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TESTING AN ACCEPTANCE AND COMMITMENT THERAPY WEBSITE FOR
HOARDING: A RANDOMIZED WAITLIST-CONTROLLED TRIAL

by

Jennifer Krafft

A dissertation submitted in partial fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Psychology

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2021

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ABSTRACT

Testing an Acceptance And Commitment Therapy Website for Hoarding: A

Randomized Waitlist-Controlled Trial

by

Jennifer Krafft

Utah State University, 2021

Major Professor: Michael E. Levin, Ph.D.

Department: Psychology

Hoarding disorder is relatively common and linked to substantial distress, impairment, and family dysfunction. However, access to hoarding treatment is limited, due to barriers such as availability and stigma. Moreover, only one treatment for hoarding is empirically well-established (CBT for hoarding), and several processes that may contribute to hoarding are not directly addressed by CBT, including psychological inflexibility. Therefore, this study tested a self-help program based on acceptance and commitment therapy (ACT), which has the potential to improve hoarding treatment by overcoming barriers to access and directly targeting psychological inflexibility.

The self-help program was tested relative to a waitlist condition in a randomized controlled trial. Program content was based on prior trials of ACT self-help, delivered as 16 website modules tailored for hoarding and addressing all components of psychological inflexibility. The program was implemented as an 8-week treatment with a 4-week follow-up, and supportive coaching was provided during the 8-week treatment period. The sample comprised 73 individuals meeting a clinical cutoff for hoarding symptoms; as is common in hoarding treatment studies, participants were largely white and female.

This sample was slightly less white and somewhat younger compared to typical samples for in-person trials.

Overall, results supported the initial efficacy and acceptability of an ACT self-help program for hoarding. The treatment condition improved significantly more than the waitlist condition on nearly all outcomes and processes of interest, including overall hoarding severity, overall functional impairment, hoarding-related psychological inflexibility, and progress toward personal values. Reliable and clinically significant change was limited compared to in-person CBT, and superior at follow-up compared to posttreatment . Pre-determined benchmarks for acceptability, credibility, treatment expectancy, and ease of use were all met. Longitudinal mediation analyses did not support hypothesized mediators; however, exploratory cross-sectional mediation models with the mediator and outcome measured at follow-up supported a potential role for mindful awareness and acquiring-related psychological inflexibility in explaining hoarding severity.

Limitations include lack of diversity within the sample and the need for comparison to an active control. However, overall these findings indicate that ACT self-help programs are a promising and acceptable option for treatment of hoarding.

(166 pages)

PUBLIC ABSTRACT

Testing an Acceptance And Commitment Therapy (ACT) Website for Hoarding: A

Randomized Waitlist-Controlled Trial

Jennifer Krafft

Hoarding disorder is relatively common and seriously affects those who experience it. However, it is difficult to access hoarding treatment, due to barriers such as availability and stigma. Moreover, only one treatment is well-established for hoarding (CBT), and it does not directly address important processes such as mindfulness and acceptance. Therefore, in order to make treatment more useful and easy to access, this study tested a self-help program that focused on teaching mindfulness and acceptance as related to hoarding. The self-help program was compared to a waitlist condition; participants were randomly assigned to use the website or wait 12 weeks. The website was structured as 16 self-help modules tailored for hoarding. The program was implemented as an 8-week treatment with a 4-week follow-up period, and supportive coaching was provided during the 8-week treatment period. The sample included 73 individuals with problematic hoarding symptoms; as is common in hoarding treatment studies, participants were mostly white and female. These participants were slightly less white and somewhat younger compared to participants in studies on traditional therapy. Overall, results suggested that the program was helpful and participants found it satisfactory. Those who used the website improved significantly more than the waitlist on overall hoarding symptoms, overall difficulties in functioning, self-stigma, and progress toward personal values. Many participants did not finish the program, and many still had a problematic level of hoarding symptoms after treatment, which suggests room for improvement. Participants overall found the website satisfactory and easy to use, and perceived it as likely to be helpful. It is unclear what processes led to improvement in the treatment condition, although increasing mindful awareness and reducing rigid responses to thoughts and feelings about acquiring belongings may have contributed. Future studies should test this treatment in more diverse participants and compare it to other types of

treatment options. However, these results suggest that a self-help website teaching mindfulness and acceptance skills is likely to be useful for people with hoarding problems.

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Above all, I would like to dedicate this project to my participants. “Hoarders” do not have a great reputation. However, I have found them wonderful and rewarding to work with. My participants were caring, passionate, funny, persistent, and generous, time and time again. Their courage in opening up to difficult experiences was extraordinary and moving. From the bottom of my heart, thank you.

Jennifer Krafft

CONTENTS

	Page
Abstract.....	iii
Public Abstract.....	v
Acknowledgments.....	vii
List of Tables	xi
List of Figures	xii
Chapter I Introduction.....	1
Chapter II Literature Review	4
Hoarding Disorder	4
Treatment of Hoarding Disorder	5
Barriers to Treatment Provision	7
Barriers to Treatment Seeking.....	8
ACT as a Potential Treatment for Hoarding	12
Conclusions	16
Chapter III Methods.....	19
Study Design	19
Participants	19
Demographics	19
Removal of Invalid Responses.....	19
Recruitment	21
Procedures	22
Intervention	23
Measures.....	27
Screening Measures	27
Outcome Measures Administered at Baseline, Posttreatment, and Follow-up.....	27
Process Measures Administered at Baseline, Posttreatment, and Follow-up.....	29

Other Measure Administered at Baseline, Posttreatment, and Follow-up.....	31
Measure Administered Only at Baseline	31
Measure Administered Only after Completion of First Website Session	31
Other Measure Administered Only at Posttreatment and Follow-up.....	31
Acceptability Measures Administered Only to the ACT Website Condition at Posttreatment.....	32
Analysis Plan.....	33
Preliminary Analyses	33
Feasibility Analyses	34
Outcome Analyses	35
Treatment Response.....	36
Mediation Analyses	37
Chapter IV Results.....	39
Preliminary Analyses	39
Participant Characteristics	40
Treatment-Seeking History	40
COVID-19 Pandemic Impact.....	40
Feasibility Analyses	41
Treatment Acceptability.....	41
Treatment Adherence.....	42
Outcome Analyses.....	44
Treatment Response	47
Mediation Analyses	48
Longitudinal Analyses	48
Cross-Sectional Analyses.....	48
Chapter V Discussion	50
Summary of Outcomes	50
Feasibility	50
Efficacy	53
Mediation.....	59
Participant Characteristics	60
Limitations and Future Directions.....	61
References.....	65

Appendices.....	111
Appendix A. Treatment Outline.....	112
Appendix B. Measures	115
Curriculum Vitae	143

LIST OF TABLES

	Page
Table 1 Participant Demographics and Outcome/Process Variables by Group at Baseline.....	84
Table 2 Descriptive Statistics by Group at Baseline, Posttreatment and Follow-up	86
Table 3 Ratings of Novel Satisfaction Items	87
Table 4 Time by Condition Models	88
Table 5 Longitudinal Mediation Results.....	92
Table 6 Cross-Sectional Mediation Results.....	93
Table A.1 Treatment Outline	98

LIST OF FIGURES

	Page
Figure 1. Diagram of Study Enrollment.	94
Figure 2. Time by Condition Model of Hoarding Severity	95
Figure 3. Time by Condition Model of Difficulty Discarding.....	96
Figure 4. Time by Condition Model of Excessive Acquisition	97
Figure 5. Time by Condition Model of Clutter.....	98
Figure 6. Time by Condition Model of Overall Functional Impairment	99
Figure 7. Time by Condition Model of Work/School Impairment.....	100
Figure 8. Time by Condition Model of Family/Home Impairment	101
Figure 9. Time by Condition Model of Social/Leisure Impairment	102
Figure 10. Time by Condition Model of Perceived Symptom Change	103
Figure 11. Time by Condition Model of Well-Being	104
Figure 12. Time by Condition Model of Progress Toward Values.....	105
Figure 13. Time by Condition Model of Self-Stigma of Difference	106
Figure 14. Time by Condition Model of Self-Stigma of Disdain	107
Figure 15. Time by Condition Model of Self-Stigma of Blame	108
Figure 16. Time by Condition Model of Hoarding-Related Psychological Inflexibility	109
Figure 17. Time by Condition Model of Saving-Related Psychological Inflexibility...	110
Figure 18. Time by Condition Model of Acquiring-Related Psychological Inflexibility	111
Figure 19. Time by Condition Model of Mindful Awareness	112

CHAPTER I

INTRODUCTION

Hoarding disorder is estimated to occur in 2.5% of the population (Postlethwaite et al., 2019), making it a relatively common psychological problem. Clinical hoarding is also linked to serious difficulties in functioning, including impairment in work, social life, and relationships (Drury et al., 2014) as well as housing instability (Tolin, Frost, Steketee, Gray, et al., 2008). Developing treatments for hoarding that are both effective and acceptable is of great importance.

Cognitive-behavioral therapy (CBT) for hoarding has substantial empirical evidence supporting its use (Tolin et al., 2015). CBT for hoarding leads to improvements in symptom severity and impairment (Tolin et al., 2015). However, most individuals treated with CBT for hoarding still do not experience clinically significant change (Tolin et al., 2015), and improved treatment options are needed. One way to advance hoarding treatment would be to clarify active processes of change that lead to improvement.

There are also challenges in both treatment provision and treatment seeking that limit access to effective treatments for hoarding. CBT for hoarding is very time intensive (Tolin et al., 2015) and few therapists are trained in its delivery (Frost, Ruby, et al., 2012). Alternative options such as facilitated bibliotherapy groups for hoarding are also promising (Frost, Pekareva-Kochergina, et al., 2011; Frost, Ruby, et al., 2012) but still require expert supervision and can only be provided in a limited geographic area. Treatment seeking is also limited in hoarding (Chasson et al., 2018; Rodriguez et al., 2016), and it appears that self-stigma may play a role in preventing treatment seeking (Chasson et al., 2018). Low insight (Tolin, Fitch, et al., 2010), lack of motivation

(Steketee et al., 2010), inattention (Tolin & Villavicencio, 2011), and high rates of comorbidity (Frost, Steketee, et al., 2011) are also common clinical features of hoarding disorder that may interfere with accessing or engaging in treatment. In sum, innovative treatments for hoarding are needed that can increase access to treatment, overcome barriers to treatment seeking and engagement, and efficiently target active processes of change.

Testing alternative treatments for hoarding could be particularly helpful in identifying novel processes of change relevant to its treatment. Acceptance and commitment therapy (ACT; Hayes et al., 2012) is an evidence-based treatment that may be particularly promising. An initial multiple baseline trial of individual ACT for hoarding found improvements in the rate of discarding for five of six individuals, suggesting that ACT may be an efficacious treatment for hoarding and merits further study (Ong et al., 2021). There is also a large body of indirect support for utilizing ACT in this area. Several processes targeted by ACT have been demonstrated to be relevant to hoarding, including experiential avoidance (Wheaton et al., 2011, 2013), mindfulness, cognitive fusion, and values progress (Ong et al., 2018). ACT appears to help address self-stigma (Krafft, Ferrell et al., 2018) and its emphasis on values clarification and flexible attention could theoretically help address motivation and inattention in hoarding. In addition, ACT is a transdiagnostic therapy, which may be beneficial given the high rates of comorbidity in hoarding.

Therefore, this study tested a self-help website delivering ACT for hoarding. Determining if hoarding treatment can be effectively delivered in a website is advantageous because web-based treatment is scalable and can be accessed from a wide

range of locations. This study aimed to clarify if an ACT website for hoarding is efficacious in improving symptoms and functioning, if an ACT website is feasible and acceptable, and if an ACT website can improve hoarding through theoretically important processes of change such as psychological inflexibility and mindfulness.

CHAPTER II

LITERATURE REVIEW

Hoarding Disorder

Hoarding disorder is a relatively common psychological problem. Estimated point prevalence rates for compulsive hoarding based in large community samples have ranged from 1.5 to 6% (Iervolino et al., 2009; Nordsletten et al., 2013; Samuels et al., 2008; Timpano et al., 2011); a recent meta-analysis suggested a prevalence of 2.5% (Postlethwaite et al., 2019). Hoarding appears to be more common than obsessive-compulsive disorder (OCD; which has a 1.2% twelve-month prevalence) and is similar in prevalence to generalized anxiety disorder, which occurs in 2.9% of adults over 12 months (American Psychiatric Association, 2013).

Despite its relatively frequent occurrence, the consequences of hoarding can be severe and wide-ranging. By definition, hoarding disorder involves either clinically significant distress or impairment, as well as clutter that interferes with living conditions (American Psychiatric Association, 2013). Hoarding is linked to elevated distress (Timpano et al., 2011) and consistent impairment (Ong et al., 2015). People with hoarding disorder experience greater difficulties across virtually all important domains of life, including work, social life, leisure, and relationships (Drury et al., 2014). They experience poorer physical functioning, energy, and general health relative to controls, as well as greater pain (Drury et al., 2014). In one study, 64.5% of hoarding participants reported missing at least one day of work in the past month due to psychiatric impairment, 5.5% reported that they had been fired from a job due to their hoarding, and

43% reported they had been threatened with eviction (Tolin, Frost, Steketee, Gray, et al., 2008).

The consequences of hoarding extend far beyond the individuals who have the disorder. Although initial research suggests that most people who hoard do not live in squalor (Snowdon et al., 2013), there is a large correlation between hoarding severity and unsanitary conditions in the home (Rasmussen et al., 2014), which presents a health risk for both people who hoard and anyone who resides with them. In one survey, family members who lived with a hoarding relative before age 21 reported greater childhood distress and had people over to visit less often than family members who did not (Tolin, Frost, Steketee, & Fitch, 2008). Relatives of people with hoarding disorder also reported elevated impairment in important life domains including work, home management, and relationships as well as heightened caregiver burden compared to controls (Drury et al., 2014).

Hoarding also represents a challenging public health issue. One survey found that most public health departments had experienced at least one hoarding case, 38% of these cases involved overwhelming clutter and squalor, and the hoarding individuals cooperated in addressing the clutter in only 32% of cases (Frost et al., 2000). Given the prevalence and serious consequences of hoarding, it is essential to develop and disseminate effective treatments.

Treatment of Hoarding Disorder

Research on the treatment of hoarding disorder has progressed notably in the last decade (Tolin et al., 2015), but is still limited in some key ways. A modified version of CBT for hoarding has been developed that combines motivational interviewing to address

motivation and insight, exposure to non-acquisition and discarding, cognitive restructuring to address thoughts and beliefs about possessions, organizational and problem-solving skills training, and relapse prevention (Steketee & Frost, 2007). CBT for hoarding has been tested in more than 10 trials (Mathews et al., 2016; Muroff & Steketee, 2018; Tolin et al., 2015), and has large effects on symptom severity and medium effects on impairment on average (Tolin et al., 2015). Rates of reliable change are also good for CBT for hoarding (Tolin et al., 2015). However, only 25.44% to 43.30% of those treated experienced clinically significant change across outcomes (Tolin et al., 2015). This means that even when individuals receive the best available treatment for hoarding, most of them continue to score in the clinical range on hoarding symptoms and impairment. Therefore, current evidence supports CBT for hoarding as effective, but also indicates that improvement is still needed.

One way to potentially improve treatment outcomes is to identify active ingredients of change and deliver them in the best dosage. The theoretical processes of change in CBT for hoarding include cognitive change, habituation through exposure, and skill development (Steketee & Frost, 2007). One study found that change in saving cognitions mediated change in hoarding symptoms during CBT for hoarding disorder (Levy et al., 2017), supporting cognitive change as an “active ingredient” in hoarding treatment. However, another study found that simply listing thoughts that occurred during exposure to discarding was actually more effective than cognitive restructuring during the exposure in increasing discarding behavior and reducing attachment to the objects discarded (Frost et al., 2016). Given these contradictory findings and the lack of

component or dismantling research designs, it is unclear which components of CBT for hoarding lead to improvement.

Barriers to Treatment Provision

Although CBT for hoarding has good empirical support, and client satisfaction appears to be good (Gilliam et al., 2011; Rodriguez et al., 2016; Turner et al., 2010), it is very time-intensive, with studies delivering a minimum of 13 sessions and a maximum of 35.3, with a median of 18.8 (Tolin et al., 2015). In addition, individual CBT for hoarding typically involves the therapist making regular home visits (Tolin et al., 2015). Finally, very few therapists are trained to treat hoarding (Frost, Ruby, et al., 2012). This means that when people seek help for hoarding disorder, they are unlikely to receive the specialized care they need, and if they do, treatment is time-intensive and costly (Mathews et al., 2016).

Due to these limitations, most hoarding treatment studies to-date have tested group therapy (Tolin et al., 2015), and initial comparisons found no difference between group and individual therapy in their impact on major outcomes (Tolin et al., 2015). In addition, there is a growing body of research on alternative intervention formats for hoarding. The use of bibliotherapy combined with facilitated support groups is promising (Frost, Pekareva-Kochergina, et al., 2011; Frost, Ruby, et al., 2012) and one study found these as effective as group CBT (Mathews et al., 2016). This intervention is less expensive and does not require professionals to implement (Frost, Pekareva-Kochergina, et al., 2011; Frost, Ruby, et al., 2012; Mathews et al., 2016). However, it does require facilitator training and supervision, which still presents a substantial barrier in terms of cost (Mathews et al., 2016) and the lack of available supervisors trained to treat hoarding.

These groups are also a form of in-person treatment, which means they are only accessible to those individuals who have this service offered locally. In addition, while researchers have received some informal positive feedback regarding participant satisfaction (Frost, Pekareva-Kochergina, et al., 2011), no systematic data have been published regarding whether or not participants find this type of treatment credible or acceptable. Therefore, while groups like this are a promising option for dissemination, they are still limited in important ways.

Barriers to Treatment Seeking

In addition to supply side challenges with providing hoarding treatment, there is a demand side challenge in hoarding disorder: treatment seeking appears to be rare. For example, one study of individuals with hoarding disorder at risk for eviction in New York City found that only 48% were seeking mental health treatment (Rodriguez et al., 2012). One recent online survey of individuals meeting the clinical cutoff for hoarding disorder found that participants rated the item “I am willing to ask for help for my clutter, hoarding, or saving difficulties” as a 2.87 on average, where 2 = “Disagree” and 3 = “Not sure” (Chasson et al., 2018). Refusal and dropout rates in hoarding treatment studies can also be high (Muroff et al., 2011), indicating a potential mismatch between available treatment and the preferences or resources of clients.

One potential barrier to treatment seeking is self-stigma. A recent survey study found that the disdain component of self-stigma was correlated with lower treatment-seeking willingness among those with clinical levels of hoarding symptoms (Chasson et al., 2018). Another study of the acceptability of various hoarding treatments found that no type of treatment had a mean rating higher than a 6.2 on a scale from 0 (not at all

acceptable) to 10 (completely acceptable; Rodriguez et al., 2016). Fear of being judged, perceived lack of control over the treatment process, doubting the effectiveness of treatment, and anticipated distress or harm were among the most common reasons why treatments were perceived as not acceptable (Rodriguez et al., 2016).

There are several clinical features of hoarding that may contribute to both the limited effectiveness of treatment and the lack of treatment seeking. Poor insight is very commonly observed in hoarding (see Frost et al., 2010 for a review). For instance, a majority of family members of people who hoard describe them as having poor or no insight (Tolin, Fitch, et al., 2010). However, it is possible that defensiveness may explain some of this observed “lack of insight” (Frost et al., 2010). Family members of those who hoard report high levels of rejecting attitudes, notably higher than attitudes towards those with OCD (Tolin, Frost, Steketee, & Fitch, 2008). It is easy to imagine that protracted rejection and criticism by family members could lead to high levels of defensiveness in those who hoard. Such a pattern would be consistent with the finding from the Motivational Interviewing (MI; Miller & Rollnick, 2002) literature that when a therapist uses more confrontational or authoritarian language, a client will voice more arguments against changing their behavior (Moyers et al., 2007).

Motivation is also frequently cited as an issue in the treatment of hoarding (Steketee et al., 2000, 2010) and may be related to lack of insight. In particular, hoarding patients have been reported to frequently miss sessions and not complete homework (Steketee et al., 2010).

These difficulties may also be complicated by possible information processing deficits in hoarding (Steketee & Frost, 2003). Inattention has been found to be associated

with hoarding in many different samples (Burton et al., 2016; Fullana et al., 2013; Hall et al., 2013; Hartl et al., 2005; Mcmillan et al., 2013; Raines et al., 2014; Tolin & Villavicencio, 2011). Some studies have found memory deficits to be linked to hoarding (Blom et al., 2011; Hartl et al., 2004) but many other studies have found no differences compared to controls (Tolin et al., 2011; Woody et al., 2014) or had mixed findings (Mackin et al., 2011; Testa et al., 2011). Some research also suggests that hoarding may be linked to greater difficulty in categorization (Luchian et al., 2007; Mackin et al., 2011; Wincze et al., 2007) although one study found no difference (Grisham et al., 2010). Difficulty attending to treatment components or remembering when and how to implement them could potentially limit engagement in treatment or its effectiveness.

Another feature of hoarding that may complicate treatment is its high rates of comorbidity with other disorders (Burton et al., 2016; Frost, Steketee, et al., 2011; Hall et al., 2013). One study found that 76.5% of those with HD have a comorbid anxiety or mood disorder, most often major depression (50.7%), followed by generalized anxiety disorder (24.4%) and social anxiety disorder (23.5%; Frost, Steketee, et al., 2011). A latent class analysis investigating relationships between OCD, hoarding, depression, and ADHD symptoms in individuals with clinically significant hoarding found 3 major classes: non-comorbid hoarding (42%), hoarding with depression (42%), and hoarding with depression and inattention (16%; Hall et al., 2013). Hoarding experts have noted that depression, distractibility, and obsessive-compulsive symptoms can interfere with progress (Steketee & Frost, 2007).

Given both the supply side and demand side limitations to hoarding treatment, it is clear that innovative treatments are needed in order to increase both access to treatment

and engagement in it. Web-based interventions, if effective, could be particularly useful. Web-based interventions can easily be scaled up and accessed from any location as long as one has internet access. Web and mobile app interventions for mental health are growing (Andersson et al., 2014; Spek et al., 2007), and have been effective in other areas (Spek et al., 2007) particularly when they include a guided component (Andersson et al., 2014).

One web-based treatment for hoarding has been tested previously (Muroff et al., 2010). This study evaluated the effects of an existing web-based self-help group that used CBT resources. Because it lacked randomization, it is difficult to draw firm conclusions, but findings were promising (Muroff et al., 2010). Participants who completed all assessments across 15 months improved significantly on almost all measures of symptom severity, longer-term users reported less severe hoarding than recent users, and website users reported overall improvement compared to a waitlisted group of users (Muroff et al., 2010). Higher engagement in the group (i.e., posting activity) was associated with lower hoarding severity (Muroff et al., 2010). This suggests that at least some people with hoarding disorder are willing to use web-based resources and benefit from doing so. No data were collected on acceptability in that study (Muroff et al., 2010). However, a study on the acceptability of various treatment types found that an online support group was relatively high in acceptability (slightly less than individual CBT, but higher than group CBT; Rodriguez et al., 2016).

Online interventions also have the potential to reduce the impact of barriers to treatment seeking by reducing the impact of defensiveness and stigma. Research supports the hypothesis that self-help interventions such as websites can reduce stigma as a barrier

to treatment seeking (Levin et al., 2018). It is also possible that interacting with a website might reduce defensiveness, a common feature in hoarding disorder (Frost et al., 2010) relative to interacting with a therapist or facilitator. Hoarding researchers have observed that people with a hoarding problem discarded belongings much more readily in a low-pressure situation than they seem to in therapy (Frost et al., 2010). Given the unique features and treatment needs of hoarding, research is needed to determine if a self-help website is feasible, acceptable, and efficacious for hoarding.

ACT as a Potential Treatment for Hoarding

Another way to potentially improve treatment for hoarding is by evaluating alternative treatments to determine if they are effective in addressing hoarding problems. Identifying effective alternatives to CBT would not only provide additional treatment options, but could help to identify complementary or alternative processes of change that may be used to enhance the treatment of hoarding. One treatment that appears particularly well suited as a potential alternative to CBT is acceptance and commitment therapy (ACT; Hayes et al., 2012).

The behaviors observed in hoarding disorder can be explained parsimoniously in terms of the core pathological process in ACT: psychological inflexibility, defined as a pattern in which one's behavior is overly regulated by rigid verbal processes, and insufficiently influenced by experienced consequences and chosen values (Hayes et al., 2012). Psychological inflexibility includes six component processes (Hayes et al., 2012), all of which may theoretically help explain how hoarding develops and is maintained. *Cognitive fusion* is the tendency to respond to thoughts in a rigid, literal manner, such that they exert excessive control over behavior. In contrast, when cognitive fusion is

minimal, individuals are able to notice thinking as a process and to choose how to respond to thoughts. People who hoard may be fused with beliefs about possessions (e.g., “It would be too wasteful to discard this”) or related behavior (e.g., “I couldn’t handle people touching my things.”) Research from a cognitive-behavioral perspective suggests that people who hoard endorse higher rates of certain beliefs about possessions (Steketee et al., 2003), and CBT for hoarding uses cognitive restructuring to change those beliefs (Levy et al., 2017). However, the ACT model suggests an alternative method to address hoarding-related beliefs: altering the behavioral impact of these beliefs when they occur by observing them mindfully and intentionally selecting a behavioral response. One study has found cognitive fusion to be associated with hoarding severity (Ong et al., 2018).

Experiential avoidance refers to efforts made to control internal experiences, such as emotions, thoughts, and sensations. In hoarding, both acquiring and saving may be attempts to avoid distress or maintain positive emotions. The defensiveness observed in hoarding may also be a form of experiential avoidance (i.e., escaping or avoiding shame or embarrassment by minimizing intrapersonal or interpersonal acknowledgment of a hoarding problem). Multiple studies have found hoarding to be linked to higher experiential avoidance or general psychological inflexibility (Ayers et al., 2014; Fernández de la Cruz et al., 2013; Krafft, Ong, et al., 2018; Ong et al., 2018; Wheaton et al., 2011).

Inflexible attention is the pattern of rigidly attending to verbal conceptualizations of the past and future, and failing to attend to the present moment. People who hoard may be disconnected from the present, such that their attention is dominated by an imagined future or idealized past as they interact with their belongings. As described above,

inattention has been linked to hoarding in numerous studies. Hoarding experts have also observed that a surprising number of people who hoard appear unaware of their clutter (Frost et al., 2010), which also suggests a possible deficit in the ability to flexibly attend to actual experience. One study has found mindful awareness specifically (rather than ADHD-type inattention) to be significantly related to hoarding (Ong et al., 2018)

Self-as-content refers to a rigid sense of self that is tightly linked to verbal description, and a reduced awareness of the self as a locus from which experiences can be observed. People who hoard may be highly attached to rigid beliefs about who they are (e.g., “I am a caring mother, so I can’t throw away any of my kids’ drawings”) and may have limited ability to intentionally observe internal experiences, particularly distressing ones, as transient phenomena distinct from the observing self.

The other pathological processes in the psychological inflexibility model are *unclear values* and *lack of consistent action in service of values*. People who hoard may have difficulty describing or experientially contacting their values, or may be aware of their values yet have difficulty taking concrete steps to build patterns of values-consistent behavior due to skills deficits or the effects of other processes. Low values clarity might help explain the motivational difficulties that sometimes occur in hoarding. If people who hoard lack clearly defined values, they may not observe ways in which their acquiring, saving, or clutter interferes with valued aims. Initial research supports a relationship between hoarding severity and decreased values progress (Ong et al., 2018). As described here, the ACT model provides a parsimonious way to conceptualize many different aspects of compulsive hoarding, including both core symptoms and common clinical features.

In ACT, these theorized processes are linked to specific treatment components (Hayes et al., 2012). Experiential avoidance is targeted by eliciting and modeling acceptance, rigid attention is targeted through mindfulness skills, unclear values are addressed by helping the client describe and contact values, and cognitive fusion is targeted through the use of metaphors, exercises, and conversation that reduce the automatic dominance of thinking over behavior. Extensive component research has been done on these six processes, and nearly all have support indicating that they are active ingredients of change (Levin et al., 2012). Therefore, if these pathological processes play a role in hoarding, there are a clear set of evidence-based procedures that could be used to alter their impact.

There are two other potential advantages to applying an ACT perspective to hoarding. First, hoarding is highly comorbid with other disorders (Frost, Steketee, et al., 2011), and therefore it could be beneficial to apply a transdiagnostic model of treatment such as ACT, which teaches skills theoretically beneficial across a broad range of concerns. Indeed, there is a growing body of evidence that supports ACT as efficacious for disorders related to hoarding including OCD, other anxiety disorders, and depression (Bluett et al., 2014; Twohig & Levin, 2017), including when delivered as web-based self-help (Thompson et al., 2021).

In addition, self-criticism and shame are positively associated with hoarding symptoms (Chou et al., 2018) and it appears that self-stigma is a barrier to treatment seeking in hoarding (Chasson et al., 2018). Self-stigma could also be a barrier to engagement, as it has been in other conditions (Fung et al., 2008; Katz et al., 2013; Sirey et al., 2001). There is initial evidence supporting ACT as beneficial in targeting self-

stigma and shame (Krafft, Ferrell, et al., 2018). If self-stigma prevents treatment engagement or reduces quality of life in hoarding, targeting self-stigma with ACT could improve outcomes.

One initial trial of ACT for hoarding has been conducted, utilizing a multiple-baseline design in a sample of six. Participants were individuals with diagnosed HD, and received 10-16 sessions of individual ACT focused on hoarding, delivered face-to-face or over videoconferencing software. The results showed clear promise; 5 of 6 individuals improved on the primary outcome of rate of discarding relative to acquisition. Improvements were also observed on self-report measures at posttreatment among all 5 participants who responded, with each reporting reliable change on overall hoarding severity. Although this study is suggestive, larger trials of ACT are needed in order to continue evaluating its efficacy, assess whether this efficacy generalizes across samples, and analyze whether ACT for hoarding works through its purported processes of change.

Conclusions

ACT has shown initial promise as a treatment for hoarding (Ong et al., 2021), but further evaluation is needed. Testing ACT in a randomized-controlled trial may help to identify whether the processes of experiential avoidance, unclear values, and rigid attention can be altered by using ACT to treat hoarding, and if doing so improves outcomes. This would provide not only another treatment option but suggest potential routes to enhance CBT for hoarding.

Given the limitations to both treatment provision and treatment seeking described previously, the best modality through which to test these questions would be scalable, easy to access, and easy to use independently. One format that meets those criteria is

web-based self-help. Previous research shows that ACT can be effective when delivered through a website (Lappalainen et al., 2014, 2015; Thompson et al., 2021), and that a transdiagnostic ACT website can be helpful for a range of mental health outcomes (Levin et al., 2020). Testing an ACT website intervention could help to evaluate if hoarding can be treated efficaciously through web-based self-help, if a website is acceptable and credible to people with hoarding disorder, if psychological inflexibility processes and self-stigma can be addressed through ACT, and if they serve as mechanisms of change in hoarding treatment. Therefore, in the current study an ACT-based website for hoarding disorder was developed and tested, to answer the following research questions:

- 1) Is an ACT-based guided self-help website efficacious for hoarding? The primary outcome of interest is hoarding symptoms, but important secondary outcomes are specific symptom dimensions, global improvement, functional impairment, overall well-being, and values progress.
- 2) Is an ACT-based guided self-help website feasible? Specifically, is it credible and acceptable to participants, and do they adhere sufficiently?
- 3) Does an ACT-based guided self-help website work through predicted processes? Specifically, does it result in decreased psychological inflexibility and self-stigma, and increased mindfulness, and do those processes mediate outcomes?

Testing an ACT self-help website for hoarding in order to answer these questions is practically significant for several reasons. First, it can help provide early feedback as to whether a self-help website is helpful in treating hoarding, and similarly whether ACT is helpful in treating hoarding. If hoarding can be treated successfully with a self-help website, then not only can this specific intervention be released publicly in the future, but

other similar interventions would have greater support for their development and testing.

If ACT is useful in treating hoarding, this may help to expand the number of clinicians who can treat hoarding effectively as well as giving those who are seeking hoarding treatment or have not benefited from CBT for hoarding additional evidence-based options. Moreover, research into therapeutic processes that help people with hoarding improve can help identify specific skills such as mindful awareness that may be useful for hoarding. These processes could then be targeted more directly with future treatments for hoarding.

CHAPTER III

METHODS

Study Design

In this study, the efficacy of an ACT self-help website for hoarding was assessed through a randomized, waitlist-controlled trial. This study was preregistered at ClinicalTrials.gov with the identification number NCT04239729 and all procedures were approved by the Utah State University Institutional Review Board.

Participants

Participants ($n = 73$) were adults with significant hoarding problems. Inclusion criteria were: 1) being 18 years of age or older, 2) living in the USA, 3) seeking help for clutter and/or hoarding, 4) being interested in testing a self-help website, and 5) scoring at or above the clinical cutoff of 41 on the Saving Inventory-Revised (SI-R; Frost et al., 2004). The SI-R clinical cutoff was developed using receiver operating characteristic (ROC) curves to maximize sensitivity and specificity, and most individuals seeking help for hoarding have scores above this cutoff (Frost & Hristova, 2011). There were no additional exclusion criteria.

Demographics

Participant age was variable, with a mean age of 47.67 ($SD = 14.34$). The sample was overwhelmingly female (87.67%, compared to 12.33% male). Most participants were not Hispanic/Latinx (93.15%), compared to 6.85% Hispanic/Latinx. The majority of participants were White (76.71%, compared to 6.85% Asian, 5.48% bi/multiracial, 4.11% Black, and 6.85% other race). Combining across race and ethnicity, most participants

were non-Hispanic White (73.97%). Income was highly variable, with 16.44% reporting <\$20,000 in annual household income, 9.59% reporting \$20,000-39,999, 19.18% reporting \$40,000-59,999, 12.33% reporting \$60,000-79,999, another 12.33% reporting \$80,000-99,999, 19.18% reporting \geq \$100,000, and 10.96% unsure. A plurality of respondents were single (31.51%), but many were married (28.77%), or divorced (20.55%), while others were living with a partner (12.33%) or widowed (6.85%). Regarding employment status, a plurality of participants were working full-time (34.25%) but others were working part-time (16.44%), unemployed (16.44%), retired (10.96%), a student (6.85%), or reported another unspecified status (15.07%). Participant demographics within each condition are reported in Table 1, and Figure 1 provides an overview of participant flow.

Removal of Invalid Responses

Based on suspicious response patterns, data were screened for potentially invalid responses (e.g., bots). Responses were removed from the data prior to data analysis based on 1) the signature field lacking a valid signature ($n = 16$), 2) suspicious email addresses ($n = 7$), and 3) completing a study survey in less than 5 minutes, unless there were clear indications the participant was meaningfully engaged in the study such as email or phone responses ($n = 4$). The second criterion was applied because multiple suspicious responses used the same email format, e.g., first name-last name-number@yahoo.com, in each case not matching the participant's name, and most of these responses also included at least one of a variety of other indicators of invalid responding such as unusually fast responses, maximum scores on screening questions, and/or invalid phone numbers. A majority of responses screened out ($n = 16$) were linked to a single burst of clearly invalid

responses over a very brief timeframe (less than 5 hours). Screening decisions were made prior to reviewing responses or analyzing data in order to maintain objectivity.

Recruitment

Participants were recruited from within the United States through a variety of channels. Given the need to recruit a targeted sample with clinical levels of hoarding symptoms, online advertisements through Google ads were the primary recruitment method. Online ads of this type have been demonstrated to be highly effective in recruiting participants for web and mobile-based health interventions (Lane et al., 2015). The cost per participant of Google advertisements in various studies has ranged from a minimum of \$6.70 per participant (Gordon et al., 2006) to maximum of \$66.50 (McDonnell et al., 2010). In this study, 28 participants (38.36%) were recruited through Google Ads, and a total of \$647 was directed to these advertisements, indicating an average cost per participant of \$23.11, relatively similar to published costs.

Successful recruitment methods used in previous studies were also reviewed to develop a full recruitment plan. One study reported that referrals from providers, paper flyers, online postings, and referrals from family/friends were the most successful forms of recruitment (Ayers et al., 2015). Other forms of recruitment that have been used in previous trials of hoarding treatment include notifying attendees of hoarding-related conferences (Mathews et al., 2016), contacting social service agencies (Frost, Pekareva-Kochergina, et al., 2011), radio and newspaper ads (Frost, Pekareva-Kochergina, et al., 2011) and media exposure (Tolin et al., 2007).

Accordingly, a range of recruitment methods were employed in this study, including online postings, notifications to professional listservs and groups, contacting

social services, and contributing to a newspaper article. Participants were asked how they heard about the study when screened in order to identify and continue successful recruitment methods. The recruitment methods generating the most study contacts were online postings ($n = 34$) and Google ads ($n = 28$), followed by referrals from friends/family ($n = 7$), the newspaper article ($n = 3$), and provider referrals ($n = 1$).

Participants also received an Amazon gift card worth \$10 after completing each of the final two surveys, the posttreatment survey and the follow-up survey, in order to encourage assessment completion. Funding was received from the USU Department of Psychology, College of Education and Human Services and a USU Graduate Research and Creative Opportunities grant.

Procedures

Participants completed an initial brief screening, provided consent, and then completed a baseline survey. Each of these steps was completed online and participants were automatically guided from each step to the next. That is, those who screened as eligible were automatically directed to an online consent form, and those who provided consent were automatically directed to begin the initial online baseline survey. Participants were randomly assigned automatically upon completing the baseline survey to either use the ACT self-help website and receive supportive coaching for the next 8 weeks, or wait for the next 8 weeks. After 8 weeks, participants were asked to complete a posttreatment survey. They were asked to complete a final, follow-up survey an additional 4 weeks after the posttreatment survey. After the follow-up survey was completed, waitlisted participants were provided with access to the website (see Figure 1 for an overview of study procedures). In addition to these surveys, those in the treatment

condition were asked to complete a measure of treatment credibility and expectancy at the end of the first website session. Participants were sent reminders every 2-4 days to complete assessments, up to 8 times.

Intervention

The website implemented a self-help version of ACT. Multiple studies have found ACT-based website interventions to be efficacious (Thompson et al., 2021) and acceptable, including for depression (Lappalainen et al., 2014, 2015) and as a transdiagnostic intervention (Petersen et al., 2019). The website intervention was based on previous ACT self-help website prototypes found to be helpful for improving well-being in a general help-seeking sample (Petersen et al., 2019), distressed university students (Levin et al., 2020), and dementia caregivers (Fauth et al., 2019) but substantially adapted to address hoarding.

The author restructured the sessions included and reorganized their order and flow in order to better apply to hoarding (for example, adding a novel session focused on the process of self-as-context). Subsequently, the author created and adapted website exercises and examples to focus on hoarding and associated clinical features such as self-stigma and inattention. Additional descriptive text was also created to link one session to the next in order to help clarify the role of each skill or concept introduced. A final session helping participants review specific skills learned and develop a personalized plan for relapse prevention was also a new addition.

Feedback was received and implemented from several relevant experts, including Dr. Michael Levin, an expert in web and mobile-based ACT self-help, Dr. Michael Twohig, an expert in ACT for OCDs, and Clarissa Ong, a doctoral student who has

conducted extensive research related to ACT and hoarding. The website was also tested informally for initial clarity and usability by multiple research assistants.

The website was structured such that participants were asked to complete 16 brief self-help website sessions, each taking around 15-20 minutes to finish, twice a week for eight weeks (see Table A.1 in Appendix A for a full treatment outline). Multiple response formats and piping of previous answers were used to create interactivity and coherence in each session. For example, a participant could identify “I might need this later” as a thought that they fuse with from a list of options. It would then be integrated into subsequent exercises, such as a defusion exercise asking the participant to label that thought as a thought. Audiovisual content (e.g., audio meditation exercises) was also incorporated into sessions to make them more engaging.

Sessions used some existing ACT exercises and metaphors, such as the “Passengers on the Bus” metaphor or the Tombstone exercise (Hayes et al., 2012), but new exercises and metaphors were also developed as needed. Each session concluded by guiding participants to commit to practicing a relevant skill in their daily life, generally directed towards addressing hoarding. For instance, participants were asked to practice mindful awareness while discarding an item at the end of Session 10.

Sessions 1 and 11 focused specifically on identifying values. Session 1 also incorporated psychoeducation regarding hoarding as well as exercises exploring current acquiring, saving, and clutter, and personal values in order to increase motivation to engage in treatment. Sessions 2 and 3 taught acceptance skills, first by identifying avoidance and then practicing acceptance. Sessions 5 and 6 were similarly organized around identifying fusion and practicing defusion. Sessions 4 and 7 focused on applying

ACT skills to shame and self-stigma in order to prevent those serving as barriers to treatment engagement and success. Session 8 was organized around developing the self-as-context perspective. Sessions 9 and 10 were oriented towards developing mindful awareness in general and as applied to discarding. Session 12 focused on connecting values to action and Session 13 shifted to committed action skills. Sessions 14 and 15 focused on psychological flexibility applied to functioning in general, rather than hoarding specifically. Session 16 focused further on committed action (specifically relapse prevention) by reviewing previous skills, helping participants create an individualized plan for the future, and preparing for potential lapses.

In general, website sessions emphasized autonomy and choice to enhance motivation as this may help engagement in hoarding treatment (Frost et al., 2010). Sessions also focused on practical skills as results of some studies suggest this is a priority for individuals seeking help for hoarding (Ayers et al., 2012) or may be particularly effective (Frost et al., 2010, 2016). Inattention (e.g., Tolin & Villavicencio, 2011) and poor memory (Hartl et al., 2004) are also commonly reported as concerns in hoarding, and may be potential barriers to treatment. Therefore, each session was designed to be brief and engaging, and included introductory and concluding pages that provided a clear overview and summary of each session.

The website landing page was hosted on the Weebly platform, while the sessions were hosted through Qualtrics, a popular survey administration tool. Participants generally were not able to see their previous responses in Qualtrics (unless they chose to print or save a PDF) but were able to check their progress to see if they have completed each session.

Participants assigned to the website condition also received coaching following the supportive accountability model of eHealth (Mohr et al., 2011). This model posits that human support, characterized by trust, benevolence, and expertise, increases adherence to interventions by creating accountability. Coaching aimed to help participants engage with the website and adhere to the intervention. The coaching protocol consisted of an initial phone call of 10-15 minutes followed by weekly supportive coaching emails during the 8-week treatment period. In addition to in-depth coaching emails, coaches sent brief responses to any replies from participants, and sent an additional brief weekly reminder about sessions if participants fell behind schedule. Actual initial phone call length ranged from 12 to 28 minutes ($M = 19.05$ minutes, $SD = 5.07$), while 28.95% of participants ($n = 11$) never scheduled a phone call, and 2.63% ($n = 1$) opted to begin coaching over email instead. On average, coaches spent 32.92 minutes ($SD = 18.14$) emailing each participant. Overall, this means approximately 52 minutes of coaching time was required per participant. Coaches were two graduate students trained in clinical psychology. However, the supportive accountability model is designed to apply to a range of potential coaches, from medical professionals to lay people, and in order to support potential dissemination of this approach, the coaching protocol was designed such that it could be delivered by a range of professionals and nonprofessionals with a small amount of training.

The initial phone call focused on establishing a relationship in which the participant sees the coach as trustworthy, benevolent, and having expertise; setting clear expectations regarding engagement rooted in a rationale that fits the participants' goals; and collaborative goal-setting (Mohr et al., 2011). Subsequent emails focused on monitoring engagement, providing feedback to support motivation, answering any

questions raised, and supporting problem-solving if engagement was low (Mohr et al., 2011). Minimal counseling support has been found to lead to better outcomes in online interventions for anxiety and depression (Spek et al., 2007).

Measures

Screening Measures

Eligibility Questions. During the screening stage, participants were asked their age, if they lived in the USA or not, if they were seeking help for clutter and/or hoarding, and if they were interested in testing a self-help website. The Saving Inventory-Revised (SI-R; Frost et al., 2004) was also used to screen for clinically significant hoarding symptoms, and is described in detail below.

Screening Questions. To aid recruitment, participants were also asked how they learned about the study. In addition, to help screen out invalid respondents, an open-ended question was added asking participants to write a sentence or two describing why they were interested in the study.

Outcome Measures Administered at Baseline, Posttreatment, and Follow-up

Saving Inventory-Revised (SI-R; Frost et al., 2004). The SI-R is a 23-item measure of hoarding severity, with three subscales: Difficulty Discarding, Acquisition, and Clutter. Each item is measured from 0, indicating low frequency/intensity, to 4, indicating high frequency/intensity (specific anchors vary by item). A sample Difficulty Discarding item is “How often are you unable to discard a possession you would like to get rid of?” A sample Acquisition item is “How upset or distressed do you feel about your acquiring habits?” A sample Clutter item is “How much of your home is difficult to

walk through because of clutter?” The SI-R is a one of the most commonly used measures of hoarding severity (Frost, Steketee, et al., 2012), and is sensitive to treatment (e.g., Frost, Pekareva-Kochergina, et al., 2011; Steketee et al., 2010; Tolin et al., 2007). In addition, it has good internal consistency, test-retest reliability, and validity in clinical samples (Frost et al., 2004). Internal consistency in this study was good to excellent (Total $\alpha = .93$, Difficulty Discarding $\alpha = .88$, Excessive Acquisition $\alpha = .85$, and Clutter $\alpha = .93$).

Sheehan Disability Scale (Sheehan et al., 1996). The SDS is a 3-item measure of functional impairment in work, social life, and family/home domains due to symptoms of a disorder. Each item is rated from 0 (Not at all) to 10 (Extremely), with higher scores indicating greater impairment. Internal consistency for the total score is good, and the SDS has a unidimensional structure and initial evidence of construct validity (Leon et al., 1997). Instructions were adapted to refer to disability related to hoarding specifically, consistent with previous research (Fitch & Cougle, 2013). In this sample, internal consistency was good ($\alpha = .83$).

Clinical Global Impression – Improvement (CGI-I; Guy, 1976). The CGI-I is a single-item measure of overall symptom improvement, rated from 1 (very much improved) to 7 (very much worse; i.e. higher scores indicate worsening while low scores indicate improvement). A self-report version was used for the present study. The CGI-I has been used extensively in clinical trials, and demonstrated treatment sensitivity in previous hoarding research (Muroff et al., 2010).

General Health Questionnaire-12 (GHQ-12; Goldberg, 1978). The GHQ-12 is a 12-item measure of overall well-being (conceptualized as the absence of distress). Each

item is rated from 1 to 4, and summed with higher scores indicating lower distress (specific anchors vary by item). A sample item is “Have you recently...felt constantly under strain?” The GHQ-12 is commonly used and has good evidence of validity in detecting clinically significant distress (Goldberg et al., 1997). Internal consistency in the present study was excellent ($\alpha = .91$).

Process Measures Administered at Baseline, Posttreatment, and Follow-Up

Stigma of Hoarding Items (Chasson et al., 2018). These seven items have previously been used in one study on hoarding, and measure three components of stigma: disdain, difference, and blame. Disdain refers to perceiving a stigmatized group negatively (e.g., one item is “How good or bad do you think is a person with hoarding disorder compared to everyone else in the general population?”) Difference refers to perceiving a stigmatized group as unlike other people (e.g., one difference item is “How similar or different do you think is a person with hoarding disorder compared to everyone in the general population?”) Blame refers to blaming a stigmatized group for their problems, and was assessed with a single item (“How responsible do you think a person with hoarding disorder is for his or her condition?”) Higher scores indicate greater stigma. These items were developed to measure public stigma, but have been used as a proxy for self-stigma in those with clinically significant hoarding symptoms (Chasson et al., 2018). In previous research, internal consistency was marginal to good for each component, and disdain was significantly correlated with the other two subscales, while blame was correlated to treatment-seeking willingness, providing initial evidence of convergent validity (Chasson et al., 2018). In this study, internal consistency was adequate to excellent (Difference $\alpha = .93$, Disdain $\alpha = .70$).

Acceptance and Action Questionnaire for Hoarding (AAQH; Krafft, Ong, et al., 2018). The AAQH is a 14-item measure of hoarding-related psychological inflexibility. Each item is rated from 1 (Never true) to 7 (Always true). The measure has two subscales, Saving (i.e., psychological inflexibility regarding discarding) and Acquisition (i.e., psychological inflexibility related to buying and owning things). A sample Saving item is “I need to stop feeling so attached to my things,” while a sample Acquisition item is “I collect or buy objects when I feel distressed.” This measure has shown good internal consistency and construct validity in a sample of college students with above-average hoarding symptoms. Internal consistency was good to excellent in the current sample (Total $\alpha = .90$, Saving $\alpha = .89$, Acquisition $\alpha = .83$).

Five-Facet Mindfulness Questionnaire – Acting with Awareness (FFMQ-AA; Baer et al., 2006). The 8-item Acting with Awareness subscale of the FFMQ assesses the ability to devote one’s full attention to an activity in the moment. Each item is rated from 1 (Never or very rarely true) to 5 (Very often or always true), and all items are reverse scored such that higher scores indicate greater awareness. A sample item is “I find it difficult to stay focused on what’s happening in the present.” This subscale has good internal consistency and strong evidence of convergent validity. In this sample, internal consistency was good ($\alpha = .89$).

Valuing Questionnaire-Progress (VQ-Progress; Smout et al., 2014). The Progress subscale of the VQ is a 5-item measure of progress toward personal values. Each item is rated from 0 (Not at all true) to 6 (Completely true). A sample item is “I made progress in the areas of my life I care about most.” This subscale has good internal

consistency and excellent convergent validity. Internal consistency was excellent in this study ($\alpha = .92$).

Other Measure Administered at Baseline, Posttreatment, and Follow-Up

Novel Questions on Impact of COVID-19. Three questions assessed the impact of the COVID-19 pandemic on functioning and ability to participate in the study. Question 1 assessing overall impact on recent functioning was administered only at baseline, question 2 assessing overall impact on participation was administered at posttreatment and waitlist, and question 3 assessing life domains impacted was administered at all three time points. Of note, these questions were added after data collection began, and 5 participants at baseline and 2 at posttreatment were not presented with these questions.

Measure Administered Only at Baseline

Demographics. Participants were asked a series of demographic questions at baseline, including their age, gender, ethnicity, race, marital status, employment status, household income, current treatment utilization, and history of treatment utilization for hoarding.

Measure Administered Only After Completion of First Website Session

Credibility/Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000). The CEQ is a 6-item measure of treatment credibility and treatment expectancy. Some items are rated from 1 to 9, and others are rated from 0% to 100%, with higher scores indicating higher credibility and expectancy. A sample credibility item is “At this point, how logical does the therapy offered to you seem?” A sample expectancy item is “At this

point, how much do you really *feel* that therapy will help you to reduce your anxiety symptoms?” Items were revised slightly such that they all referred to “treatment” rather than “therapy,” and to “clutter and/or hoarding” rather than “anxiety” symptoms. The CEQ has good internal consistency, and the expectancy subscale has good predictive validity (Deville & Borkovec, 2000). The CEQ was administered automatically following completion of the first website session. Internal consistency was inadequate for credibility ($\alpha = .59$) and good for expectancy ($\alpha = .82$)

Other Measure Administered at Posttreatment and Follow-Up

Access to Other Treatment. Questions on recent use of psychiatric medications and recent access to therapy/counseling were repeated at posttreatment and follow-up.

Acceptability Measures Administered Only to the ACT Website Condition at Posttreatment

System Usability Scale (SUS; Tullis & Albert, 2008). The SUS is a 10-item measure of the usability of technological systems. Every item is rated from 1 (Strongly disagree) to 5 (Strongly agree). Items were adapted to refer to the self-help website for hoarding. Sample items include “I thought the website was easy to use” and “I felt very confident using the website.” The SUS has evidence of reliability and validity (Bangor et al., 2008; Tullis & Albert, 2008). The SUS has been used in previous research on technology-based interventions (e.g., Krafft et al., 2017; Levin et al., 2020). Internal consistency was good ($\alpha = .87$).

Treatment Evaluation Inventory-Short Form (TEI-SF; Kelley et al., 1989).

The TEI-SF is a 9-item measure of treatment acceptability. A revised, 7-item version was

used as two of the original items are irrelevant to an adult sample, and one item was revised to refer to “clutter and/or hoarding” rather than “anxiety.” The 7-item version has been used in previous research (e.g., Twohig et al., 2010). Items are scored from 1 (Strongly disagree) to 5 (Strongly agree). This measure has good internal consistency, and can detect differences between treatments (Kelley et al., 1989). Internal consistency in the present study was good ($\alpha = .89$).

Other Satisfaction Items. A series of ten novel questions assessing satisfaction (including overall satisfaction, suitability, and perceived effectiveness) with the website and the coaching were administered. These questions used a 6-point scale, from 1 (Strongly disagree) to 6 (Strongly agree). Similar questions have been used in previous research on self-help interventions (Krafft et al., 2017; Levin et al., 2017).

Open Responses. Four questions with open text responses assessed what participants liked, learned, and disliked about the website, as well as asking for any suggestions they had for improvement.

Analysis Plan

Preliminary Analyses

Demographic information was summarized for each group. Groups were compared on demographics as well as outcome and process variables at baseline to identify any failures of randomization in creating equivalent groups, using independent-samples t tests and χ^2 tests. If the two groups were significantly different on any variables at baseline, they would be included as covariates in further analyses. Descriptive statistics were also calculated for study variables at each time point. Finally, the distribution of

study variables was inspected for normality. If any dependent variables failed to meet normality assumptions they would be transformed to approximate normality or alternative analyses would be used that do not require a normally distributed outcome. Missingness was inspected and potential predictors of missingness were tested for significance in generalized linear models.

Feasibility Analyses

Treatment feasibility (acceptability, credibility, usability, and adherence) was evaluated by comparison to pre-established benchmarks. Acceptability as measured with the TEI-SF was evaluated relative to a score of 21 or higher (indicating that the treatment was more acceptable than unacceptable), a benchmark that has been used in previous intervention research (Twohig et al., 2006). There are no established cutoffs for the CEQ. However, a similar strategy was applied, in which scores of 6 or higher (on the 1-9 scale) and scores of 60% or higher (on the 0-100% scale) were considered to indicate adequate credibility and expectancies. Individual satisfaction items were considered to demonstrate adequate satisfaction if they scored at a 4 (“Slightly agree”) or higher. Existing benchmarks were applied to evaluate scores on the SUS (a “good” score is 72.75, while an “excellent” score is 85.58; (Bangor et al., 2008). Treatment adherence was also calculated. Dropout rates in previous studies of hoarding treatment have varied widely from 0% to 45%. The sole previous study of online treatment for hoarding found that only 28.3% of participants completed all waves of data collection; however, data collection was spaced over 15 months (Muroff et al., 2010). Therefore, as a benchmark, if 70% of participants complete most of the sessions, this would be considered to indicate adequate engagement relative to other treatment options. In addition, adherence (in terms

of number of sessions completed) was examined for association with improvement on the primary outcome in a linear regression.

Outcome Analyses

The impact of the intervention on outcomes was investigated through a series of multilevel models. These models account for the clustered nature of longitudinal data (i.e., multiple observations within each participant). Maximum likelihood estimation was employed, which is advantageous as it allows the use of all available data and provides accurate parameter estimates if data are missing at random (Kwok et al., 2008). In each model, a random intercept was estimated for each participant, allowing levels of the outcome to vary by participant. In addition, random slopes for each participant over time were tested to determine if they significantly improved the model, using the likelihood ratio test. Next, time by condition interactions were modeled for each specified outcome to determine if the intervention group improved relative to the waitlist group. Hoarding severity is the primary outcome of interest. However, a secondary set of analyses, using the same method, were conducted to determine if treatment led to differential effects on secondary outcomes (difficulty discarding, acquiring, clutter, global improvement, functional impairment, distress, and values progress) and process variables (hoarding-related psychological inflexibility, mindful awareness, and self-stigma).

These time-by-condition interactions were evaluated for statistical significance using p -values obtained using the Satterthwaite approximation from the lmerTest package (Kuznetsova et al., 2017), a method which has evidence of adequate Type I error rates (Luke, 2017). Outcome variables were standardized using grand mean centering (i.e., standardizing with reference to total means and standard deviations for all participants and

timepoints). Condition and time were left dummy coded in all analyses in order to aid interpretation and help estimate effect size. This is a recommended procedure for mixed-effects models (Lorah, 2018). Condition was coded as 0 = Waitlist, 1 = ACT, while timepoint was coded as 0 = baseline, .67 = posttreatment, and 1 = follow-up to approximate the overall study duration. This results in coefficients that can be interpreted easily; for example, a regression coefficient for time indicates estimated change in the dependent variable from the start to the end of the study period, in terms of standard deviations for the variable across sample participants and timepoints. Estimates of within-condition change were also obtained from these models. Analyses were conducted using R statistical software (R Core Team, 2018). Figures indicating both observed and predicted values for both conditions at each timepoint were then used to evaluate the timing of change.

Treatment Response

Change was also examined on an individual basis for clinical significance. Specifically, rates of reliable change and rates of clinically significant change for the primary outcome were calculated among on respondents at posttreatment. Reliable change was calculated according to standard methods (Jacobson & Truax, 1991) based on clinical norms in a large, recent study of the SI-R (Kellman-McFarlane et al., 2019), while clinical significance was assessed by evaluating whether individuals dropped below the clinical cutoff for the SI-R. Finally, chi-square tests with completers were used to assess whether reliable change, or clinically significant change, differed across conditions at posttreatment.

Mediation Analyses

A series of longitudinal mediation models were employed to determine if improvement occurred through predicted processes. These models tested if there was a significant indirect effect of condition on the main outcome (hoarding severity) at follow-up, through the hypothesized mediators (psychological inflexibility and its subscales, awareness, and self-stigma components) at post-treatment. In these models, the *a* path is the hypothesized mediator regressed on condition (adjusting for any covariates), the *b* path is hoarding severity regressed on the mediator (adjusting for any covariates), the *c* path is the total effect of condition on hoarding severity, and the *c'* path is the residual effect of condition on hoarding severity after accounting for the product of the *a* and *b* path coefficients. Ideally, mediators should be measured before change in the outcome occurs; however, these analyses provide an initial exploration of whether earlier change in hypothesized processes is linked to later change in outcomes.

Mediation models were estimated with the lavaan package (Rosseel, 2012) in R, which allows for calculation of the total effect (*c* path; total impact of condition on hoarding severity), indirect effect (*ab* path; impact of condition on hoarding severity that is mediated by each process variable), and the direct effect (*c'* path; impact of condition on hoarding severity adjusting for the indirect effect). Missing data were accounted for with full-information maximum likelihood (FIML) estimation. Accelerated bias-corrected bootstrapping was used to estimate the indirect effect. Bootstrapped confidence intervals were computed with a novel R function written by a quantitative psychologist (S. Serang, personal communication). If the confidence interval of the indirect effect does not contain

0, this indicates significant mediation (Hayes, 2009). As in other models, mediators and outcomes were standardized to help facilitate interpretation of results.

CHAPTER IV

RESULTS

Preliminary Analyses

All outcome and process variables approximated normality. Descriptive statistics for demographics at baseline and process and outcome variables at each timepoint were calculated (see Tables 1 and 2). Time-by-condition model residuals were inspected. All adequately approximated normality.

Groups were assessed for equivalence on all outcome and process variables, demographics, and the impact of COVID at baseline (see Tables 1 and 2). The two groups differed significantly only on the CGI-I, with the waitlist group reporting significantly greater recent improvement on symptoms at baseline. Thus, baseline CGI-I was included as a covariate in time-by-condition and mediation analyses.

At posttreatment, 52 participants completed the assessment (71.23%), while 56 (76.71%) completed the follow-up assessment. The pattern of missingness was such that participants nearly always completed the entire survey or provided no data at all (i.e., pairwise correlations for missingness were $r = 1$ for the outcomes of SI-R total, SDS total, CGI-I, GHQ-12, and VQ-Progress). Therefore, potential baseline predictors of missingness on the SI-R total score (the primary outcome) at posttreatment were evaluated in a series of generalized linear mixed-effects models with logit links. Baseline scores on outcome and process variables (excluding subscales), baseline therapy and medication utilization, age, gender, and credibility and expectancy were tested to determine whether they significantly predicted later missingness. None of these variables

significantly predicted missingness ($ps > .05$), indicating that there was no need to include them as auxiliary variables in subsequent models.

Participant Characteristics

Treatment Seeking History

At baseline, only 24.66% of participants reported they had ever sought psychotherapy for hoarding previously, and only 6.85% reported they had sought medication for hoarding previously. In contrast, when asked about whether they had received therapy or taken a psychiatric medication (for any concern) in the past nine weeks, 26.03% reported receiving therapy and 50.68% reported taking medication.

COVID-19 Pandemic Impact

Participants indicated across both conditions that on average the pandemic made it “slightly harder” or “harder” to function recently (see Table 1). However, at posttreatment, 44% of those in the intervention condition reported that the pandemic had made participation in the study easier, while 32% reported it had made participation harder and the remaining 24% reported it neither helped not hurt their participation. These questions were added after recruitment began, and these questions were not presented to 5 participants at baseline and 2 at posttreatment.

At posttreatment, participants across both conditions reported that the COVID-19 pandemic had affected these areas of life: physical health (50.98%), mental health (84.31%), work (66.67%), finances (45.10%), relationships (60.78%), household management (62.75%), social life (80.39%), caregiving/childcare (21.57%), and leisure

(76.47%). Although it is clear that the COVID-19 pandemic affected participation, it was not controlled statistically given that the impact at baseline was similar across conditions, and overall participants reported that their participation in the study was not negatively impacted.

Feasibility Analyses

Treatment Acceptability

The mean score on the TEI-SF (based on posttreatment responders) was 25.46 (SD = 6.33), exceeding the cutoff of 21. Mean CEQ-Credibility score was 6.62 (SD = 1.23), exceeding the predetermined cutoff of 6. The mean CEQ-Expectancy score was 61.09 (SD = 21.27), very slightly exceeding the predetermined cutoff of 60. The mean score on the SUS was 86.46 (SD = 13.43), slightly exceeding the established cutoff of 85.58 indicating “excellent” usability.

Scores on novel individual satisfaction items all indicated overall satisfaction with the intervention (see Table 3). Average scores fell between “slightly agree” and “agree” anchors for the statements “Overall, I was satisfied with the quality of the program,” “The program was helpful to me,” “I felt the program was made for someone like me,” “I would recommend the program to other people with a clutter and/or hoarding problem,” “The psychological skills taught (ex. mindfulness, opening up) were helpful to me,” “This treatment fit well with my goals,” and “Overall, I was satisfied with the coaching that I received.” Average scores slightly exceeded the “agree” anchor for the statements “The program was easy to use” and “The practice exercises (ex. discarding, not

acquiring) were helpful to me.” Finally, average scores fell close to “slightly disagree” for the statement “The website would have been just as useful without a coach.”

Open responses were coded by overall theme and sorted by frequency.

Participants reported that they liked: the psychological skills taught ($n = 9$), coaching ($n = 3$), a gradual/doable approach ($n = 3$), practical skills ($n = 3$), a positive approach ($n = 2$), website being well-tailored for hoarding ($n = 2$) and ease of use, engaging content, flexibility, clean design layout, use of audio, metaphors, short sessions, and the focus on values ($n = 1$ each). When asked what they learned, participants overwhelmingly noted ACT-consistent psychological skills ($n = 20$), with one participant noting the main thing they learned was motivation broadly. When asked what they disliked, participants reported: specific website content (e.g., disliked wording or a modality such as audio/video; $n = 7$), wanting more content ($n = 3$), issues with coaching ($n = 3$), feeling bad about lack of progress or difficulty implementing content ($n = 2$), and difficulty with the timeline, emotional discomfort, confusion, disliking metaphors, finding the website not engaging, finding the website repetitive, and overall difficulty with technology ($n = 1$ each). When asked for suggestions, participants offered: wanting more repetition and review ($n = 2$), clearer expectations for coaching (i.e., that it would consist of brief check-ins rather than in-depth personal coaching), greater accountability, more reminders, a slower pace, changes to metaphors and meditation exercises, content from real-life people with hoarding problems, and providing a written version ($n = 1$ each).

Treatment Adherence

Participants in the ACT condition on average completed 6.89 website sessions ($SD = 5.71$) by posttreatment. About one fourth of participants completed no sessions (n

= 9, 23.68%), while about one third completed some sessions, but less than half ($n = 12$, 31.58%) and slightly less than half completed 8 or more sessions ($n = 17$, 44.74%). Only 5 participants had completed all sessions by the posttreatment time point (13.16%). Completion rates fell substantially below the preestablished benchmark of 70% completing the majority of the sessions.

In a linear regression with listwise deletion (i.e., completer analysis), the number of sessions completed by posttreatment was not significantly associated with change on the SI-R ($b = -0.21$, $SE = 0.47$, $p = 0.67$).

Adherence was investigated in a series of exploratory analyses for relationships with participant demographics. Age was not significantly correlated with number of sessions completed ($r = 0.18$, $p = .30$). Number of sessions completed at posttreatment was not significantly different based on gender ($t(9.18) = -1.22$, $p = .25$) or ethnicity ($t(3.64) = 0.12$, $p = .91$). Race ($F(4,33) = 0.90$, $p = 0.47$) and income ($F(6,31) = 0.56$, $p = 0.76$) were also not significantly related to number of sessions completed.

Some participants completed additional sessions between posttreatment and follow-up; however, this was a small proportion ($n = 9$, 23.68%). Among those who completed any sessions between posttreatment and follow-up, the number completed ranged between 1 and 9 sessions ($M = 3.56$, $SD = 2.60$).

Only one participant (who was in the intervention condition) explicitly withdrew from the study (see Figure 1); however, it is common in self-help studies for participants to not adhere to the intervention while still completing assessments and/or not officially withdrawing (Christensen et al., 2009), as the completion rates suggest.

Outcome Analyses

The overall impact of the intervention on outcomes and process variables was estimated in a series of multilevel models with random intercepts for participant-level variance. As an initial model-building step, likelihood ratio tests comparing nested models were used to evaluate whether adding random slopes modelling participant-level variability in the slope of the outcome variable over time significantly improved the model given $\alpha = .05$. Random slopes significantly improved all models except one, with the outcome of self-stigma of difference ($\chi^2(2) = 4.95, p = .08$). This indicates that across nearly all outcome and process variables there was significant between-person variability in the slope of the outcome variable over time (unrelated to condition effects), such that modeling this variability improved the predictive value of the models.

Thus, based on likelihood ratio tests, random slopes significantly improved models with the dependent variables of SI-R total ($\chi^2(2) = 43.15, p < .001$), SI-R Difficulty Discarding ($\chi^2(2) = 23.55, p < .001$), SI-R Excessive Acquisition ($\chi^2(2) = 33.17, p < .001$), SI-R Clutter ($\chi^2(2) = 27.25, p < .001$), SDS total ($\chi^2(2) = 12.39, p = .002$), SDS Work ($\chi^2(2) = 7.14, p = .03$), SDS Social/Leisure ($\chi^2(2) = 10.91, p = .004$), SDS Family/Home ($\chi^2(2) = 17.74, p < .001$), CGI-I ($\chi^2(2) = 20.29, p < .001$), GHQ-12 ($\chi^2(2) = 27.83, p < .001$), VQ-Progress ($\chi^2(2) = , p = .02$), self-stigma of disdain ($\chi^2(2) = 17.25, p < .001$), self-stigma of blame ($\chi^2(2) = 12.67, p = .002$), AAQH total ($\chi^2(2) = 35.41, p < .001$), AAQH Acquisition ($\chi^2(2) = 20.58, p < .001$), AAQH Saving ($\chi^2(2) = 41.55, p < .001$), and FFMQ Acting with Awareness ($\chi^2(2) = 16.86, p < .001$). Random slopes were included in these models for all analyses.

Next, a series of models evaluating time by condition effects were estimated (see Table 4). There was a significant interaction of time and condition for all outcomes and processes, with the exception of self-stigma of blame. In each case, the interaction was in the direction expected (i.e., greater improvement in the ACT condition relative to waitlist). Time by condition interactions were significant for the primary outcome (SI-R total score; see Figure 2); secondary outcomes of SI-R Difficulty Discarding, SI-R Excessive Acquisition, SI-R Clutter, SDS total, SDS Work, SDS Social/Leisure, SDS Family/Home, CGI-I, GHQ-12, VQ-Progress, and processes of change, namely self-stigma of difference, self-stigma of disdain, AAQH total, AAQH Acquisition, AAQH Saving, and FFMQ Acting with Awareness.

Within these models, the partially standardized coefficient for time represents the effect of time for the waitlist condition, while the time by condition coefficient represents the difference between the two conditions over time. As such, within-condition results can also be derived from these models. For example, for the primary outcome of hoarding severity, with a time coefficient of -0.59 and a time by condition coefficient of -0.74, the waitlist condition was estimated to improve by 0.59 standard deviations from baseline to follow-up, and the active condition to improve by 1.33 standard deviations. Standard deviations are based on all observations in this sample, and would likely vary across samples.

Based on these models, the ACT condition was estimated to improve 1.20 SDs on difficulty discarding, 1.29 SDs on excessive acquisition, 0.98 SDs on clutter, 1.01 SDs on overall functional impairment, 0.72 SDs on work/school impairment, 1.07 SDs on social/leisure impairment, 0.99 SDs on home/family impairment, 1.59 SDs on overall

impressions of clinical improvement, 1.59 SDs on overall well-being, 1.00 SD on progress toward personal values, 0.81 SDs on self-stigma of difference, 1.03 SDs on disdain, 0.69 SDs on blame, 1.30 SDs on overall hoarding-related psychological inflexibility, 1.17 SDs on saving-related psychological inflexibility, 1.18 SDs on acquiring-related psychological inflexibility, and 1.24 SDs on mindful awareness.

Both observed and predicted means and slopes were plotted for this series of models in Figures 2 through 19 in order to evaluate the timing of change and model fit descriptively (i.e, not statistically). Changes in overall hoarding severity (Figure 2), difficulty discarding (Figure 3), excessive acquisition (Figure 4), clutter (Figure 5), self-stigma of disdain (Figure 14), overall hoarding-related psychological inflexibility (Figure 16), saving-related psychological inflexibility (Figure 17), and acquiring-related psychological inflexibility (Figure 18) were relatively linear in both groups. There was some curvature in both groups' observed data for overall functional impairment (Figure 6) and social/leisure impairment (Figure 9), with change accelerating in the ACT group and slowing in the waitlist group over time. Progress toward personal values also had some deviations from linearity in both groups, with change slowing in the ACT group and increasing slightly in the waitlist group over time (Figure 12).

Several outcomes exhibit more complex patterns of change. The ACT group appears to have experienced linear change on work/school impairment (Figure 7), self-stigma of difference (Figure 13), self-stigma of blame (Figure 15), and mindful awareness (Figure 19), while the waitlist group means suggest a curvilinear trend with a dip at posttreatment and a return to baseline at follow-up. The ACT group also experienced consistent linear change on home/family impairment, while the waitlist

group means decreased more sharply over time (Figure 8). Overall perceived symptom change had a linear and nearly flat slope in the waitlist group across all time points, but clearly decreased from baseline to posttreatment in the ACT group before flattening out from posttreatment to follow-up (Figure 10). Well-being exhibits a similar pattern, with a small linear increase in the waitlist group, contrasted with a sharp increase from baseline to posttreatment for the ACT group, and minimal change between posttreatment and follow-up (Figure 11).

Treatment Response

Rates of reliable change were calculated for those who provided responses at posttreatment ($n = 52$). At posttreatment, 9 participants in the ACT condition (34.61%) had experienced reliable change, while 17 (65.38%) had not. In the waitlist condition, 4 participants (16.00%) experienced reliable change, while 21 (84.00%) did not. Rates were not statistically different across condition ($\chi^2(1) = 1.45, p = 0.23$).

In the ACT condition, 3 of 26 participants reported clinically significant change (11.54%) at posttreatment, and the same number (3 of 25, 12.00%) reported clinically significant change in the waitlist ($\chi^2(1) = 0.00, p = 1.00$).

Given that further improvement was observed between the posttreatment and follow-up timepoints, reliable and clinically significant change were also calculated for follow-up as an additional exploratory analysis. At follow-up, 16 of those in the ACT condition (64.00%) and 7 of those in the waitlist condition (24.14%) experienced reliable change. The ACT condition experienced significantly greater reliable change ($\chi^2(1) = 5.30, p = .02$).

At follow-up, 10 participants in the ACT condition (37.04%) and 5 in the waitlist condition (17.86%) had experienced clinically significant change. However, this was not a statistically significant difference between conditions ($\chi^2(1) = 1.67, p = .20$).

Mediation Analyses

Longitudinal Analyses

As for outcome and process analyses, CGI-I at baseline was included as a covariate in these models given baseline differences between conditions. Model results for longitudinal mediation are presented in Table 5. The AAQH total score did not significantly mediate between condition and SI-R score at follow-up. The statistically significant paths in this model were the *a* path, *b* path and total *c* path.

AAQH Saving also was not a significant mediator. In this model, the statistically significant paths were also the *b* path and total *c* path. Similarly, AAQH Acquisition was not a significant mediator, and only the *b* path and *c* path were significant.

FFMQ Acting with Awareness also did not significantly mediate between condition and SI-R total score, and only the *a* path was significant in this model.

Elements of self-stigma also did not significantly mediate effects of condition. For difference, the *ab* path point estimate was 0.00, while the *c* and *c'* paths were significant. For disdain, the *ab* path point estimate was -0.05, and again only the *c* and *c'* paths were significant. Finally, the *ab* path was not significant in the model for blame, and only the *c* and *c'* paths were significant in the model.

Cross-sectional Analyses

In addition to the planned longitudinal mediation analyses conducted above, cross-sectional mediation from baseline to follow-up was examined in a series of models with the same set of potential mediators, given that process measures were not measured at midtreatment and most process measures continued to change significantly between posttreatment and follow-up. These analyses cannot provide strong evidence of mediation as the direction of effects is unclear, but results may be either consistent or inconsistent with potential mediation. Full results of these models are presented in Table 6.

AAQH total was not a significant mediator. The *a*, *b*, and *c* paths were significant in this model, but not the *c* ' path.

AAQH Saving did not mediate the effects of condition significantly. Only the *c* path was significant in this model. However, AAQH Acquisition was a significant mediator; in this model, the *a*, *b*, and *c* paths were also significant.

FFMQ Acting with Awareness also significantly mediated between condition and SI-R total. In this model the *a* and *b* paths were also significant.

Self-stigma of difference was not a significant; only the *c* and *c* ' paths were significant. Self-stigma of disdain did not significantly mediate the effect of condition on SI-R total; the *a* and *c* paths were significant. Self-stigma of blame was also not a significant mediator. In this model, only the *a* and *c* paths were significant.

CHAPTER V

DISCUSSION

Summary of Outcomes

The results of this initial randomized controlled trial of an ACT self-help website for hoarding with supportive coaching are highly supportive. Overall, the treatment condition improved significantly more than the waitlist condition on all outcomes of interest and nearly all processes. In addition, every benchmark for acceptability, satisfaction, and ease of use was met. Notable limitations remain, including low adherence, limited reliable and clinically significant change, and a lack of support for hypothesized mediators in longitudinal analyses. However, overall it appears likely that this intervention is efficacious and acceptable, and there are promising signs that an intervention of this nature may reach individuals unlikely to access other forms of treatment for hoarding.

Feasibility

Treatment acceptability, credibility, and expectancy all exceeded the predetermined cutoffs. Average scores also met the benchmark for “excellent” usability. Participants also reported overall satisfaction with the program, the psychological skills taught, the practice exercises, and coaching. Participants additionally indicated that overall, they perceived coaching as necessary (despite a substantial minority of participants never choosing to begin coaching). Few studies of hoarding treatment have formally examined acceptability beyond treatment refusal and dropout rates, making comparisons difficult. Two trials found high satisfaction with face-to-face CBT (Gilliam

et al., 2011; Turner et al., 2010), and CBT delivered as telehealth appears promising based on informal feedback (Muroff, 2011). One survey on acceptability suggests individual CBT, professional organizing, self-help books, and an online support group are all similarly acceptable for hoarding (although the online support group fell just below the acceptability cutoff, while the other options fell just above; Rodriguez et al., 2016). Given that the present study does not neatly fit into any of these categories, further comparative research would be useful. However, the initial responses suggest that an online ACT self-help program for hoarding is acceptable, satisfactory, and easy to use.

Participant open responses indicated a few areas for potential improvement. Multiple participants noted that they would appreciate more reminders and accountability to help with consistent engagement. Some web content was not well-suited for the audience; for example, multiple participants reported that they were confused by a metaphor referring to a “CGI villain.” However, themes were largely specific to individuals rather than suggesting consistent areas for improvement based on consensus. For example, several participants noted particularly liking coaching while others noted difficulty with it; similarly, some participants asked for more repetition while one found the website too repetitive.

There were notable problems with adherence, with a substantial minority of participants completing no sessions at all, and completion rates falling below the pre-specified benchmark. Treatment refusal and dropout have been concerning in some trials of face-to-face treatment. For example, in the largest waitlist-controlled trial, there was a 44% refusal rate (Steketee et al., 2010); in one open trial, there was a 29% dropout rate (Tolin et al., 2007). It has also been common for hoarding treatment to be extended in

order to complete a specified number of sessions (e.g., requiring up to 77 weeks to complete 26 therapy sessions; Steketee et al., 2010).

It is difficult to compare adherence between individual or group therapy and online self-help. Overall, it seems that nonadherence was a substantial problem, and likely more so in this study than in traditional therapy for hoarding. However, this may be a natural consequence of making it easy to enroll and begin treatment, as some people may choose to see the intervention content before choosing whether to seriously engage with it or not. One review reported rates of full adherence for web-based depression treatment as 50-70%, substantially higher than the present study (Christensen et al., 2009). It is possible that additional supports are needed to improve adherence. On the other hand, rates of adherence in open-access websites provided directly to the community are often extremely low (i.e., 1% or less; Christensen et al., 2004; Farvolden et al., 2005). Given that this study was very easy to enroll in (e.g., no phone screening or formal diagnosis was used), it is possible that some participants engaged with it similarly to an open-access website. Also, some participants continued to engage with the intervention after the treatment period, which suggests that adherence could potentially be improved by allowing a longer timeframe for treatment.

Adherence was not significantly associated with change in hoarding severity. As power was limited for such fine-grained analyses, the relationship between adherence and outcomes should be further investigated in a larger trial. Findings are mixed on the relationship between adherence and outcomes in self-help generally (e.g., Farvolden et al., 2005; Rapee et al., 2012). It is possible that, similar to one web-based intervention for

social phobia (Farvolden et al., 2005), many individuals can benefit from only a small intervention dose, although this may not be sufficient for reliable change.

Finally, while this study did not incorporate a formal analysis of cost, it appears likely that this intervention would have a relatively small cost per individual. Assuming the website content has already been developed, ongoing costs would be limited. Total coaching time was less than one hour per participant; other costs would be personnel time to send reminder emails (which could be automated), the cost of a Qualtrics license if not available through one's institution, and potential training and supervision costs for coaches. As such, costs for this intervention seem likely to be much smaller than the \$481-795 per participant estimated for bibliotherapy groups or group CBT (Mathews et al., 2016).

Efficacy

The initial efficacy of the ACT website relative to the waitlist was evaluated in a series of time-by-condition models. The ACT condition improved to a larger degree than waitlist from baseline to follow-up on all outcomes (overall hoarding severity, difficulty discarding, excessive acquisition, clutter, overall functional impairment, work impairment, social impairment, home/family impairment, general perceived symptom improvement, overall well-being, and progress toward personal values). The ACT condition also improved more than waitlist from baseline to follow-up on all processes except for self-stigma of blame, with superior outcomes on hoarding-related psychological inflexibility (in general and related to saving and acquiring specifically), mindful awareness, and the self-stigma of difference and disdain. This suggests that an

ACT self-help website for hoarding is a highly promising intervention, with the potential to rapidly lead to improvement across a range of relevant outcomes, including symptom severity, functioning, and valued living.

Considering these results alongside one promising initial trial of in-person ACT for hoarding (Ong et al., 2021), early findings support the efficacy of ACT for hoarding. ACT offers a novel conceptualization of hoarding, using acceptance, mindfulness, and values processes to address the core pathological process of psychological inflexibility as it relates to saving, acquiring, self-stigma, and related issues such as mood and anxiety symptoms. These results suggest that this approach may be useful in not only addressing hoarding symptoms, but also fostering valued living and improving overall well-being and functioning. Nearly all hypothesized processes of relevance were effectively targeted by this intervention, suggesting that an ACT intervention for hoarding can successfully alter theoretically meaningful processes including hoarding-related psychological inflexibility and mindful awareness.

Based on these findings, ACT for hoarding clearly merits further research including trials evaluating its efficacy relative to CBT for hoarding. One evaluation of a CBT-based online self-help group for hoarding found improvement for recent members on hoarding severity, clutter, and overall perceptions of change, but not excessive acquisition, and significantly greater improvement for recent members relative to the waitlist on self-reported perceptions of symptom improvement, but not hoarding severity or clutter. However, it is difficult to compare these two studies given that the CBT trial was quasi-experimental, tested a substantially different intervention format (i.e., online

group with CBT resources rather than interactive website with supportive coaching), and used a very different timeframe (i.e., assessments every 3 months for 15 months).

These findings also add to the literature on ACT for obsessive-compulsive and related disorders (OCDs). A 2014 review reported that ACT has been evaluated for OCD in 5 published studies as well as for trichotillomania and skin-picking in 4 published studies, all with promising results (Bluett et al., 2014). This area of research has continued to grow rapidly since this review was published. One relatively large ($n = 58$) randomized trial found equivalent acceptability and efficacy for ACT (including exposure) compared to exposure and response prevention (ERP) in the treatment of OCD (Twohig et al., 2018). Another recent study found ACT and ERP to have comparable effects on OCD symptom severity when combined with pharmacological treatment (Zemestani et al., 2020). Two waitlist-controlled trials have found ACT to be effective for reducing symptom severity in trichotillomania, delivered face-to-face or as teletherapy (Lee et al., 2018, 2020). Moreover, a large body of research suggests that ACT is effective for mood and anxiety disorders generally, typically with equivalent effects compared to established treatments (Twohig & Levin, 2017). These initial results suggest that, similar to these related disorders, ACT may be an efficacious treatment for hoarding.

The findings are also consistent with previous studies that suggest ACT can be delivered effectively as an online self-help intervention. A recent transdiagnostic review summarizing 25 studies found web-based ACT to be overall efficacious in improving anxiety, depression, quality of life, and psychological flexibility, albeit with small effects on average (Thompson et al., 2021). This review also found that reliable and clinically

significant change were limited in these interventions, suggesting that ACT interventions may be generally efficacious but result in a limited degree of change (Thompson et al., 2021).

Within-condition change was also investigated to further characterize efficacy of this intervention. Improvements in the ACT condition ranged in average size from 0.63 to 1.62 standard deviations in these models. While there are no definitive interpretations of such effect sizes (Lorah, 2018), this degree of change appears likely to be of practical significance. Of note, the waitlist condition also improved significantly on several measures, namely overall hoarding severity, difficulty discarding, excessive acquisition, clutter, overall functional impairment, overall well-being, self-stigma of difference, overall hoarding-related psychological inflexibility, saving-related psychological inflexibility, and acquiring-related psychological inflexibility. As the time by condition results indicate, the degree of improvement was significantly smaller for the waitlist condition. However, this does suggest that these participants were motivated and engaged, particularly given that hoarding most often follows a chronic course and only rarely remits without intervention (Tolin, Meunier, et al., 2010). The waitlist similarly improved in a trial of an online CBT-based self-help group for hoarding (Muroff et al., 2010), suggesting that those who actively seek self-help may be unusual compared to the hoarding population broadly in that they are already on an improving trajectory even without the tested intervention.

The timing of this change was further examined by inspecting model plots with predicted and observed values. In many cases, change was consistent across timepoints in the ACT condition, rather than being limited to the treatment period, including for the

primary outcome of overall hoarding severity. This implies that even with low adherence, individuals with hoarding problems may continue to utilize self-help resources and progress on a range of outcomes after an intervention, including when coaching support is no longer available. This suggests a potential advantage for self-help programs, as individuals may be more easily able to continue accessing and using such resources relative to traditional therapy. Change in the ACT condition did largely occur during the treatment period for some outcomes, particularly overall perceived symptom change and well-being. Model plots also suggested that for several outcomes (i.e., work/school impairment, self-stigma of difference, self-stigma of blame, and mindful awareness) the waitlist group had improved at the posttreatment timepoint (although the statistical significance of this change is unknown), but reverted to a value close to baseline by the follow-up period, while the ACT condition experienced linear change. This suggests that accessing a self-help program may be useful for helping individuals continue progress over time more steadily, when they would otherwise experience lapses in progress.

While a one-month follow-up is very brief for a chronic condition, results support the initial possibility that treatment gains from a self-help website can be maintained or enhanced over time for hoarding disorder. Initial findings suggest that effects of therapist-delivered CBT for hoarding are relatively stable over time (Muroff et al., 2014); thus, while much longer follow-ups are needed, it is valuable to know that ACT self-help for hoarding may also lead to sustained improvement.

Despite the overall consistent pattern of improvements, reliable and clinically significant change were weak at posttreatment. Only 34.61% of completers experienced reliable change in the intervention condition, not significantly different from the waitlist,

while an even smaller minority (11.54%) experienced clinically significant change, with the same rate in waitlist and follow-up. When measured at follow-up, most intervention participants had experienced reliable change (64.00; significantly more than the control group), and a substantial minority had experienced clinically significant change (40.00%). For comparison, in trials of face-to-face CBT for hoarding, rates of reliable change have on average been around 90% or higher for symptom severity and impairment (Tolin et al., 2015), while rates of clinically significant change have been between 25 and 43%, and hoarding severity was comparable in this sample compared to large CBT trials (Frost, Ruby, et al., 2012; Steketee et al., 2010). Overall, this suggests that reliable change after this intervention may be somewhat limited compared to traditional CBT, while clinically significant change is comparable; however, it is difficult to make direct comparisons given the range of intervention timelines and populations.

Reliable and clinically significant change were not examined in the one trial of online CBT self-help, but the average change on measures in this trial was similar or greater for overall hoarding severity, difficulty discarding, excessive acquisition, clutter measured with the SI-R, and overall improvement (Muroff et al., 2010). These results suggest that, even if online ACT program for hoarding is somewhat less likely to result in reliable change relative to face-to-face CBT, this may be true of online self-help generally. Limited reliable change has been noted as one weakness of web-based ACT interventions broadly (Thompson et al., 2021), which suggests the present findings are not specific to those with hoarding problems. Moreover, this limitation should be weighed against the advantages of a self-help intervention for increasing reach. Further research should investigate whether rates of reliable change are similar between ACT and

CBT for hoarding generally, and whether reliable and clinically significant change can be further improved by changing aspects of the intervention such as duration, intensity of coaching, and content and order of web modules.

Mediation

Potential mediators of treatment effects were investigated including hoarding-related psychological inflexibility, mindful awareness, and components of self-stigma. However, in each case planned longitudinal analyses did not support mediation. Point estimates for self-stigma components were all very close to zero, indicating minimal support for the possibility that altering self-stigma (at posttreatment relative to baseline) fosters later change. In contrast, point estimates for hoarding-related psychological inflexibility and mindful awareness are not inconsistent with mediation, but confidence intervals for each of these paths was large.

Exploratory cross-sectional mediation models, testing the effects of potential mediators at follow-up on the outcome at follow-up, indicated that acquiring-related psychological inflexibility and mindful awareness were statistically significant mediators. These models are not a true test of mediation given their cross-sectional nature. However, they suggest that these two processes are potential mediators in ACT for hoarding and merit further investigation in future studies.

There are several methodological limitations to note. This sample is small for mediation, and these analyses should be repeated in a fully powered study before drawing firm conclusions. Confidence intervals were large for indirect effects. Moreover, mediators were not measured at midtreatment, which is ideal for assessing mediation; future studies should include more time points so that mediation can be assessed with

greater rigor. It would be premature to conclude that nonsignificant indirect effects indicate a lack of mediation by the specified processes given these limitations.

Participant Characteristics

The recruited sample has some notable characteristics. First, most participants had never sought psychotherapy or medication for hoarding previously (despite many receiving help for other concerns). This indicates that this intervention did reach individuals with hoarding problems who were not otherwise accessing treatment. However, data from other studies assessing history of treatment seeking are lacking, so it is not possible to make a direct comparison to face-to-face treatment for example.

The mean age in this study was 47.67 years, younger than is typical for group or individual CBT (Tolin et al., 2015). It is possible that web-based treatment is more accessible or acceptable to younger individuals, as the average age was fairly similar in the trial of online CBT self-help (Muroff et al., 2010). The sample was overwhelmingly female, which is very common in hoarding treatment studies (Tolin et al., 2015). Previous trials have had samples that are 80-100% White (Muroff et al., 2011), and this sample was slightly more diverse in terms of the number of non-Hispanic White participants, although overall still lacking in diversity. This sample was also slightly more diverse in terms of gender and race/ethnicity compared to the previous trial of an online CBT self-help group (Muroff, 2011), which was over 90% female and White.

This study also provides some novel information on recruitment. Online postings and Google ads were both highly successful recruitment methods. The cost per enrolled participant of Google ads was fairly similar to published estimates (Gordon et al., 2006; McDonnell et al., 2010). Of note, while demographic targeting was not used in the

current study, it is an option when using Google ads, which provides one route for recruiting more diverse samples for future trials.

Data were also gathered on the impact of the COVID-19 pandemic. Recruitment for the study began in late February 2020, and data collection ended in November 2020. Thus, almost the entire study duration overlapped with the COVID-19 pandemic. Participants did report that the COVID-19 pandemic generally made daily living more difficult at baseline, and that it affected several aspects of their life throughout the study, most notably mental health, leisure, and social life. It is possible that the overall pattern of results would be different if this study were conducted during a different time. The pandemic may have made it more difficult for participants to engage as they faced mental health challenges or social isolation reduced motivation to declutter. On the other hand, spending increased time at home may have facilitated time and motivation to engage. Participants generally reported that the pandemic did not interfere with their participation in the study, and in some cases facilitated it. This tentatively suggests that online self-help, and this program in particular, may potentially be easy to use even when unexpected circumstances restrict normal activities.

Limitations and Future Directions

These results should be considered in light of methodological limitations. As is common in hoarding treatment studies, the sample was overwhelmingly female and largely non-Hispanic White. The study must be replicated in diverse samples in order to evaluate whether findings hold. While hoarding is a relevant problem across multiple cultures (e.g., Timpano et al., 2011, 2015), the meaning of possessions and living circumstances vary across cultures in ways that are certain to influence hoarding

problems and their treatment. In addition, this study had a younger sample than is typical of hoarding research, and CBT for hoarding is more effective with younger samples (Tolin et al., 2015). Future research should evaluate whether an ACT self-help program is efficacious and acceptable to older adults. In addition, it seems likely that this sample was relatively motivated to engage with their hoarding issues given that the waitlist condition improved significantly on several outcomes. It would be beneficial to further assess the impact of motivation and how the initial levels and effects of motivation compare for online self-help versus group and individual treatment.

It is difficult to know what effect the COVID-19 pandemic may have had on this study. It is possible that results would be different under different conditions, and hard to determine whether the pandemic overall facilitated or hindered participant progress. However, given the randomized waitlist-controlled design, it is likely that between-group comparisons would remain largely similar even if the effect sizes differed under different conditions. Nonetheless, replicating the study when the impact of the pandemic is minimized would be useful.

Model figures comparing predicted and observed values also suggest some potential misspecification in using linear models. While linear models have practical advantages in allowing comparisons within and across trials, model parameters might be more accurate for certain outcomes if nonlinear modeling techniques were employed instead.

Power was limited for some analyses, most notably mediation. Mediation may also have been difficult to detect given the limited adherence within the treatment group. For example, few participants completed later sessions such as those that specifically

targeted mindful awareness, which may have contributed to null results in longitudinal models. It would be highly beneficial to conduct mediation analyses in a fully powered trial, with sufficient participants to support subgroup analyses such as tests of mediation within treatment completers.

The randomized waitlist-controlled design employed in this trial has several advantages, including increasing statistical power to detect between-condition differences. However, comparisons to active controls are also clearly needed. This intervention should ideally be compared to a similar self-help program based on CBT for hoarding, given its strong evidence base, as well as compared to traditional therapy, on both efficacy and feasibility.

In addition to addressing these limitations, future studies should investigate several lines of inquiry. Perhaps most pressing is evaluating whether parameters of this intervention can be altered in a manner that leads to greater reliable and clinically significant change. Similarly, it would be beneficial to evaluate whether adherence can be improved and what type of therapeutic dose is sufficient to achieve various degrees of change. It is also important to evaluate efficacy over a longer follow-up period, as supporting durable change is essential in hoarding where a chronic course is typical of the disorder.

Finally, one aim of this study was to improve the reach of hoarding treatment. Given this goal, more fine-grained research specifically evaluating reach would be valuable. For example, a full-scale dissemination trial evaluating implementation and effectiveness is needed. In addition, further evaluating who chooses this type of treatment and why, particularly relative to other treatment options, would help to clarify whether

web-based self-help truly has the capability to increase access to treatment. In addition, evaluating changes to increase scalability such as removing or automating coaching would be beneficial. It would also be useful to formally evaluate the cost-effectiveness of this intervention compared to alternatives.

In sum, it appears that an ACT self-help website for hoarding combined with coaching is overall efficacious across outcomes of interest and acceptable, although with drawbacks such as low adherence and limited reliable change relative to face-to-face treatment. These findings have several practical implications. First, the intervention tested in this study should be made available to individuals with hoarding problems as it may benefit them while being potentially easy to access. In addition, while research on ACT for hoarding remains limited, and CBT for hoarding should be considered the first-line treatment, ACT for hoarding appears promising and may be a useful option for individuals who do not benefit from CBT for hoarding, or in other circumstances based on clinical expertise and client goals and preferences. As such, these findings can potentially expand the range of treatment options for hoarding, meeting a significant need.

Future studies should further investigate web-based interventions for hoarding relative to alternative treatment options, in larger and more diverse samples, and in a manner that supports deeper investigation of reach, scalability, and therapeutic processes.

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Table 1***Participant Demographics and Outcome/Process Variables by Group at Baseline***

Demographics	ACT (<i>n</i> = 38)	Waitlist (<i>n</i> = 35)	Group comparison at baseline
	<i>M</i> (<i>SD</i>)/%	<i>M</i> (<i>SD</i>)/%	
Age	50.26 (13.39)	44.86 (14.98)	$t(68.4) = -1.62, p = .11$
Gender			$\chi^2(1) = 0.88, p = .35$
Female	84.21%	91.43%	
Male	15.79%	8.57%	
Ethnicity			$\chi^2(1) = 1.68, p = .19$
Hispanic	10.53%	2.86%	
Non-Hispanic	89.47%	97.14%	
Race			$\chi^2(4) = 2.21, p = .70$
Asian	10.53%	2.86%	
American/Pacific Islander			
Black	5.26%	2.86%	
White	73.68%	80.00%	
Multiracial	5.26%	5.71%	
Other	5.26%	8.57%	
Marital status			$\chi^2(4) = 1.84, p = .77$
Single	26.32%	37.14%	
Married	34.21%	22.86%	
Cohabiting	13.16%	11.43%	
Divorced	21.05%	20.00%	
Widowed	5.26%	8.57%	
Median household income			$\chi^2(6) = 2.75, p = .84$
< \$20,000	10.53%	22.86%	
\$20,000-39,999	10.53%	8.57%	
\$40,000-59,999	21.05%	17.14%	
\$60,000-79,999	13.16%	11.43%	
\$80,000-99,999	15.79%	8.57%	
> \$100,000	18.42%	20.00%	
Unknown	10.53%	11.43%	
Employment status			$\chi^2(5) = 5.48, p = .36$
Working full-time	34.21%	34.29%	
Working part-time	13.16%	20.00%	
Retired	15.79%	5.71%	
Unemployed	10.53%	22.86%	
Student	10.53%	2.86%	

Other	15.79%	14.29%	
Ever tried therapy for hoarding?			$\chi^2(1) = 0.55, p = .46$
Yes	21.05%	28.57%	
No	78.95%	71.43%	
Ever tried medication for hoarding?			$\chi^2(1) = 0.14, p = .71$
Yes	7.89%	5.71%	
No	92.11%	94.29%	
Recent therapy utilization			$\chi^2(1) = 0.23, p = .63$
Yes	23.68%	28.57%	
No	76.32%	71.43%	
Recent medication utilization			$\chi^2(1) = 0.02, p = .90$
Yes	50.00%	51.43%	
No	50.00%	48.57%	
COVID impact	5.71 (1.47)	5.24 (1.68)	$t(63.3) = -1.00, p = .23$

Table 2

Descriptive Statistics by Group at Baseline, Posttreatment and Follow-up

	Baseline		Group comparison at baseline	Posttreatment		Follow-up	
	ACT (n = 38) M(SD)/%	Waitlist (n = 35) M(SD)/%		ACT (n = 26) M(SD)/%	Waitlist (n = 26) M(SD)/%	ACT (n = 25) M(SD)/%	Waitlist (n = 29) M(SD)/%
SI-R Total	66.25 (11.96)	67.18 (14.84)	$t(65.4) = -0.734, p = .47$	54.46 (13.40)	59.15 (12.18)	46.72 (13.40)	55.55 (14.86)
SI-R Difficulty Discarding	20.94 (4.20)	20.88 (5.48)	$t(60.2) = -0.68, p = .50$	17.62 (4.53)	18.58 (4.43)	14.68 (4.54)	17.93 (4.61)
SI-R Excessive Acquisition	17.69 (5.02)	18.59 (4.50)	$t(70) = -0.30, p = .77$	14.15 (4.09)	16.19 (4.62)	11.52 (4.81)	15.07 (5.06)
SI-R Clutter	27.62 (5.95)	27.71 (7.61)	$t(68) = -0.76, p = .45$	22.69 (7.17)	24.38 (6.46)	20.52 (6.93)	22.55 (7.23)
SDS Total	22.06 (6.17)	22.94 (6.04)	$t(52.6) = 0.75, p = .46$	16.88 (6.64)	19.23 (7.86)	13.40 (7.99)	18.79 (7.84)
SDS Work	6.38 (2.75)	6.94 (2.25)	$t(52.9) = 0.42, p = .67$	4.58 (2.82)	5.38 (2.87)	3.92 (2.80)	5.55 (3.04)
SDS Social	7.69 (1.99)	7.88 (2.69)	$t(69.8) = 0.09, p = .93$	6.00 (2.67)	6.77 (2.97)	4.04 (2.95)	6.86 (2.59)
SDS Home	8.00 (2.07)	8.12 (2.42)	$t(70) = -0.79, p = .43$	6.31 (2.45)	7.08 (2.74)	5.44 (3.24)	6.38 (2.74)
CGI-I	4.31 (0.87)	3.76 (0.90)	$t(68.3) = -2.81, p = .006$	2.69 (0.79)	3.65 (1.38)	2.76 (1.05)	3.66 (1.01)
GHQ-12	26.19 (7.39)	27.35 (8.01)	$t(70.6) = 1.75, p = .08$	36.15 (6.93)	30.35 (6.51)	36.12 (7.21)	31.76 (5.37)
VQ Progress	12.06 (7.08)	12.82 (7.60)	$t(70.6) = 1.24, p = .22$	17.27 (6.85)	13.58 (7.74)	18.36 (7.58)	15.14 (6.02)
Difference	6.62 (2.07)	6.41 (2.19)	$t(69.8) = -1.15, p = .25$	5.85 (1.77)	5.38 (2.04)	5.44 (2.29)	5.76 (2.04)
Disdain	5.75 (2.27)	5.73 (1.81)	$t(70.9) = -1.91, p = .06$	5.32 (1.59)	5.51 (1.68)	4.49 (1.91)	5.70 (1.80)
Blame	4.62 (2.39)	5.76 (2.70)	$t(68.6) = 0.03, p = .98$	4.27 (1.85)	4.81 (2.23)	3.72 (1.67)	5.34 (2.04)
AAQH Total	75.25 (10.32)	74.76 (11.97)	$t(71) = -0.46, p = .64$	63.54 (9.35)	67.35 (10.77)	57.80 (14.15)	65.38 (13.93)
AAQH Saving	40.69 (4.87)	40.71 (6.25)	$t(70.8) = -0.03, p = .98$	35.12 (5.21)	37.00 (5.08)	32.52 (8.81)	35.31 (7.76)
AAQH Acquisition	34.56 (6.40)	34.06 (7.62)	$t(71) = -0.76, p = .45$	28.42 (6.15)	30.35 (7.20)	25.28 (7.34)	30.07 (7.77)

FFMQ Acting with Awareness	20.00 (5.20)	19.00 (3.87)	$t(68.9) = 1.85, p = .07$	22.92 (5.04)	19.88 (4.56)	25.28 (4.77)	21.72 (5.95)
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Table 3***Ratings of Novel Satisfaction Items***

Item	<i>M</i>	<i>SD</i>
Overall, I was satisfied with the quality of the program.	4.69	1.26
The program was helpful to me.	4.77	1.48
The program was easy to use.	5.08	1.02
I felt the program was made for someone like me.	4.73	1.46
I would recommend the program to other people with a clutter and/or hoarding problem.	4.88	1.40
The psychological skills taught (ex. mindfulness, opening up) were helpful to me.	4.96	1.37
The practice exercises (ex. discarding, not acquiring) were helpful to me.	5.08	1.15
This treatment fit well with my goals.	4.80	1.32
Overall, I was satisfied with the coaching that I received.	4.73	1.43
The website would have been just as useful without a coach.	2.92	1.67

Note. Response options were 1 (Strongly disagree), 2 (Disagree), 3 (Slightly disagree), 4

(Slightly agree), 5 (Agree), 6 (Strongly agree).

Table 4***Time by Condition Models***

Outcome	Time β	Condition β	Time*Condition β	Baseline CGI-I β
SI-R Total	-0.59***	0.04	-0.74**	0.14
SI-R Difficulty Discarding	-0.46**	0.11	-0.74**	0.07
SI-R Excessive Acquisition	-0.51***	-0.05	-0.78***	0.16
SI-R Clutter	-0.53***	0.05	-0.45*	0.11
SDS Total	-0.28*	-0.05	-0.73***	0.05
SDS Work/School	-0.15	-0.04	-0.57*	0.03
SDS Social	-0.17	-0.02	-0.90***	0.13
SDS Home/Family	-0.33*	0.07	-0.66**	0.08
CGI-I	-0.17	0.44*	-1.42***	
GHQ	0.45*	-0.17*	1.14***	-0.29***
VQ Progress	0.09	-0.03	0.91***	-0.35***
<i>Process</i>				
Difference	-0.31*	0.10	-0.50*	0.32**
Disdain	0.09	0.30	-1.12***	0.27**
Blame	-0.17	-0.14	-0.52	0.24**
AAQH Total	-0.51**	0.13	-0.79**	-0.03
AAQH Saving	-0.56**	0.09	-0.61*	-0.07
AAQH Acquisition	-0.36*	0.15	-0.82***	0.02
FFMQ Acting with Awareness	0.13	-0.37	1.11***	-0.10

Notes. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Time is coded as 0 = Baseline, .67 =

Posttreatment, 1 = Follow-up. Condition is coded as 0 = Waitlist, 1 = ACT.

Table 5***Longitudinal Mediation Models***

Mediator	a path	b path	c path	c' path	Product of coefficients		Bootstrapped 95% CI		CGI-I → M	CGI-I → Y
					Point estimate	SE	Lower	Upper		
AAQH Total	-0.53*	0.53***	-0.66*	-0.38	-0.28	0.16	-0.70	0.03	0.22	-0.06
AAQH Saving	-0.49	0.51***	-0.65*	-0.40	-0.25	0.15	-0.64	0.01	0.17	-0.03
AAQH Acquisition	-0.44	0.38**	-0.64*	-0.48	-0.17	0.12	-0.55	0.02	0.21	-0.03
FFMQ Acting With Awareness	0.59*	-0.26	-0.56	-0.47	-0.15	0.11	-0.52	0.01	0.05	0.07
Difference	-0.02	0.05	-0.61*	-0.61*	0.00	0.01	-0.08	0.08	0.42**	0.01
Disdain	-0.29	0.16	-0.62*	-0.58*	-0.05	0.06	-0.32	0.03	0.26	0.01
Blame	-0.52	-0.02	-0.62*	-0.63*	0.01	0.08	-0.22	0.22	0.42**	0.06

Notes. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. CGI-I \Rightarrow M refers to the effect of baseline CGI-I on the mediator at posttreatment; CGI-I

\Rightarrow Y refers to the effect of baseline CGI-I on the outcome (hoarding severity) at follow-up.

Table 6***Cross-Sectional Mediation Models***

Mediator	a path	b path	c path	c' path	Product of coefficients		Bootstrapped 95% CI		<u>CGI-I → M</u>	<u>CGI-I → Y</u>
					Point estimate	SE	Lower	Upper		
AAQH Total	-0.56*	0.73***	-0.62*	-0.21	-0.41	0.20	-0.84	0.01	0.00	0.05
AAQH Saving	-0.37	0.62	-0.62*	-0.39	-0.23	0.17	-0.66	0.11	-0.01	0.06
AAQH Acquisition	-0.63*	0.66***	-0.63*	-0.62	-0.42	0.18	-0.84	-0.08	0.01	0.05
FFMQ Acting With Awareness	0.58*	-0.30*	-0.58	-0.44	-0.18	0.11	-0.44	-0.01	0.04	0.07
Difference	-0.42	0.19	-0.62*	-0.53*	-0.08	0.08	-0.42	0.03	0.33*	-0.02
Disdain	-0.83***	0.21	-0.63*	-0.45	-0.17	0.13	-0.51	0.07	0.26*	0.00
Blame	-0.85***	0.11	-0.62*	-0.52	-0.10	0.12	-0.46	0.15	0.18	0.04

Notes. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. CGI-I \Rightarrow M refers to the effect of baseline CGI-I on the mediator at follow-up; CGI-I \Rightarrow

Y refers to the effect of baseline CGI-I on the outcome (hoarding severity at follow-up).

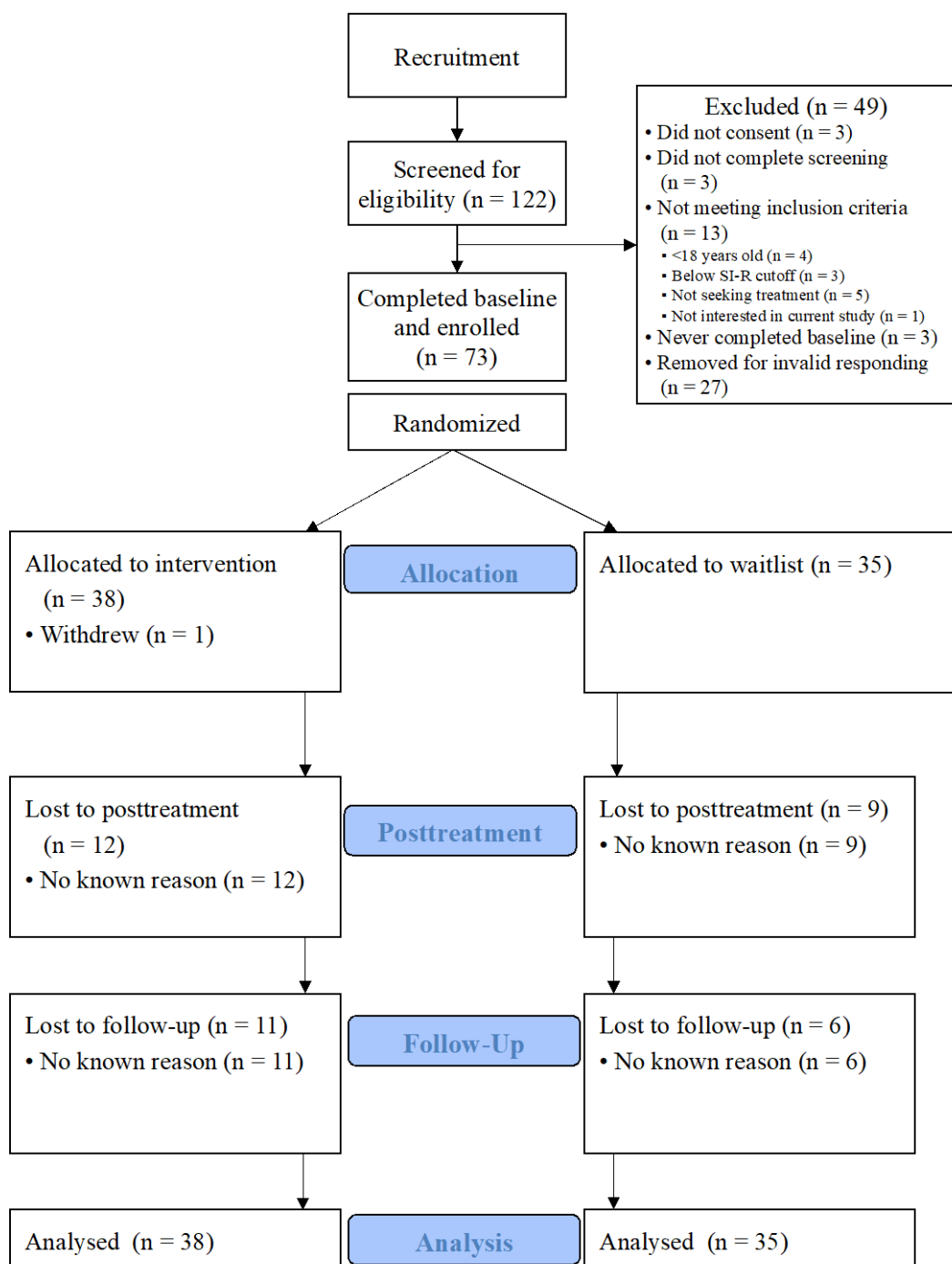
Figure 1*Diagram of Study Enrollment*

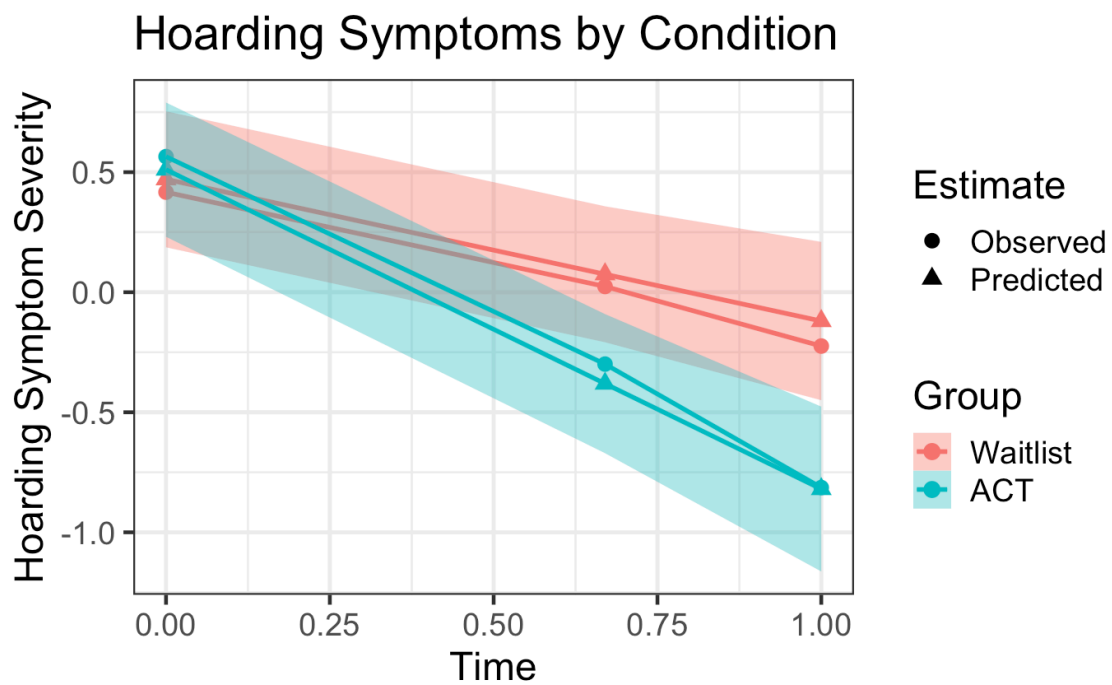
Figure 2*Time by Condition Model of Hoarding Severity*

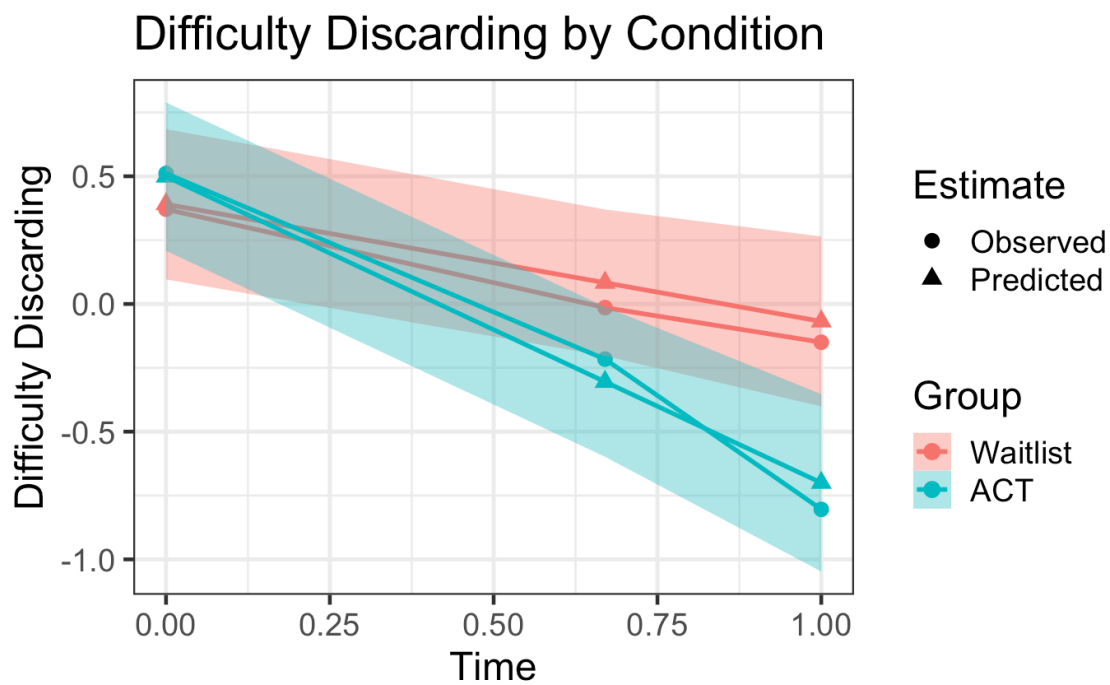
Figure 3*Time by Condition Model of Difficulty Discarding*

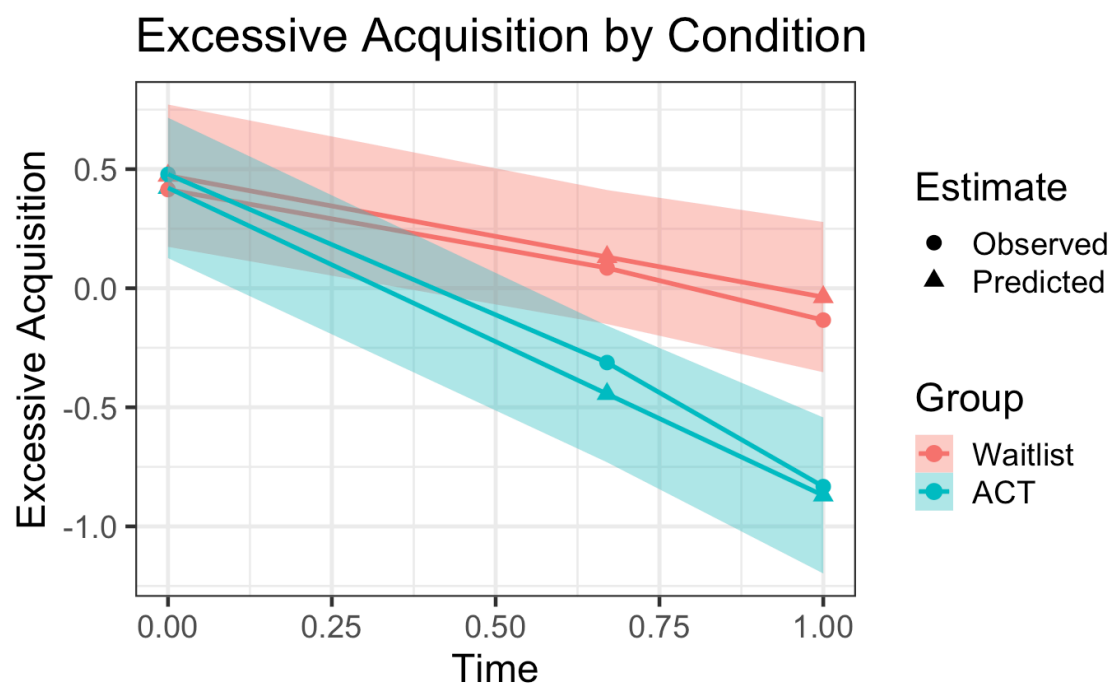
Figure 4*Time by Condition Model of Excessive Acquisition*

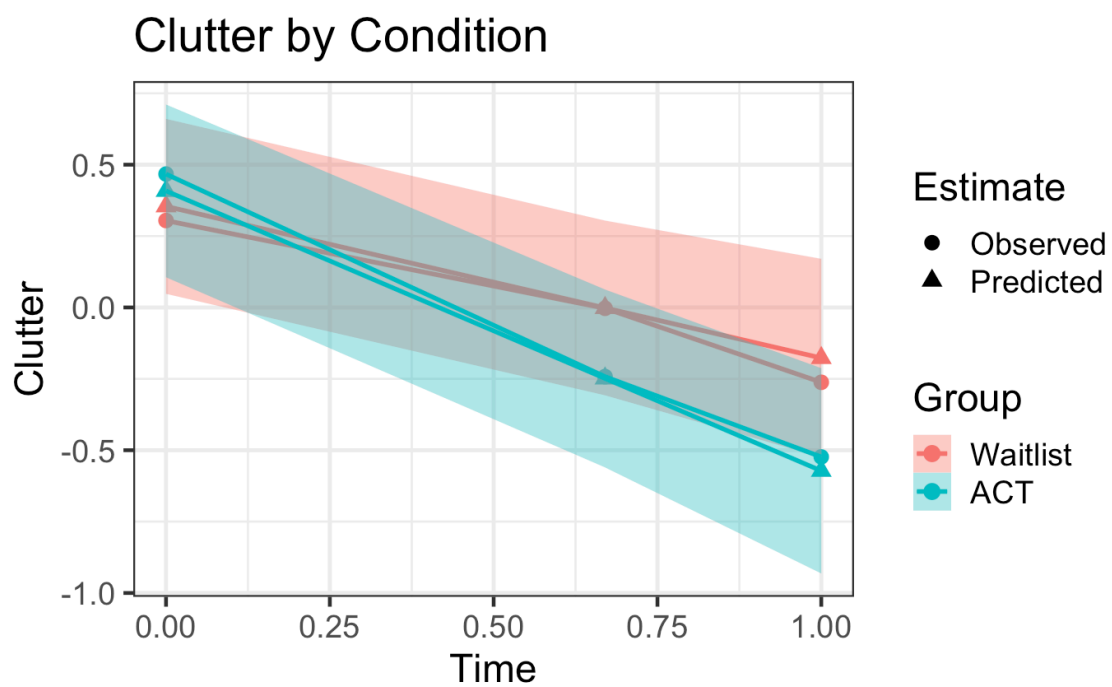
Figure 5*Time by Condition Model of Clutter*

Figure 6

Time by Condition Model of Overall Functional Impairment

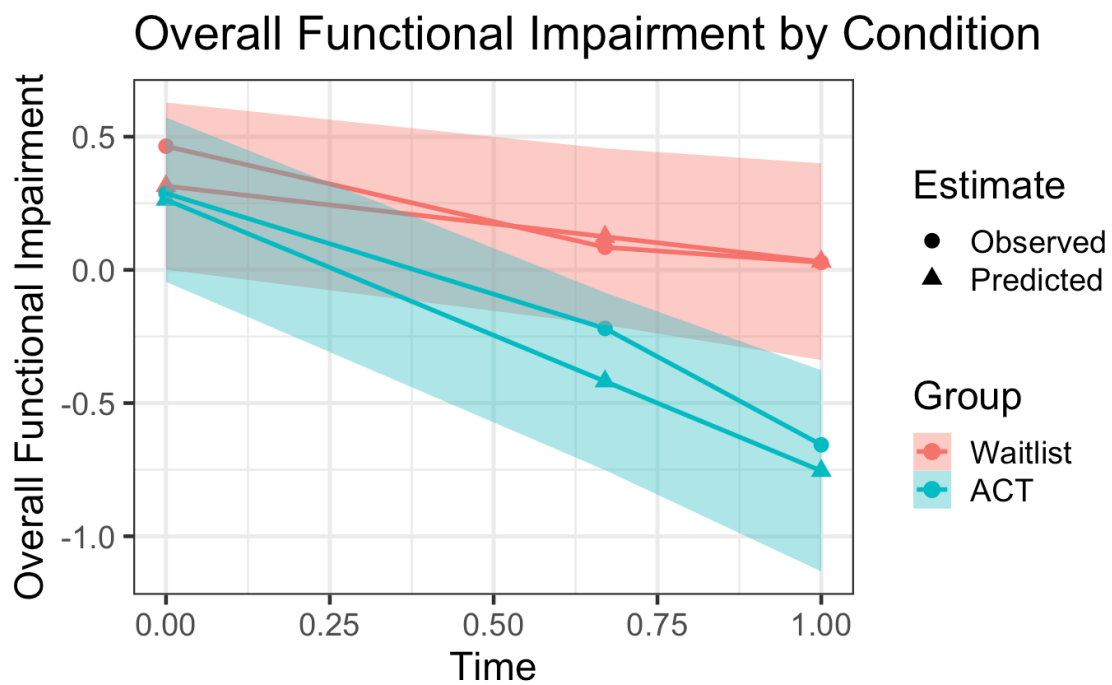


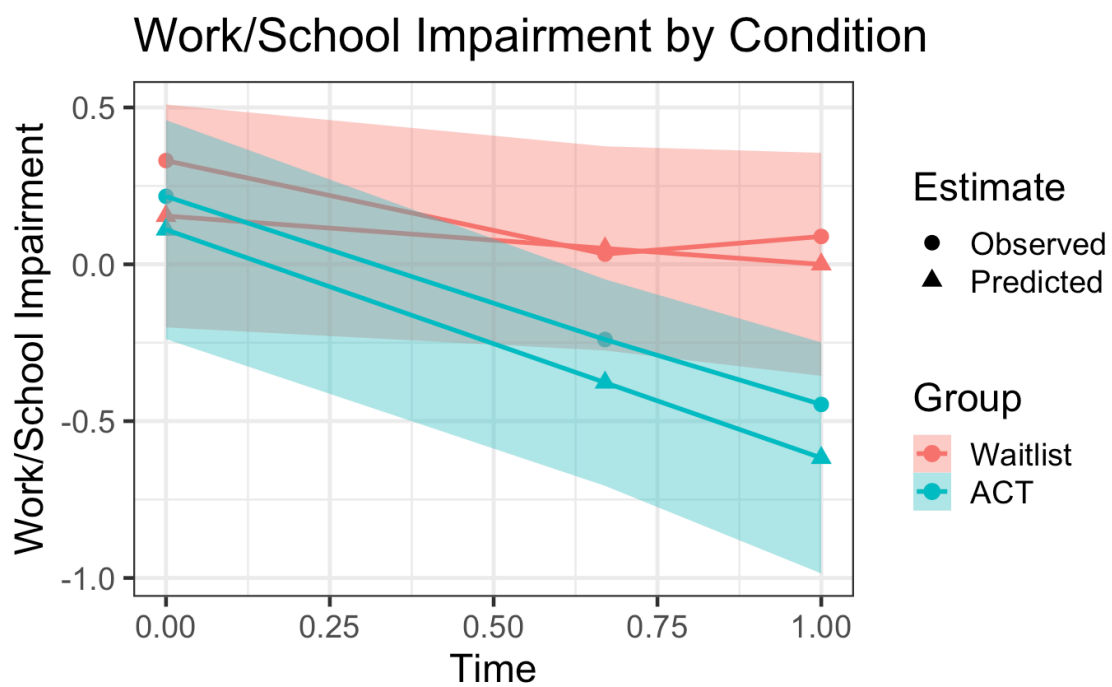
Figure 7*Time by Condition Model of Work/School Impairment*

Figure 8

Time by Condition Model of Family/Home Impairment

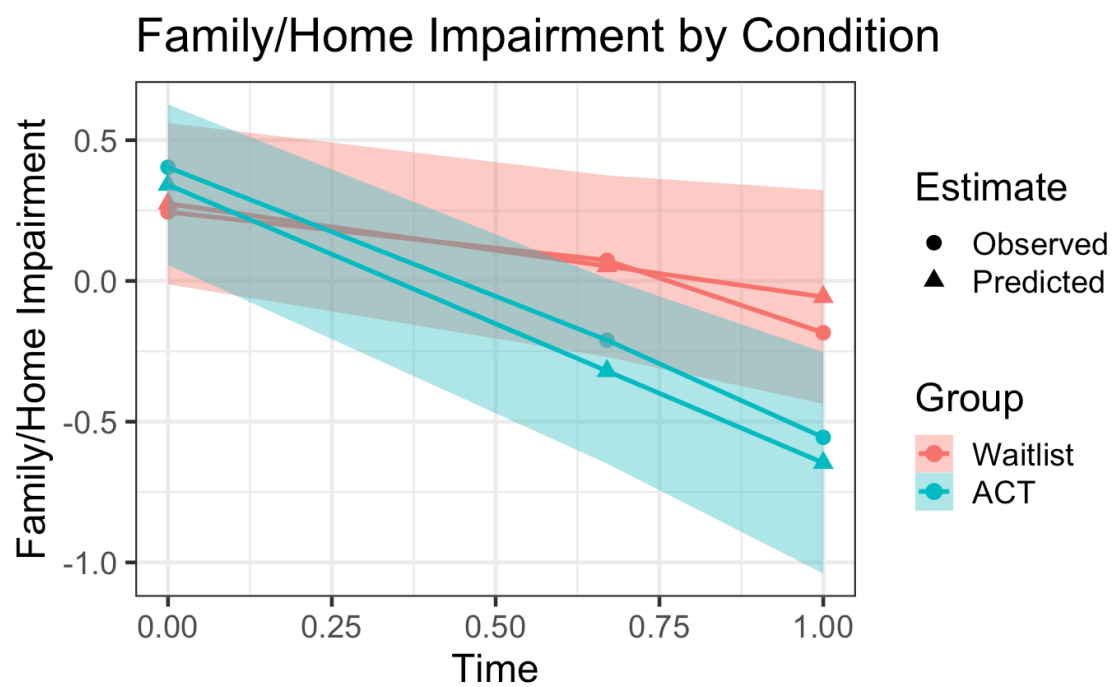


Figure 9

Time by Condition Model of Social/Leisure Impairment

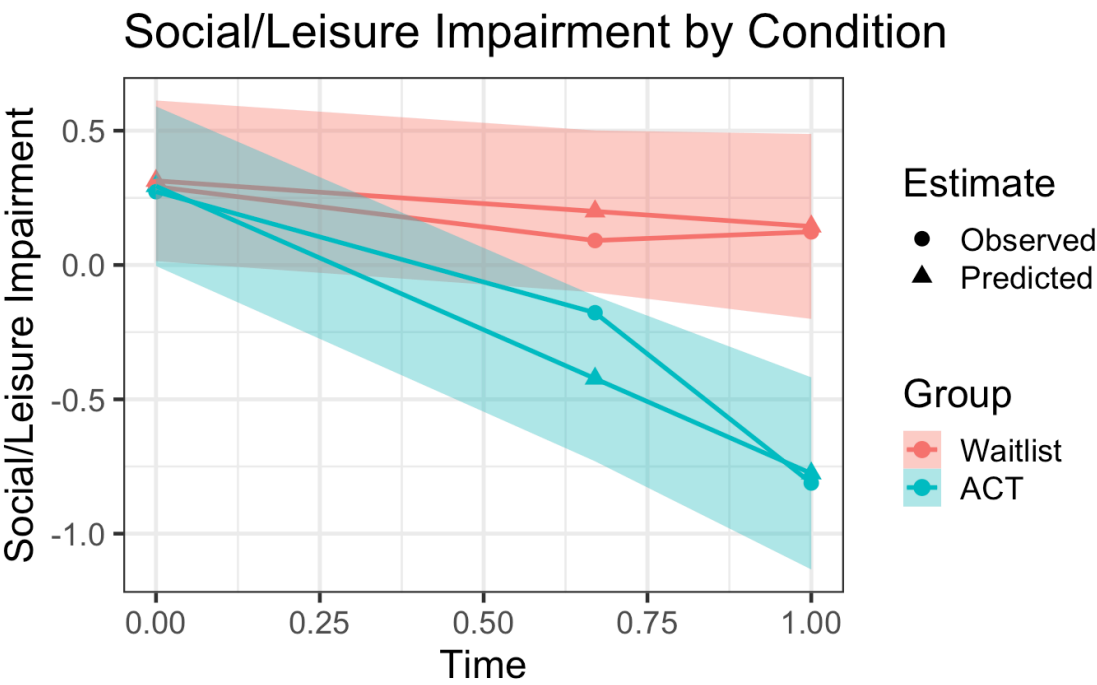


Figure 10

Time by Condition Model of Perceived Symptom Change

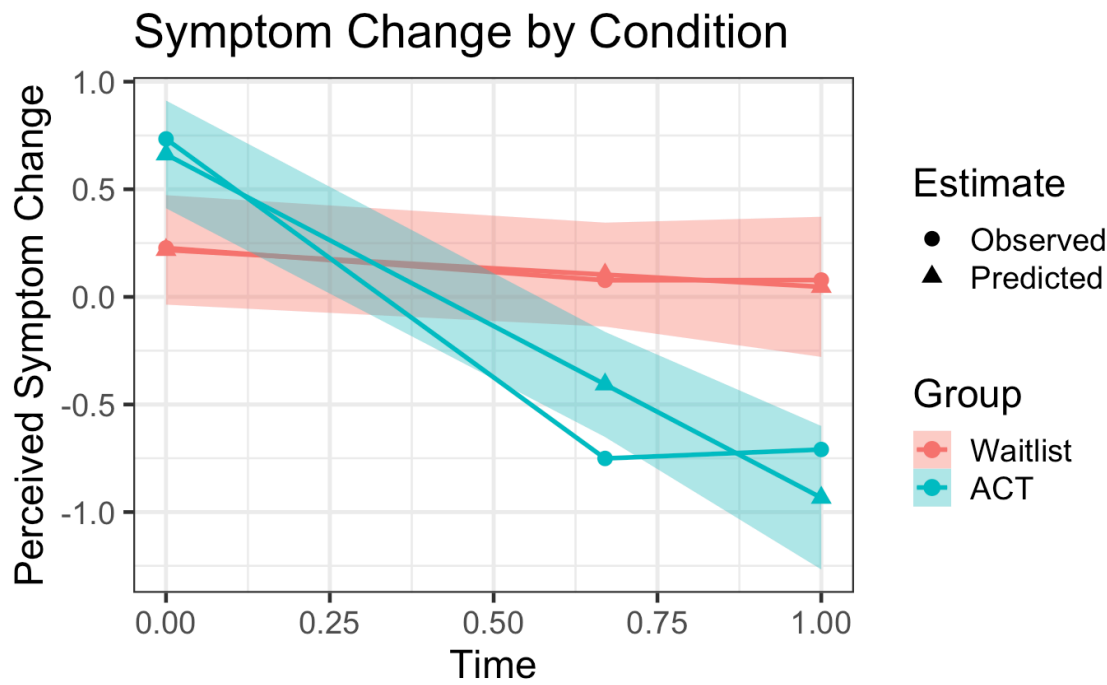


Figure 11

Time by Condition Model of Well-Being

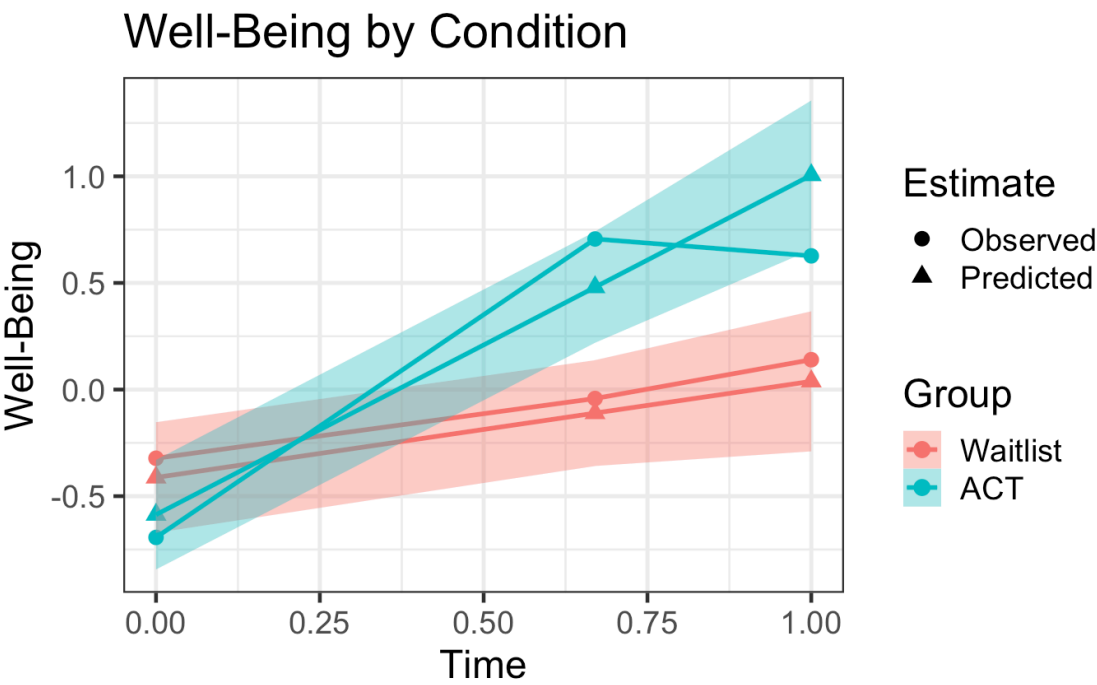


Figure 12

Time by Condition Model of Progress Toward Values

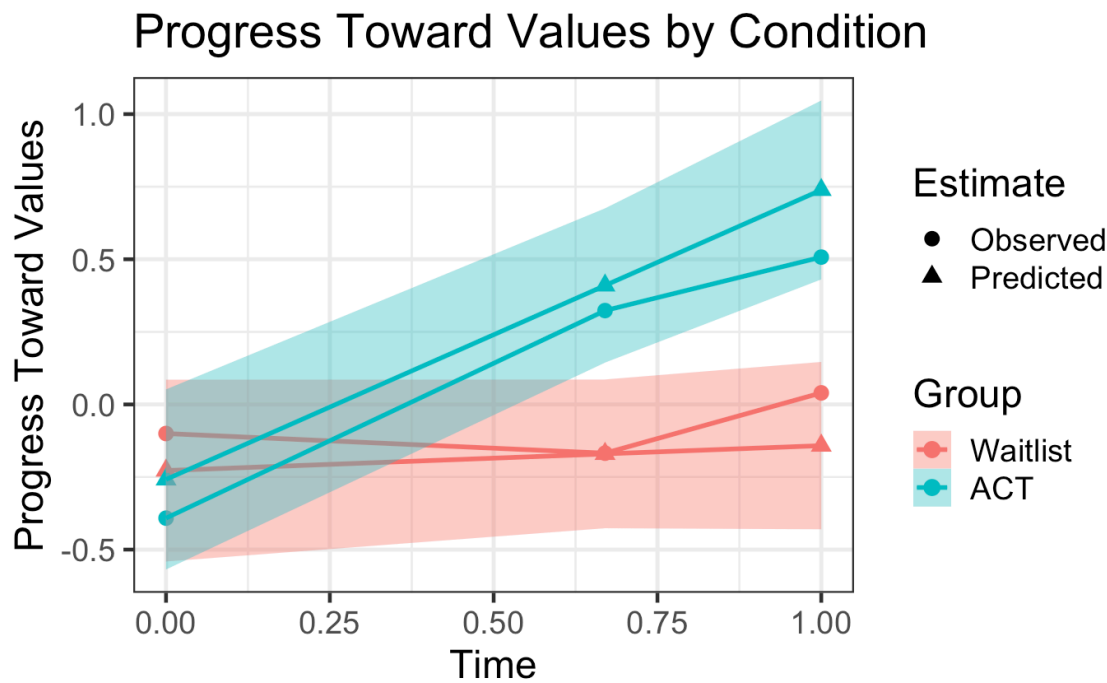


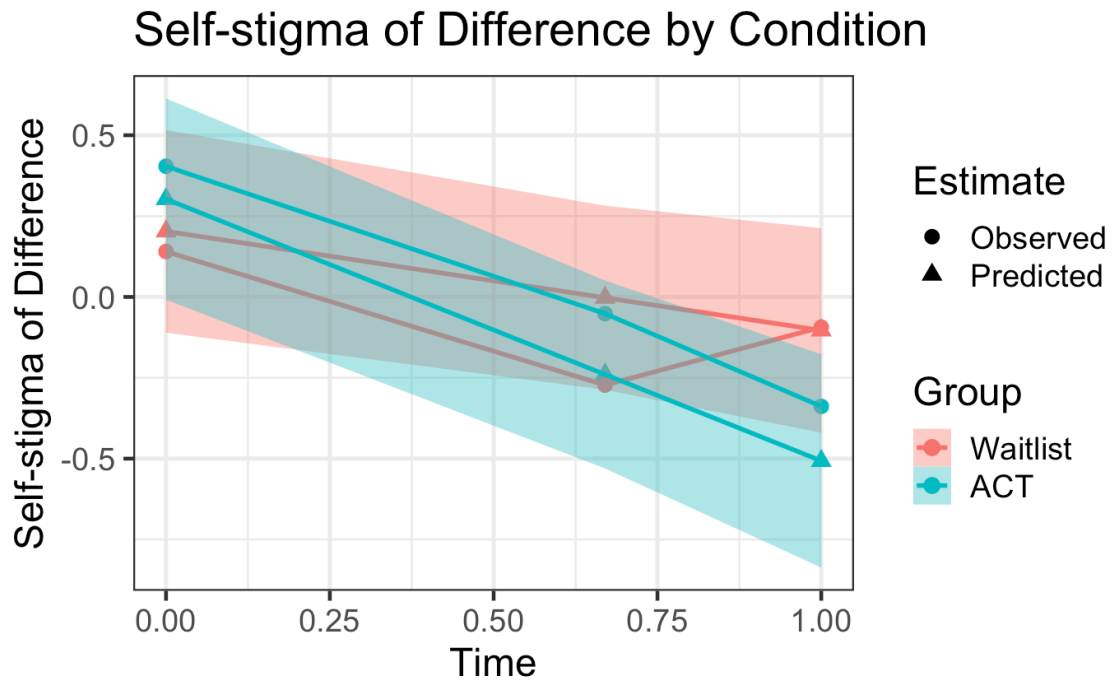
Figure 13*Time by Condition Model of Self-stigma of Difference*

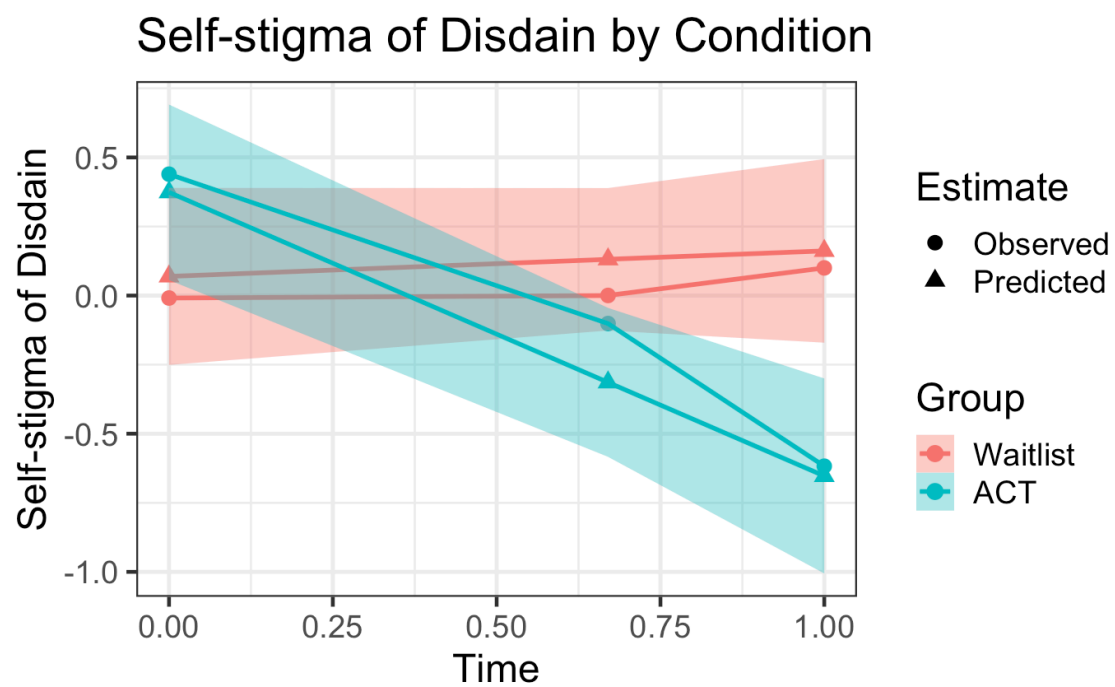
Figure 14*Time by Condition Model of Self-stigma of Disdain*

Figure 15

Time by Condition Model of Self-Stigma of Blame

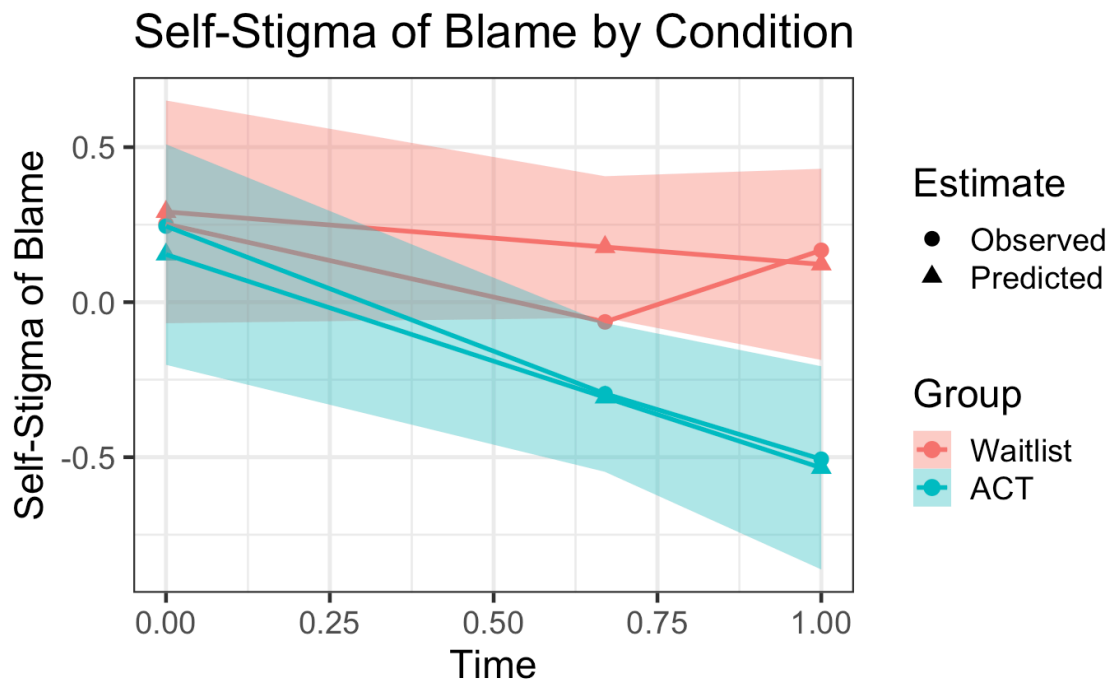


Figure 16

Time by Condition Model of Hoarding-related Psychological Inflexibility

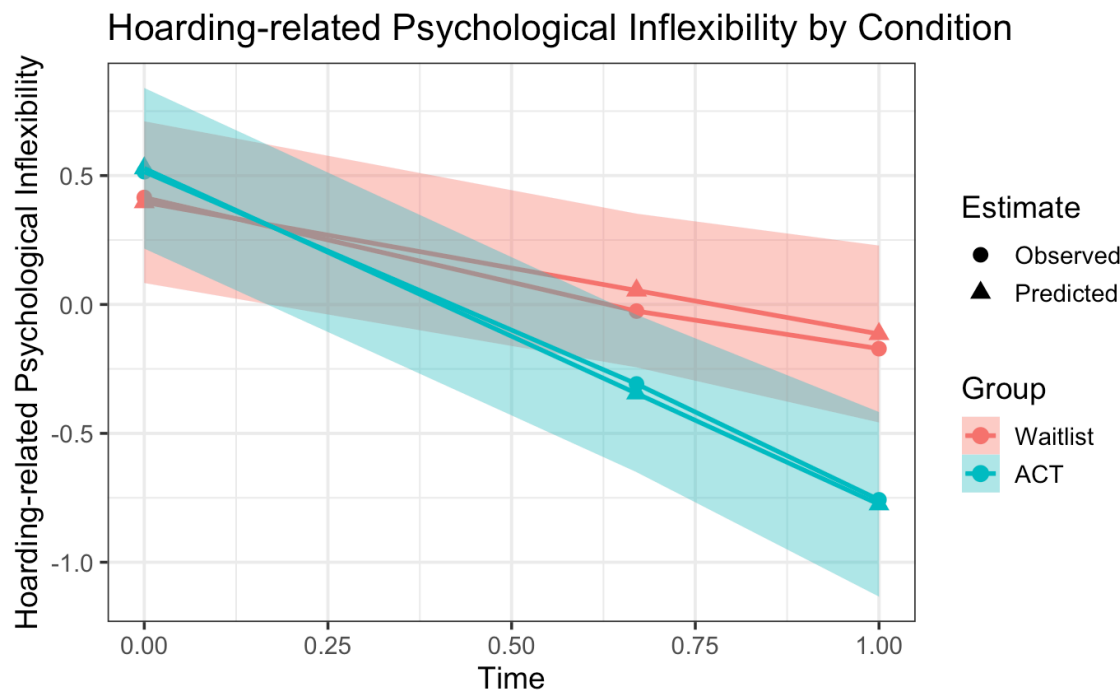


Figure 17

Time by Condition Model of Saving-related Psychological Inflexibility

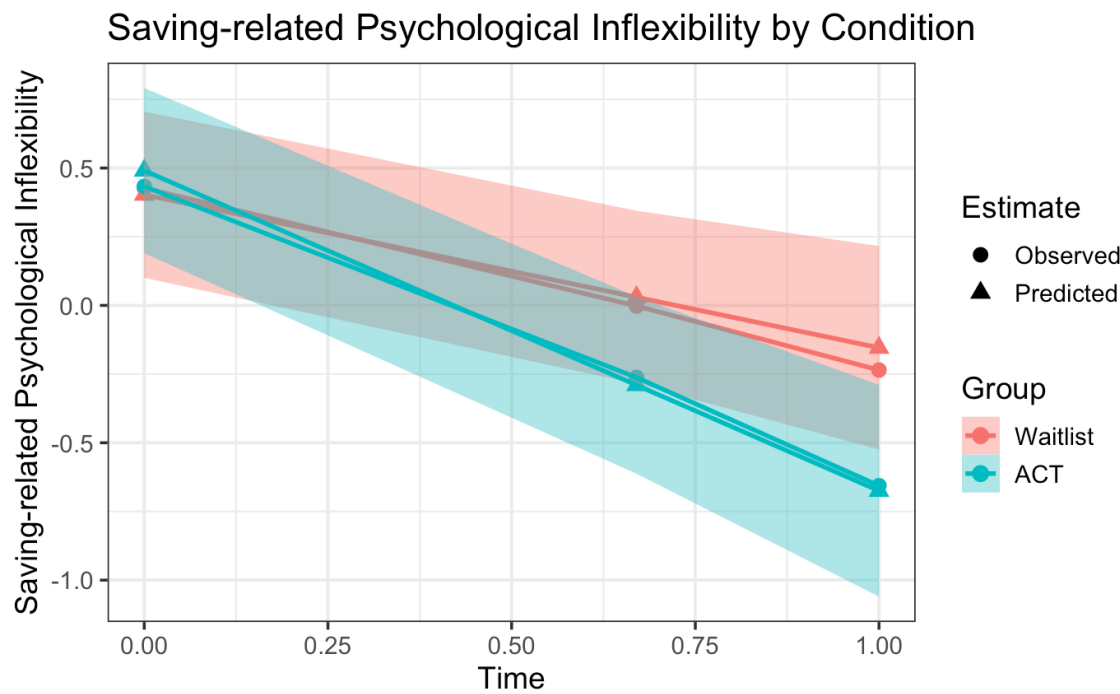


Figure 18

Time by Condition Model of Acquiring-related Psychological Inflexibility

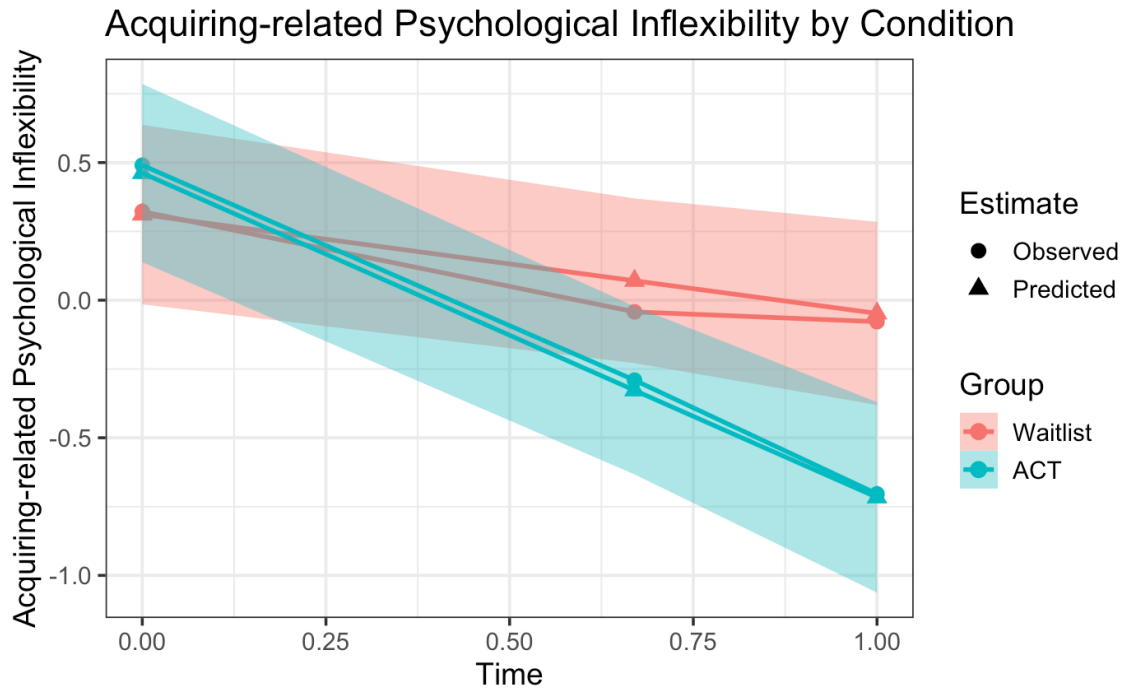
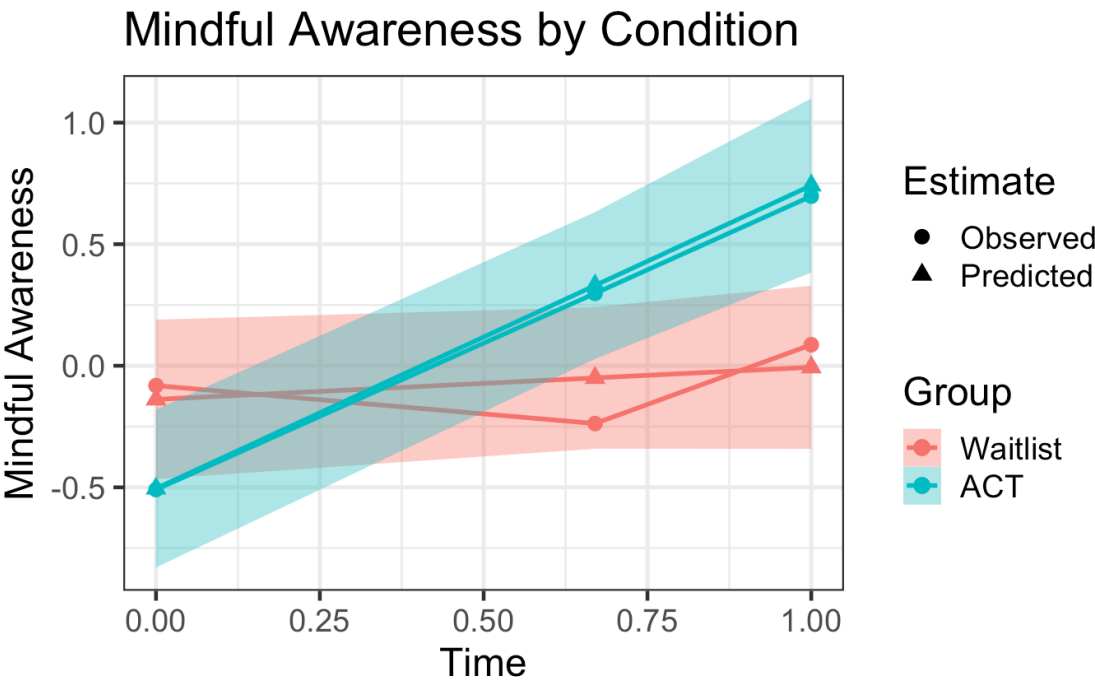


Figure 19

Time by Condition Model of Mindful Awareness



Appendices

Appendix A. Treatment Outline

Table A.1

Treatment outline

Session	Description	Session Content
1	Psychoeducation and Values	<ul style="list-style-type: none"> • Psychoeducation on hoarding • Reflecting on values and the impact of saving/acquiring on values • Identifying what is important about participation
2	Noticing Avoidance	<ul style="list-style-type: none"> • Noticing avoidance repertoire in relation to workability
3	Acceptance	<ul style="list-style-type: none"> • Teaching acceptance as an alternative to avoidance
4	Acceptance of shame and self-judgment	<ul style="list-style-type: none"> • Normalizing shame and self-judgment • Reflecting on why avoiding shame doesn't work
5	Noticing fusion	<ul style="list-style-type: none"> • "Passengers on the bus" metaphor • Introducing idea of being hooked by thoughts • Increasing awareness of what happens when fused and signs you are fused
6	Defusion	<ul style="list-style-type: none"> • Practicing defusing from thoughts with "Leaves on a stream" and "Labeling" exercises
7	Defusion from self-stigmatizing thoughts	<ul style="list-style-type: none"> • Normalizing self-judgment • Identifying costs of fusing with self-judgment • "I can't walk" exercise
8	Self-as-context	<ul style="list-style-type: none"> • Experiential exercise observing thoughts, feelings, memories, and belongings as "paint on the canvas" of the self, rather than the whole self • Audio exercise observing different "selves" over time
9	Awareness	<ul style="list-style-type: none"> • Teaching the difference between being present and not being present • Teaching how to notice where your attention goes
10	Awareness	<ul style="list-style-type: none"> • Teaching a series of brief skills to increase present-moment awareness
11	Values	<ul style="list-style-type: none"> • Practicing awareness while discarding • Identifying values as qualities of action • Tombstone exercise

12	Values and committed action	<ul style="list-style-type: none"> • Values sorting exercise • Identifying values that are served by saving and discarding items • Practice setting short-term and long-term goals • Brainstorming values-consistent alternatives to saving
13	Committed action	<ul style="list-style-type: none"> • Introducing “fail-give up” and “fail-recommit” patterns • Identifying warning signs for drifting from commitments and ways to recommit
14	Generalizing acceptance	<ul style="list-style-type: none"> • Identifying unwanted thoughts/feelings in life broadly • “Tin can monster” exercise to practice awareness, acceptance and defusion
15	Generalizing committed action	<ul style="list-style-type: none"> • Describing common barriers • Teaching strategies to overcome barriers
16	Relapse prevention	<ul style="list-style-type: none"> • Helping participants see progress by re-evaluating progress on goals and values consistency • Recapping core ideas from each session and guiding participants to explore what they learned and what they want to keep practicing • Creating summary for clients of their main takeaways and what they’d like to continue practicing • Sharing links to further resources: psychoeducation, hoarding treatment, ACT

Appendix B: Measures

Eligibility Questions

1. What is your age?
2. Do you currently live in the USA?
 - a. Yes
 - b. No
3. Are you seeking help for clutter and/or hoarding?
 - a. Yes
 - b. No
4. Are you interested in testing a self-help website?
 - a. Yes
 - b. No

Screening Questions

1. How did you hear about this study?

- a) Facebook ad
- b) Google ad
- c) Referral from provider
- d) Referral from friend/family
- e) Paper flyer
- f) Online posting
- g) Email notification
- h) Newspaper ad
- i) Other (please specify)

2. Please describe why you are interested in participating in this study in a few sentences

Saving Inventory-Revised (Frost et al., 2004)**1. To what extent do you have difficulty throwing things away?**

0 = Not at all

1 = To a mild extent

2 = To a moderate extent

3 = To a considerable extent

4 = Very much so

2. How distressing do you find the task of throwing things away?

0 = No distress

1 = Mild distress

2 = Moderate distress

3 = Severe distress

4 = Extreme distress

3. To what extent do you have so many things that your room(s) are cluttered?

0 = Not at all

1 = To a mild extent

2 = To a moderate extent

3 = To a considerable extent

4 = Very much so

4. How often do you avoid trying to discard possessions because it is too stressful or time-consuming?

0 = Never avoid, easily able to discard items

1 = Rarely avoid, can discard with a little difficulty

2 = Sometimes avoid

3 = Frequently avoid, can discard items occasionally

4 = Almost always avoid, rarely able to discard items

5. How distressed or uncomfortable would you feel if you could not acquire something you wanted?

0 = Not at all

1 = Mild, only slightly anxious

2 = Moderate, distress would mount but remain manageable

3 = Severe, prominent and very disturbing increase in distress

4 = Extreme, incapacitating discomfort from any such effort

6. How much of the living area in your home is cluttered with possessions?

(Consider the amount of clutter in your kitchen, living room, dining room, hallways, bedrooms, bathrooms or other rooms.)

0 = None of the living area is cluttered

1 = Some of the living area is cluttered

2 = Much of the living area is cluttered

3 = Most of the living area is cluttered

4 = All or almost all of the living area is cluttered

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

0 = Not at all

1 = Mild, slight interference, but overall functioning not impaired

2 = Moderate, definite interference, but still manageable

3 = Severe, causes substantial interference

4 = Extreme, incapacitating

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

0 = Never feel compelled

1 = Rarely feel compelled

2 = Sometimes feel compelled

3 = Frequently feel compelled

4 = Almost always feel compelled

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

0 = Urge is not at all strong

1 = Mild urge

2 = Moderate urge

3 = Strong urge

4 = Very strong urge

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

0 = Complete control

1 = Much control, usually able to control urges to acquire

2 = Some control, can control urges to acquire only with difficulty

3 = Little control, can only delay urges to acquire only with great difficulty

4 = No control, unable to stop urges to acquire possessions

11. How often do you decide to keep things you do not need and have little space for?

0 = Never keep such things

1 = Rarely

2 = Occasionally

3 = Frequently

4 = Almost always keep such possessions

12. To what extent does clutter prevent you from using parts of your home?

0 = All parts of the home are usable

1 = A few parts of the home are not usable

2 = Some parts of the home are not usable

3 = Many parts of the home are not usable

4 = Nearly all parts of the home are not usable

13. To what extent does the clutter in your home cause you distress?

0 = No feelings of distress or discomfort

1 = Mild feelings of distress or discomfort

2 = Moderate feelings of distress or discomfort

3 = Severe feelings of distress or discomfort

4 = Extreme feelings of distress or discomfort

14. How frequently does the clutter in your home prevent you from inviting people to visit?

0 = Not at all

1 = Rarely

2 = Sometimes

3 = Often

4 = Very often or nearly always

15. How often do you actually buy (or acquire for free) things for which you have no immediate use or need?

0 = Never

1 = Rarely

2 = Sometimes

3 = Frequently

4 = Almost always

16. How strong is your urge to save something you know you may never use?

0 = Not at all strong

1 = Mild urge

2 = Moderate urge

3 = Strong Urge

4 = Very strong urge

17. How much control do you have over your urges to save possessions?

0 = Complete control

1 = Much control, usually able to control urges to save

2 = Some control, can control urges to save only with difficulty

3 = Little control, can only stop urges with great difficulty

4 = No control, unable to stop urges to save possessions

18. How much of your home is difficult to walk through because of clutter?

0 = None of it is difficult to walk through

1 = Some of it is difficult to walk through

2 = Much of it is difficult to walk through

3 = Most of it is difficult to walk through

4 = All or nearly all of it is difficult to walk through

19. How upset or distressed do you feel about your acquiring habits?

0 = Not at all upset

1 = Mildly upset

2 = Moderately upset

3 = Severely upset

4 = Extreme embarrassment

20. To what extent does the clutter in your home prevent you from using parts of your home for their intended purpose? For example, cooking, using furniture, washing dishes, cleaning, etc.?)

0 = Never

1 = Rarely

2 = Sometimes

3 = Frequently

4 = Very frequently or almost all the time

21. To what extent do you feel unable to control the clutter in your home?

0 = Not at all

1 = To a mild extent

2 = To a moderate extent

3 = To a considerable extent

4 = Very much so

22. To what extent has your saving or compulsive buying resulted in financial difficulties for you?

0 = Not at all

1 = A little financial difficulty

2 = Some financial difficulty

3 = Quite a lot of financial difficulty

4 = An extreme amount of financial difficulty

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

0 = Never have a problem discarding possessions

1 = Rarely

2 = Occasionally

3 = Frequently

4 = Almost always unable to discard possessions

Sheehan Disability Scale (Sheehan, Harnett-Sheehan, & Raj, 1996)

Please mark ONE circle for each scale.

WORK* / SCHOOL

The symptoms have disrupted your work / school work:

Not at all Mildly Moderately Markedly Extremely

0 ← 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 → 10

☐ I have not worked / studied at all during the past week for reasons unrelated to the disorder.
 * Work includes paid, unpaid volunteer work or training

SOCIAL LIFE

The symptoms have disrupted your social life / leisure activities:

Not at all Mildly Moderately Markedly Extremely

0 ← 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 → 10

FAMILY LIFE / HOME RESPONSIBILITIES

The symptoms have disrupted your family life / home responsibilities:

Not at all Mildly Moderately Markedly Extremely

0 ← 1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9 → 10

Clinical Global Impression – Improvement (CGI-I; Guy, 1976)

Rate your total improvement in symptoms whether or not, in your judgement, it related to any treatment received.

Compared to your condition 8* weeks ago, how much have you changed?

- 1 = Very much improved
- 2 = Much improved
- 3 = Minimally improved
- 4 = No change
- 5 = Minimally worse
- 6 = Much worse
- 7 = Very much worse

*"8 weeks" was changed to "12 weeks" for the follow-up survey.

General Health Questionnaire-12 (GHQ-12; Goldberg, 1978)

We would like to know if you have had any medical complaints, and how your health has been in general, *over the past few weeks*. Please answer ALL questions by choosing the answer which you think most nearly applies to you. Remember that we want to know about present and recent complaints, not those that you had in the past.

Have you recently:

1. been able to concentrate on whatever you're doing?

4	3	2	1
Better than usual	Same as usual	Less than usual	Much less than usual

2. lost much sleep over worry?

4	3	2	1
Not at all	No more than usual	Rather more than usual	Much more than usual

3. felt that you are playing a useful part in things?

4	3	2	1
More so than usual	Same as usual	Less useful than usual	Much less useful

4. felt capable of making decisions about things?

4	3	2	1
More so than usual	Same as usual	Less so than usual	Much less capable

5. felt constantly under strain?

4	3	2	1
Not at all	No more than usual	Rather more than usual	Much more than usual

6. felt you couldn't overcome your difficulties?

4	3	2	1
Not at all	No more than usual	Rather more than usual	Much more than usual

7. been able to enjoy your normal day-to-day activities?

4	3	2	1
More so than usual	Same as usual	Less so than usual	Much less than usual

Have you recently:

8. been able to face up to your problems?

4	3	2	1
More so than usual	Same as usual	Less able than usual	Much less able

9. been feeling unhappy and depressed?

4	3	2	1
Not at all	No more than usual	Rather more than usual	Much more than usual

10. been losing confidence in yourself?

4	3	2	1
Not at all	No more than usual	Rather more than usual	Much more than usual

11. been thinking of yourself as a worthless person?

4	3	2	1
Not at all	No more than usual	Rather more than usual	Much more than usual

12. been feeling reasonably happy, all things considered?

4	3	2	1
More so than usual	About same as usual	Less so than usual	Much less than usual

Stigma of hoarding items (Chasson et al., 2018)

Please answer the following questions about individuals with hoarding disorder. By hoarding disorder, we mean people who have so much clutter in their home they can't use rooms as intended (e.g. using the kitchen to cook, bedroom to sleep).

1. How similar or different do you think is a person with hoarding disorder compared to everyone in the general population?
2. How like or unlike do you think is a person with hoarding disorder compared to everyone else in the general population?
3. How comparable or not comparable do you think is a person with hoarding disorder compared to everyone else in the general population?
4. How good or bad do you think is a person with hoarding disorder compared to everyone else in the general population?
5. How respected or disrespected do you think is a person with hoarding disorder compared to everyone else in the general population?
6. How favorable or unfavorable do you think is a person with hoarding disorder compared to everyone else in the general population?
7. How responsible do you think a person with hoarding disorder is for his or her condition?

Items are rated on the following scale:

- ☐ Very similar to others - 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ Not at all similar to others - 9

Acceptance and Action Questionnaire for Hoarding (AAQH; (Krafft, Ong, et al., 2018)

Below you will find a list of statements that have to do with how you feel about the things you own. Some of the statements have to do with acquiring new things (e.g., buying, getting free things) and some of them have to do with discarding or letting go of your things (e.g., throwing them out, giving them away, donating, etc.). Please rate how true each statement is for you within the past week by selecting an option next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
Never true	Very seldom true	Seldom true	Sometimes true	Frequently true	Almost always true	Always true
1. I need to stop feeling so attached to my things.					1 2 3 4 5 6 7	
2. I get lost in my thoughts about buying or finding something I really want.					1 2 3 4 5 6 7	
3. I can't stand feeling like I might make a mistake if I get rid of something.					1 2 3 4 5 6 7	
4. My thoughts or feelings about my things control my actions.					1 2 3 4 5 6 7	
5. I have a hard time getting rid of things even when I know I should.					1 2 3 4 5 6 7	
6. My things are a central part of who I am.					1 2 3 4 5 6 7	
7. My thoughts or feelings make it hard for me to get rid of my things.					1 2 3 4 5 6 7	
8. I need to get rid of my urges to acquire new things.					1 2 3 4 5 6 7	
9. I struggle to get rid of items that feel important to me.					1 2 3 4 5 6 7	
10. I am always thinking about my things.					1 2 3 4 5 6 7	
11. If I am worried I might need something in the future, I keep it.					1 2 3 4 5 6 7	
12. I continue to collect items, even when they cause problems for me.					1 2 3 4 5 6 7	
13. I keep my things because I am attached to them.					1 2 3 4 5 6 7	
14. I collect or buy objects when I feel distressed.					1 2 3 4 5 6 7	

Five-Facet Mindfulness Questionnaire – Acting with Awareness (FFMQ-AA; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006)

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1. When I do things, my mind wanders off and I'm easily distracted.
2. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
3. I am easily distracted.
4. I find it difficult to stay focused on what's happening in the present.
5. It seems I am "running on automatic" without much awareness of what I'm doing.
6. I rush through activities without being really attentive to them.
7. I do jobs or tasks automatically without being aware of what I'm doing.
8. I find myself doing things without paying attention.

Response options are:

- 1 - never or very rarely
- 2 - not often true
- 3 - sometimes true, sometimes not true
- 4 - often true
- 5- very often or always true

Valuing Questionnaire-Progress (VQ-Progress; Smout, Davies, Burns, & Christie, 2014)

Please read each statement carefully and then circle the number which best describes how much the statement was for you DURING THE PAST WEEK, INCLUDING TODAY

0	1	2	3	5	6
Not at all true					Completely true

1. I worked toward my goals even if I didn't feel motivated to
2. I was proud about how I lived my life
3. I made progress in the areas of my life I care most about
4. I continued to get better at being the kind of person I want to be
5. I felt like I had purpose in life

Access to other treatment**1. Have you seen a therapist in the last nine* weeks?**

- a. Yes (If so, about how many times in the last nine* weeks? _____)
- b. No

2. Have you been on any psychological medications in the last nine* weeks (e.g., antidepressants, sleep aids, etc.)?

- a. Yes
- b. No

*Posttreatment: nine, follow-up: five

Demographics

1. How old are you? _____

2. What is your gender?

a. Male

b. Female

c. Other (Please describe _____)

3. What is your ethnic background?

a. Hispanic or Latino

b. Not Hispanic or Latino

4. What is your racial background? (Choose one or more)

a. American Indian/Alaska Native

b. Asian

c. Native Hawaiian or other Pacific Islander

d. Black or African American

e. White or Caucasian

f. Other (Please specify _____)

5. For your primary household, please estimate the gross annual income (before taxes) for the last year. If unknown, choose unknown.

a. less than \$20,000

b. \$20,000-\$39,999

c. \$40,000-\$59,999

d. \$60,000-\$79,999

e. \$80,000-\$99,999

f. \$100,000 or more

g. unknown

6. Which of these best describes your marital status?

a. Single

b. Married

c. Living with a partner

d. Divorced

e. Widowed

7. Which of these best describes your employment status?

a. Employed full-time

b. Employed part-time

c. Retired

d. Unemployed

e. Student

f. Other

8a. Have you ever sought psychotherapy and/or counseling to address hoarding/clutter before?

a. Yes

b. No

8b. About how many psychotherapy/counseling sessions have you had where you worked on addressing hoarding/clutter problems? ____

9a. Have you ever tried medication to address hoarding/clutter before?

a. Yes

b. No

9b. About how many different medications have you tried to address hoarding/clutter problems?

Novel questions about COVID-19 impact

1. We would like to know how much the COVID-19 pandemic (and related experiences) has affected you recently. Have any aspects of the pandemic (including changes to your physical health, mental health, financial/work situation, relationships, or social life) **affected your ability to do things that are important to you?**

The coronavirus/COVID-19:

- 1) has made it much easier to do important things
- 2) has made it easier to do important things
- 3) has made it slightly easier to do important things
- 4) has had no effect on ability to do important things
- 5) has made it slightly harder to do important things
- 6) has made it harder to do important things
- 7) has made it much harder to do important things

2. We would like to know how the COVID-19 pandemic (and related experiences) have affected you recently. Have any aspects of the pandemic (including changes to your physical health, mental health, financial/work situation, relationships, or social life) **affected your participation in this study?**

The coronavirus/COVID-19:

- 1) made it much easier to participate
- 2) made it easier to participate
- 3) made it slightly easier to participate
- 4) had no effect on my participation
- 5) made it slightly harder to participate
- 6) made it harder to participate
- 7) made it much harder to participate

3. Please check off any areas of your life that have been significantly affected by the COVID-19 pandemic:

- Physical health
- Mental health
- Work
- Finances
- Relationships
- Household management
- Social life
- Caregiving/childcare responsibilities
- Leisure activities

Credibility/Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000)

We would like you to indicate below how much you believe, *right now*, that the treatment you are receiving will help to reduce your clutter and/or hoarding problem. Belief usually has two aspects to it: (1) what one *thinks* will happen and (2) what one *feels* will happen. Sometimes these are similar; sometimes they are different. Please answer the questions below. In the first set, answer in terms of what you *think*. In the second set answer in terms of what you really and truly *feel*. Please answer honestly. You may skip any question you do not wish to answer.

Set I

1. At this point, how logical does the treatment offered to you seem?

1	2	3	4	5	6	7	8	9
not at all logical			somewhat logical				very logical	

2. At this point, how successfully do you think this treatment will be in reducing your clutter or hoarding symptoms?

1	2	3	4	5	6	7	8	9
not at all useful			somewhat useful				very useful	

3. How confident would you be in recommending this treatment to a friend who experiences similar problems?

1	2	3	4	5	6	7	8	9
not at all confident			somewhat confident				very confident	

4. By the end of the treatment period, how much improvement in your clutter or hoarding symptoms do you think will occur?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
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Set II

For this set, close your eyes for a few moments, and try to identify what you really *feel* about the treatment and its likely success. Then answer the following questions.

1. At this point, how much do you really *feel* that treatment will help you to reduce your clutter or hoarding symptoms?

1	2	3	4	5	6	7	8	9
not at all			somewhat				very much	

2. By the end of the treatment period, how much improvement in your clutter or hoarding symptoms do you really *feel* will occur?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
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System Usability Scale (SUS; Tullis & Albert, 2008)

Please answer the following questions regarding the website you used over the last 6 weeks.

1. I think that I would like to use this website frequently.
2. I found the website unnecessarily complex.
3. I thought the website was easy to use.
4. I think that I would need the support of a technical person to be able to use this website.
5. I found the various functions in this website were well integrated.
6. I thought there was too much inconsistency in this website.
7. I would imagine that most people would learn to use this website very quickly.
8. I found the website very cumbersome (e.g., awkward, difficult) to use
9. I felt very confident using the website
10. I needed to learn a lot about this website before I could effectively use it.

Response options: 1 (Strongly disagree), 2, 3, 4, 5 (Strongly agree)

Treatment Evaluation Inventory-Short Form (TEI-SF; Kelley, Heffer, Gresham, & Elliott, 1989)

Please complete the items listed below by selecting the option that best indicates how you feel about the treatment. Please read the items over carefully.

1. I find this treatment to be an acceptable way of dealing with my clutter and/or hoarding problem.

<u>strongly</u> disagree	<u>disagree</u>	<u>neutral</u>	<u>agree</u>	<u>strongly</u> agree
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2. I liked the procedures used in this treatment.

<u>strongly</u> disagree	<u>disagree</u>	<u>neutral</u>	<u>agree</u>	<u>strongly</u> agree
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3. I believe this treatment is likely to be effective.

<u>strongly</u> disagree	<u>disagree</u>	<u>neutral</u>	<u>agree</u>	<u>strongly</u> agree
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4. I experienced discomfort as a result of the treatment.

<u>strongly</u> disagree	<u>disagree</u>	<u>neutral</u>	<u>agree</u>	<u>strongly</u> agree
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5. I believe this treatment is likely to result in permanent improvement.

<u>strongly</u> disagree	<u>disagree</u>	<u>neutral</u>	<u>agree</u>	<u>strongly</u> agree
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6. I believe it would be acceptable to use this treatment with individuals who cannot choose treatment for themselves.

<u>strongly</u> disagree	<u>disagree</u>	<u>neutral</u>	<u>agree</u>	<u>strongly</u> agree
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7. Overall, I have a positive reaction to this treatment.

<u>strongly</u> disagree	<u>disagree</u>	<u>neutral</u>	<u>agree</u>	<u>strongly</u> agree
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Satisfaction Items

Please answer the following questions regarding the self-help website you used.

1. Overall, I was satisfied with the quality of the program.
2. The program was helpful to me.
3. The program was easy to use.
4. I felt the program was made for someone like me.
5. I would recommend the program to other people with a clutter and/or hoarding problem.
6. The psychological skills taught (ex. mindfulness, opening up) were helpful to me.
7. The practice exercises (ex. discarding, not acquiring) were helpful to me.
8. This treatment fit well with my goals.
9. Overall, I was satisfied with the coaching that I received.
10. The website would have been just as useful without a coach.

Response options: 1 (Strongly disagree), 2, 3, 4, 5, 6 (Strongly agree)

Open Response Items

1. What did you like best about the Making Space program?
2. What was the most important thing you learned about the Making Space program?
3. What did you like least about the Making Space program? Why did you like this the least?
4. Do you have any other comments or suggestions regarding the Making Space program?

CURRICULUM VITAE

Jennifer Krafft, M.S.

Curriculum Vitae

Contact Information

Mailing Address: Utah State University, Department of Psychology
2810 Old Main Hill, Logan, Utah 84322

Phone: (607) 592-5834

Email: jennifer.krafft@aggiemail.usu.edu

Education

2022, Ph.D. Anticipated Utah State University
Combined Clinical/Counseling Psychology (APA accredited)
Dissertation: *Testing an acceptance and commitment therapy (ACT) website for hoarding: A randomized waitlist-controlled trial.*
Chair: Michael E. Levin, Ph.D.

2018, M.S. Utah State University
Combined Clinical/Counseling Psychology (APA accredited)
Master's Thesis: *Using ecological momentary assessment to clarify the function of hoarding.*
Chair: Michael E. Levin, Ph.D.

2010, B.A. Carleton College
Summa Cum Laude
Integrative Exercise with Distinction: *Rendaku: Sequential voicing in Japanese.*
Advisor: Michael J. Flynn, Ph.D.

Clinical Experience

May 2019-May 2020 *Student Therapist, Utah Center for Evidence-Based Treatment, Salt Lake City, UT.*

- Responsibilities: provided individual therapy and intake assessments to adults; received advanced training in evidence-based treatments; participated in specialized

consultation teams for anxiety and mood disorders and clinical health. Primary assessment instruments: DIAMOND, PHQ-9, GAD-7.

- Total hours: 417, Direct contact hours: 144
- Supervisor: Sarah Turley, Ph.D.

Sep 2018-
May 2020

Study Therapist, ACT Research Lab, Logan, UT.

- Responsibilities: developed and conducted group ACT protocol for generalized anxiety disorder, administered structured diagnostic interviews, delivered individual ACT for hoarding disorder, and delivered telehealth ACT for adolescent trichotillomania. Primary assessment instruments: MINI International Neuropsychiatric Interview, DIAMOND.
- Total hours: 250, Direct contact hours: 127
- Supervisor: Michael P. Twohig, Ph.D.

May 2018-
Apr 2019

Student Therapist, Neuropsychology Center of Utah, Clinton, UT.

- Responsibilities: individual therapy, intake assessments, and cognitive and psychoeducational assessments provided to adults, adolescents, and children; received advanced training in cognitive-behavioral therapy and assessment. Primary assessment instruments: WAIS-IV, WISC-V, KTEA-3, CAS, WRAT, TOMAL.
- Total hours: 700, Direct contact hours: 348
- Supervisor: Adam Schwebach, Ph.D.

Aug 2017-
May 2018

Student Therapist, Utah State University Anxiety Group, Logan, UT.

- Responsibilities: intake assessments and individual therapy provided to adults; advanced training in acceptance and commitment therapy and exposure for anxiety; psychodiagnostic assessment, personality assessment, and integrated report writing. Primary assessment measures: PAI, AAQ-II, GAD-7, PHQ-9.
- Total hours: 385, Direct contact hours: 137
- Supervisor: Michael P. Twohig, Ph.D.

Aug 2016-
May 2017

Student Therapist, Utah State University Psychology Community Clinic, Logan, UT.

- Responsibilities: intake assessments and individual therapy provided to children, adolescents, and adults; psychoeducational assessment and integrated report

writing. Primary assessment measures: OQ-45.2, WAIS-IV, Woodcock-Johnson IV.

- Total hours: 486, Direct contact hours: 111.5
- Supervisors: Susan Crowley, Ph.D. and Sara Boghosian, Ph.D.

Publications

Books

Levin, M. E., Twohig, M. P., & **Krafft, J.** (Eds). (2020). *Innovations in acceptance and commitment therapy: Clinical advancements and applications in ACT*. New Harbinger.

Published Journal Articles

26. Levin, M. E., **Krafft, J.**, An, W., Ong, C. W. & Twohig, M. P. (2021). Preliminary findings on processes of change and moderators for cognitive defusion and restructuring delivered through mobile apps. *Journal of Contextual Behavioral Science*, 20, 13-19.
25. Ong, C. W., **Krafft, J.**, Panoussi, F., Petersen, J. M., Levin, M. E., & Twohig, M. P. (in press). In-person and online-delivered acceptance and commitment therapy for hoarding disorder: A multiple baseline study. *Journal of Contextual Behavioral Science*.
24. Davis, C. H., **Krafft, J.**, Hicks, E. T., & Levin, M. E. (In press). The role of psychological inflexibility and perspective taking in anti-racism and anti-sexism. *Personality and Individual Differences*.
23. Twohig, M. P., Petersen, J. M., Fruge, J., Ong, C. W., Barney, J. L., **Krafft, J.**, Lee, E. B., & Levin, M. E. (In press). A pilot randomized controlled trial of online-delivered ACT-enhanced behavior therapy for trichotillomania in adolescents. *Cognitive and Behavioral Practice*.
22. Levin, M. E., **Krafft, J.**, Davis, C. H. & Twohig, M. P. (In press). Evaluating the effects of guided coaching calls on engagement and outcomes for online acceptance and commitment therapy. *Cognitive Behaviour Therapy*.
21. Potts, S., **Krafft, J.** & Levin, M. E. (In press). A randomized controlled trial of acceptance and commitment therapy self-help with or without phone coaching for overweight and obese adults high in weight self-stigma. *Behavior Modification*.
20. Levin, M. E., **Krafft, J.** & Twohig, M. P. (2020). Examining processes of change in the open and engaged components of acceptance and commitment therapy. *Journal of Contextual Behavioral Science*, 17, 10-16.
19. Levin, M. E., **Krafft, J.**, Seifert, S. & Lillis, J. (2020). Tracking valued and avoidant functions with health behaviors: A randomized controlled trial of the acceptance and commitment therapy matrix mobile app. *Behavior Modification*, 0145445520913987.
18. Levin, M. E., Hicks, E. & **Krafft, J.** (In press). Pilot evaluation of the Stop, Breathe & Think mindfulness app for student clients on a college counseling center waitlist. *Journal of American College Health*. Advance online publication.
17. Petersen, J. M., **Krafft, J.**, Twohig, M. P., & Levin, M. E. (In press). Evaluating the open and engaged components of acceptance and commitment therapy in an online self-guided website: Results from a pilot trial. *Behavior Modification*. Advance online publication.

16. Levin, M. E., **Krafft, J.**, Hicks, E. T., Pierce, B. & Twohig, M. P. (2020). A randomized dismantling trial of the open and engaged components of acceptance and commitment therapy in an online self-help program for distressed college students. *Behaviour Research and Therapy*, 126, 103557.
15. **Krafft, J.**, Twohig, M. P., & Levin, M. E. (2020). A randomized trial of acceptance and commitment therapy and traditional cognitive-behavioral therapy self-help books for social anxiety. *Cognitive Therapy and Research*, 44, 954-966.
14. **Krafft, J.**, Ong, C. W., Cruz, R. A., Twohig, M. P., & Levin, M. E. (2020). An ecological momentary assessment study investigating the function of hoarding. *Behavior Therapy*, 51, 715-727.
13. Ong, C.W., **Krafft, J.**, Levin, M.E., & Twohig, M.P. (2020). Comparing effects of acceptance training and psychoeducation on hoarding symptoms. *Journal of Obsessive-Compulsive and Related Disorders*, 25, 100521.
12. Twohig, M. P., Ong, C. W., **Krafft, J.**, Barney, J. L., & Levin, M. E. (2019). Starting off on the right foot in Acceptance and Commitment Therapy. *Psychotherapy*, 56, 16-20.
11. Ong, C. W., Lee, E. B., **Krafft, J.**, Terry, C. L., Barrett, T. S., Levin, M. E., & Twohig, M. P. (2019). A randomized controlled trial of acceptance and commitment therapy for clinical perfectionism. *Journal of Obsessive-Compulsive and Related Disorders*, 22, 100444.
10. **Krafft, J.**, Hicks, E. T., Mack, S., & Levin, M. E. (2019). Psychological inflexibility predicts suicidality over time in college students. *Suicide and Life-Threatening Behavior*, 49, 1488-1496.
9. Levin, M. E., **Krafft, J.**, Pistorello, J. & Seeley, J. R. (2019). Assessing psychological inflexibility in university students: Development and validation of the Acceptance and Action Questionnaire for University Students (AAQ-US). *Journal of Contextual Behavioral Science*, 12, 199-206.
8. **Krafft, J.**, Ong, C. W., Twohig, M. P., & Levin, M. E. (2019). Assessing psychological inflexibility in hoarding: The Acceptance and Action Questionnaire for Hoarding (AAQH). *Journal of Contextual Behavioral Science*, 12, 234-242.
7. **Krafft, J.**, Haeger, J., & Levin, M. E. (2019). Comparing cognitive fusion and cognitive reappraisal as predictors of college student mental health. *Cognitive Behaviour Therapy*, 48, 241-252.
6. **Krafft, J.**, Potts, S., Schoendorff, B., & Levin, M. E. (2019). A randomized controlled trial of multiple versions of an acceptance and commitment therapy matrix app for well-being. *Behavior Modification*, 43, 246-272.
5. Levin, M. E., **Krafft, J.**, Pierce, B. & Potts, S. (2018). When is experiential avoidance harmful in the moment? Examining global psychological inflexibility as a moderator. *Journal of Behavior Therapy and Experimental Psychiatry*, 61, 158-163.
4. Ong, C. W., **Krafft, J.**, Levin, M. E., & Twohig, M. P. (2018). An examination of the role of psychological flexibility in hoarding using multiple mediator models. *Journal of Cognitive Psychotherapy*, 32, 97-111.
3. Levin, M. E., **Krafft, J.** & Levin, C. (2018). Does self-help increase rates of student help seeking by minimizing stigma as a barrier? *Journal of American College Health*, 66, 302-309.
2. **Krafft, J.**, Ferrell, J., Levin, M. E., & Twohig, M. P. (2018). Psychological inflexibility and stigma: A meta-analytic review. *Journal of Contextual Behavioral Science*, 7, 15-28.

1. **Krafft, J.**, Haeger, J., & Levin, M. E. (2017). The interaction of mindful awareness and acceptance in couples satisfaction. *Personality and Individual Differences*, 113, 20-23.

Journal Articles Under Review

6. Ong, C. W., **Krafft, J.**, Levin, M. E., & Twohig, M. P. (Under review). A systematic review and psychometric evaluation of self-report measures for hoarding disorder.
5. **Krafft, J.**, & Levin, M. E. (Under review). Does the Cognitive Fusion Questionnaire measure more than frequency of negative thoughts?
4. **Krafft, J.**, Klimczak, K. S., & Levin, M. E. (Under review). Effects of cognitive restructuring and defusion for coping with difficult thoughts in daily life.
3. Akbari, M., Seyvadi, M., Hosseini, Z. S., **Krafft, J.**, & Levin, M. E. (Under review). Experiential avoidance in anxiety and depression: A comprehensive systematic review and meta-analysis.
2. Ong, C. W., Petersen, J. M., Terry, C. L., **Krafft, J.**, Barney, J. L., Abramowitz, J. S., & Twohig, M. P. (Under review). How therapy procedures predict processes of change and symptom severity in exposure and response prevention for obsessive-compulsive disorder.
1. **Krafft, J.**, Ong, C. W., Davis, C. H., Petersen, J. M., Levin, M. E., & Twohig, M. P. (Under review). An open trial of group acceptance and commitment therapy (ACT) with an adjunctive mobile app for generalized anxiety disorder (GAD).

Book Chapters

5. **Krafft, J.**, Petersen, J. M., & Twohig, M. P. (In press). Acceptance and commitment therapy for obsessive-compulsive and related disorders. In D. McKay, J. Abramowitz, & E. Storch (Eds.). *Complexities in obsessive-compulsive and related disorders*. New York: Oxford Press.
4. Twohig, M. P., **Krafft, J.**, Petersen, J. M., & Davis, C. H. (In press). Training and supervision in acceptance and commitment therapy. In D. McKay, J. Abramowitz, & E. Storch (Eds.), *Training and supervision in specialized cognitive-behavior therapy: Methods, settings, & populations*. The American Psychological Association Press.
3. Haeger, J., **Krafft, J.**, & Levin, M. E. (In press). Acceptance and commitment therapy (ACT) for substance use disorders. In P. Lucena-Santos, S.A. Carvalho, J. Pinto-Gouveia, M.S. Oliveira, & J. Pistorello (Eds.), *Manual prático internacional de Terapia de Aceitação e Compromisso* [International practical handbook of Acceptance and Commitment Therapy]. Sinopsys.
2. Levin, M. E., **Krafft, J.**, & Twohig, M. P. (2020). Refining acceptance and commitment therapy to meet the challenges of the human condition. In Levin, M. E., Twohig, M. P., & Krafft, J. (Eds.), *Innovations in acceptance and commitment therapy: Clinical advancements and applications in ACT*. New Harbinger.
1. **Krafft, J. E.**, Butcher, G. M., Levin, M. E., & Twohig, M. P. (2020). Acceptance and commitment therapy. In I. Ivtzan (Ed.), *The handbook of mindfulness-based programs: Every established intervention, from medicine to education*. Routledge Press.

Conference Presentations and Posters

15. Johnson, H. M.*, **Krafft, J.**, Willis, M. E., & Odum, A. (2021, May). *Reinforcement of variability through an online video game*. Poster accepted for presentation at the 47th Annual Convention of the Association for Behavior Analysis International.
14. **Krafft, J.**, Davis, C. H., Twohig, M. P., & Levin, M. E. (2020, November). *Impact of coaching on outcomes, engagement, and processes of change in an online ACT intervention*. Paper presented at the 54th Annual Convention of the Association for Behavioral and Cognitive Therapies.
13. Johnson, H.*, **Krafft, J.**, & Odum, A. (2020, April). *The relationship between reinforced variability and psychological flexibility in people with depression*. Poster presented at the 2020 Utah State University Student Research Symposium.
12. Ong, C. W., Lee, E. B., **Krafft, J.**, Terry, C. L.*, Barrett, T. S., Levin, M. E., & Twohig, M. P. (2019, November). *A randomized controlled trial of acceptance and commitment therapy for clinical perfectionism*. Paper presented at the 53rd Annual Convention of the Association for Behavioral and Cognitive Therapies, Atlanta, GA.
11. **Krafft, J.**, Ong, C. W., Cruz, R. A., Twohig, M. P., & Levin, M. E. (2019, July). *The function of hoarding in the moment and its relationship to psychological flexibility*. Paper presented at the 26th Annual International OCD Foundation Conference, Austin, TX.
10. **Krafft, J.**, Haeger, J., An, W., Twohig, M. P., & Levin, M. E. (2018, July). *Examining a prototype mobile app for self-critical thoughts: A clinical component test*. Paper presented at the 16th Annual World Conference of the Association for Contextual Behavioral Science, Montreal, Canada.
9. **Krafft, J.**, & Levin, M. E. (2018, July). *The incremental validity of the Cognitive Fusion Questionnaire (CFQ) over a measure of automatic negative thoughts*. Poster presented at the 16th Annual World Conference of the Association for Contextual Behavioral Science, Montreal, Canada.
8. **Krafft, J.** (Chair), Bricker, J., Levin, M. E., Uebelacker, L. A., & Johnson, B. (Discussant). (2018, July). *Barriers and innovations in self-guided ACT interventions*. Symposium at the 16th Annual World Conference of the Association for Contextual Behavioral Science, Montreal, Canada.
7. **Krafft, J.**, & Levin, M. E. (2018, July). *An ecological momentary assessment (EMA) investigation of cognitive processes for responding to difficult thoughts*. Paper presented at the 16th Annual World Conference of the Association for Contextual Behavioral Science, Montreal, Canada.
6. **Krafft, J.**, & Levin, M. E. (2017, November). *The differential impact of defusion and reappraisal on college student mental health*. Poster presented at the 51st Annual Convention of the Association for Behavioral and Cognitive Therapies, San Diego, CA.
5. Ong, C. W., Levin, M. E., **Krafft, J.**, & Twohig, M. P. (2017, November). *An examination of the role of psychological flexibility in hoarding using multiple mediator models*. Poster presented at the 51st Annual Convention of the Association for Behavioral and Cognitive Therapies, San Diego, CA.
4. Haeger, J., **Krafft, J.**, & Levin, M. (2017, June). *Initial findings from a randomized dismantling trial of the LifeToolbox website: A transdiagnostic online acceptance and commitment therapy intervention for distressed college students*. Paper presented at the 15th Annual

World Conference of the Association of Contextual and Behavioral Sciences, Seville, Spain.

3. **Krafft, J. E.**, Haeger, J., Pierce, B., & Levin, M.E. (2016, November). *The interaction between mindful awareness and acceptance in predicting couples satisfaction*. Poster presented at the 50th Annual Convention of the Association for Behavioral and Cognitive Therapies, New York, NY.
2. Levin, M.E., Haeger, J., **Krafft, J.**, Pierce, B., Daines, J.* & Twohig, M. (2016, November). *Web-based self-help for college students: Evaluating a transdiagnostic Acceptance and Commitment Therapy program*. Paper presented at the 50th Annual Convention of the Association for Behavioral and Cognitive Therapies, New York, NY.
1. Kwan, K., Westbrook, M., **Krafft, J.E.**, Barton, S., and Wright, H. (2014, April). *Reducing bullying: Asian and Pacific American teen perspectives*. Paper presented at the Annual Convention of the Rocky Mountain Psychological Association, Salt Lake City, UT.

*Indicates undergraduate author

Grant Proposals Funded

Testing an acceptance and commitment therapy (ACT) website for hoarding: A randomized waitlist-controlled trial.

Role: Principal Investigator

Agency: Utah State University, Graduate Research and Creative Opportunities

The relationship between reinforced variability and psychological flexibility in people with depression.

Principal Investigator: Hannah M. Johnson

Role: Consultant

Agency: Utah State University, Undergraduate Research and Creative Opportunities

Grant Proposals Submitted

A randomized waitlist-controlled trial of web-based acceptance and commitment therapy for hoarding disorder. (Not funded)

Role: Principal Investigator

Agency: International OCD Foundation

Research Experience

Jan 2020-
Aug 2020

Research Assistant, Utah State University, ACT Research Group

- Developed an adapted version of a transdiagnostic web-based self-help program for adolescents. Duties included conceptualization, conducting user testing, and prototyping program content.

- Developed survey assessing utilization of self-help website program among university students.
- Created enhanced mentorship process for undergraduate research assistants.

Aug 2016-
Apr 2018

Research Assistant, Utah State University, ACT Research Group

- Oversaw study on the effectiveness of a transdiagnostic web-based self-help program for distressed college students. Duties included recruitment, screening participants, monitoring participation, and conducting phone coaching.
- Developed and conducted study testing a novel protocol of ACT groups and a mobile app for generalized anxiety disorder.
- Collaborated on a study of the effectiveness of multiple versions of a mobile app using the ACT matrix to improve well-being. Duties included recruitment, overseeing undergraduate research assistants, and monitoring participation.
- Collaborated on a study evaluating a mobile app using the ACT matrix to improve health behaviors. Duties included monitoring participation, overseeing undergraduate research assistants, and study documentation.
- Designed and oversaw study comparing mechanisms of change in bibliotherapy for social anxiety based in cognitive behavior therapy and acceptance and commitment therapy among college students.
- Developed and ran study evaluating effectiveness and moderators of cognitive processes for coping with difficult thoughts using ecological momentary assessment.
- Supervised undergraduate research assistants in developing research competencies.

Oct 2017-
Mar 2018

Consultant, Utah State University, ACT for Caregivers Website Study

- Provided human development researchers with guidance on ACT content for a web-based program for caregivers of adults with dementia.

May 2014-
Jul 2015

Research Assistant, University of Utah, Social Development Lab

- Collaborated on study of the effects of narration on emotional regulation in children.
- Duties included obtaining assent and consent, guiding participants through study procedure, preparing

physiological monitors, data processing, and coding written responses.

- Feb 2014-
May 2014
- Research Assistant*** to Dr. Karen Kwan, Salt Lake Community College
- Collaborated on study of experiences of bullying among Asian-American and Pacific Islander youth in Utah.
 - Duties included literature reviews and transcribing interviews.

Teaching Experience

- Jan 2020-
May 2020
- Teaching Assistant***
PSY 3500 (Social Psychology), Utah State University
- Duties included in-person and video lectures and grading quizzes and essays.
- Aug 2019-
Dec 2019
- Teaching Assistant***
PSY 4230 (Psychology of Gender), Utah State University
- Duties included tutoring and grading discussions and essays.
- Aug 2019-
Dec 2019
- Teaching Assistant***
PSY 3010 (Psychological Statistics), Utah State University
- Duties included tutoring and grading lab assignments.
- Dec 2018
- Guest Lecturer***
PSY 1010 (General Psychology), Utah State University
- Mindfulness and Therapy
- Nov 2017
- Guest Lecturer***
PSY 3720: Behavior Assessment and Intervention, Utah State University
- Acceptance and Commitment Therapy
- Aug 2017-
Dec 2016
- Teaching Assistant***
PSY 3010 (Psychological Statistics), Utah State University
- Duties included teaching lab sections, office hours, and writing and grading exams.
- Apr 2016 and
Nov 2016
- Guest Lecturer***
PSY 1010 (General Psychology), Utah State University
- Mindfulness
- May 2016-
- Teaching Assistant***

- Aug 2016 *PSY 1010 (General Psychology), Utah State University*
- Duties included grading and facilitating online discussion groups for PSY 1010 (General Psychology).
- Aug 2015-
May 2016 ***Teaching Assistant***
PSY 1010 (General Psychology), Utah State University
- Duties included grading, office hours, conducting discussion groups, classroom assistance, and lecturing.

Professional Experience

- Jan 2016-
Aug 2016 ***Professional Officer to the Journal of Contextual Behavioral Science***
- Duties included monitoring publication process, providing administrative assistance to the Editorial Board, and increasing awareness of the journal.

Professional Organization Membership

Steering Committee & Student Representative, ACBS Aging in Context SIG
Research Task Force Member, Women in ACBS SIG
Member, International OCD Foundation Hoarding SIG
Student Member, Association for Contextual Behavioral Science (ACBS)
Student Member, Association for Behavioral and Cognitive Therapies (ABCT)

Editorial Activities

Ad Hoc Reviewer, *Journal of Contextual Behavioral Science*
Ad Hoc Reviewer, *Journal of Cognitive Psychotherapy*

Awards & Honors

- Apr 2020 Doctoral Student Researcher of the Year Award, *Utah State University*
- Feb 2020 College of Education and Human Services Doctoral Student
Researcher of the Year Award, *Utah State University*
- Sep 2019 College of Education and Human Services Graduate Student Research
Award, *Utah State University*
- Jun 2019 Student Spotlight Award, *Association for Contextual Behavioral
Science*
- May 2019 Graduate Enhancement Award, *Utah State University*

Apr 2019	Anthony LaPray Scholarship, <i>Utah State University</i>
May 2018, Nov 2017, and May 2016	Department of Psychology Travel Award, <i>Utah State University</i>

Professional Development

Apr 2019	Focused ACT: The Basics and Beyond Kirk Strosahl, Ph.D. Workshop Utah State University
Sep 2018	Advanced ACT: Doing Experiential Work Without Exercises Matthieu Villatte, Ph.D. & Jennifer Villatte, Ph.D. Workshop Utah State University
Jul 2018	Understanding ACT Assessment and Treatment: Not Just for Beginners Kelly Wilson, Ph.D. Pre-Conference Workshop ACBS World Conference, Montreal
Jun 2016	Acceptance & Commitment Therapy: Focusing on Values Work, Self- Care, and Self-Compassion Kelly Wilson, Ph.D. Pre-Conference Workshop ACBS World Conference, Seattle
Apr 2016	Innovations in Clinical Assessment and Treatment of Suicidal Patients David Jobes, Ph.D. Counseling and Psychological Services Conference Utah State University
Nov 2015	Treating Hoarding Disorder Gail Steketee, Ph.D. & Randy Frost, Ph.D. Master Clinician Seminar ABCT World Conference, Chicago
Oct 2015	Promoting Rapid and Lasting Change in Clinical Practice Benjamin Schoendorff, M.A. Intensive Workshop

Rocky Mountain ACBS Regional Conference

Sep 2015

Introduction to Acceptance and Commitment Therapy

Michael Twohig, Ph.D.

Workshop

Utah State University