper) were identified in order to investigate whether there were key differences in psychological inflexibility between these groups, given that both groups were at either end of the hoarding continuum. Indeed, if there were to be differences, identifying individuals in these two groups would assist to highlight those.

Five dependent variables comprising all the components of psychological inflexibility were included in the analysis, namely cognitive fusion, experiential avoidance, mindfulness, self-as-context, and valued living. The independent variable was hoarding severity band (low or high). Total $N$ of 267 was reduced to 263 due to four multivariate outliers ($p < .001$ Mahalanobis distance $\chi^2 = 20.52$) leaving group totals of $n = 131$ in the lower quartile and $n = 132$ in the upper quartile.

Results of evaluation of assumptions of normality, linearity, and multicollinearity were satisfactory. MANOVA works acceptably well with moderately correlated dependent variables in either direction (Tabachnick & Fidell, 2013, p. 270). On inspection of the correlations between DVs (see Table 5) in this analysis intercorrelations were acceptable.
Table 5
Intercorrelations Between Psychological Inflexibility Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BEAQ total</td>
<td>–</td>
<td>.51&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.64&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.43&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.39&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>2. CFQ total</td>
<td>–</td>
<td>–</td>
<td>-.66&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.48&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.43&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>3. FFMQ total</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>.59&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.44&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>4. SACS total</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>.42&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>5. VLQ total</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Note. For BEAQ total and CFQ total, higher scores are indicative of higher levels of psychopathology, whereas for the FFMQ total, SACS total, and VLQ total lower scores are indicative of higher levels of disordered behaviour. <sup>a</sup><i>p</i> < .001 (1-tailed).

Upon evaluating the homogeneity of variance matrices, the Levene’s test was violated with outcomes for cognitive fusion, self-as-context, and valued living dependent variables all significant (<i>p</i> < .05). As sample sizes were equal and N large, small differences in group variance can produce a Levene’s test that is significant, therefore it was considered appropriate to continue with the analysis (Field, 2009).

The combined DVs were significantly affected by level of hoarding severity (low vs. high), <i>F</i> (5, 257) = 62.66, <i>p</i> < .001; Wilks’ Lambda = .45; partial <i>η</i><sup>2</sup> = .55.

Table 6
Between Group Effects of Psychological Inflexibility Measures as a Function of Level of HD (Low vs. High)

<table>
<thead>
<tr>
<th>Measure</th>
<th>MANOVA</th>
<th>MANCOVA&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;i&gt;F&lt;/i&gt;</td>
<td>&lt;i&gt;Sig.&lt;/i&gt;</td>
</tr>
<tr>
<td>CFQ total</td>
<td>214.75</td>
<td>.001</td>
</tr>
<tr>
<td>BEAQ total</td>
<td>162.01</td>
<td>.001</td>
</tr>
<tr>
<td>FFMQ-SF total</td>
<td>114.68</td>
<td>.001</td>
</tr>
<tr>
<td>SACS total</td>
<td>62.00</td>
<td>.001</td>
</tr>
<tr>
<td>VLQ total</td>
<td>100.33</td>
<td>.001</td>
</tr>
</tbody>
</table>

<sup>a</sup> Multivariate Analysis of Covariance controlling for DASS total.
As can be seen in Table 6, all of the psychological inflexibility measures were significantly different, with large effect sizes (Richardson, 2011). The low hoarding group reported significantly lower levels of psychological inflexibility than the high hoarding group. These results are evidence of higher levels of inflexibility for hoarding sufferers in all areas and cognitive fusion (CFQ) and experiential avoidance (BEAQ) with the largest effect sizes.

The results from this MANOVA indicate the core processes detailed in the ACT psychological inflexibility model are highly relevant to hoarding disorder. Nevertheless, it has been suggested that general levels of depression, anxiety, and stress should be controlled for as the processes of psychological inflexibility may conceptually overlap with general distress (Bond et al., 2011, p. 686). Therefore, a one-way between-groups MANCOVA was conducted controlling for depression, anxiety, and stress (DASS-total). Assumption testing was conducted to check for normality, linearity, and multicollinearity with no serious violations noted. As the MANCOVA was comparing two groups which are categorical predictor variables and not independent variables in an experiment, the assumption of homogeneity of regression slopes, which is testing to see if the predictor variable and the covariate are independent of each other and do not interact, was deemed irrelevant and not interpreted.

The combined DVs, controlling for general distress and anxiety, were significantly affected by level of hoarding severity (low vs. high), $F(5, 257) = 12.40, p < .001$; Wilks’ Lambda = .80; partial $\eta^2 = .20$. Results from the MANCOVA are detailed in Table 6. It was hypothesised that cognitive fusion would become non-significant after controlling for general distress, however, it was mindfulness that appeared most impacted by the inclusion of the covariate into the model. Additionally, self-as-context approached significance with a small effect size.
Post-Hoc Test.

In order to further investigate the impact of the covariate psychological distress on mindfulness, a one-way between-groups MANCOVA was conducted on the five facets of mindfulness: FFMQ-Describe, FFMQ-Non-react, FFMQ-Observe, FFMQ-Act aware, FFMQ-Non-judge, controlling for general distress (DASS-total) as a post-hoc test to deepen the understanding of the relationship between the five facets of mindfulness and HD severity.

Assumption tests of linearity, and multicollinearity were satisfactory. Total N of 268 was reduced to 266 due to two multivariate outliers (p < .001 Mahalanobis distance $\chi^2 = 20.52$) leaving group totals of $n = 134$ in the lower quartile and $n = 132$ in the upper quartile. Box’s test of equality of covariance matrices was violated therefore Pillai’s Trace was used to interpret the model result. Intercorrelations between dependent variables were statistically significant ($p < .01$, 2-tailed) and ranged from .12 to .53, which was satisfactory to continue the analyses.

Table 7
Between Group Effects of Facets of Mindfulness, Controlling for General Distress (DASS-21) as a Function of Level of Hoarding Low vs. High

<table>
<thead>
<tr>
<th>Subscales</th>
<th>$F$</th>
<th>Sig.</th>
<th>Partial $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFMQ-Describe</td>
<td>1.33</td>
<td>N/S</td>
<td>–</td>
</tr>
<tr>
<td>FFMQ-Non-react</td>
<td>4.55</td>
<td>.03</td>
<td>.02</td>
</tr>
<tr>
<td>FFMQ-Observe</td>
<td>2.00</td>
<td>N/S</td>
<td>–</td>
</tr>
<tr>
<td>FFMQ-Act aware</td>
<td>5.02</td>
<td>.03</td>
<td>.02</td>
</tr>
<tr>
<td>FFMQ-Non-judge</td>
<td>.873</td>
<td>N/S</td>
<td>–</td>
</tr>
</tbody>
</table>

The combined mindfulness DVs, controlling for general distress and anxiety, were significantly affected by level of hoarding severity (low vs. high), $F(5, 259) = 2.60,$
Upon inspection of the results, mindfulness subscales of FFMQ-Describe, FFMQ-Observe, and FFMQ-Non-judge were not significantly different when low and high hoarding groups were compared and general distress (DASS total) was controlled for (Table 7). Scores on the FFMQ-Non-react and FFMQ-Act aware subscales of Mindfulness were statistically significantly different when the low and high hoarding groups were compared, with small effect sizes (Table 7).

In order to investigate these relationships and understand the nature of difficulty discarding, hoarding’s defining characteristic, from the perspective of psychological inflexibility and emotion regulation more sophisticated analyses are required. The following chapter will investigate the proposed psychological inflexibility path model of difficulty discarding in HD.
In Chapter 6 it was established that those reporting high levels of hoarding symptoms displayed significantly more psychological inflexibility than those at the low end of the hoarding continuum. When general distress (as measured by DASS total) was controlled for in the analysis, mindfulness (as measured by the FFMQ-SF total) was no longer significantly different between the low and high groups and self-as-context was approaching statistical significance \( (p < .056) \). General cognitive fusion (as measured by the CFQ), general experiential avoidance (as measured by the BEAQ), and inaction towards values (as measured by the VLQ) were significantly different between those participants reporting high levels of hoarding severity and those reporting low levels, even after controlling for general psychological distress. While these comparisons are useful, they are but the first step in understanding the nature of hoarding disorder’s defining characteristic, namely difficulty discarding, from an acceptance perspective and informing future treatment enhancement. Indeed, more sophisticated analyses are required to estimate the statistical path of difficulty discarding in HD.

In the aid of clarity, it is firstly important to briefly define the terms being used in this chapter before describing the analyses. Differentiating between saving and difficulty discarding is required to clearly differentiate between a behaviour and a process. In the current study, saving is being defined as inertia or the absence of physical behaviour in the form of avoidance of discarding and will be measured using the SI–R-saving subscale (see Table 3). Difficulty discarding is defined here as the psychological process where hoarding sufferers approach discarding and interact with the emotions and resulting cognitions that complicate decision-making and subsequently lead to saving and
disorganised clutter. This distinction between saving and difficulty discarding is both important and beneficial to investigate and differentiate as it offers the opportunity to identify possible intervention points in the path to pathological saving and physical clutter.

Using more sophisticated causal analyses such as structural equation modelling (SEM) allows for more complex relationships to be estimated and path models to be tested for goodness-of-fit to the data. Thus, identifying the elements in the process of difficulty discarding in HD, from a psychological inflexibility perspective, and estimating this process using SEM path analysis was the aim of this chapter.

**Data analytic approach.**

According to the hypothesised model presented in Chapter 5, the difficulty discarding phase (see Figure 2) begins with the trigger of negative emotions, resulting from a threat or catalyst, which leads to the contemplation of large scale discarding. Incidentally, as this was not an experimental study there were no priming activities to elicit these emotional reactions. Contemplation of discarding is followed by the emergence of negative internal experiences of anxiety and stress (as measured by the DASS-Anxiety and the DASS-Stress). Hoarding sufferers are hypothesised to endeavour to make sense of reflexive emotional reactions and in order to problem solve these internal experiences they fuse with thoughts that they accept as inflexible truths (as measured by the CFQ). In HD, these rules tend to be related to specific beliefs about the importance and meaning of possessions (as measured by the SCI) and lead to avoidance behaviours (as measured by the BEAQ) to delay decision-making, without inspecting the environment for cues. Experiential avoidance leads to the abandonment of discarding efforts (as measured by the SI-R-saving subscale) and a return to the emotion regulation strategies previously employed of saving and acquiring (see Figure 2; Phase II) and clutter (as measured by the SI-R-clutter) continues to increase.
In simplified terms it can be said that the levels of the initial difficulty discarding path model (Figure 5 below) indicate: 1) distressing emotions lead to 2) cognitive fusion with strict thoughts about the value and meaning of possessions, that are taken as true without debate, and consequently 3) avoidance of discarding results in large volumes of 4) clutter.

However, other psychological inflexibility elements of inflexible attention (as measured by FFMQ-SF) and the attachment to the conceptualised self (as measured by the SACS), are posited to influence and interact with general cognitive fusion (as measured by the CFQ) and HD specific cognitive fusion (as measured by the SCI) and, in turn, impact general avoidance behaviours (BEAQ) and HD specific experiential avoidance (SI-R-saving), leading finally to clutter (SI-R-clutter).

As all psychological inflexibility processes have not been investigated in a HD path analysis to date, this initial model was exploratory, therefore predictions about the relationship amongst variables at each level and between levels were not made and direct relationships were tested initially. Indeed, given the results from the MANOVA and MANCOVA’s reported in Chapter 6, and the moderate to high intercorrelations between the psychological inflexibility variables (see Table 4), the initial fully latent model (Figure 5) was conducted to estimate relationships between variables at each level of the hypothesised model and assess results for cross-loading factors.

Following the data screening details for this sample are the results from the initial analysis into the exploratory difficulty discarding model (Figure 5). Consequently, after interpreting these exploratory results, a revised latent psychological inflexibility path model of difficulty discarding in HD was hypothesised and tested and the results are presented below.
**Data screening.**

Collinearity diagnostics indicated that the tolerance values for the independent variables were all above the cut off of .10 (.32 – .44), while the corresponding Variance Inflation factors (VIF) were all below 10 (2.28 – 3.10). All measured variables were screened together for multivariate outliers. On inspection of the Mahalanobis distance, five cases were identified as multivariate outliers, however the maximum value for Cook’s Distance was less than one (.057). According to Tabachnick and Fidell (2013), this is not deemed to influence the results of the model unduly, and thus the cases were retained.

Variable normality ensures robustness of statistical inference and is therefore important in most inferential statistics. Structural Equation Modelling (SEM) is no exception. In this sample, the assumption of normality was violated for the majority of variables (SI-R, SCI, AAQ, CFQ, DASS, FFMQ, SACS) according to Kolmogorov-Smirnov tests ($D (532) = .063 – .178\ p \text{'s} < .001$); nonetheless, in large samples these tests can be significant where only slight variations from normality exist. In this case, inspection of histograms, P-P and Q-Q plots, and values of skew and kurtosis indicated normality was reasonable for this sample. Additionally, given the sample size of over 500 participants, the use of the Maximum Likelihood estimation method for structural equation modelling analyses is suggested as it performs well, that is, the test statistic neither rejects or accepts the true model too many times at a $p < .05$ level (Tabachnick & Fidell, 2013).

**Results.**

**The Initial Hypothesised Model.**

The initial fully latent hypothesised model is detailed in Figure 5, with ovals representing latent variables. In SEM, lines with one arrow indicate a hypothesised direct relationship between two variables and the variable with arrows pointed at it but none from
it is the dependent variable. In this case the dependent variable is clutter (SI-R-Clutter). Lines with arrows at both ends represent a covariance with no hypothesised direction of effect. Each latent variable was represented by a number of questionnaire items, however for ease of interpretation these were excluded from the diagram. This path model was hypothesised to test the difficulty with the discarding process from a psychological inflexibility perspective in an oversampled community sample. Clutter, the dependent variable, a latent variable with nine indicators (SI-R items of 1,3,5,8,10,12,15,20,22) measured the level of physical disorder in the home environment and the level of distress and ability to perform everyday tasks. It was hypothesised that exogenous variables, namely distress and anxiety (as measured by the DASS subscales of stress and anxiety), lead to the avoidance behaviours of saving (SI-R items 4,6,7,13,17,19,23) and other experiential avoidance tactics (BEAQ with six subscales) via psychological inflexibility processes of general cognitive fusion (CFQ), inflexible attention (FFMQ), attachment to the conceptualised self (SACS), and inflexible saving beliefs (SCI). Avoidance behaviours of saving (SI–R saving) and experiential avoidance (BEAQ) then lead to the dependent variable of clutter (SI–R-Clutter). This model consisted of four-levels with multiple sequential mediators.

Consequently, a full measurement and structural model analysis was conducted using AMOS® 24. Cross-loading of variables was a concern based on previous analyses (see Chapter 6), in particular tiers 2 and 3 of the hypothesised model as the items across mindfulness (FFMQ), self-as-context (SACS), and cognitive fusion (CFQ) measures do share language and concepts in common, as do items across the saving behaviours (SI–R-Save) and experiential avoidance (BEAQ) measures.
The full latent model was analysed using AMOS® 24 and the initial model fit was deemed acceptable (CMIN/DF = 2.26; CFI = .92; RMSEA = .05; PCLOSE = .85). Standardised regression weights for all latent variables were acceptable (SRW = .37 – .93), thus predictors were deemed to explain acceptable levels of variance in the target variables. However, when modification indices and the residual covariance matrix were analysed there was evidence of significant cross loading on a number of items, with exogenous covariance indicating variable redundancy.

Specifically, exogenous variables DASS-anxiety and DASS-stress subscales in the current sample were extremely highly correlated (97%), indicating statistical redundancy and the need to exclude one variable from future analyses. Considering previous research has found anxiety to be highly related to HD (e.g. Timpano et al., 2009), DASS-anxiety was retained and stress was dropped from all future investigations.
When considering the results of the full latent path model, self-as-context was not significantly related to any aspects of difficulty discarding and it was excluded from future analyses.

Tier 2 of the original model included latent mediating variables of cognitive fusion (CFQ), mindfulness (FFMQ), self-as-context (SACS), and hoarding cognitions (SCI) that were measures of the various facets of psychological flexibility - the core ACT process discussed in Chapter 3. When assessing modification indices, evidence of numerous cross-loading items and cross loading latent variables within and between measures was found, indicating items were measuring similar concepts.

A confirmatory factor analysis (CFA) of Tier 2 of the model and first level moderators did offer some insights into the elements of mindfulness, cognitive fusion, and self-as-context and their relationship with each other, and with saving cognitions.

Mindfulness (FFMQ-SF) and cognitive fusion (CFQ) were highly negatively correlated (−.86) which indicated they were measuring very similar concepts. When inspecting modification indices, the error term of CFQ item 5 “I get upset with myself for having certain thoughts” was negatively correlated (−.32) with the error term of FFMQ-Non-judge subscale with reverse scored questions such as “I tell myself I shouldn’t be feeling the way I’m feeling” and I tell myself I shouldn’t be thinking the way I’m thinking”. Clearly these are tapping into similar concepts. The low factor loading on the FFMQ-observe subscale .178, suggests this concept is measuring a different concept to the overall measure of mindfulness. Self-as-context and saving cognitions were moderately correlated to mindfulness (.67 and -.60 respectively). Additionally, cognitive fusion and saving cognitions were also moderately correlated (.65).

Second Tier mediators of general experiential avoidance (BEAQ) and saving behaviours (SI–R-saving) correlated moderately (.56) when results from a CFA was
analysed, and model fit was poor, CMIN/DF = 3.405, CFI = .962, RMSEA = .067 [.058, .077], PCLOSE = .002. Subsequently, modification indices were inspected and a suggested path from saving behaviours to the BEAQ-procrastination and BEAQ-distress endurance subscales would improve the model fit. When a direct path was included from saving to procrastination and another from saving to distress endurance the model fit was good, CMIN/DF = 2.374, CFI = .979, RMSEA = .051 [CI, .040, .063], PCLOSE = .430.

Although deletions of troublesome items and measures may have allowed for a successful interpretation of the model and perhaps the development of a single measure of psychological inflexibility for this sample, this procedure was rejected. It was considered more suitable to use an already validated and tested measure of overall psychological inflexibility in future analyses. Additionally, the result from the second CFA of the experiential avoidance measures the BEAQ and the SI-R-saving indicated some common variance particularly with two of the six BEAQ subscales. As this path model was intended to measure difficulty discarding in HD, it was decided that the use of hoarding specific experiential avoidance in future investigations.

**Theoretical support for a reformulated difficulty discarding path model.**

In order to revise the latent structural model, it was necessary to consider which concepts were potentially exogenous in the model and which concepts were potential mediators in the process from a theoretical perspective. When contemplating the discarding of possessions, a high level of anxiety is reported by hoarding sufferers (Capron, Norr, Macatee, & Schmidt, 2013; Timpano et al., 2009).
Concurrently, there is the potential for feelings of helplessness and depression that may, independently, lead to saving beliefs (Frost, Steketee, & Tolin, 2011; Mackin et al., 2011; Raines et al., 2016). Typically, anxiety and depression, or levels of general psychological distress are controlled for in HD research (e.g. Steketee et al., 2003). In contrast, this structural path model includes these negative affective states as exogenous variables not as mere covariates. This is designed to gain evidentiary support for the theoretical perspective of ACT which suggests that emotions are the precursor to cognitions rather than the reverse as proposed in the current C-B model of hoarding disorder (see Chapter 4).

Psychological inflexibility, as previously detailed, is theorised to be a risk factor for a range of psychopathologies and higher levels of inflexibility were related to hoarding severity in Chapter 6 of this thesis. The concept of psychological inflexibility is considered to be a rigid cognitive state and a way of interacting with the world that avoids direct experience. When experiencing the world from a psychologically inflexible position, behaviours tend to be based on reactive thoughts and feelings that are ruminations on past failings and negative experiences or anxiety over uncertainty in the future (Hayes et al., 2012).
The Acceptance and Action Questionnaire – II (AAQ-II), which was developed to measure the general inability to adapt to internal and external contexts (Bond et al., 2011), is an entirely different set of items when compared to the original AAQ (Hayes et al., 2004), which was primarily created to measure experiential avoidance. The seven-item measure of psychological inflexibility is a uni-dimensional reflective scale; higher scores are associated with greater levels of overall psychological distress (Bond et al., 2011).

Based on the findings of Chapter 6 indicating that overall psychological inflexibility is a predictor of hoarding severity and the cross-loading found in the initial SEM path model, the AAQ-II was considered an appropriate exogenous variable in the reformulated parsimonious hypothesised model along with anxiety and depression.

As previously discussed in the introduction to this chapter, hoarding sufferers are hypothesised to endeavour to make sense of reflexive emotional reactions (the exogenous variables of anxiety, depression, and psychological inflexibility in the model) and in order to problem solve these internal experiences they fuse with thoughts that they accept as inflexible truths. In HD, these rules tend to be related to specific beliefs about the importance and meaning of possessions (as measured by the SCI). While hoarding sufferers were found to report significantly higher levels of general cognitive fusion (see Chapter 6) than non-hoarding sufferers, it is the specific saving beliefs that are relevant in this difficulty discarding model. To this end, hoarding specific cognitive fusion will be measured using the four subscales of the SCI (possession attachment, responsibility, memory, and control).

ACT theory suggests cognitive fusion leads to avoidance behaviours and evidence from the previous statistical analysis in Chapter 6 suggests those who report higher levels of hoarding symptoms also report higher levels of general experiential avoidance when compared to those reporting low levels of hoarding behaviours. Once again, hoarding
sufferers are likely to respond to their inflexible beliefs they treat as true (without
inspecting the environment for cues) and engage avoidance tactics. In hoarding, saving
behaviour is the means through which sufferers engage in experiential avoidance (Ayers,
Castriotta, et al., 2014). Therefore, in the acceptance-based difficult discarding model,
hoarding-specific experiential avoidance was measured by the SI–R-saving subscale.

**Hypothesis.**

The revised psychological inflexibility difficulty discarding model in Figure 6
tested the relationship between emotions, cognitions, and avoidance in HD. It is
hypothesised that anxious, depressed, and psychologically inflexible approaches to living
lead to the use of saving cognitions to make sense of emotional reactions when
contemplating the discarding of possessions. These inflexible beliefs about the nature and
value of possessions then lead to discarding avoidance (saving) to circumvent the strong
emotions. By avoiding discarding and saving possessions clutter builds over time and has
a negative effect on hoarding sufferers’ lives.

**Results.**

Once again, the Maximum Likelihood estimation method was used for the
structural equation modelling analyses as it performs well with large samples ($N = 532$);
that is, the test statistic neither rejects or accepts the true model too many times at a $p < .05$
level (Tabachnick & Fidell, 2013).

All of the path coefficients between measured variables and factors in the model
were significant ($p < .05$), except for the path from depression to saving beliefs, which was
subsequently deleted. Modification indices suggested significant paths existed between
depression and saving behaviour and depression and clutter; since these paths were
theoretically legitimate two regression lines were subsequently added (see Figure 7).
Other suggested modifications to the model were not theoretically substantiated therefore no further changes were made to the model.

Figure 7. Results of the Psychological Inflexibility Difficulty Discarding Path Model.

Model fit.

After these post hoc model modifications were made the final model fit indices were: CMIN/DF = 2.22; CFI = .93; RMSEA = .05; PCLOSE = .94). Although the acceptable minimum level of the CFI is .95 (Schreiber, Nora, Stage, Barlow, & King, 2006), Iacobucci (2010) suggests one should not be “overly critical” if the CFI is not quite at that level especially if the other goodness-of-fit measures are acceptable. Thus, the model was deemed to fit the data well.

Direct Effects.

Increased clutter was predicted by greater saving behaviour ($B = 1.14, p < .001$) and depression ($B = .15, p < .05$). Saving behaviour increased as saving cognitions ($B = .51, p < .001$) and depression increased ($B = .11, p < .05$). Increased saving cognitions were predicted by greater anxiety ($B = .40, p < .01$) and psychological inflexibility ($B = .41, p < .001$). When comparing standardised coefficients, the relationship between psychological inflexibility and saving cognitions ($\beta = .53$) was stronger than between
anxiety and saving cognitions ($\beta = .20$). In order to test the hypothesis that the psychological inflexibility and anxiety standardised beta weights were statistically significantly different from each other, their corresponding 95% confidence intervals were estimated via percentile corrected bootstrap (2,000 resamples) using SPSS®24. Results indicated there was no overlap in the calculated confidence intervals for psychological inflexibility (PC CI [.40, .57]) and anxiety (PC CI [.14, .31]), therefore the difference between standardised beta weights ($\Delta \beta = .33$) was considered statistically significant ($p < .001$) (Cumming, 2009).

**Indirect Effects.**

Indirect effects were test using 2,000 bootstraps with 95% percentile correction. More than two thirds (69%) of the variance in clutter was accounted for by saving behaviour. Paths were assessed by multiplying the unstandardised estimates of each regression analysis (Gaskin, 2016a, 2016b).

Path 1 from anxiety to clutter via sequential mediators, saving cognitions, followed by saving behaviour was significant ($B = .23$, PC CI [.08, .38], $p = .008$). Path 2 from psychological inflexibility to clutter via sequential mediators, saving cognitions, followed by saving behaviour was significant ($B = .24$, PC CI [.17, .31], $p = .001$). Path 3 from depression to clutter via saving behaviour was significant ($B = .12$, PC CI [.02, .24], $p = .02$).

Results from this psychological inflexibility difficulty discarding path model indicate that multiple paths directly and indirectly impact the outcome variable clutter with a good model fit. Overall, the model contributed 69% to the variance in the outcome variable clutter.

As hypothesised, psychological inflexibility (measured by the AAQ-II) and anxiety (measured by the DASS-anxiety) contributed significantly to hoarding-specific cognitive
fusion (measured by the SCI), which in turn significantly impacted hoarding-specific experiential avoidance (measured by the SI-R-saving), leading to clutter (measured by the SI–R-clutter).

Comparisons indicate that the psychological inflexibility path was a significantly greater influence on the variance in saving specific cognitive fusion than the anxiety path. The path from depression to hoarding specific cognitive fusion was not significant contrary to the hypothesis. In contrast, the significant path of depression directly to clutter and indirectly to clutter via hoarding specific experiential avoidance (saving) was not hypothesised.
Chapter 8

Discussion

The aim of this thesis was to reconceptualise the Frost and Hartl (1996) model of hoarding disorder (HD) from an emotion regulation perspective through an acceptance and commitment therapy (ACT) lens. Based on critical reviews of: firstly, the HD treatment literature, secondly, the evidence supporting the impact of psychological inflexibility processes in HD, and thirdly, the research substantiating the key elements of the current cognitive behavioural model of HD, a novel four phase acceptance-based emotion regulation model of HD was hypothesised.

Study 1 of the thesis investigated whether hoarding participants exhibited higher levels of psychological inflexibility when compared to non-hoarding participants. To this end, multivariate analyses of variance and covariance were conducted to establish between group differences on the six core processes of psychological inflexibility, comparing those participants reporting high hoarding severity levels against those reporting low hoarding severity levels.

Subsequently, in Study 2, hypothesised path models of the process of difficulty discarding, previously detailed in Phase III of the novel emotion regulation model were tested using structural equation modelling. Findings from the path models resulted in adjustments being made to the difficulty discarding phase of the proposed acceptance-based emotion regulation model of HD to reflect the statistically relationships established.

In the final chapter of this thesis, the findings from the multivariate analyses of psychological inflexibility conducted in Study 1 will be reviewed. This will be followed by an evaluation of the results from the difficulty discarding structural equation modelling path analyses conducted in Study 2. Theoretical implications of the proposed acceptance-
based emotion regulation model, psychological inflexibility, and hoarding severity findings, as well as the psychological inflexibility difficulty discarding path results will be explored and the limitations of this project discussed. Suggestions for future research are then proposed, followed by a review of practical implications of the current findings and finally a detailed discussion of the ways in which the novel treatment protocol, developed in the project, can assist clinicians working with hoarding sufferers.

Study 1.

Results: Multivariate analyses of variance and covariance.

The results from the initial multivariate analysis of variance (MANOVA) conducted to establish between group differences on the five psychological inflexibility measures indicate that those reporting high levels of hoarding symptoms in the upper quartile of this sample were significantly less psychologically flexible than the lower quartile. Based on this finding further analysis using these variables in a SEM path analysis was appropriate. Nevertheless, upon inspection of the intercorrelations between the five variables (see Table 4) and the results of the MANCOVA (controlling for general psychological distress measured by DASS-21) there was a need to continue cautiously. There was statistical evidence of some overlap between dependent variables. Of particular interest, considering the post-hoc MANCOVA results on the FFMQ-SF subscales, the significant negative correlations between the FFMQ-SF and the CFQ \( (r = -.66, n = 267, p < .001) \), BEAQ \( (r = -.64, n = 267, p < .001) \), and the significant positive relationship between the FFMQ-SF and the SACS \( (r = .59, n = 267, p < .001) \) highlight potential concerns. Indeed, although multicollinearity in this case was not found, further inspection of the items and potential cross-loading were important when assessing the results of the fully latent path model in Study 2.
The results from Study 1 indicated overall inflexibility levels were statistically significantly different in the group reporting high hoarding severity, even after controlling for psychological distress, when compared to the low severity group overall. However, when considering the individual inflexibility measures, significance results varied. Following is a discussion of the results for the psychological inflexibility MANCOVA conducted and the follow-up post-hoc MANCOVA for the mindfulness subscales.

*Cognitive fusion and experiential avoidance.*

General cognitive fusion and experiential avoidance, which were extensively discussed in Chapter 3, were both significantly higher in the high hoarding group even after controlling for negative affect (Table 5) supporting the conclusion that these ACT processes are relevant to HD. The hypothesised that cognitive fusion (as measured by the CFQ) would be not significantly different between high and low groups after controlling for general distress (as measured by the DASS-21) was not supported. Certainly, the process pair of fusion and avoidance, known in ACT as the closed response style (Hayes et al., 2012, p. 67) is applicable when considering the inflexible beliefs commonly held by hoarding sufferers about the value and meaning of their possessions (measured by the SCI) and their use of inanimate objects to regulate emotions by avoiding discarding (measured by the SI-R-saving). Further investigation into how the general measures of cognitive fusion (CFQ) and experiential avoidance (BEAQ) related to the hoarding specific measures of fusion (SCI) and avoidance (SI–R-saving) will offer evidence to support whether HD can be conceptualised in ACT terms at least in terms of this closed psychological inflexibility response style.
Inflexible attention and attachment to the conceptualised self.

Inflexible attention and attachment to the conceptualised self are the second process pair in the psychological inflexibility model and indicate a lack of centredness (Hayes et al., 2012, p. 67). Centredness in ACT is when one is able to remain present and take alternative points of view including viewing ones internal experiences without judgment (Hayes et al., 2012, p. 85). Without flexible attention or present moment awareness and the ability to separate one’s identity from thoughts and take a personal perspective from those thoughts, ACT theory suggests choices and behaviours are not based on what is happening in the environment now. Consequently, when one is also open (accepting and defused) one is able to connect with direct experience in the present moment. In fact, ACT sees centredness as behaving like an axis with openness on one side and engagement of values through committed actions on the other (Hayes et al., 2012, p. 78).

Interestingly, the results here for measures of mindfulness and self-as-context indicate that there was not a significant difference between high and low hoarding severity groups for total mindfulness, and a borderline significance result for self-as-context, after controlling for general psychological distress. This suggests there is no difference in hoarding sufferers’ ability to remain centred and attentive to the present moment, which supports the conclusion made in Chapter 3 regarding the lack of evidence for objective attention deficits in HD. Alternatively, the five facets of mindfulness measured in this sample of observe, describe, acting with awareness, non-judging of inner experiences, and non-reactivity to inner experiences should be considered separately to identify key differences. A post-hoc MANCOVA was conducted comparing the five facets of mindfulness individually (Table 6) to offer a more fine-grained analysis.
Mindfulness.

The results of the post-hoc MANCOVA indicate two of the five mindfulness facets were significantly different. After controlling for general distress, there was a statistically significant difference between low and high hoarding groups for the acting with awareness and the non-reactivity to inner experience facets of mindfulness. Yet, there were non-significant results for the observe, describe, and non-judging of inner experience mindfulness facets.

As mindfulness has not been investigated in relation to HD in the literature, it is necessary to relate these individual results to observations and findings in other areas of HD research in order to understand them in the greater context of hoarding behaviours.

Acting with awareness.

Acting with awareness is the ability to stay focused on the present moment and results indicate there was a statistically significant difference between those reporting high levels of hoarding severity and those reporting low levels (Table 6). Hoarding sufferers are between 6 and 9.5 times more likely to exhibit ADHD-inattentive type symptoms (Fullana et al., 2013; Sheppard et al., 2010). Findings at this stage are inconclusive (see Chapter 4), however, it is possible that hoarding sufferers find attending to the present moment difficult because they have objective attentional deficits. Alternately, being inflexible and fusing with emotional thoughts such as “I could not tolerate it if I were to get rid of this item” inherently draws attention away from the present moment into the past when an experience of intolerable anxiety was experienced. Similarly, the same thought leads attention away from the present and into a preferred future, where intolerable emotions would be avoided (Hayes et al., 2012, p. 79).

Additionally, it is possible, hoarding sufferers “run on automatic”, rushing through activities without really paying attention to them (Bohlmeijer et al., 2011) as a habitual
response to avoid negative feelings they believe are associated with certain daily activities such as getting ready for work, or preparing meals. Paying attention to such tasks would lead hoarding sufferers to pay attention to the clutter and disorder in their surroundings. For HD sufferers the tendency to be intolerant of uncertainty (e.g. Oglesby et al., 2013) and ruminate over problems (Portero, Durmaz, Raines, Short, & Schmidt, 2015) is likely to contribute to automatisation. Perhaps rumination over other problems is a way to avoid thinking about discarding. Without further research into the acting with awareness facet of mindfulness and HD these hypotheses remain untested, however, practicing mindfulness while engaging in a valued activity may be beneficial. Typical mindfulness exercises involve noticing the activity one is currently engaging in, letting thoughts pass without judging or trying to change them, and acknowledging feelings without attempts to may avoid them. Encouraging hoarding sufferers to focus on specific activities unrelated to possessions may improve their attentional skills.

*Non-reactivity to inner experiences.*

Linked to acting with awareness is non-reactivity to inner experiences, which was another of the mindfulness facets the high hoarding group scored significantly lower on than the low hoarding group. As discussed in Chapter 3, research indicates hoarding sufferers report lower levels of emotional tolerance, that is low distress tolerance and high anxiety sensitivity (Timpano et al., 2009) which is a vulnerability factor for hoarding. When faced with distressing emotions, those reporting high levels of hoarding symptoms tended to feel overwhelmed by anxiety and completely engrossed by the experience feeling emotions more intensely than those reporting low levels of hoarding symptoms when exposed to a mood induction (Timpano, Shaw, et al., 2014). Most sensitive to the physical sensations of anxiety such as racing heartbeat, chest tightening, and sweaty palms, hoarding sufferers react reflexively to negative inner experiences with avoidance
behaviours of acquiring and saving. Accordingly, mindfulness techniques could be used in this case to disrupt problematic avoidance behaviours. Mindful observation of the way in which hoarding sufferers engage in reactionary behaviours of saving and acquiring by bringing full awareness to thoughts and feelings whilst saving or acquiring may significantly reduce hoarding severity by disrupting the behaviours before they can be engaged in (Harris, 2009). Observing avoidance behaviours and paying attention to triggers and internal experiences that lead to reactions could leverage a mindfulness facet in which hoarding sufferers appear to have a relative strength: Observing.

**Observe.**

The observe facet of the mindfulness measure was not significantly different between the low and high hoarding groups. Noticing the smells, sounds, and visual elements in art or nature are indicators of being mindfully observant. Interestingly, hoarding sufferers have been observed revering the sensory details and uniqueness of their collected objects (Frost & Steketee, 2010, Chapter 3). It has been hypothesised that this admiration and focus on the visual aspects of possessions, may be due to an emphasis on visual and spatial aspects of the environment to compensate for navigating clutter living conditions (McMillan et al., 2013). While the high hoarding group did not score higher than the low hoarding group on the observe mindfulness facet, perhaps observing is a relative strength for hoarding sufferers that may dominate when dealing with their possessions over other facets of mindfulness such as acting with awareness and non-reactivity to inner experiences. Directionality of this relationship between an apparent emphasis on sensory aspects of possessions and observing mindfulness is interesting but not discernible with such limited information and would require further investigation. Nonetheless, it could be used to demonstrate to hoarding sufferers how to engage in the moment with non-tangible aspects of life like feelings, thoughts, and bodily sensations.
particularly as previously mentioned, with regards to observing problematic behaviour in order to disrupt it.

Describe.

Being able to describe one’s emotions and thoughts has received little attention in the HD literature. However, alexithymia, a personality risk-factor for psychopathology with symptoms that include the inability to describe emotions in oneself and appreciate the emotions of others (Bagby, Parker, & Taylor, 1994), has been found to significantly predict hoarding severity, fully mediated by psychological inflexibility (as measured by the AAQ-II) (Taylor, 2017). Full mediation occurs when there is no significant relationship between, in this case, alexithymia and HD severity unless psychological inflexibility is present. This result implies that hoarding sufferers report difficulty describing emotions only in the presence of psychological inflexibility. Indeed, the finding in this study that there was no significant difference between the low hoarding and high hoarding groups on the mindfulness describe facet is not unexpected. The nature of between groups analyses does not allow for mediation effects. Indeed, as suggested by ACT researchers, psychological inflexibility is likely to be a vulnerability factor and act as a mediator (Hayes et al., 2012). It appeared investigating the interrelationships between all psychological inflexibility concepts and how they may impact HD was important in understanding their relevance to hoarding severity. Additionally, treatment to improve psychological flexibility could assist people with their ability to describe emotions and other internal experience so they may improve their mindful awareness.

Non-judging inner experiences.

Non-judging inner experiences was not significantly different between low and high hoarding severity groups in post-hoc testing. Believing that thoughts can be good or
bad and that one should not be experiencing certain types of feelings and emotions is evidence of becoming entangled with internal events and struggling to control, suppress, or avoid them (Blackledge, 2007; Hayes et al., 2004). Contrary to findings here, rather than noticing inner experiences at a distance and accepting them, hoarding sufferers have been found to reject negative emotions (Tolin et al., 2018). Additionally, recent research has found self-criticism and shame are positively related to hoarding severity in the presence of cognitions regarding responsibility for the welfare of possessions, as measured by the SCI-responsibility subscale (Chou et al., 2017). Perhaps the ego-syntonic nature of HD (i.e. the alignment of hoarding behaviours with one’s self-image; Frost, Tolin, & Maltby, 2010) and high levels of fusion with cognitions about the meaning and value of possessions found in HD (see Chapter 3) circumvent judgemental thoughts about the legitimacy of feelings, thoughts and physical sensations and leads directly to avoidance of negative experiences through acquiring and saving behaviours.

Indeed, the interaction between cognitive fusion, experiential avoidance, and inflexible attention to the present moment in HD is demonstrated when interpreting the between groups comparisons of the five facets of mindfulness and considering them in terms of relevant HD research. All mindfulness facets can be theoretically related to HD severity; however, further research is necessary to fully understand the nature of the relationships. As mediation analyses were not conducted here, the influence of intermediary variables such as cognitive fusion and experiential avoidance is unknown. Moreover, these results support the proposition that the relationships between the elements of psychological inflexibility and hoarding behaviours are likely to be more complex than simple direct relationships. This is also relevant information when developing treatment protocols for HD and offers guidance regarding the relative strengths and weaknesses of the average hoarding sufferer’s present moment awareness.
Perspective taking, or the observing self as it is sometimes known, is a psychological flexibility factor that has been investigated experimentally in the relation frames literature in terms of how it occurs through language and cognition (Hayes et al., 2012, p. 86). Yet, until recently no reflective self-assessment tool was available to measure this construct. The Self-As-Context Scale (SACS) used in this study was developed and tested to assess its psychometric properties (Gird & Zettle, 2013).

Described by the developing researchers as “witnessing life experiences from an enduring and stable perspective” (Gird, Zettle, Webster, & Hardage-Bundy, 2015, p. 2) when considered from a psychologically inflexible perspective it is often referred to in the literature attachment to the conceptualised self (Hayes et al., 2012, p. 81). Results indicate the difference between the low hoarding group and the high hoarding group approached significance for the SACS when general distress was controlled for and are therefore inconclusive. The SACS includes items such as item 5: “When I think back to when I was younger, I recognize that a part of me that was there then is still here now” and item 2: “Though I have had many roles in my life, I have always had a sense of self that is stable and enduring” (Gird et al., 2015, p. 9). The relationship of sense of self in HD has received relatively little attention in the literature and a recent review of emotional attachment to possessions and self-concept in hoarding revealed the majority of studies have focused on emotional attachment to possessions and anthropomorphism (see Chapter 4). A recent study employed a novel single item pictorial measure (see Chapter 4) of interconnectedness between self and hoarding participants’ possessions (Dozier et al., 2017). The measure is a series of seven pairs of circles; one circle in the pair is “Self” the other circle in the pair is “Items”. Each pair of circles progressively overlap from 1 where the circles are just touching to 7 where the two circles are predominantly overlapping.
Results indicated a statistically significant difference between HD participants and community controls on the Relationship between Self and Items (RSI), which was not associated with anxiety and depression symptoms and was sensitive to change post-treatment. Indeed, over values ideas about objects as an extension of the self, the ego-syntonic nature of HD, and the fusion between self and objects as previously mentioned in Chapter 3 and earlier in this chapter, are potential treatment inhibitors (see Kings et al., 2017 for a review).

Understanding the relationship between HD and the self is an area that requires further investigation; however, the recent development of the RSI offers a simple visual measure that can be used in treatment and research offering an overall assessment of the interrelationship between the self and possessions and efficacy of treatment interventions.

Valued living.

The ACT definition of valued living is the congruence between important values and actions taken towards those values. According to ACT, engagement with life is the key to psychological health (Hayes et al., 2012). Indeed, it is proposed that the interaction of the three pairs of responses styles of openness, centredness, and engagement leads to a sense of health and wellbeing. “While openness can make one’s repertoire of actions more flexible, and centering (sic) can ground awareness in the present moment, what makes life meaningful are the connections with closely held values through daily life actions” (Hayes et al., 2012, p. 92). Valued living cannot occur without the other psychological flexibility processes working in tandem. The results from the comparison between those reporting high levels of hoarding severity and those reporting low levels indicate that there was a significant difference in the congruence between values and committed action between groups even after controlling for negative affect. That is to say, the values the high hoarding group considered important were not consistently being acted upon.
Values have not been investigated in the hoarding literature from an ACT perspective; however, research found the greatest motivation for saving and acquiring in HD was avoidance of waste over emotional attachment and aesthetic appreciation (Frost et al., 2015). As hoarding sufferers engage in saving and acquiring pathologically, these behaviours perhaps become linked to self-worth and objects represent one’s personal identity (Kings et al., 2017). Known for holding idealised values (Frost et al., 2010; Veale, 2002), hoarding sufferers have been observed continuing to act in accordance with their inflexible values even when actions lead to extremely negative consequences (Burgess et al., 2017; Frost et al., 2010; Veale, 2002). The CBT for HD treatment protocol suggests the exploration of values through the use of motivational interviewing techniques in order to improve treatment follow-through (Steketee & Frost, 2014b, Chapter 5).

This investigation is a small step towards understanding values in HD. Certainly, there is more to comprehend especially with regard to idealised values that are inflexibly held by hoarding sufferers, particularly in regard to the type and level of inflexibility. However, it can now be said that hoarding severity may be significantly impacted by a lack of congruence of commonly held values and committed action towards those values.

**Study 1: Conclusion**

This preliminary investigation of the six core processes of psychological inflexibility and HD finds that overall, hoarding sufferers tend to be more psychologically inflexible than non-hoarding sufferers even when controlling for general distress. Specifically, hoarding sufferers are less flexible in the areas of general cognitive defusion and acceptance, acting with awareness and reacting to inner experiences, and taking committed action towards freely chosen values. This information is particularly relevant to the development of treatment protocols for HD; however, more research is needed to
understand the details of the interrelationships between the processes of psychological inflexibility and their impact on hoarding symptoms.

Study 2.

The central defining characteristic of hoarding disorder is difficulty discarding, and significant behavioural change relies on improving hoarding sufferers’ approach to discarding. The difficulty discarding process in HD through the theoretical lens of ACT was explored statistically in this dissertation using SEM path analysis. The findings of the initial and revised psychological inflexibility difficulty discarding path analyses are reviewed below. Following, the theoretical and practical implications of the revised model will be presented, including limitations of this study and suggestions for future research.

Overview of results

The initial psychological inflexibility difficulty discarding path model offered further support for the findings in Study 1; however, was found to be a poor fit for the data. Consequently, results from the initial difficulty discarding model were interpreted and are reviewed below. Additionally, a review of the theoretical support for the proposed revisions to the psychological inflexibility path model are presented followed by a summary of the findings from the revised psychological inflexibility difficulty discarding path model tested using SEM.

Results: Initial hypothesised difficulty discarding model.

The initial hypothesised path model (see Figure 5) suggested that the emotional reactions of anxiety and distress were exogenous or independent variables in the SEM path analysis, which led to the dependent variable, clutter, via sequential multiple mediators.
The first level of the endogenous variables included mindfulness, cognitive fusion, and self-as-context, theorised to be the elements of psychological inflexibility relevant to difficulty discarding, and hoarding cognitions. Second level mediators included in the model were experiential avoidance and saving behaviours. The initial general hypothesis proposed that anxiety and stress lead to clutter via mindfulness, cognitive fusion, self-as-context, and saving cognitions sequentially mediated by experiential avoidance and saving behaviours.

Results of this fully latent SEM path model exposed substantial cross loading of variables particularly in the first level mediators making it difficult to interpret the statistical results (see Chapter 7 for further details). After reviewing the SEM results and the available literature, a revised difficulty discarding model was proposed. Theoretical support for the model revision and results from the fully latent revised difficulty discarding model are discussed.

**Theoretical support for difficulty discarding model revision.**

Cognitive fusion and saving cognitions, as previously detailed in Chapter 3, appear to measure closely related concepts. When considering the two measures by item, it is theoretically appropriate to see cognitive fusion as general approach or psychological attitude (e.g. “I get so caught up in my thoughts that I am unable to do the things I most want to do”). Comparatively, saving cognitions can be described as the outcomes of this trait (e.g. “I am responsible for finding a use for this possession”), measuring hoarding specific “stories” and “thoughts”. To this end, as this path model is intended to measure outcomes (e.g. saving and clutter) of difficulty discarding in HD, it would be appropriate to retain saving cognitions in the path model and exclude cognitive fusion. In fact, previous researchers have suggested that saving behaviour is the way in which hoarding sufferers engage in experiential avoidance (Ayers, Castriotta, et al., 2014; Fernández de la
Similarly, results indicated that saving behaviours and the experiential avoidance subscale of procrastination were highly related concepts in this sample. Indeed, in support of this result recent research found decisional procrastination mediated the relationship between evaluative concerns (i.e. fear of making mistakes) and difficulty discarding in a community sample (Burgess et al., 2017). Consequently, it was decided that saving behaviour would be conceptualised as hoarding specific experiential avoidance in the revised difficulty discarding model.

ACT theorists suggest the six core processes of psychological inflexibility overlap and interact. The results from the full latent model and CFA’s of each level of the path model support this notion. A more parsimonious model, considering these results, was needed to further test the difficulty discarding process. It was decided that a more general measure of psychological inflexibility would be statistically appropriate in further SEM analysis.

The measure known as the Acceptance and Action Questionnaire–Version II (AAQ-II, Bond et al., 2011) was developed to more closely determine the level of overall psychological inflexibility by improving upon the original AAQ (Hayes et al., 2004) measure’s reliability and comprehensibility. As detailed in Chapter 6, the authors of the AAQ-II, define psychological inflexibility as:

…the rigid dominance of psychological reactions over chosen values and contingencies in guiding action; this often occurs when people fuse with evaluative and self-descriptive thoughts and attempt to avoid experiencing unwanted internal events, which has the “ironic” effect of enhancing people’s distress reducing their contact with the present moment and decreasing their likelihood of taking values-based actions (Bond et al., 2011, p. 678).
Critical appraisal of the AAQ-II’s validity indicates that rather than measuring psychological inflexibility as an approach or an attitude towards private events, it measures general distress which is an outcome of high levels of psychological inflexibility (Wolgast, 2014). As the proposed difficulty discarding model was attempting to statistically demonstrate the lived experience or outcome of hoarding sufferer’s hypothesised unwillingness to experience unwanted negative emotions, the AAQ-II was an appropriate exogenous variable in the revised latent path model.

Depression was not included in the initial hypothesised model; however, research suggests major depressive disorder is frequently comorbid with HD (e.g. Frost, Steketee, & Tolin, 2011; Hall, Tolin, Frost, & Steketee, 2013). Routinely controlled for in HD research (ref e.g.) depression has not been considered as an exogenous variable in a path model measuring difficulty discarding to date. Therefore, it was included in order to investigate its impact on hoarding cognitions and behaviours in relation to psychological inflexibility and anxiety including its overall contribution to the model.

When conceptualising the process of large-scale discarding in HD from an ACT perspective, negative emotions arise spontaneously when the contemplation of discarding occurs. In response to the powerful negative emotions, hoarding sufferers will attempt to make sense of their feelings and problem solve or control them. Rigid beliefs, that offer reasons for these emotions, become the rules that guide future behaviours, rather than referring to the present environment for cues. Typical rules hoarding sufferers use to understand their anxious reaction to parting with possessions centre around emotional attachment, responsibility, control, and memory and can be measured by the Saving Cognitions Inventory (SCI; Steketee et al., 2003). Because these inflexible beliefs seem to give valid reasons for saving possessions, despite feedback from the environment to the contrary, experiential avoidance is considered by hoarding sufferers to be an appropriate
way to immediately circumvent the aversive emotions and return to baseline emotional arousal. The notion that the anxiety that is felt is a direct result of “real” emotional connection to possessions or “true” responsibility for the welfare of possessions gives hoarding sufferers justifiable reasons to save.

This conceptualisation of difficulty discarding is supported by the findings from Study 1, indicating general cognitive fusion and experiential avoidance processes of psychological inflexibility are related to hoarding severity.

Based on this theorised path of outcomes, it was hypothesised that saving cognitions and saving behaviours would sequentially mediated the relationship between three exogenous variables anxiety, psychological inflexibility, and depression and the eventual physical outcome of excessive, disorganised clutter (Figure 6).

**Results: Revised difficulty discarding path model.**

In review, results from the difficulty discarding latent path model suggest exogenous variables of anxiety, psychological inflexibility, and depression with sequential mediators of saving cognitions and saving behaviours leading to clutter was not a good fit for the data. The paths from anxiety and psychological inflexibility to saving cognitions were both statistically significant, as hypothesised, however, the path from depression to saving cognitions was insignificant which was counter to our model hypothesis. As there are no published SEM path studies estimating the statistical relationship between emotions and clutter via cognitions and saving behaviour, and these relationships have not been specifically theorised about, the decision was made to remove insignificant paths and include the statistically significant paths suggested by the modification indices. When the insignificant path between depression and saving cognitions was removed and significant paths directly from depression to saving behaviour and depression to clutter were included, the fit indices were significantly improved, and the model was a good fit for the data.
Psychological inflexibility contributed statistically significantly more to the variance in saving cognitions than anxiety. The relative strength of paths from each exogenous variable were not hypothesised; however, this finding has theoretical and practical importance. Whilst there is debate as to whether the psychological inflexibility measure employed in this study, the AAQ-II, indeed taps into the process of flexibility or the outcome distress is perhaps a moot point. Indeed, this path model is statistically estimating self-reported outcome variables rather than processes; therefore, the AAQ-II is the appropriate measure in these circumstances.

Anxiety has long been reported as a co-morbid disorder in HD studies and does indeed contribute significantly to saving cognitions, however, psychological inflexibility is responsible for more of the variance in cognitions.

Depression did not significantly impact hoarding cognitions, which was contrary to the hypothesised path. Furthermore, depression was found to significantly impact saving and clutter directly and clutter indirectly via saving, which was not hypothesised.

These results support an ACT-consistent difficulty discarding path from emotions to behaviours via cognitions using structural equation modelling in a community sample. The theoretical and practical implications of the proposed acceptance-based emotion regulation model and the findings from Study 1 and 2 are discussed below.

**Theoretical implications.**

This research takes the current theoretical position of the aetiology and maintenance of HD and uses an alternative theoretical lens through which to view hoarding cognitions and behaviours. The new acceptance-based emotion regulation model builds on a growing body of evidence that supports the centrality of emotions in the maintenance of HD and moves away from the notion presented in the current Frost and
Hartl (1996) model, that information processing deficits are both antecedent and maintaining factors in the disorder. The theoretical implications of each phase of the proposed new model will be discussed highlighting how the alternative perspective impacts the understanding and investigation of HD moving forward.

**Phase I: Antecedents.**

This reconceptualised hypothetical model of HD uses the theoretical basis for Acceptance and Commitment Therapy (ACT), Relational Frame Theory (RFT), to propose an explanation for the development of strong emotional attachment to possessions that makes discarding so difficult for average hoarding sufferers. Conditioned emotional responses develop from an epigenetic interaction between predisposition, environment, and chance and lead to future maladaptive emotion regulation behaviours of saving and acquiring possessions. A recent, novel study has found hoarding sufferers significantly more interconnected with their possessions than a community sample and level of interconnectedness increased with hoarding severity (Dozier et al., 2017). Conceptualising hoarding as primarily a relational disorder, as is suggested by Dozier et al., supports the use of RFT as a way to understand the development of possession attachment.

At this stage little is understood about the development of hypersentimentality and possession attachment in HD (Kellett & Holden, 2014; Kings et al., 2017). However, it is hoped that RFT and the proposal of novel theories of early childhood experiences that are untested in HD, such as transitional object attachment and goodness of fit between child temperament and maternal personality presented in this thesis may encourage researchers to investigate and clarify the relevance of these hypothesised antecedents to the development of HD.
Acceptance-Based Emotion Regulation Model of Hoarding Disorder

**Phase I: Antecedents**

- Early Experiences
  - Trauma
  - Attachment disturbances
  - Parental practices

- Genetics

- Learned Conditioned Responses (RFT)

**Phase II: Emotion Regulation**

- Intense Negative Emotion
  - Saving (SI-R-saving)
  - Positive Affect

- Intense Positive Emotion
  - Acquisition (SI-R-acquiring)
  - Possessions on Display

- Preference for similar objects

- Mere-Repeated-Exposure Effect

**Phase III: Difficulty Discarding**

- Cue/Threat

- Imagines Discarding

- Depression (DASS-21)

- Anxiety (DASS-21)

- Psychological inflexibility (AAQ-II)

- Cognitive Fusion (SCI)

- Experiential Avoidance (SI-R-saving)

- Clutter (SI-R-clutter)

**Phase IV: Decision-making**
Fig. 8. Novel Acceptance-Based Emotion Regulation Model of Hoarding Disorder.

Phase II: Emotion regulation.

Building on the novel proposal by Kellett and Holden (2014) that the positive affect described by hoarding sufferers when amongst their hoarded items may be due to the robust mere-repeated-exposure effect, this new theoretical model includes this phenomenon in the emotion regulation phase.

Previous hoarding disorder and compulsive buying research has supported the notion that saving and acquiring are used to regulate emotions (Kyrios et al., 2004; Lawrence, Ciorciari, & Kyrios, 2014; Phung et al., 2015); however, this is the first attempt to explain the origin of diffuse and unspecific positive feelings hoarding sufferers report just being with their possessions that encourages saving behaviours and the acquisition of similar or identical items. It is proposed here that the preference for similar objects may lead to feelings of attachment even prior to owning the item, as described by Grisham et al. (2009), as a result of the repeated-exposure effect.

Theoretically, understanding the repeated-exposure effect and its influence of saving and acquiring behaviours in HD could lead to uncovering a way to reverse or
extinguish the effect, as is being currently investigated in the area of phobias (Becker & Rinck, 2016).

The opportunity to experimentally explore the repeated-exposure effect in HD may improve our understanding of positive affective responses when amongst hoarded possessions and instantaneous attachment to objects in order to improve treatment outcomes by removing items from hoarding sufferers’ sensory perception before attempting the discarding process.

It is hoped that this new acceptance-based framework for the development and maintenance of HD will generate research interest and spark new insight into this disorder. Specifically, it is hoped that the results of this study will lead to modifications in the treatment protocols (suggestions detailed below) that will improve clinical outcomes for HD. The difficulty discarding process offers the opportunity to help those who suffer from clinical levels of the disorder, and the antecedent and emotion regulation phases may lead to early detection of HD before behaviours reach clinical levels.

The theoretical implications of the findings from the difficulty discarding SEM path model are detailed below.

**Phase III: Difficulty discarding – SEM.**

This exploratory investigation offers support for the theoretical application of ACT to HD and specifically identifies the difficulty discarding process from an ACT perspective, which to date has been unidentified.

The cognitions and behaviours that define clinical hoarding disorder are interpreted in ACT terms in the difficulty discarding phase of the acceptance-based emotion regulation model presented here with saving cognitions (SCI) representing HD specific cognitive fusion and saving behaviours (SI–R-saving) interpreted as HD specific experiential avoidance. Previous research has considered saving behaviours as hoarding
specific experiential avoidance (Ayers, Castriotta, et al., 2014), however this study is the first to theorise and test saving cognitions as an outcome of trait cognitive fusion and offer a potential answer for the improvement in hoarding behaviours and cognitions when using a defusion technique (Frost et al., 2016). Considering saving cognitions as hoarding specific cognitive fusion changes the dynamic between emotions, cognitions and behaviours. Instead of attempting to change the rigid beliefs hoarding sufferers have in relation to their possessions, as is the goal of cognitive restructuring or reappraisal, by encouraging hoarding sufferers to view beliefs as “reason-giving” stories that are omnipresent but not omnipotent they can learn to accept these thoughts and choose to discount their validity without struggling with them.

Offering a phenomenological (lived experience) process of difficulty discarding in HD, the results of this SEM analysis are the first evidence describing the course of consequences that are initially triggered by the idea of large scale discarding in the mind of hoarding sufferers.

As hypothesised, anxiety and distress emerge when hoarding sufferers are unable to flexibly attend to the physical reactions that appear at the mere image of letting go of precious items. Looking for a reason for this anxious reaction they believe can be problem solved and “fixed”, hoarding sufferers turn to beliefs that have guided them–consciously or subconsciously–all their lives. These beliefs are so entrenched and veritable to sufferers that they by-pass testing the validity of the thoughts and accept them as true. Attachment to possessions imbued with stories and the essence of loved ones, responsibility for the well-being of every item owned, the fallibility of memory if the item isn’t kept, and the total control over articles in the space are cognitions that average hoarding sufferers believes to be accurate. Consequently, hoarding sufferers behave accordingly by avoiding
discarding. Ultimately negative internal experiences are avoided all together via saving leading to large amounts of clutter and further distress.

The interesting finding that was not hypothesised was the relationship between depression, saving behaviour, and clutter. The difficulty discarding SEM revealed the significant influence of depression on clutter directly and indirectly via saving. Perhaps depression’s contribution to overwhelming clutter is the inability to approach the discarding process when sufferers have attempted to discard before and “failed”. The relationship between depression and saving behaviour may be related to ruminating on past failures, childhood experiences, and negative parental attitudes to hoarding sufferers’ efficacy. Perhaps depression is tapping into the meaninglessness of life, and hoarding sufferers’ feelings of worthlessness as people; “I don’t deserve a clean and tidy house.” In reality, difficulty discarding in these circumstances may be a misnomer as the depression represents helplessness and worthlessness leaving the hoarding sufferer with no motivation to even engage in activities that might be a trigger or catalyst for large scale discarding.

The path from depression to clutter via saving could be considered inertia. As found in the SEM results, there are no reason-giving or maladaptive beliefs in play because the meaninglessness and worthlessness felt by those in a depressive state does not allow them to initiate any discarding behaviours at all.

None of the HD measures, anxiety, or psychological inflexibility captures this rumination on past failures; however, it is possible the depression path is partially capturing this. Portero et al. (2015) found rumination was significantly related to elevated levels of hoarding severity above and beyond the effects of depression across two independent non-clinical samples. When considering the measures of HD, there is a lack of items seeking to measure past failures at discarding or the level of worthlessness related directly to their hoarded circumstances. Perhaps the exploration of this
depression/rumination path might reveal more about how past attempts at discarding impact future attempts and likelihood of clinically significant change for hoarding sufferers. Indeed, the decision-making problems faced by hoarding sufferers is important in this discussion regarding past failures and depression.

**Phase IV: Decision-making.**

The final phase in the proposed acceptance-based emotion regulation model of HD is important as it captures how compromised cognitive functioning and general decision-making biases can impact the attempts to discard possessions. Coupled with these cognitive difficulties faced by hoarding sufferers is the intolerance of uncertainty (Mathes et al., 2017; Oglesby et al., 2013) and evaluative concerns (Burgess et al., 2017) or worries about making mistakes when contemplating decisions to discard or indeed, acquire items in HD. Lack of decision-making experience due to chronic avoidance make the process of discarding frustrating and demoralising for hoarding sufferers and this must be taken into consideration when treating the disorder.

Theoretically, the separation of decision-making into a separate phase of the hypothesised phenomenological model of HD allows for the extensive research into executive function difficulties to be combined with the emotion regulation vulnerabilities. This combination then allows for future research efforts to explore the relative impact of emotions on cognitive functioning in HD and the effect this interaction has on decision-making.

**Practical Implications**

The underlying research question this thesis aimed to address was a practical one focusing on treatment efficacy. Enquiring what it is about the current gold standard CBT
for HD treatment that leaves 65% of hoarding sufferers with clinically significant symptoms post-treatment drove this project. A review of the treatment literature pointed towards potential inhibiting factors of co-morbidity, cognitive deficits, insight, and emotion dysregulation that may impact the efficacy of cognitive reappraisal, which is the central technique used in treating HD. Indeed, a theoretical approach that has the scope to counteract these inhibiting factors implicated in HD by targeting alternative change mechanisms might offer improved treatment outcomes. Emerging research has suggested that hoarding behaviours of acquiring and saving are dysfunctional emotion regulation strategies employed by hoarding sufferers to improve mood and avoid anxiety (see Chapter 5).

Considering the theorised treatment inhibitors of HD and the growing body of evidence implicating emotion regulation in the maintenance of HD alternative treatment theories were investigated and the hypothesised acceptance-based emotion regulation model of HD was developed (detailed in Chapter 5).

Following is the outline of an acceptance-based treatment protocol for clinicians, using the CBT for HD as an outline and incorporating psychological flexibility techniques and ACT approaches to therapy. The evidence from this project supports the use of ACT and psychological flexibility processes for HD treatment and will be referred to when detailing the practical suggestions in this section of the discussion.

Although the full acceptance-based emotion regulation HD model is not tested in this thesis, the process of difficulty discarding is specified and is a key target of the current CBT protocol. The difficulty discarding process, with emotions preceding cognitions followed by saving leading ultimately to clutter, only changes slightly from the original C-B model of HD, it is enough to open up a new method of approaching the treatment of HD that is supported by cross-sectional evidence using structural modelling.
Individual ACT for HD treatment protocol (iHACT).

Following the outline of the individual ACT for HD (or iHACT) treatment is a therapist guide that may be used by clinicians to familiarise themselves with ACT and the psychological flexibility processes as they relate to HD. References for a number of excellent ACT practitioner guides are included with examples of techniques for further study for those clinicians who are unfamiliar with the theory. Comparisons are made between the CBT protocol and the iHACT protocol regarding theoretical differences. References are included for the hoarding treatment manuals, which are also excellent resources. It must be noted that this protocol is suitable for treatment seeking individuals and may require adaptations for reluctant or mandated HD clients.

It is proposed that, armed with these psychological flexibility tools, hoarding clients will be able to create a space between stimulus and response and halt the struggle with possessions that has been a primary difficulty in their lives. By focusing on freely chosen values it is suggested that hoarding clients will make less individual discarding decisions by asking simple broad questions such as “Are these items essential for the life I want to lead?” rather than specific enquires such as “Do I need this item?” It is likely that the ACT approach detailed here will be more time consuming in the early stages of treatment as values are established and techniques are mastered; however, once these skills are practiced and mastered, the committed actions taken towards life values will continue beyond the treatment period. Indeed, this has been one of the concerns with CBT for HD. Although limited information is available on treatment follow-up what has been found is that the reduction in clutter is likely to stall post treatment and no further discarding occurs without intervention (Muroff et al., 2013).

In general terms the proposed iHACT protocol focuses less on HD psycho-education and the identification of an understanding “coach” in the early treatment stages
and more on establishing the context and nature of the problems as sufferers sees it, first in clinicians’ offices and then in the context of the home. The majority of the initial assessment is similar to that conducted in the CBT protocol, however, there is an emphasis on assessing levels of psychological inflexibility and creating a context for change through the exploration of values with clients. The CBT protocol does suggest the use of motivational interviewing (MI) in the protocol where necessary, to investigate clients values and motivation for change (Steketee & Frost, 2014b, Chapter 5). In contrast, the iHACT protocol spends significantly more time early in the programme establishing clients’ “whys” and understanding their general inability to live the life they desire.

It is evident when comparing the two protocols that the CBT steps are very specific to HD, however, the early steps of the iHACT intervention are more general and could apply to any number of psychopathologies. This is known as transdiagnostic treatment and in cases where clients may have co-morbid diagnoses, the techniques employed in an ACT intervention can be effective across all disorders concurrently (Ciarrochi & Bailey, 2008; Harris, 2009; Hayes & Smith, 2005; Hayes et al., 2012). Acquiring can be treated similarly as can other maladaptive behaviours that may co-occur with HD such as excessive gambling, eating disorders, and alcoholism (Frost, Steketee, et al., 2011).

While the CBT protocol calls for skills training in problem solving and organisational skills prior to exposure exercises, the proposed iHACT protocol suggests general ACT skills should be developed (both in the office and in the home) before approaching the actual organising of the home environment. The benefit of early organising and discarding action taken in the CBT protocol may appear to offer swift results for concerned parties; however, the results indicate the CBT for HD treatment does not lead to a further decrease in the volume of the hoard after the treatment programme has been completed (Muroff et al., 2013). This stagnation in the hoard volume suggests the
skills being taught in CBT for HD may be ineffective in the long term and are unable to create lasting change in discarding for the majority of hoarding sufferers (Tolin et al., 2015).

Presented here is a proposed protocol for individual ACT treatment for HD (iHACT) alongside the current gold-standard CBT for HD protocol (Steketee & Frost, 2014b). All ACT measures and concepts are based on the texts *Acceptance and Commitment Therapy: The process and practice of mindful change* (Hayes et al., 2012), *Get out of your mind and into your life: The new acceptance and commitment therapy* (Hayes & Smith, 2005), and *Anxiety and avoidance: A universal treatment for anxiety, panic, and fear* (Tompkins, 2013). *ACT made simple: A quick start guide to ACT basics and beyond* (Harris, 2009) and *A CBT practitioner’s guide to ACT: How to bridge the gap between cognitive behavioural therapy and acceptance and commitment therapy* (Ciarrochi & Bailey, 2008). These texts offer detailed descriptions of techniques and theory described unless otherwise cited. Until further research is conducted on the efficacy of this protocol, it is a proposal only and should be treated as a work-in-progress, as the CBT for HD protocol has been described (Tolin et al., 2015). Any statements made about how hoarding sufferers might behave is based on the hoarding literature, both quantitative and qualitative, case studies, and anecdotal evidence and is interpreted through an ACT lens.
### Individual CBT for HD Protocol (Steketee & Frost, 2007)

<table>
<thead>
<tr>
<th>Assessment</th>
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<tbody>
<tr>
<td>- Complete assessment measures (SI-R, SCI, ADL-H)</td>
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<tr>
<td>- Conduct home visit</td>
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<tr>
<td>- Help identify family member/friend to be coach</td>
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<table>
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<tr>
<th>Case Formulation &amp; Psycho-Education</th>
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</thead>
<tbody>
<tr>
<td>- Personal and family vulnerabilities</td>
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<tr>
<td>- Information processing problems</td>
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<tr>
<td>- Meaning of attachment to possessions/beliefs</td>
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<tr>
<td>- Emotional reactions</td>
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<tr>
<th>Treatment Planning</th>
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<tbody>
<tr>
<td>- Establish treatment goals and set rules for treatment</td>
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<tr>
<td>- Complete visualisation exercise</td>
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<tr>
<td>- Use problem-solving methods barriers to progress</td>
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### Proposed Individual ACT (iHACT) for HD Protocol

<table>
<thead>
<tr>
<th>Assessment – office</th>
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<tbody>
<tr>
<td>- Complete assessment measures (SI-R, SCI, ADL-H, AAQ-II, RSI, executive function tests, physical ailments impacting HD)</td>
</tr>
<tr>
<td>- Functional analysis – assessment of time, trajectory, &amp; context</td>
</tr>
<tr>
<td>- Values interview – current life space in love, work, &amp; play</td>
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<tr>
<th>Creating a Context for Change</th>
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<tr>
<td>- Assess willingness to change behaviours</td>
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<tr>
<td>- What has been tried, how has it worked, what has it cost?</td>
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<tr>
<td>- Validate the “gap” b/w life they have and life they want</td>
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<tr>
<td>- Create a Treatment Agreement <strong>including rules of engagement</strong></td>
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<table>
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<tr>
<th>Assessment – home visit</th>
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<tr>
<td>- Photographs of rooms in the home and any extra storage</td>
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<tr>
<td>- Complete safety questions &amp; HEI</td>
</tr>
<tr>
<td>- Assessment of psychological inflexibility in context using one or more of the following ACT tools:</td>
</tr>
<tr>
<td>- Flexibility Rating Sheet, Hexaflex Case Monitoring Tool, Turtle Case Formulation Tool, Psy-Flex Planning Tool</td>
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<thead>
<tr>
<th>Core Values Identification</th>
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<tbody>
<tr>
<td>- Explore the client’s “WHY?” Bulls Eye / Eulogy metaphors</td>
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<tr>
<td>- Establish treatment goals based on freely chosen values</td>
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<thead>
<tr>
<th>Skills Training</th>
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<tbody>
<tr>
<td>- <strong>Attentional training:</strong></td>
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<tr>
<td>- Mindfulness breathing exercise, body scan</td>
</tr>
<tr>
<td>- Increase attentional flexibility by closing eyes and noticing feelings of tension/anxiety in body</td>
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<tr>
<td>- Slow down activity to increase present moment awareness &amp; break down old patterns</td>
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<table>
<thead>
<tr>
<th>Skills Training</th>
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<tbody>
<tr>
<td>- Problem-solving</td>
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<tr>
<td>- Organising skills</td>
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<tr>
<td>- Implement a Personal Organising Plan</td>
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<tr>
<td>- Paper organisation – creating a filing system</td>
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<thead>
<tr>
<th>Exposure</th>
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</thead>
<tbody>
<tr>
<td>- Create exposure hierarchy</td>
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<tr>
<td>- Graduated exposure exercises</td>
</tr>
</tbody>
</table>
Individual CBT for HD Protocol (Steketee & Frost, 2007)

Cognitive Strategies
- Identify errors in thinking
- Application of C-T techniques during exposures

Relapse Prevention
- Progress review
- Develop strategies for setbacks/lapses

Proposed Individual ACT (iHACT) for HD Protocol

- Defusion techniques:
  - Thought listing, “thank you mind”, “I’m having the thought that…”
  - ACT metaphors (passengers on the bus, leaves on a stream, “phishing”), step outside thoughts and view as object
  - Understanding the difference b/w having, holding, & buying thoughts
  - Substituting “and” for “but”
  - Evaluation vs. description (the “bad” cup metaphor)

- Acceptance & workability
  - Tug of war with a monster metaphor & “dropping the rope”
  - Offer alternative to the “control & eliminate” agenda

- Exposure-based acceptance:
  - Can be graduated if necessary e.g. imagine, bring items to session, in-home session, in-store session etc.
  - Willingness vs. wanting & “clean” vs. “dirty” pain
  - Stimulate discomfort – voluntarily confront discarding and resisting acquiring in the home context. Use humour e.g. “ready to look for Mr./Mrs. Discomfort?”
  - Contact emotions describe bodily sensations, emotions, memories, & thoughts – ask client to see if they can “let go” of the struggle (of thought /feeling /memory /physical pain) just momentarily and sit with it.

Organising & Planning Skills Training
- Decision-making training & understanding cognitive biases
- Teach methods of organising and planning possessions and paperwork once attention, defusion, and acceptance techniques are mastered
- Tips, tricks could be taught by professional organizer or trained coach

Managing Inevitable Setbacks
- Reassess willingness to change
- Reconnect with freely chosen values
- Home visits to practice exposure-based acceptance
Assessment – office.

Initially an office visit, possibly two, will be required to assess clients in a neutral environment and build trust for future home visits. As a sincere therapeutic relationship is a significant mediator for positive treatment outcomes, these early sessions should be thoughtfully constructed.

Generally, the initial office assessment is similar to any other conducted by clinicians with self-report measures used to establish clients’ views of their problems. It is suggested that the hoarding measures of the SI-R, SCI, and the Clutter Image Rating (CIR) a pictorial rating of clutter severity (Dozier & Ayers, 2014; Steketee & Frost, 2014b) be completed to allow clinician to compare these results to established clinical levels (see Steketee & Frost, 2014b for measures). As psychological inflexibility (measured by the AAQ-II) was the best predictor of the path to clutter and general hoarding dysfunction, the AAQ-II is also recommended as a short self-report measure that can be used to compare with clinicians’ own observations during interactions with clients. Assessment of anxiety (DASS-21) is beneficial as it impacts both saving cognitions and saving behaviours. Depression (DASS-21) contributed to saving behaviour directly and clutter via saving and directly therefore assessment of general level of negative affect will assist with treatment planning and may be highly relevant with respect to motivation and initiative of hoarding clients.

The Activities of Daily Living in Hoarding (ADL-H; Frost, Hristova, et al., 2013) is a self-report measure that indicates the activities that are affected by the clutter and can be compared with clinicians personal evaluation during initial home visits. It is also necessary to gather information about any physical ailments that may
restrict the discarding process, as HD is often comorbid with obesity, fibromyalgia, and chronic pain (Frost, Steketee, et al., 2011; Kaplan & Hollander, 2004; Wheaton & Van Meter, 2014). Testing of clients’ executive function may be necessary if there are indications of deficits in the patient history or observed during sessions. Indeed, having clients complete a battery of cognitive function tests may be useful when comparing emotional tasks and non-emotion eliciting activities to determine if objective deficits are present.

Once these baseline measures are gathered, a second session in the office may be required to complete a functional analysis and a values interview.

**Functional analysis.**

Much like the process described in the Hoarding Therapist’s Guide (Steketee & Frost, 2014b), the functional analysis is the exploration of the timeline of the problem; when it started, any time when the hoarding behaviour was absent, and whether the problem is the same intensity or is it escalating and seeming less controllable than previously. Understanding the public and private triggers or antecedents of this behaviour should be investigated and exactly what type of hoarding or avoidance behaviours the client engages in when triggered and the consequences of these behaviours. The positive and negative consequences of the problematic behaviour need to be identified and how these play out over the short and long-term assessed. It is also important from an ACT perspective to discuss a wide range of private experiences with clients not only fused thoughts; the memories, emotions and physical sensations the client experiences are equally important to this assessment process.

Understanding the current relationships, particularly the familial and romantic, should be extensively discussed and the relationships between the internal and
external worlds explored. Understanding the negative impact hoarding behaviour is having on clients’ lives and which functional areas are widening and which are narrowing leads into the values interview.

**Values interview.**

As the congestive clutter in the home is likely to be considerable, physical activities of daily living are likely to be the focus in clients’ minds. It is important for the clinician to explore the other areas of clients lives including areas of social, work, physical health that the hoarding behaviour is impacting and obtain a current snapshot of their interaction with life prior to engaging in treatment.

**Creating a context for change.**

With any therapy, there is a need to establish a treatment agreement between clinician and client and with HD this is particularly important for three reasons. Firstly, as ACT therapy is likely to raise emotionally painful issues, secondly, as HD is a highly complex disorder with home-visits required, and thirdly, wavering motivation often seen in HD clients. For these reasons, it is prudent to commit to a specific course of treatment at the earliest juncture. Behaviours such as relentless complaining, arguing, arriving late, cancelling, and “forgetting” appointments have been described in the literature and experienced by this researcher during interactions with HD clients, which are likely to be expressions of experiential avoidance (Steketee & Frost, 2014b). It is important for all parties, including family members, to commit to the treatment program and rules set out by clinicians and agree to progress reviews at mutually agreed intervals (after a specific number of sessions). Prior to the signing of a treatment agreement it is judicious to establish which stage of change hoarding clients are in.
Interestingly, the CBT for HD protocol does not suggest the use of a readiness to change measure to establish where clients are situated in relation to stages of change being: pre-contemplation, contemplation, action, and maintenance (McConnaughy, Prochaska, & Velicer, 1983). However, an HD adaptation of the Stages-of-Change Questionnaire is included in the bibliotherapy text Buried in treasures: Help for compulsive acquiring, saving, and hoarding (Tolin et al., 2014). It is likely that trained therapists conduct such change questionnaires or intuit the information from their initial assessment; nonetheless, ascertaining where clients see themselves in terms of these stages is therapeutically useful for treatment planning and comparison with other observed indicators. Consequently, exploration of the stages of change is a direct opening and is suggested as the first step in creating a context for change.

Following the stages-of-change discussion, the iHACT protocol suggests that in order to create a context for change, it is necessary to assess what techniques have been tried, how these have worked, and what is the cost of using these techniques. This is a way for the clinician to connect clients with the personal costs that have come with the previous coping strategies, which will predominantly be various forms of avoidance to attempt to “control” negative private experiences.

At this point in the session, clinicians are able to highlight how the previous attempts to “get rid of” anxiety has been unsuccessful, not only in extinguishing the anxiety, which tends to rebound twice as strong after suppression, but also in creating a better life. It is here where ground-rules for the acceptance and commitment work are set out and the treatment agreement is created. A straightforward way to reach this ACT treatment agreement is for clinicians to describe clients’ problem in an objective way, validate the gap between what is occurring and what is desired, taking
into consideration clients’ struggles with thoughts and feelings, and relate the lack of values-based behaviours (Harris, 2009). Importantly, this agreement is concluded with the assertion that both parties agree to pursue a fundamentally different treatment path that includes ACT-supportive actions.

**Preparation for home visits: Rules of engagement.**

As clients are likely to feel overwhelmed after the office sessions regarding the prospect of allowing “strangers” into their home, it may be necessary to discuss the avoidance reactions that are likely to occur when anticipating the first home visit. Often hoarding sufferers will call and cancel home visits or postpone them indefinitely because they are too anxious or feeling “unwell”. ACT clinicians expect this behaviour as clients have demonstrated high levels of experiential avoidance and cognitive fusion during the initial office treatment sessions. In order to prepare the client, questioning of therapeutic commitment and experiential avoidance of treatment should be discussed *before* the inevitable call comes with the client begging off the in-home session. Clinicians need to reassure clients that this is their first attempt at accepting anxious feelings not avoiding them! It is likely to be extremely uncomfortable and possibly physically painful; however, using evidence collected from the values interview, clinicians can explain this is an important first step towards living a full life without the life-limiting restrictions clients have described. To reassure clients further, establishment of treatment rules at this point, prior to the first home visit, will increase clients’ confidence in the process. These four rules for clients, clinicians, and “helpers” are adapted for the ACT protocol from the CBT treatment text as follows (Steketee & Frost, 2014b, p. 85):

1. Do not touch or remove any items without explicit permission
2. Clients make all decisions about possessions
3. Clients think aloud while sorting

4. Treatment proceeds in a flexible manner.

Other treatment rules will follow when the organising begins; however, in contrast to the CBT protocol, the proposed iHACT protocol focuses on the psychological inflexibility first, in the home and office, prior to planning large scale sorting, organising, and discarding. It is predicted that the focus on teaching attentional, defusion, and acceptance skills in the office and in the home context, will allow clients to experience higher levels of self-efficacy prior to major sorting and discarding sessions. This is not to say that actual discarding will not be approached prior to large scale planning and discarding but it will be in service of learning acceptance and defusion skills, without the pressure of full scale de-hoarding.

Further assessment is required in the first home visit to assess safety of the home environment, take photographs (with permission) while completing the CIR and establish the context specific psychological inflexibility of HD clients.

*Assessment – home visit.*

After two sessions of getting to know clients outside the context of their hoard, it is essential for clinicians to visit the home/s and any other storage facilities for an initial assessment and at other times, as required, during the treatment program. The necessity of in-home visits is important for novice HD clinicians to be aware of if they are embarking on an iHACT program. The context in which the behaviours are triggered impacts the maintenance of the psychopathology and is difficult to replicate outside the home. Alternatives could be employed if necessary including photograph updates, video chat, and virtual reality (VR) program, if In-Real-Life (IRL) visits are impossible; see skills training section below.
Clients usually offer a tour of the home and property upon arrival and this is an opportunity for clinicians to take photographs of the rooms (with permission of course remembering to ask before touching anything) and complete the CIR to compare with clients’ self-reports. The safety aspects of the home should also be noted at this time by completing the safety questions and the Home Environment Index (HEI) (Steketee & Frost, 2014b, pp. 220–222). Understanding the codes and regulations relating to public health and safety in particular countries is not within the scope of this thesis; nonetheless, the text *The hoarding handbook: A guide for human services professionals* (Bratiotis, Schmalisch, & Steketee, 2011) is an excellent general guide.

A number of tools are available that may be used by clinicians to assess clients’ level of psychological inflexibility when in the home. The Flexibility Rating Sheet, Hexaflex Case Monitoring Tool, the Turtle Case Formulation Tool, and the Psy-Flex Planning tool are some of the forms described in detail in the Acceptance and Commitment Therapy text (Hayes et al., 2012, pp. 127–140) that can be used to gather the data needed for case conceptualisation, treatment and planning. Because the elements of psychological inflexibility model are integrated there is no one place to start so it is a judgment call on the part of clinicians. Although it is not the goal of this portion of the thesis to detail all of the psychological inflexibility elements in relation to HD, it is instructive to describe some of the likely indicators especially of the “closed” response style (experiential avoidance and cognitive fusion) that is likely to be the largest obstacle to valued living in HD as findings indicated in Study 1.

Hoarding clients are highly likely to present with well-rehearsed excuses as to why their home is cluttered, why change is impossible, or why change cannot occur at this time. It is probable that clients are living by highly rigid rules of “shoulds”,...
“musts”, and “cants” based on societal and/or parental expectations (even if the parent has passed many years before as has been observed by the researcher) and based on the belief that negative private experiences are toxic and bad for their health.

Listening to hoarding clients’ speech can offer insight into how fused they are to these rules and self-stories. Comparisons and evaluations tend to riddle their answers rather than descriptions. Highly fused individuals are likely to be unable to describe their particular problems without resorting to personal comparisons. Complex, busy, and confusing speech also offers an indicator of underlying problem solving that is running in the background constantly making the hoarding client appear frantic. Justification and self-argument (“will I or won’t I declutter?”) tend to appear during the assessment sessions with hoarding clients, indicating that solution-seeking behaviour is dominant. Perseveration, that is, being unable to flexibility shift between topics, is another clear sign of fusion. It is especially obvious when probing clients about the domains of their life they find fulfilling. Clients will be unable to prevent themselves from returning to the fused content (e.g. worrying about eviction) and will change the topic back to the well-worn content they repeat frequently in sessions.

All of these signs are likely to be amplified during an in-home session, which makes them imperative for a complete case formulation. Once the level and shape of the psychological inflexibility Hexaflex is ascertained (see figure 4.2. Hayes et al., 2012 for an example), it is time to establish clients’ values.

**Core values identification.**

In order to establish clear, freely chosen values, office sessions are suggested to lessen the impact of emotions on attention experienced by HD clients when amongst their possessions. As findings from Study 1 show, particularly relevant to
hoarding are automatisation of activities, and reflexive reactivity to inner experiences. Both of these facets of mindfulness were found to be lower in hoarding level participants and impact their ability to remain in contact with the present moment. In the home this is likely to be amplified. In this session it is important for clinicians to convey the importance of values in living well. What “well” means will differ between individuals; however, it is generally understood that living well is a result of connecting with closely held values. For some individuals, values might include family, parenting, relationships, career, spirituality, and physical self-care.

Results from Study 1 indicate there was a significant difference in the congruence between values and committed action between low and high hoarding severity groups even after controlling for negative affect. That is to say, the values the high hoarding group considered important were not consistently being acted upon.

As previously discussed (in Chapter 3 and earlier in this chapter), it is common for hoarding clients to express closely held values regarding avoiding being wasteful. Sometimes these values are predicated on environmental conscientiousness. Commonly, these environmental values are not centred around choices that have been made through clear reasoning but are likely to be justifications based on avoidance of shame and a desire to avoid the censure of others. If they were reasoned choices, then hoarding sufferers would take steps to create less waste, actively re-purpose items, and recycle correctly. This is rarely the case and hoarding sufferers tend to continue to acquire useful items and save items with the intention of re-purposing or recycling instead taking no committed actions towards this anti-wastefulness or environmental value of reducing waste and consumption.

Connecting with values is an important process that cannot be adequately discussed here, however, there are two examples of values exercises that both
illustrate values work and how these might be freely chosen by clients with the guidance from ACT clinicians. The first exercise is the called the eulogy exercise (Hayes & Smith, 2005, p. 166). After an initial period of centring and relaxation clients are asked to imagine they have just died and are able to attend their own funeral in spirit. The question is then asked: “What do you want your life to stand for?”; “What would you want your significant other, family, and friends to say about you at your funeral?” or “What would you want your tombstone to say about you?” This exercise often uncovers wide discrepancies between clients’ values and their current actions.

The other popular values activity is the “Bull’s Eye” intervention (Lundgren, Luoma, Dahl, Strosahl, & Melin, 2012). This activity is a way to visually represent the degree to which clients are living life in the direction of their values. Thinking about a value that has been expressed, clients are asked to place a mark on the bull’s eye target (multiple concentric circles) where they believe they are currently in relation to that goal; the closer the mark is to the centre the closer the client is to living their life according to the chosen value. To illustrate, Anne, a hoarding client, may express the value of parenting as her key focus. According to Anne, this means a number of different things including creating safe spaces for her young children to play and create. If Anne’s living room is full of teetering towers of possessions that may fall on her children, there is no floor space for them to play, and access to craft supplies is impossible she would make a mark on the very outer ring of the bull’s eye.

The process of exploring hoarding clients’ “whys” is essential in the iHACT treatment protocol because this identification of freely chosen values offers the motivation and direction required for clinical change to occur. It is also a way for discarding decisions to be simplified in alignment with these values.
Skills Training

*Attentional training.*

Attention is the key to all forms of observing and at least a quarter of hoarding sufferers self-report attentional symptoms (Wheaton & Van Meter, 2014). Understanding why flexible attentional control is important to convey to HD clients. Because anxiety and tension impacts attention, focusing on the breath and body scans activities can help re-centre clients when they are overwhelmed by emotional events during the treatment process. Flexibility attending to stimuli and using environmental feedback to shift cognitive sets has been identified as a possible executive function deficit in HD (McMillan et al., 2013). It is possible to train hoarding clients in attentional flexibility by bringing client’s focus on noticing what is present, then gently shifting their attentional focus wide and then narrow using it like a muscle or instrument (as described in Harris, 2009). This may be particularly useful in HD as clients are often unable to shift attention from a single possession to the entire hoard. Slowing everything down including speech and movements through modelling is a way for clinicians to break up old patterns and allow for present moment awareness as was previously discussed in the discussion for Study 1. By setting a new pace and creating a new rhythm a space can be created between stimulus and response.

*Defusion techniques.*

Thought listing is a defusion technique that has been successfully used in a HD treatment sample (Frost et al., 2016). When compared to a cognitive restructuring group, the thought-listing group discarded more possessions and reported reduced possession attachment post intervention. This process involves talking about thoughts as thoughts. In HD, clients are encouraged to vocalise their thoughts has they have
them while sorting, organising, and discarding in the home. Clinicians are there, not to engage in Socratic questioning (Steketee & Frost, 2014b, p. 168) to examine the evidence and evaluate the clients’ logic, they are listening and observing.

Other defusion techniques that could be used are simply adding “I’m having the thought that…” before a statement like “I’m completely useless” or thanking the mind for a thought instead of accepting it as true can unhook clients from entangling thoughts that emerge when they attempt to take valued action.

One of the most popular ACT metaphors is the Passengers on the Bus (Hayes et al., 2012, p. 250), which depicts a scenario where clients are the bus driver, and the passengers are thoughts, feelings, bodily sensations, and memories. The passengers keep telling the bus driver what to do, “Stop!”, “Go back!”, “You can’t expect to do this!” expecting the driver to listen and do what they say. The purpose of this metaphor is to demonstrate the constant struggle with negative private experiences is not only futile but is stopping clients from engaging in life and moving in the direction of their values.

There are many more defusion techniques described in the ACT texts and finding the appropriate defusion metaphors or exercises to use with HD clients is at the discretion of ACT clinicians. The techniques discussed here are some of the more common strategies employed to aid defusion, and are similar to the thought-listing exercise (see Steketee & Frost, 2014b, pp. 146–149 for detailed steps) that has been proven particularly successful with HD clients (Frost et al., 2016) and is included in the CBT protocol.

Defusion work often leads to acceptance work. Acceptance is an alternative to avoidance and is supported by the willingness to contact negative private experiences or contexts that are likely to trigger them. As experiential avoidance, in the form of
saving behaviour, is central to the maintenance of HD, a great deal of work will be
done improving an HD client’s openness and acceptance when following this ACT
protocol. Prior to engaging in exposure-based acceptance work, it will be essential to
teach hoarding clients about the nature of acceptance in ACT terms before attempting
to contact uncomfortable emotional content.

Acceptance.

Acceptance is not a technique it is a state of openness towards life and through
practice acceptance can improve but will never be mastered completely; it will ebb
and flow moment to moment.

When clients hear “acceptance” it is commonly interpreted as giving in, failure, resignation, or tolerance; it is none of these things. In ACT, acceptance is
defined as “the voluntary adoption of an intentionally open, receptive, flexible, and
non-judgmental posture with respect to moment-to-moment experience” (Hayes et al.,
2012, p. 272). The use of metaphors is a way to explain acceptance without too much
clinician existentialist verbiage and the bus metaphor is an excellent way to
demonstrate the idea of acceptance without using terminology that might be
inaccessible to clients. Accepting the negative private experiences and not giving the
passengers on the bus the power to control behaviour is allowing the passengers to
stay on the bus but continuing to drive in the direction of values. Another useful
metaphor is “dropping the rope” in the tug of war with a monster; the monster is still
there but there is no longer struggle. Giving the HD client an alternative to the
“control and eliminate” agenda that they have been using by saving possessions is
crucial to treatment success for HD clients. By demonstrating the benefit of
acceptance as a stance and a way of openly connecting with all experience, HD clients
are ready to practice exposure-based acceptance, first in an office session and then in
the home context. This type of exposure is an ACT technique and not the same as the traditional exposure therapy described in the *Treatment for Hoarding: Therapists guide*.

**Exposure-based acceptance.**

Unlike classical exposure therapy, ACT exposure is the “organised presentation of previously repertoire-narrowing stimuli in a context designed to ensure repertoire expansion” (Hayes et al., 2012, p. 284). While traditional exposure therapy is intended to reduce arousal by exposing clients to anxiety provoking stimuli through habituation and extinction, exposure-based acceptance is not aimed at reducing arousal. In fact, it is important for clinicians to make clear the intention and state that the anxiety may get better, worse or stay the same. Learning to sit with the private experiences, without avoiding them or trying to change or control them is the purpose of exposure-based acceptance.

In exposure sessions, clinicians ask clients to search for emotional discomfort and encourages them to describe all the details of the experience (bodily sensations, emotions, memories, thoughts etc.) while instructing clients to see if it is possible to sit with the discomfort and let go of the struggle, even momentarily. In the CBT for HD exposure exercises, a graduated approach is suggested building up from images to personal possessions in session, and finally discarding in the home in order to reach habituation. This graduated approach may be taken with ACT exposure however it is the length of exposure time sitting with uncomfortable experiences that is gradually increased. Home sessions will be required in order for clients to experience the discomfort in context for the exposure-based acceptance to be effective.

When HD clients are ready, an organising plan for the home can be developed, a coach or professional organiser appointed to assist clients with problem solving the
physical aspects of discarding possessions. Before this occurs, it is important to discuss decision-making difficulties HD clients might face.

**Decision-making.**

As discussed in Phase IV of the acceptance-based emotion regulation model (see Chapter 5 for a full description and discussion) a number of factors (not intended as an exhaustive list) were highlighted that may be problematic for HD clients when engaging in treatment. Many cognitive biases described in behavioural economics impact all of us when making decision not just HD clients. Awareness of these biases and how they can impact clients’ choices can help HD clients make more deliberate decisions and avoid these traps. The endowment effect is particularly relevant to HD, where people over value items they own over those they do not. This is a universal phenomenon (see Kahneman, 2012 for a comprehensive discussion) and relates to loss aversion, another highly relevant cognitive bias where avoiding losses is preferred to acquiring identical gains.

Intolerance of uncertainty is a vulnerability factor that impacts both saving and acquiring in HD. Certainly, it is this tendency that is the trigger for “just-in-case” acquiring and saving behaviours and is also related to another factor that affects decision-making in HD and that is perfectionism. In particular, the evaluative concerns dimension of the perfectionism construct has been found to impact HD severity via its indirect effect on decisional procrastination and indecisiveness.

With such significant experiential avoidance (Study 1 & 2), HD clients are likely to have little decision-making experience. Memory of past intense moments of pleasure, pain, or emotions is likely to encourage avoidance of actions that are related to that memory. When practicing decision-making clinicians need to consider the
impact memory and emotions is likely to have on HD client’s ability to make decisions.

Organising and planning involve highly complex executive processes that test forward thinking abilities (Grisham et al., 2007) and any objective deficits found in the cognitive function battery will need to be taken care of when working with cognitively impaired HD clients.

Organising and planning skills training.

At this point in the treatment process defusion and acceptance will be understood and practiced, and clients will have clear values that have been freely chosen. The planning and organising phase is where clients are applying the ACT skills they have learned and taking committed action, which is a “choice to behave in a particular way on purpose” (Hayes et al., 2012, p. 330). Clinicians will work with clients to develop committed action plans that are specific action-goals in the service of established values. For hoarding sufferers, the value may be to become more connected parents. In order to move towards this value, clients will need to create goals such as committing to focus on making the children’s play areas clutter free. Action steps might be removing all the objects into another space, deciding which toys to keep, returning those toys the children engage with, and donating the rest. The goal is in service of the over-arching value of becoming more connected parents. Being able to sit down and play safely and mindfully will enable clients to be present and bond with their children in a meaningful way. Depending on the values clients identify, goals and committed actions will vary accordingly, and they will form the basis for the hands-on organising plan.

To demonstrate the integration of ACT processes at work in HD, a specific example is offered. Instead of deciding if she needed to keep the dozens of single
socks in a pile on the living room table Anne would ask herself the simple question: “Are these socks essential to living according to my value of becoming a more connected parent?” In this case, Anne, who is taking actions towards her parenting value, answers “No” to this question. In the past Anne may have reasoned that it was wasteful, and she “should” at least keep some socks and make hand puppets or create sock toys and avoided the decision to discard by keeping them all. Today, with some anxiety, that she is able to sit with and old faithful thoughts that she thanks her mind for, Anne parts with them all. In order to take committed action as just described it is necessary for ACT attentional, diffusion, and acceptance skills to be learned and practiced until they become the habitual response when clients face emotionally charged situations.

Whilst the ACT defusion, acceptance, values, and committed action work requires a trained psychologist or counsellor, the logistical stage of large-scale discarding requires an empathetic, HD-aware individual trained in the basics of iHACT that can support and reinforce the psychologically flexible stance required for behavioural change. This may be a clinician; however, coaches or professional organisers may be more feasible. Undoubtedly, the “decluttering coaches” need to be endorsed by clinicians and specific training in the ACT approach may need to be conducted prior to the physical work commencing in order to ensure a cohesive approach to treatment and decluttering. Teaming up with trusted partners who are experts in the field of organising and that have a working knowledge of ACT is highly recommended in order to free up clinicians to treat other HD clients. Nevertheless, clinicians will need to integrate their sessions with nominated decluttering coaches and remain project managers of the process.
The CBT for HD protocol has an excellent chapter on organising training skills (Chapter 8, Steketee & Frost, 2014) including detailed plans of how to lead clients through categorisation for unwanted items and saved objects to the details of how to set up a filing system for documents. There are also numerous organising books, blogs, and websites that offer great problem-solving tips and tricks for the physical organisation of the hoarding sufferer’s home should clinicians wish to oversee the physical decluttering phase themselves. Incidentally, be aware of avoidance in the form of searching for the “perfect” way to organise or categories possessions (if Pinterest comes up in sessions be warned!) as this type of procrastination is typical of HD clients. Indeed, digital hoarding of images, blog posts, and websites can be as maladaptive as hoarding possessions, without the behavioural residue of extreme clutter, due to the hours that can be lost scouring the Internet. Ironically, many HD clients have piles of books on organising amongst their hoarded possessions.

**Managing inevitable setbacks.**

Setbacks or exceedingly slow progress is common in HD cases, which can lead to demotivation and behavioural backsliding (Steketee & Frost, 2014b). Given the chronic nature of HD, typical behaviours have continued unchanged for many years. Therefore, returning clients to the values they have expressly chosen, using photographs to visually demonstrate progress, and practicing defusion and acceptance in the context of the home will refocus clients and return them to committed action.

The iHACT intervention protocol is a proposal at this stage and is untested. Indeed, this protocol shares techniques in common with the current CBT treatment and is intended as a supplement to the manualised treatment that is currently considered the gold-standard in individual HD interventions (Steketee & Frost, 2007,
2014b). It is hoped that this practical iHACT guide, based on the findings from this thesis will encourage treatment efficacy studies to gather further support for the use of ACT in HD.

**Project Limitations**

This proposed acceptance-based emotion regulation model of hoarding disorder and subsequent statistical testing of the difficulty discarding path, was exploratory and not without limitations.

In general terms it must be acknowledged that whilst the acceptance-based emotion regulation model is intended as a framework for hoarding disorder, and not merely hoarding behaviours, future research using a clinical cohort is required to confirm its applicability to the psychopathology of hoarding.

As many of the psychological inflexibility measures were untested in HD, the aim of this exploratory research was to ascertain the nature and strength of relationships using SEM. As a result, preliminary results indicated the difficulty discarding path model needed to be reconfigured. Far from being unproductive, the initial fully latent SEM highlighted methodological issues unforeseen prior to this study. The overlap between measures of mindfulness, cognitive fusion, self-as-context, and saving cognitions led to the realisation that cognitive fusion is a process measure and saving cognitions is an outcome measure in HD. Indeed, a recently published measure, unavailable when this study was designed, the Multidimensional Psychological Flexibility Inventory (MPFI; Rolffs, Rogge, & Wilson, 2016) offers a 30-item measure of psychological inflexibility and a 30-item measure of psychological flexibility from an exhaustive pool of items from the most widely used acceptance and mindfulness measures. Therefore, the use of a multidimensional
measure such as the MPFI should be considered by future researchers to both clarify the level of inflexibility in clinical HD sufferers and to assess clinically significant change in the population post ACT treatment.

The cross-sectional design using only self-report measures was chosen as a practical and cost-effective first step to assess the relevance of using ACT as a theoretical lens for HD behaviours. As a result, causal assertions cannot be made; however, the use of SEM path analysis ensures more statistically robust results than simple mediation or multiple regression, due to simultaneous estimation of variance and error.

Additionally, the use of an oversampling method of recruitment was both beneficial and problematic. The benefit of targeting hoarding level participants via online chat groups and forums yielded a large number of individuals who self-reported clinical levels of hoarding symptoms \((n = 222)\), allowing for the use of SEM and offering adequate statistical power to detect mediation effects. Conversely, the use of an oversampling technique targeting individuals who reach clinical levels on questionnaires means the sample is likely to be biased towards participants who have reasonable levels of insight and engagement, thus would be more likely to seek treatment. This is not true for the majority of the hoarding population (Frost et al., 2010). Additionally, the use of online recruitment and self-report questionnaires, make it impossible to confirm the accuracy of reported hoarding symptoms and psychological inflexibility; however, for this type of exploratory research of a difficult to access population like HD, the use of online data collection and administration is likely to be valid and reliable (Ramsey, Thompson, McKenzie, & Rosenbaum, 2016).

Statistically it must be noted that using an oversample can seriously inflate the percentage of variance explained in a model (McClelland & Judd, 1993). Thus,
conclusions about the results in the final model of 69% \( (r^2 = .69) \) of the variance in clutter is explained by the model should be interpreted cautiously.

Very few males participated in the online questionnaire, which makes these findings limited in their generalisability. Because of this lack of male participation, further studies may use a similar over-sampling technique for male hoarding sufferers to locate clinical-level participants.

Finally, it should be noted that, as with all psychopathology, it is unlikely the relationship between the variables tested in this model is one-way; unfortunately, AMOS® 24 is unable to test non-recursive models.

**Suggested Future Direction of the Research**

The lack of a clinical cohort limits the generalisability of these findings, therefore future research aimed to replicate results in a clinical hoarding sample is required before conclusions can be made as to the applicability of the acceptance-based emotion regulation model to HD. Further, qualitative research into the phenomenology or “lived experience” of difficulty discarding in clinically diagnosed hoarding participants would add weight to the results found here. An assessment of the thoughts and sensations experiences and responses to those while attempting to discard with and without ACT treatment would be highly beneficial to round out the results from this cross-sectional exploratory study. Experimental research using emotional cues to trigger anxiety, and inflexibility would also allow causal inferences to be made regarding difficulty discarding in HD.

A series of ACT randomised controlled trials or a trial with multiple groups each comparing a CBT group without cognitive reappraisal and distancing/defusion techniques, a group using acceptance techniques, with a CBT group using the
standard protocol would be highly beneficial. An extra layer could be added comparing those who had higher levels of psychological inflexibility at baseline prior to the intervention and see if that impacts the efficacy of CBT and ACT techniques.

The new theoretical model of HD proposed here hypothesises that emotion regulation plays a more central role than information processing deficits in the aetiology and maintenance of HD than previously theorised. The idea that emotion overregulation is in fact impacting cognitive functioning in HD rather than the alternative proposed by the Frost and Hartl (1996) model that objective cognitive deficits are the cause of hoarding related beliefs and subsequent emotional reinforcement, is untested. This intersection of HD beliefs and cognitive processes requires exploration (Woody et al., 2014) as research indicates executive functioning provides essential neuropsychological support for self-regulation and when self-control is depleted executive function suffers (Baumeister, 2002). Additionally, devoting finite cognitive resources and energy to regulate emotions—either decrease the negative or increase the positive—takes time and effort away from other pursuits and does not deliver the desired result of psychological health (Kashdan, Breen, & Julian, 2010). The impact of HD emotion dysregulation on executive functioning is considered hypothetically in Phase IV decision-making of the acceptance-based emotion regulation model. Future research is required to understand these relationships in HD and, ultimately, their impact on clutter.

Conclusion

This research takes the current cognitive-behavioural model of the aetiology and maintenance of HD and uses an alternative theoretical lens through which to view hoarding cognitions and behaviours. The new acceptance-based emotion regulation
model builds on a growing body of evidence that supports the centrality of emotions in the maintenance of HD and moves away from the notion presented in the current Frost and Hartl (1996) model, that information processing deficits are both antecedent and maintaining factors in the disorder. The reconceptualisation of the theoretical model of HD from an acceptance and commitment therapy (ACT) perspective suggests emotions precede cognitions and behaviours in both the emotion regulation and difficulty discarding phases of the acceptance-based emotion regulation model. Support for this path from distressing emotions to cognitions followed by behaviours can be found in the outcome of Study 2, the psychological inflexibility difficulty discarding path model of HD. Offering a phenomenological (lived experience) process of difficulty discarding in HD, the results of the difficulty discarding path analysis are the first to describe the course of consequences that are initially triggered by the idea of large scale discarding from a psychological inflexibility perspective.
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https://doi.org/http://dx.doi.org/10.1155/2015/670724


https://doi.org/10.1007/s10862-005-3265-z

https://doi.org/10.1016/j.brat.2006.12.008


https://doi.org/10.1016/j.psychres.2008.05.007


https://doi.org/10.1016/j.comppsych.2016.10.007

https://doi.org/10.1017/S0033291714000269

https://doi.org/10.1002/ajmg.b.30370

https://doi.org/10.1037/0033-2909.114.2.376


https://doi.org/http://dx.doi.org/10.1037/neu0000234


https://doi.org/10.1016/0887-6185(92)90037-8


Appendices
Appendix A: Participant Information Sheet
PARTICIPANT INFORMATION

Project Title: Exploring the relationship between hoarding disorder and psychological inflexibility

Investigators: Jan Malcolm, Ph.D. Candidate, janmalcolm@student.rmit.edu.au
Dr Sophia Xenos, sophia.xenos@rmit.edu.au, +61 3 9925 1081
A.Prof Andrew Francis, andrew.francis@rmit.edu.au, +61 3 9925 7782

This is an open invitation to participate in a research project being conducted by RMIT University. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please ask one of the investigators.

Who is involved in this research project? Why is it being conducted?

This research forms part of a larger student project. Jan Malcolm is working under the supervision of Dr Sophia Xenos and Associate Professor Andrew Francis; this study will form part of her Doctor of Philosophy dissertation in Psychology. The RMIT Human Research Ethics Committee has approved this project.

What is the project about? What are the questions being addressed?

Everyone keeps things they no longer need “just in case”, however, some people have persistent difficulty discarding or parting with possessions, regardless of their actual value, which results in the accumulation of possessions that congest and clutter active living areas. If clinically significant distress or impairment to the self or others is present a diagnosis of hoarding disorder may be appropriate.

Finding out what causes people to keep possessions and continue to save them, despite the problems this may create, is essential to improve the lives of those who hoard. Because the tendency to save varies in degree and character in all of us it is important to understand how those along the saving continuum compare with regard to emotion management. This research is asking the questions: what is the relationship between the tendency to save and how psychologically flexible a person is? Are those who are psychologically rigid more likely to have strong emotionally attachment to their possessions and therefore have more difficulty letting go of them?

It is expected approximately 400 people from all areas of the community will participate in this study.

If I agree to participate, what will I be required to do?

This study is a straightforward online questionnaire, which will take approximately 20 – 30 minutes to complete. Example questions are:
- “To what extent do you have difficulty throwing things away?”
- “How often do you decide to keep things you do not need and have little space for?”
Example statements are:

- "The key to a good life is never feeling any pain."
- "I find myself doing things without paying attention."

You will be able to save and return to your unfinished survey if required.

**What are the possible risks or disadvantages?**

It is possible, though highly unlikely, that you may feel concerned by your responses to questionnaire items or you may find participation in the project distressing. Those wishing to discuss any psychological unease can contact: www.beyondblue.org.au ph: 1300 22 4636 or http://www.lifeline.org.au ph: 13 11 14. If you live outside Australia, find assistance in your country by visiting: http://www.befrienders.org/directory.

If you have any concerns with the conduct of researchers involved in the project, you should contact Dr Sophia Xenos as soon as convenient. Dr Xenos will discuss your concerns with you confidentially and suggest appropriate follow-up, if necessary.

**What are the benefits associated with participation?**

If you participate in this project feedback on your level of mindfulness will be automatically generated by Qualtrics and available at the end of the survey. This information may act as an impetus for self-reflection and encourage you to seek ways to further improve your psychological wellbeing.

**What will happen to the information I provide?**

Your individual responses are completely confidential and unidentifiable, however, due to the online collection method, you should consider the following:

**Security of the website:**
Users should be aware that the World Wide Web is an insecure public network that gives rise to the potential risk that a user’s transactions are being viewed, intercepted or modified by third parties or that data which the user downloads may contain computer viruses or other defects.

**Security of the data:**
This project will use an external site to create, collect and analyse data collected in a survey format. The site we are using is Qualtrics. If you agree to participate in this survey, the responses you provide to the survey will be stored on a host server that is used by Qualtrics. No personal information will be collected in the survey so none will be stored as data. Once we have completed our data collection and analysis, we will import the data we collect to the RMIT server where it will be stored for five (5) years. The data on the Qualtrics host server will then be deleted and expunged.

Grouped results will be published and disseminated in the investigator’s Ph.D. dissertation and retained in the RMIT Repository, which is a publically accessible online library of research papers, indefinitely and may, at some future time, be published in an academic journal and/or presented at relevant conferences.

Because of the nature of data collection, we are not obtaining written informed consent from you. Instead, we assume that you have given consent by your completion and submission of the online questionnaire.

**What are my rights as a participant?**

You have the right to withdraw from participation at any time and to have any unprocessed data withdrawn and destroyed, provided it can be reliably identified, and provided that so doing does not increase the risk for you, the participant. You also have the right to have any questions answered at any time.
Whom should I contact if I have any questions?

If you have any questions, at any time about this project, please contact: Jan Malcolm, sophia.xenos@rmit.edu.au, or Dr Sophia Xenos, phone (03) 9925 1081.

Yours sincerely,

Jan Malcolm
Ph.D. Candidate

Dr Sophia Xenos
Senior Lecturer

A. Prof. Andrew Francis
Associate Professor

This project, XXXX/XXX, has been approved by or on behalf of RMIT’s Human Research Ethics Committee (HREC) in line with the National Statement on Ethical Conduct in Human Research. If you have any concerns about your participation in this project, which you do not wish to discuss with the researchers, then you can contact the Ethics Officer, Research Integrity, Governance and Systems, RMIT University, GPO Box 2476V VIC 3001. Tel: (03) 9925 2251 or email human.ethics@rmit.edu.au
Appendix B: Survey Questionnaires
Draft Survey Questions

Demographic Questions

Gender: What is your sex?
- Male
- Female

Age: numeric value minimum 18 years, maximum open ended (Opinio allows this question to be a filter for age if participant is under 18)

Employment Status: Are you currently...? (Drop down menu)
- Employed full-time for wages
- Employed part-time for wages
- Self-employed
- Out of work and looking for work
- Out of work but not currently looking for work
- A homemaker
- A student
- Retired
- Unable to work

Education Status: What is the highest degree or level of school you have completed? If you are currently enrolled, highest degree received: (Drop down menu)
- Some high school, no diploma
- High School graduate, diploma or equivalent
- University Undergraduate – commenced but incomplete
- Trade/Technical/Vocational training
- Bachelor’s degree
- Master’s degree
- Professional degree (MD, LLB)
- Doctorate

Household income: What is your total household income? (Drop down menu)
- Less than $10,000
- $10,000 to $19,999
- $20,000 to $29,999
- $30,000 to $39,999
- $40,000 to $49,999
- $50,000 to $59,999
- $60,000 to $69,999
- $70,000 to $79,999
- $80,000 to $89,999
- $90,000 to $99,999
- $100,000 to $149,999
- $150,000 or more

What is your relationship status?

- Single, never married
- In a committed relationship
- Married or domestic partnership
- Widowed
- Divorced
- Separated

Living arrangements – What are your current living arrangements? Do you...

- Live alone
- Live in share accommodation
- Live with your partner
- Live with your parents
- Other

Do you have any first-degree relatives with excessive clutter problems?

- Yes
- No
Saving Inventory – Revised (Modified Format)

For each question below, circle the number that corresponds most closely to your experience DURING THE PAST WEEK.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>A little</td>
<td>A moderate amount</td>
<td>Most/Much</td>
<td>Almost All/Complete</td>
<td></td>
</tr>
<tr>
<td>1. 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).</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. How much control do you have over your urges to acquire possessions?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. How much of your home does clutter prevent you from using?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. How much control do you have over your urges to save possessions?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. How much of your home is difficult to walk through because of clutter?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

For each question below, circle the number that corresponds most closely to your experience DURING THE PAST WEEK.

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Mild</td>
<td>Moderate</td>
<td>Considerable/Severe</td>
<td>Extreme</td>
<td></td>
</tr>
<tr>
<td>6. To what extent do you have difficulty throwing things away?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. How distressing do you find the task of throwing things away?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. To what extent do you have so many things that your room(s) are cluttered?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. How distressed or uncomfortable would you feel if you could not acquire something you wanted?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. How much does clutter in your home interfere with your social, work or everyday functioning? Think about things that you don’t do because of clutter.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. How strong is your urge to buy or acquire free things for which you have no immediate use?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
DURING THE PAST WEEK:

<table>
<thead>
<tr>
<th>Question</th>
<th>Not at all</th>
<th>Mild</th>
<th>Moderate</th>
<th>Considerable/Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. To what extent does clutter in your home cause you distress?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13. How strong is your urge to save something you know you may never use?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14. How upset or distressed do you feel about your acquiring habits?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. To what extent do you feel unable to control the clutter in your home?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. To what extent has your saving or compulsive buying resulted in financial difficulties for you?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

For each question below, circle the number that corresponds most closely to your experience.

DURING THE PAST WEEK:

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes/Occasionally</th>
<th>Frequently/Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. How often do you avoid trying to discard possessions because it is too stressful or time consuming?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. How often do you feel compelled to acquire something you see? e.g., when shopping or offered free things?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. How often do you decide to keep things you do not need and have little space for?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. How frequently does clutter in your home prevent you from inviting people to visit?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21. How often do you actually buy (or acquire for free) things for which you have no immediate use or need?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22. 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.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>23. How often are you unable to discard a possession you would like to get rid of?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
SI-R (Modified) Scoring Subscales:

Clutter Subscale (9 Items):
Sum items: 1, 3, 5, 8, 10, 12, 15, 20, 22

Difficulty Discarding/ Saving Subscale (7 items):
Sum items: 4 (reverse score), 6, 7, 13, 17, 19, 23

Acquisition Subscale (7 items):
Sum items: 2 (reverse score), 9, 11, 14, 16, 18, 21
Total Score = sum of all items

Interpretation of Scores

Means for Nonclinical samples:

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition</td>
<td>8.1</td>
<td>4.1</td>
</tr>
<tr>
<td>Difficulty Discarding</td>
<td>7.8</td>
<td>4.5</td>
</tr>
<tr>
<td>Clutter</td>
<td>8.1</td>
<td>7.1</td>
</tr>
<tr>
<td>Total Score</td>
<td>24</td>
<td>12.0</td>
</tr>
</tbody>
</table>

Typical scores for people with hoarding problems:

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition</td>
<td>Greater than 13</td>
</tr>
<tr>
<td>Difficulty Discarding</td>
<td>Greater than 13</td>
</tr>
<tr>
<td>Clutter</td>
<td>Greater than 15</td>
</tr>
<tr>
<td>Total</td>
<td>Greater than 40</td>
</tr>
</tbody>
</table>
# Saving Cognitions Inventory

Use the following scale to indicate the extent to which you had each thought when you were deciding whether to throw something away during the past week. (If you did not try to discard anything in the past week, indicate how you would have felt if you had tried to discard.)

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>not at all</td>
<td>sometimes</td>
<td>very much</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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 is 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 |
SCI Scoring
Subscales:
Emotional Attachment (10 items): 1, 3, 6, 8, 9, 10, 13, 16, 22, 23
Control (3 items): 5, 18, 24
Responsibility (6 items): 2, 7, 11, 12, 15, 19
Memory (5 items): 4, 14, 17, 20, 21
Total Score = Sum of all items

Clutter Image Rating

In our work on hoarding, we’ve found that people have very different ideas about what it means to have a cluttered home. For some, a small pile of things in the corner of an otherwise well-ordered room constitutes serious clutter. For others, only when the narrow pathways make it hard to get through a room does the clutter register. To make sure we get an accurate sense of a clutter problem, we created a series of pictures of rooms in various stages of clutter – from completely clutter-free to very severely cluttered. People can just pick out the picture in each sequence comes closest to the clutter in their own living room, kitchen, and bedroom. This requires some degree of judgment because no two homes look exactly alike, and clutter can be higher in some parts of the room than others. Still, this rating works pretty well as a measure of clutter. In general, clutter that reaches the level of picture # 4 or higher impinges enough on people’s lives that we would encourage them to get help for their hoarding problem. These pictures are published in our treatment manual (Compulsive Hoarding and Acquiring: Therapist Guide, Oxford University Press) and in our self-help book (Buried in Treasures: Help for Compulsive Acquiring, Saving, and Hoarding, Oxford University Press).
Clutter Image Rating: Bedroom
Please select the photo that most accurately reflects the amount of clutter in your room.

1  2  3
4  5  6
7  8  9

Clutter Image Rating: Living Room
Please select the photo below that most accurately reflects the amount of clutter in your room.

1  2  3
4  5  6
7  8  9
Appendix CFQ

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

<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></td>
<td>never true</td>
<td>very seldom true</td>
<td>seldom true</td>
<td>sometimes true</td>
<td>frequently true</td>
<td>almost always true</td>
<td>always true</td>
</tr>
</tbody>
</table>

1. My thoughts cause me distress or emotional pain
   1  2  3  4  5  6  7

2. I get so caught up in my thoughts that I am unable to do the things that I most want to do
   1  2  3  4  5  6  7

3. I over-analyse situations to the point where it's unhelpful to me
   1  2  3  4  5  6  7

4. I struggle with my thoughts
   1  2  3  4  5  6  7

5. I get upset with myself for having certain thoughts
   1  2  3  4  5  6  7

6. I tend to get very entangled in my thoughts
   1  2  3  4  5  6  7

7. It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful
   1  2  3  4  5  6  7

Thank you for completing this questionnaire: A formatted form of this questionnaire can be downloaded from: [http://contextualscience.org/CFQ](http://contextualscience.org/CFQ)
Appendix

Brief Experiential Avoidance Questionnaire

Please indicate the extent to which you agree or disagree with each of the following statements.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>strongly disagree</td>
<td>moderately disagree</td>
<td>slightly disagree</td>
<td>slightly agree</td>
<td>moderately agree</td>
<td>strongly agree</td>
</tr>
</tbody>
</table>

1. The key to a good life is never feeling any pain 1 2 3 4 5 6
2. I’m quick to leave any situation that makes me feel uneasy 1 2 3 4 5 6
3. When unpleasant memories come to me, I try to put them out of my mind 1 2 3 4 5 6
4. I feel disconnected from my emotions 1 2 3 4 5 6
5. I won’t do something until I absolutely have to 1 2 3 4 5 6
6. Fear or anxiety won’t stop me from doing something important 1 2 3 4 5 6
7. I would give up a lot not to feel bad 1 2 3 4 5 6
8. I rarely do something if there is a chance that it will upset me 1 2 3 4 5 6
9. It’s hard for me to know what I’m feeling 1 2 3 4 5 6
10. I try to put off unpleasant tasks for as long as possible 1 2 3 4 5 6
11. I go out of my way to avoid uncomfortable situations 1 2 3 4 5 6
12. One of my big goals is to be free from painful emotions 1 2 3 4 5 6
13. I work hard to keep out upsetting feelings 1 2 3 4 5 6
14. If I have any doubts about doing something, I just won’t do it 1 2 3 4 5 6
15. Pain always leads to suffering 1 2 3 4 5 6

Note: To score, first reverse key item 6 (i.e., subtract the value from 7), then sum all items.

Factor Structure-7 Item SACs α = .83

<table>
<thead>
<tr>
<th>Items</th>
<th>Α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Even though there have been many changes in my life, I'm aware of a part of me that has witnessed it all.</td>
<td>.69</td>
</tr>
<tr>
<td>Though I have had many roles in my life, I have always had a sense of self that is stable and enduring.</td>
<td>.68</td>
</tr>
<tr>
<td>There is a basic sense I have of myself that doesn't change even though my thoughts and feelings do.</td>
<td>.66</td>
</tr>
<tr>
<td>As I look back upon my life so far, I have a sense that part of me has been there for all of it.</td>
<td>.66</td>
</tr>
<tr>
<td>When I think back to when I was younger, I recognize that a part of me that was there then is still here now.</td>
<td>.65</td>
</tr>
<tr>
<td>Despite the many changes in my life, there is a basic part of who I am that remains unchanged.</td>
<td>.63</td>
</tr>
<tr>
<td>I am able to access a perspective from which I can notice my thoughts, feelings, and emotions.</td>
<td>.57</td>
</tr>
</tbody>
</table>
In this section, we would like you to give a rating of how consistent your actions have been with each of your values. We are not asking about your ideal in each area. We are also not asking what others think of you. Everyone does better in some areas than others. People also do better at some times than at others. **We want to know how you think you have been doing during the past week.** Rate each area (by circling a number) on a scale of 1-10. 1 means that your actions have been completely inconsistent with your value. 10 means that your actions have been completely consistent with your value.

### During the past week

<table>
<thead>
<tr>
<th>Area</th>
<th>not at all consistent with my value</th>
<th>completely consistent with my value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family (other than marriage or parenting)</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>2. Marriage/couples/intimate relations</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>3. Parenting</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>4. Friends/social life</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>5. Work</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>6. Education/training</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>7. Recreation/fun</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>8. Spirituality</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>9. Citizenship/Community Life</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>10. Physical self care (diet, exercise, sleep)</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>
Valued Living Questionnaire

Below are areas of life that are valued by some people. We are concerned with your quality of life in each of these areas. One aspect of quality of life involves the importance one puts on different areas of living. Rate the importance of each area (by circling a number) on a scale of 1-10. 1 means that area is not at all important. 10 means that area is very important. Not everyone will value all of these areas, or value all areas the same. Rate each area according to your own personal sense of importance.

<table>
<thead>
<tr>
<th>Area</th>
<th>not at all important</th>
<th>extremely important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Family (other than marriage or parenting)</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>2. Marriage/couples/intimate relations</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>3. Parenting</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>4. Friends/social life</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>5. Work</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>6. Education/training</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>7. Recreation/fun</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>8. Spirituality</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>9. Citizenship/Community Life</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>10. Physical self care</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>(diet, exercise, sleep)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Table 1

<table>
<thead>
<tr>
<th>AQQ-II Item</th>
<th>Two-Factor Solution</th>
<th>One-Factor Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
<td>Factor 2</td>
</tr>
<tr>
<td>1. It’s OK if I remember something unpleasant. *</td>
<td>.19</td>
<td>.23</td>
</tr>
<tr>
<td>2. My painful experiences and memories make it difficult for me to live a life that I would value.</td>
<td>.61</td>
<td>.14</td>
</tr>
<tr>
<td>3. I’m afraid of my feelings.</td>
<td>.75</td>
<td>.05</td>
</tr>
<tr>
<td>4. I worry about not being able to control my worries and feelings.</td>
<td>.72</td>
<td>.03</td>
</tr>
<tr>
<td>5. My painful memories prevent me from having a fulfilling life.</td>
<td>.77</td>
<td>.09</td>
</tr>
<tr>
<td>6. I am in control of my life. *</td>
<td>.25</td>
<td>.40</td>
</tr>
<tr>
<td>7. Emotions cause problems in my life.</td>
<td>.89</td>
<td>.16</td>
</tr>
<tr>
<td>8. It seems like most people are handling their lives better than I am.</td>
<td>.55</td>
<td>.17</td>
</tr>
<tr>
<td>9. Worries get in the way of my successes.</td>
<td>.42</td>
<td>.29</td>
</tr>
<tr>
<td>10. My thoughts and feelings do not get in the way of how I want to live my life. *</td>
<td>-.07</td>
<td>.63</td>
</tr>
<tr>
<td>Percent explained variance</td>
<td>41.47</td>
<td>4.94</td>
</tr>
<tr>
<td>Scale mean</td>
<td>30.69</td>
<td>21.41</td>
</tr>
<tr>
<td>Scale SD</td>
<td>9.91</td>
<td>7.97</td>
</tr>
<tr>
<td>Coefficient α for scale</td>
<td>.87</td>
<td>.88</td>
</tr>
</tbody>
</table>

Note: Coefficients in bold load onto the corresponding factor.

* Item reversed for scoring purposes.

---

**Appendix**

Item Mean and Completely Standardized Factor Loadings in the Correlated Three-Factor CFA Model of the AFQ-II

<table>
<thead>
<tr>
<th>Item</th>
<th>Observed</th>
<th>Scale 1</th>
<th>Scale 2</th>
<th>Scale 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>304</td>
<td>2.31</td>
<td>.58</td>
<td>.09</td>
<td>.73</td>
</tr>
</tbody>
</table>
### DASS 21

**NAME ___________________ DATE ________**

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 - NEVER
1 Applied to me to some degree, or some of the time - SOMETIMES
2 Applied to me to a considerable degree, or a good part of the time - OFTEN
3 Applied to me very much, or most of the time - ALMOST ALWAYS

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

**TOTALS**