The Influences of Unresolved Trauma and Family Experiences
on Hoarding Behavior

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Dedication

This one goes out to my husband, Duncan Susag- for all of the million other things that did not get done while I wrote this crazy paper. I am sorry, I love you, and I promise that I will never write another dissertation ever again. ☺

Abstract

In a sample of 387 participants who self-reported being a person who hoards or a family member of a person who hoards, structural equation modeling (SEM) was used to test the fit of a proposed model that examined the influences that unresolved trauma and loss, psychological distress, attachment security, and positive family dynamics had on hoarding behavior. The study found that higher levels of unresolved trauma and loss and psychological distress contribute to predicting hoarding severity, and positive family dynamics can serve as a protective factor in the relationship between these variables. Future research, treatment, and policy implications are discussed.

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CHAPTER ONE: INTRODUCTION

Hoarding behavior has been defined through three criteria: (a) the acquisition of, and failure to discard, a large number of possessions, (b) clutter that precludes activities for which living spaces were designed, and (c) significant distress and impairment in functioning caused by the hoarding (Frost & Hartl, 1996). The behavior has been referred to as 'pathological collecting', and due to the significantly cluttered living space that can result from the behavior, it has been found to cause large amounts of distress and impairment for individuals who hoard and their family members (Tolin, Frost, Steketee, & Fitch, 2008), both living in and outside the hoarded home (Sampson, 2012). Estimates project that up to 2-5% of the individuals in the United States compulsively hoard (Samuels et al., 2008); however, when considering the number of family members that are affected by hoarding behavior, the number of people that are affected by this problem increases exponentially.

Despite this, the present state of family research on hoarding is limited. Very few studies to date have examined the influence that hoarding behavior has on the family system (e.g. Sampson, 2012; Tolin, Frost, Steketee, & Fitch, 2007; Wilbram, Kellett, & Beail, 2008). Currently, studies on hoarding behavior have been individually-based and are embedded in biological (e.g. Stern & Passingham, 1994) or cognitive-behavioral (e.g. Frost & Hartl, 1996) frameworks of thought and study, emerging across a range of research fields, including neuropsychology (Lawrence et al., 2006), cognitive psychology (Kyrios, Steketee, Frost, & Oh, 2002), and brain imaging and genetics (Anderson, Damasio, & Damasio, 2005; Saxena et al., 2004). Little attention has been paid to this

subject within the family research realm, an area that considers systemic and contextual influences on individual behaviors.

Past research has repeatedly studied hoarding behavior as an outcome of afflictions like mental health co-morbidity (i.e. Mataix-Cols, et al., 2000; Lunhins, et al., 1992; Samuels et al., 2007; Samuels et al., 2008) or information-processing deficits (e.g. Frost & Hartl, 1996), while focusing significantly less attention on hoarding as a potential response to other types of contextual influences, like family dynamics or past relational experiences. Though some studies have begun to examine how experiences like traumatic life events (Cromer, Schmidt, & Murphy, 2007) or early family relationships (Frost, Kyrios, McCarthy, & Matthews, 2007) may influence hoarding behavior, this area is still in great need of further investigation.

Recent research on hoarding behavior has started to uncover a relationship between unresolved loss related to past family relationships and hoarding behavior (Sampson, 2012; Sampson, Yeats, & Harris, 2012). These studies argue that hoarding behavior may exist on some level as a response to living with trauma and loss that remains unresolved in the mind of the person who hoards. The findings of these studies also lend credence to the notion that, in cases where unresolved trauma and loss around past family relationships exist, supportive current family relationships may serve to buffer against hoarding behavior as a coping mechanism. However, because scant attention has been given to the different family contexts in which hoarding occurs, more research is needed to investigate these perspectives and generalize these conclusions to a larger population.

The current proposed study aims to shift the conceptual understanding in research on hoarding from an individualistic perspective to a systemic conceptualization of the phenomenon, broadening the scope of focus and practice when it comes to understanding the behavior. Taking the influences of various contexts into consideration may provide important perspectives for understanding hoarding behavior, particularly since some conditions may be created and sustained by various social and relational factors (Milstein, 2002). The benefits of this will be far-reaching for researchers, treatment providers, people who hoard, their family members, and communities as providing a new framework may open up opportunities for better understanding the perplexing disorder in a way that the current frameworks have not allowed.

This current project addressed the following three main goals: (1) to examine the relationships between unresolved trauma and loss, psychological distress, and hoarding behavior; (2) to explore what effect, if any, past and current family dynamics have on these relationships, and (3) to attempt to bridge the gap between theory and methodology by utilizing methods that reflect a contextual perspective. Chapter Two of this dissertation is an in-depth literature review on these variables, their empirical connections, as well as the existing gaps in the literature. Chapter Three of this paper contains a detailed report of the methods that used on this dissertation, and Chapter Four discusses the results from these analyses. Chapter Five contains an in-depth discussion of the analysis results as well as implications for future research, theory, clinical practice, and policy.

CHAPTER TWO: REVIEW OF THE LITERATURE

In this chapter, a background on hoarding behavior is presented, along with a theoretical framework on which the current study is based. Following this, the key psychological and social variables are discussed in depth as they relate to the outcome of hoarding behavior. These factors include unresolved trauma and loss, psychological distress, attachment security, and positive family dynamics. The model that was tested was developed through a systemic, biopsychosocial framework of hoarding behavior.

Background on Hoarding Behavior

Prevalence. Little is known about the prevalence of hoarding behavior and its sociodemographic and clinical associations. Because no epidemiological studies have been completed to date, there is no consistent estimate of how pervasive this problem is. Samuels and colleagues (2008) found that the prevalence of hoarding in a community-based sample was nearly 4%, while other estimates of persons who hoard range in the literature from 700,000 (Maidment, 2005) to 15 million people in the United States (Frost & Steketee, 2010). Most estimates have been based on clinical samples of Obsessive Compulsive Disorder (OCD) patients (e.g. Samuels et al., 2007)- the disorder with which hoarding is most often associated in the research. However, because hoarding behavior has been found to occur outside of the presence of OCD, the numbers are likely to be an underestimate (Steketee & Frost, 2003).

Genetic and biological background. Genetic etiology of hoarding behavior has been supported through several studies. Genetic studies have found significant chromosome linkage to OCD in families with two or more hoarding relatives (Samuels, et al., 2007), and research has also shown hoarding behavior to affect multiple family

members with a large proportion of persons who hoard reporting at least one other first-degree relative with hoarding problems (Pertusa, et al., 2008; Samuels, et al., 2007; Winsberg, Cassic, & Koran, 1999). Studies of sibling pairs have also shown that hoarding is familial (Cullen, et al., 2007; Chacon, et al., 2007).

Other research reinforces a biological component to hoarding, as well. Anderson, Damasio, and Damasio (2005) suggested a biological basis in their research in case studies of emergent hoarding behavior following traumatic brain injury. This was also found in functional imaging studies that identified differential brain region activation in OCD patients with and without hoarding behavior (Saxena, et al., 2004).

Course of progression. Hoarding is generally thought to have a chronic course with early onset; across several studies, many or most individuals who hoard reported symptoms that began during childhood or adolescence (Frost & Gross, 1993; Grisham et al., 2006; Pinto, Eisen, Mancebo, et al., 2007; Samuels et al., 2002; Winsberg et al., 1999)**.**

In an internet-based sample of people who hoard, Tolin and colleagues (2010) found that the majority of the participants described a chronic course of hoarding behavior after initiation of the symptoms, while a significant minority reported increasing, relapsing, or remitting courses. The average age of reported onset was between 11 and 15, with most reporting onset before age 21; later onset (i.e. after the age of 40) was only reported by 4% of the sample. The study also found that childhood hoarding behaviors were generally described as mild, with more severe symptoms

emerging after the age of 40, suggesting that hoarding symptoms, such as clutter, take many years to develop and thus do not become severe until decades after onset.

Hoarding in the family system. While biological and genetic links with hoarding are becoming more and more established in the scientific literature, research is just beginning to examine how hoarding behavior affects the family, with only a few studies to date on this subject. Tolin, Frost, Steketee, and Fitch (2007) first examined the burden of hoarding on family members of persons who hoard in a retrospective, self-report Internet survey of 665 individuals reporting to have family members with hoarding problems. The study found that living in a severely cluttered environment as a child was associated with increased levels of childhood distress, which included less happiness, more difficulty making friends, reduced social contact in the home, increased intra-familial strain, and embarrassment about the condition of the home. It was also found that family members' feelings of rejection toward the person who hoards are associated with the severity of the hoarding and lack of insight about the behavior displayed by the persons who hoard.

The second study qualitatively examined the perspectives of caretakers of persons who hoard (Wilbram, Kellett, & Beail, 2008). Ten people who served as a caretaker for a hoarding family member were qualitatively interviewed, and the major themes that emerged included 'loss of normal family life,' 'the need for understanding,' 'coping with the situation,' 'impact on relationships,' and 'marginalization.' This investigation offered a deeper level of understanding of caregiver experiences, but because of the scope of participants was limited only to caretakers, further research was needed to also

understand the experiences of family members who do not directly care for the person who hoards, which is important given the findings from Tolin and colleagues' earlier study (2007).

In response to this, the third article, a preliminary study to the currently proposed research, Sampson (2012) qualitatively explored the lived experiences of 12 non-caretaking family members of persons who hoard in order to better understand their interactions with their loved ones who hoard. It was found that participants reported a lack of understanding of hoarding behavior, which resulted in a significant amount of personal psychological distress when dealing with or thinking about their loved one's hoarding. Negative feelings toward their hoarding family members were present, as were associated feelings of trauma and loss around their deteriorating relationships with their loved ones. Further, they also reported a hesitancy to seek out social support from others around their problem, due to perceived feelings of judgment associated with the hoarding behavior, despite wishing for support in order not to feel so alone. Lastly, the participants reported struggling with internal conflicts, including feeling ashamed and concerned that they also displayed some hoarding tendencies of their own.

Theoretical Background

Current State of Theoretical Frameworks of Hoarding

Currently, the only model to be applied to hoarding research and treatment is the Cognitive-Behavioral Model of Compulsive Hoarding (Frost & Hartl, 1996). This model argues that the manifestations of hoarding (acquisition, saving, and clutter) result in the interaction of four main factors that work together to create and maintain hoarding behavior: (1) information processing deficits; (2) emotional attachment to objects; (3)

behavioral avoidance; and (4) erroneous beliefs concerning possessions (Frost & Hartl, 1996; Steketee & Frost, 2003). The model offers many benefits to understanding the behaviors of an individual who hoards, which allows for multiple points of intervention for psychotherapists who are working on treating hoarding behaviors in their clients. However, the cognitive-behavioral model falls short when considering multiple contexts or influences of behavior, as the explanation is focused around very concrete and specific behaviors and cognitions.

To date, studies have examined hoarding as an outcome of genetics, biological traits, mental illness, or cognitive-behavioral functions without taking into consideration the social and relational contexts in which hoarding behavior is embedded. While the studies discussed above have begun to look at the influence of hoarding on relational systems, they have done so without consideration to the converse- the influences of how relational systems and contexts may contribute to and maintain compulsive hoarding behavior. Given findings that contextual factors, such as experiences in familial or other close relationships, may in some way be a precursor to or be contributing to the development and maintenance of hoarding behaviors (Kellett, Greenhalgh, Beail, & Ridgway, 2010; Sampson, 2012; Sampson, Yeats, & Harris, 2012), it is imperative that a theoretical base provide a more complete picture of the problem. The proposed study aims to apply a systemic framework that takes into consideration not only how hoarding influences the family system, but also how hoarding behavior may be influenced by past and current family experiences.

Biopsychosocial Model of Hoarding Behavior

The *biopsychosocial model* was originated by George Engel as an alternative to the biomedical model which accounts for disease and disorder solely in biochemical terms (Engel, 1977). The biopsychosocial model is based in general systems theory (von Bertalanffy, 1968) and acknowledges the intersections and interdependent relationships of the biological, psychological, personal, family, and community and larger systems. The biopsychosocial model argues that not only does any disorder or dysfunction- physical, mental, or otherwise- affect multiple levels in every system- but every approach to treatment- even if focused on one aspect of the problem- affects the system on multiple levels.

When applied to the family system, particularly in one that hoarding plays a part, the biopsychosocial model contends that rather than focusing on individual pathology, the presence of a given problematic behavior- such as hoarding- by a family member is considered a symptom of underlying dysfunction in the entire family system. A family systems approach focuses on the individuals *and* the interactions between them as mechanisms of a system in which the problem develops and is maintained; this recognizes that the relationships among the family members are interrelated and reciprocal and that the individual both influences and is influenced by each family member. Family structures and dynamics are assessed and intervened upon, through the use of systems concepts, including homeostasis, boundaries, triangles, and feedback loops (for more on Systems Theory, see Bowen, 1978).

The application of the biopsychosocial model and family systems theory to the study and treatment of hoarding very much resembles its application to other compulsive

behaviors and problems, such as substance abuse (McNeece & DiNitto, 2005). Through rituals, routines, shame, rules and roles, hoarding can have a negative and lasting impact on a family system and vice versa. By applying systems ideas to this problem, we can begin to understand how hoarding not only shapes but it also shaped *by* a family system.

To date, research on hoarding has been grounded in biology, genetics, and psychology, taking an individualistic perspective to understanding a subject that seems to require a more in-depth approach to adequately comprehend. The current study will expand the theoretical framework in this area of study in order to more readily consider the effects of contextual factors, such as family relationships and unresolved trauma and loss on hoarding behavior. Applying family systems and biopsychosocial perspectives to the study and treatment of hoarding will allow us to more holistically view this problem, and will also provide a more thorough approach of intervening within the entire family system; this is important, as there is some evidence showing a better response to treatment of compulsive behaviors when it includes family members (e.g. Collins, 1990).

Factors in the Contextual Model of Hoarding Behavior

A contextual model of hoarding behavior utilizes five concepts: a) unresolved trauma and loss; b) psychological distress; c) attachment security; d) positive family dynamics; and e) hoarding severity. The following sections will discuss the literature on each of these constructs and their relationship to hoarding.

Unresolved Trauma and Loss

Traumatic Life Events

The *DSM-IV* (APA, 1994) defines a traumatic event as

direct personal experience of an event that threatens death, serious injury, or other

threat to the physical integrity of the self or other, or learning about unexpected or

violent death or injury or threat of death or injury experienced by a family

member or other close associate (p. 424).

Other authors have considered the psychological aspects of trauma in its definition,

describing it as occurring when "…neither resistance nor escape is possible, [and] the

human system of self defense becomes overwhelmed and disorganized" (Herman, 1992,

p. 34).

The effects of various traumatic experiences have lasting impacts on individuals.

According to Van der Kolk and Fisler (1994), isolated incidents of trauma may result in

"…rather discrete, conditioned biological and behavioral responses to reminders of the

trauma, while on-going traumas are more likely to have a more "pervasive effect on

psychological and behavioral regulatory processes" (p. 147). It is becoming increasingly

recognized that simply because an individual has not experienced a single significant

traumatic event in their life, it does not mean that they have not been deeply traumatized

by their life experiences. Research has shown that childhood neglect has a potentially

devastating impact on a person's development, including physical growth, self-esteem,

impulse control, peer relationships, and learning capacity (Duncan & Baker, 2007), and

that on-going trauma can be more damaging for a child than abuse alone (Schore, 2003).

An individual's ability to cope and self-soothe has also been linked to a history of

traumatizing events (e.g. van der Kolk, 1994), which has been tied to the discussion about

the neurobiological impacts of trauma on individuals. For instance, one hypothesis on

how trauma impacts the brain argues that the:

> lack of resolution of trauma can be seen as an impairment in the innate capacity of
>
> the mind to balance the differentiation and integration of energy and information
>
> flow…Unbalanced emotion may be revealed in inflexible or chaotic states, as
>
> seen in various forms in posttraumatic stress disorder and reflecting an inability to
>
> achieve complexity. Emotion is also a fundamental part of self-regulation. In this
>
> manner, we can see that the proposal that unresolved trauma exerts its effects by
>
> an impairment of integration implies that the lack of resolution is a form of self-
>
> dysregulation and emotional disequilibrium. Integration, self-regulation, and
>
> emotion are thus inextricable intertwined neural processes that are impaired in
>
> unresolved traumatic conditions (Seigel, 2003, p. 43).

The neurobiological implications of traumatic experiences provide important clues as to

why it is imperative to be considering contextual experiences when attempting to identify

contributing forces to human behavior and emotion.

Trauma and hoarding. Research has linked the onset and severity of hoarding

behavior to the occurrence of stressful life events for some people who hoard. Current

research suggests that for some people who hoard, negative childhood events and

experiences of trauma may act as triggering events, which may result in hoarding

behaviors in vulnerable individuals (Grisham, Frost, Steketee, Kim, & Hood, 2000;

Kellett, Greenhalgh, Beail, & Ridgway, 2010). People who hoard who have a later age of

onset of hoarding behavior have been found to be more likely to have experienced

stressful life events that occurred around the time of onset of the behaviors than those who reported an earlier age of onset (Grisham et al., 2000), suggesting the possibility that later onset hoarding may be etiologically different than early-onset hoarding (Tolin et al., 2010).

It has been found that people who hoard are also significantly more likely than people who do not hoard to report a childhood history of parental psychiatric illness, home break-ins, and excessive physical discipline (Samuels et al., 2008). Another a recent study by Tolin and colleagues (2010) found that 76% of an internet sample of 751 adults with self-reported hoarding behaviors reported experiencing a history of interpersonal violence, significantly higher than 32% of women in the general population (Breslau et al., 1998).

The connection between trauma history and hoarding behavior is an emerging area of interest (Cromer, Schmidt, and Murphy, 2007). To determine how traumatic life events might influence the expression of hoarding behavior in OCD, Cromer, Schmidt, and Murphy (2007) examined interview responses of 180 individuals with OCD. It was found that participants who were classified as people who hoard were more likely than those who were not classified as such to have reported at least one traumatic life event in their lifetime. Further, patients who met criteria for hoarding and who had also experienced at least one traumatic life event showed significantly greater hoarding behavior severity than participants who hoard who had not been exposed to trauma.

Previous studies have compared people who hoard to control samples in terms of trauma history, finding that people who hoard reported a greater lifetime incidence of

having experienced: possessions taken by force (31%); being physically handled roughly during adulthood (42%); forced sexual activity during adulthood (27%); forced intercourse during adulthood (27%); being physically handled roughly during childhood (46%); forced sexual activity during childhood (31%); and forced intercourse during childhood (27%; Hartl et al., 2005).

The research on trauma as a precursor to hoarding behavior has almost solely been focused the incidence of trauma, while overlooking the influences that the emotional experience and impact of an event might have on the behavior. Given the findings trauma might have on psychological and physical development of a person, it is vital that we investigate further *how* and *why* trauma and loss are considered to be potential contributors to hoarding behavior.

Unresolved State of Mind

Walker (2007) has argued that it is not the *experience* of trauma that is important in terms of outcomes of individual well-being, but rather, whether there has been any resolution of the experience. Research suggests that it is the processing, working through and integration of traumatic experiences that is relevant to how a person may overcome the trauma that may otherwise overwhelm their well-being and their future relationships (Cozolino, 2002). An *unresolved state of mind* with respect to loss or trauma "refers to the lack of full integration into consciousness of the occurrence and immediate implications of a traumatic event" (Lyons-Ruth, Yellin, Melnick, & Atwood, 2005, p. 2)-that is to say, whether or not a person has 'come to terms' with a traumatic experience.

Crittenden and Landini (2011) write:

[Unresolved trauma or loss] can interfere with the general strategic functioning. By analogy, the effect is similar to that of a land mine. One walks safely, strategically, over the ground most of the time until something triggers preconscious recall [of the traumatic event]. Information in procedural or imaged memory is usually the underground, preconscious trigger. When evoked pre-consciously, recall of unresolved events changes the individual's dispositional representation, causing behavior to become maladaptive under a narrow set of conditions. The impact of these instances on the self-protective strategy used by the individual can vary in extent. Some traumatic responses have very circumscribed and limited effects on strategic functioning. Others, especially if due to the interaction of multiple transformations of information regarding several

[events perceived as emotionally threatening], have more widespread effects (pp. 236-237).

A major implication of experiencing unresolved trauma is the development of primitive defense mechanisms to "protect the individual from the pain of the unresolved trauma. The whole gamut of defences [sic] is potentially available to anyone unconsciously warding off such pain" (Walker, 2007, p. 81). Defense mechanisms that may be used by those living with unresolved trauma may include addictions and compulsions, sometimes defined as "self-medication against emotional distress" (Walker, 2007, p. 81). In other words, when an individual has experienced a significantly traumatic event and has not resolved his or her feelings around it, there may be a possibility that the person will engage in coping mechanisms, like addictions and compulsive behaviors, as a way to try to 'block out' the emotional pain.

Unresolved trauma and loss and psychological distress. The presence of unresolved loss in an individual's life has been linked to psychological distress in the literature. A lack of resolution of a traumatic event is often indicative of increased risk for psychopathology (Crittenden & Landini, 2011). Living with trauma or loss that remains unprocessed and unresolved can lead to problems with depression, anxiety, somatic illnesses, and/or substance abuse (Boss, 2006). Barone (2003) also found a link between unresolved attachment experiences and borderline personality disorder in a comparison sample of 40 clinical and 40 non-clinical participants.

Similar symptoms to post-traumatic stress disorder (PTSD) have similarly been found. In assessing for unresolved states of mind, attachment theorists have discovered

them to exist when an individual is unable to talk about a traumatic experience in a coherent, consistent, and understandable manner. Features of a lack of resolution around loss or trauma may also include: flashbacks, nightmares, intrusive thoughts, repetitive patters of behavior, talking about a dead person as if he or she was still alive, and preoccupation about an experience (Walker, 2007). While there are clear connections between unresolved trauma and post-traumatic stress disorder (PTSD), unresolved trauma is a broader concept. According to Walker (2007), "whilst everyone suffering from PTSD would score as having unresolved trauma, the reverse is not also true " (p. 79).

Given the empirical connections between unresolved trauma and loss and mental health co-morbidity, the proposed study hypothesizes that there will be a negative relationship between unresolved trauma and loss and psychological distress. In other words, *it was hypothesized that individuals who report more unresolved trauma and loss will also report higher levels of symptoms of psychological distress.*

Unresolved trauma and loss and hoarding. Hoarding seems to be associated with high rates of stressful or traumatic life events in childhood and adulthood. Hartl and colleagues (2005) found that, compared to control participants, adults who hoard (N = 26), report a greater lifetime incidence of having possessions taken by force (31%), being physically handled roughly during adulthood (42%), forced sexual activity during adulthood (27%), forced intercourse during adulthood (27%), being physically handled roughly during childhood (46%), and forced sexual activity during childhood (27%).

Cromer and colleagues (2007) reported that in a clinical sample (n = 43) of OCD patients, 69% of people who hoard reported at least one lifetime traumatic event,

compared to 51% of a comparison sample of non-OCD patients; the number of lifetime

events was found to be positively associated with hoarding severity.

Likewise, Samuels et al. (2008) found that individuals who hoard are also more likely to

report a history of parental psychiatric illness, home break-ins, and excessive physical

discipline, than are non-hoarding individuals. Tolin and colleagues (2010) also found a

high incidence rate of stressful or traumatic life events in an Internet sample of 751 adult

with self-reported hoarding symptoms.

　　　　Qualitative studies also echoed the results of the previous investigations. In a one

study by Kellett, Greenhalgh, Beail, and Ridgway (2010), it was found that in a purposive

sample of 11 participants who reported hoarding behaviors being present across their

adult lives, that there were perceived links between childhood relational experiences and

current problems with hoarding. The participants reported generally strict, rejecting,

authoritarian parenting in which children learned to reciprocally suppress their emotions.

Further, a number of the interviewees also reported a range of childhood abusive

experiences. These findings point to the importance of the consideration of a relational

context in conceptualizing hoarding behavior as well as the last impact of these

experiences on a person who hoards.

　　　　While it the evidence seems clear that the higher rates of traumatic experiences

may exist in hoarding samples, the literature on *why* this connection is important is much

more scarce. One qualitative research study supports the idea that hoarding may be a

defense mechanism utilized in response to living with unresolved trauma. In previous

research (Sampson, 2012), participants who were family members of people who hoard

reported that their hoarding relatives had all sustained significant relational traumas- such as death, divorce, infidelity, and poor relationships with their parents- in their pasts, and that these traumas were still "very much alive" to their loved ones. Most participants had deduced that their family member's hoarding was their way of "dealing with" the emotional toll that these past events had taken on them. These findings suggest the importance of more than simply the occurrence a traumatic event may be related to hoarding; perhaps it is a person's lack of resolution around the event that may be more of a contributor to hoarding behavior. Though these findings are certainly limited by the fact they were taken from a small number of family member reports, they open the door for further investigation about exactly *how* the experience of traumatic events may contribute to hoarding behaviors.

The current study aims to examine how unresolved loss may act as a factor to predict hoarding severity. Based on findings of literature to date, it was hypothesized that unresolved trauma and loss would be positively related to hoarding severity. In other words, *it was expected that individuals who report higher levels of unresolved trauma and loss would also report higher levels of hoarding severity.*

Psychological Distress

Despite the lack of its own diagnosis, hoarding behavior has been associated with high rates of psychiatric co-morbidity. Frost and colleagues (2006) found that in a sample of 104 hoarding participants, 57% met diagnostic criteria for major depressive disorder, 29% for social phobia, and 28% for generalized anxiety disorder. Patients who have been diagnosed with OCD and have primary hoarding symptoms have been found to have

higher rates of depressive and anxious symptoms compared to other forms of OCD (Samuels et al., 2002; Samuels et al., 2007).

Previous psychiatric literature has also linked hoarding behavior with several other disorders, including schizophrenia and other psychiatric disorders (Lunhins, et al., 1992; Lysaker, et al., 2000), eating disorders (Frankenburg, 1984), dementia (Hwang, et al., 1998), obsessive-compulsive disorder (OCD: Christensen & Greist, 2001; Winsberg, et al., 1999), major depression (Steketee, et al., 2000), and personality disorders, such as OCPD, avoidant, dependent, and paranoid personality disorders (Mataix-Cols, et al., 2000). In a community sample, Samuels and colleagues (2008) found that hoarding behavior was associated with alcohol dependence; paranoid, schizotypal, avoidant, and obsessive-compulsive personality disorder traits.

Because mental health symptoms have been so closely linked with hoarding behavior in past research, the proposed study also included a construct of psychological distress in the analysis of the project. The project hypothesized that there would be a significant positive relationship between psychological distress and hoarding severity In other words, *it was expected that individuals who report higher levels of psychological distress would also report higher levels of hoarding severity.*

Past and Current Family Dynamics

Past and Current Family Support as a Buffer for Hoarding Behavior

Emotional family support may be a powerful protective factor against individual maladaptive behaviors, such as hoarding. Social support is a construct that has been defined as the comfort, assistance, and/or information one receives through formal or informal contacts with individuals or groups (Wallston et al., 1983). Colvin and

colleagues (2002) contend that people require assistance from individuals, agencies, communities, and society to meet instrumental and expressive needs. These needs have been linked to biological roots (Bowlby, 1969) and appear to be indispensable for physical safety, survival, and for emotional satisfaction (Cohen, 1988; Cohen & Wills, 1985).

Charuvastra and Cloitre (2008) argue that human social experience plays an important role in how an individual responds to trauma, starting with the attachment relationship between child and caregiver and extending into adult relationships. According to Ainsworth (1991) and Bowlby (1988), effective adaptation throughout development comes from a self-generated capacity for emotion regulation in conjunction with the ability to depend on the support of others when needed. Charuvastra and Cloitre (2008) suggest that a functional social network can provide a

> sense of safety to an individual through the presence of stable, reliable
> interpersonal connections. Certain kinds of social interactions in this network may
> help trauma survivors regulate their emotions, particularly emotions of fear,
> anxiety, and mistrust (p. 309).

Adequacy of social support from family relationships has been found to be directly related to the reported severity of psychological and physical symptoms and/or acts as a buffer between stressful life events and associated symptoms (e.g. Andrews, Tennant, Hewson, & Vaillant, 1978; Schaefer, Coyne, & Lazarus, 1981; Wills, 1990). Good social support has been also been associated with less reported depression, less reported physical symptomatology, and an increased sense of well-being (Antonovsky,

1979; Cohen & Wills, 1985; Flannery, 1987), while inadequate and harmful social support has been associated with more impaired functioning. Overinvolved or demanding supports, particularly families, have been linked with increased alcohol use, anorexia, susceptibility to infection, increased general distress, and increased relapses in schizophrenia patients (Berlin & Sluski, 1987; Levy, 1983; Minuchin et al., 1978; Shinn et al., 1984; Steinglass, 1976).

Feminists stress the role of environmental factors, such as blaming the victim and social isolation, in exacerbating the effects of a traumatic experience (Root, 1991). Studies have shown that family member rejection and critical, hostile, or other negative emotional patterns of interaction can lead to poorer response to treatment or relapse following successful treatment of behaviors in outcome studies of patients with OCD and panic disorder with agoraphobia (Chambless & Steketee, 1999; Leonard, et al., 1993). In PTSD studies, there is evidence that low social support leads to avoidant coping, while positive support decreases avoidant behaviors (Runtz & Schallow, 1997; Ullman, 1996). The finding that negative social support is associated with PTSD development lends itself to the idea that individuals who are vulnerable to PTSD may be more likely to react with greater fear to negative interactions in comparison with those who do not develop PTSD after a trauma (Charuvastra & Cloitre, 2008). Given the link between PTSD and hoarding in the literature (Hartl, et al., 2005; Cromer, 2006), one may surmise that people who hoard may experience intense reactions to negative interactions with individuals in their support network due to increased fearful emotions, thus triggering further avoidant and hoarding behavior. This may speak to the poor treatment outcomes in hoarding

populations, as level of social support has been found to be the most consistent predictor of poor outcomes among trauma victims (North, et al., 2001; Silver, et al., 2002).

In response to the literature on family support as a buffer, the current study hypothesized that past and current family dynamics would moderate the relationship between unresolved trauma and loss, psychological distress, and hoarding severity.

Past Family Dynamics

Attachment Theory. Developed by John Bowlby (1969, 1988), attachment theory relates to the human tendency to develop strong affectional bonds to particular persons. A basic tenet of attachment theory is that early childhood attachment relationships with their caregivers form internal models for how an individual forms other interpersonal relationships throughout his or her life. These internal working models of attachment are theorized to consist of beliefs about the self and others from which rules are derived and used to guide behavior (Bowlby, 1969, 1988).

The theory allows for specific predictions about the quality of early experiences with caretakers and the effect of the experiences on future behavior. Bowlby (1988) contends that the capacity of an individual to establish secure attachment bonds with others "is a principle feature of effective personality functioning and mental health" (p. 121). Internal working models of attachment are developed and constructed through repeated interactions with caretakers during episodes of distress (Bowlby, 1969, 1988; Main, Kaplan, & Cassidy, 1985). According to Bowlby (1973), if a child receives love, acceptance, and trust, the child will develop a secure attachment style that will contribute to his or her self-concept, positively affecting the quality of his or her relationships throughout life; if the child instead received neglect, rejection, or mistrust, the child will

develop and insecure attachment styles that will contribute negatively to his or her self-concept.

Longitudinal studies (Ainsworth, Blehar, Waters, & Wall, 1978; Main & Cassidy, 1988) have found evidence that attachment styles formed in childhood remain stable over time. A study by Egeland, Carlson, and Sroufe (1993) found that the development of a secure attachment bond early in childhood provides important psychological benefits throughout an individual's life. Conversely, it is argued that insecurely attached children will be more likely to be insecurely attached as adults.

In response to the long-term implications of attachment representations, several researchers have translated Bowlby's work with child and infant attachment to work with adults. According to adult attachment theory, the way an individual constructs his or her concepts of self and others as an adult is formed through the person's experience as a young child with his or her caretaker. These attachment representations fall into four categories: secure, preoccupied, dismissing, and fearful (Hazen & Shazer, 1987; Bartholomew, 1990; Feeney & Noller, 1996); the latter three categories are considered to be insecure attachment representations.

Attachment, psychological distress, and hoarding behavior. According to Bowlby (1980), presuming that internal attachment representations negatively influence the interpretation of and reaction to a given stressor, negative mental health outcomes- such as depression or anxiety- are particularly likely when insecure individuals experience stressful events. As a result, attachment theorist have argued that the modality in which the individual's expectations, feelings, and defenses are organized- the mental

representation of attachment- is central to understanding many psychopathological

disorders (Ciccheti, Cummings, Greenberg, & Marvin, 1990; Sroufe, 1995). Attachment

representations are believed to affect behavior by influencing the intensity of emotional

experience and attempts at emotional regulation (Kobak, & Sceery, 1988; Sroufe, 1995);

maladaptive behaviors or mental illness may be considered types of emotional

dysregulation, and thus, outcomes of the influences of past attachment experiences.

Attachment representations have been found to show predictive associations with

a wide-range of pathological behavior including substance abuse, personality disorders,

mood disturbance, and psychopathology (Allen, Moore, Kuperminc, & Bell, 1988;

Caspers, Yucuis, Troutman, & Spinks, 2006; Dozier, 1990; Dozier, Stovall, & Albus,

1999; Fonagy, et al., 1996; Hesse, 1999; Kobak & Sceery, 1988; Rosenstein, &

Horowitz, 1996; Sroufe, 1995; Sroufe, Carlson, Levy, & Egeland, 1999). It is believed

that the quality of attachment plays a major role in determining an individual's degree of

vulnerability to the development of maladaptive behavioral and mental health problems.

Further, it may also be considered either a protective or risk factor in developing various

psychological distress (Barone, 2003). Because of the correlations that have been found

between attachment representations and psychopathology, the proposed study will

examine the relationship between these two constructs, hypothesizing that there will be a

significant negative relationship between attachment representation and hoarding

severity.

The current state of the research on the relationship between hoarding behavior

and attachment representations is limited. In one study, Frost, Kyrios, McCarthy, and

Matthews (2007) examined self-related constructs, including uncertainty about oneself and others, as vulnerability factors for the development of OCD and cognitions related to hoarding behavior. In a sample of 127 female undergraduate students, it was found that uncertainty about self and others was correlated with hoarding and some related cognitions and behaviors, such as materialism and the acquisition of free things. However, given the lack of a clinical sample and specific attachment representation-related measures, these findings are limited in scope and applicability to attachment research in this area.

To date, the only study that directly investigated the relationship between hoarding and attachment was an exploratory study conducted by Nedelisky and Steele (2009). This study of 30 individuals with OCD (n = 14 people who hoard; n = 16 people who do not hoard) found that, while higher levels of OCD symptom severity (for both hoarding and non-hoarding groups) was correlated with higher rates of interpersonal attachment insecurity, the hoarding group did not demonstrate more insecure attachment compared to the non-hoarding group and that gender had more of a significant effect on attachment. However, given the limitations of the small sample size and exploratory nature of this study, further research is necessary to validate these findings.

Given the mixed outcomes in the literature, the current study attempted to further investigate the connection between attachment security and hoarding behavior. Supported by evidence that hoarding is intricately linked to other mental health disorders (e.g. Frost et al., 2006, Samuels et al., 2002; Samuels et al., 2007), as are attachment representations (e.g. Caspers, Yucuis, Troutman, & Spinks, 2006; Dozier, Stovall, & Albus, 1999; Hesse,

1999; Sroufe, Carlson, Levy, & Egeland, 1999), the current study hypothesized that the participants' attachment security would: (a) be significantly and negatively related to hoarding severity; and (b) serve as a protective factor or a "buffer" between unresolved trauma and loss, psychological distress, and hoarding severity.

Current Family Dynamics and Mental Health Outcomes

Current family dynamics have been used in studies of clinical samples to distinguish between "problem families" and "non symptomatic families" (Olson, 1999, p. 12). One study focused on families with a member with schizophrenia, neuroticism, families who had completed therapy in the past, and a no-therapy control group (Clark, 1984). FACES-II (Olson, 1996), a self-report assessment measure applying the Circumplex Model, was used to measure family cohesion and flexibility. Clark (1984) found a very high level of Unbalanced families in the neurotic (64%) and schizophrenic (56%) clinical groups compared to a no-therapy control group (7%).

Another study by Carnes (1989) investigated the family systems of sex offenders, finding high Unbalanced family types in both family-of-origin (49%) and current family (66%) assessments; Balanced family types were found in 11% of the family-of-origin and 19% of the current family assessments. In a comparison group, 47% of non-offender families were balanced.

Family dynamics have also been studied outside of the Circumplex Model. In relation to hoarding, Frost and colleagues (2007) examined the connection between hoarding behaviors and cognitions and family warmth in a sample of 127 female undergraduate students, but failed to find a connection to hoarding behavior. The study was limited in scope of the participants, so despite the lack of connection that was found

in this study between early family environment and hoarding and buying problems, this is an area that merits further investigation, given the systemic focus of this inquiry.

Given the systemic links that have been found between family dynamics and mental health outcomes, the proposed study hypothesizes that there will be a negative relationship between balanced family dynamics and hoarding severity (see Path d in Fig. 1). In other words, *it is expected that individuals who report more balanced current family dynamics will report lower levels of hoarding severity.*

Statement of the Purpose

The current state of research on hoarding behavior rests largely in an individually-based, pathology-oriented framework. Expanding the research on hoarding into the relational realm is an important next step in the literature, particularly since the current understanding of the behavior through an individual lens has lead to a general lack of consistent, empirical understanding of hoarding behavior. Given the deep, multi-levels of context in which each person who hoards is embedded, it seems that ignoring the influences of the context is limiting, to say the least, and thus, a systemic, contextually-focused framework might offer a new lens through which to approach research and treatment in the area of compulsive hoarding behavior.

The purpose of the current study was to test the fit of a proposed model that considered the influences of unresolved trauma and loss, psychological distress and past and current family experiences on hoarding behavior. This study aims to test these effects using structural equation modeling (SEM) to investigate the influences that past and current contextual experiences have on compulsive hoarding behavior. This type of advanced analysis will be an improvement on the state of the research methodologies used in this area in the past (e.g. ANOVA, multiple regression), as SEM allows for analyses that are not possible with these other methods, allowing for more meaningful and valid results. Structural Equation Modeling involves testing theories in complex patterns of relationships or differences between many variables and hypotheses simultaneously as a whole, while other methods of analysis frequently require several separate analyses (Schumacker & Lomax, 2010).

Research Questions and Hypotheses

In summary, empirical evidence suggests that attachment, unresolved loss, mental health, and family dynamics may systemically influence compulsive hoarding behavior in an individual. However, further investigation is needed to confirm these hypotheses.

This study will attempt to answer and test the following questions and hypotheses:

Primary Research Questions

1. Are there direct relationships between the outcome variable, hoarding severity, and the latent variables, unresolved trauma and loss, attachment security, positive family dynamics, and psychological distress?

2. Does psychological distress mediate the relationship between unresolved trauma and loss, attachment security, and/or positive family dynamics?

3. Does attachment security serve as a significant buffer between unresolved trauma and loss, psychological distress, and hoarding severity?

4. Do positive family dynamics serve as a significant buffer between unresolved trauma and loss, psychological distress, and hoarding severity?

Exploratory Question

1. Is there a difference in model fit between participants with low to moderate hoarding severity versus those with moderate to high hoarding severity? If so, how do the groups differ?

Hypotheses

1. There will be direct and significant relationships between outcome variable, hoarding severity, and the latent variables, unresolved trauma and loss (positive relationship), attachment security (negative relationship), positive family

dynamics (negative relationship), and psychological distress (positive

relationship).

2. Psychological distress will significantly mediate the relationship between

unresolved trauma and loss and hoarding severity.

3. Attachment security will serve as a significant buffer and protective factor against

psychological distress and hoarding severity from unresolved trauma and loss.

4. Positive family dynamics will serve as a significant buffer and protective factor

against psychological distress and hoarding severity from unresolved trauma and

loss.

CHAPTER THREE: DESIGN AND METHODS

Overview of Research Design

A non-experimental, cross-sectional design was used with data collected from a sample of adults age 18 years and older who self-reported to be people who hoard and/or family members of people who hoard. In order to obtain a large sample size, the author collected data over the internet- an increasingly popular method for data collection in mental health research (Skitka & Sargis, 2006). A review of web-based data collection (Gosling, Vazire, Srivastava, & John, 2004) found that web-based data collection results in a greater sample diversity, generalizability across presentation formats, and has consistent findings with data collected by more traditional means. Equivalence between Internet and paper-and-pencil measurements has also been established in clinical disorders (Carlbring et al., 2007), and this method of sampling has been previously successful with this particular targeted population (e.g. Tolin et al., 2008).

Sample Description and Selection

Sampling frame. Adults 18 and over who identified as persons who hoard and/or family members of persons who hoard were recruited for the current study. The outcome variable of interest for the current study was hoarding severity; thus, because hoarding behavior has been genetically-linked in first-degree relatives (Pertusa, et al., 2008; Samuels, et al., 2007; Winsberg, Cassic, & Koran, 1999), both people who self-reported as exhibiting hoarding behaviors as well as their families were targeted in recruitment to participate in order to reach a larger sample of those who may be more likely to exhibit hoarding behaviors even if the participants may not have considered themselves to be a person who hoards.

Volunteers were recruited through a variety methods, using electronic invitations (see Appendix A) for participation in the current study , including use of social media (i.e. Facebook, Twitter), email, web advertisements, and professional referrals (e.g. Children of Hoarders, Institute of Challenging Disorganization). The invitation directed people to the project website (www.thehoardingproject.org) from which they could follow a link to the online survey (see Appendix B to view the questions from the survey). Participants were not offered compensation for participation in the study.

Sampling size. Calculations were undertaken to determine the required number of responses for analysis to test the proposed theoretical model using structural equation modeling (SEM). To determine an appropriate sample size, structural equation modeling requires that in addition to statistical power, issues of the stability of the covariance matrix and the use of asymptotic theory be taken into account. In terms of power, it is difficult to evaluate the power associated with specific path coefficients in complex SEM models because of the large number of assumptions about population parameters that must be made.

A rough approximation of power can be obtained by using a limited information approach with single indicators of the path models. This permits the use of traditional power analysis software to gain a sense of sample size demands (Jaccard & Wan, 1996). Using G*Power 3, a power analysis software, the minimum required sample size for the proposed study is approximately 115, for an analysis with four predictors where the squared multiple correlation is 0.30 and where one wants to detect a predictor that

accounts for at least 5% unique variance in the outcome, assuming an alpha level of 0.05 and a two tailed test.

However, since Marsh, Balla, and McDonald (1988) suggested that parameter estimates are unstable in samples of less than 200, sample size was further projected using a second method. The proposed structural model consisted of 57 parameter estimates and 113 degrees of freedom, and the guidelines of Bentler and Chou (1987), which were a ratio of 5:1 or 10:1 responses to estimated parameters, were applied. The optimal sample size using these ratios was 285 to 570. Therefore 285 was selected initially as the minimum sample for this proposed study.

Given the large professional referral list, project connections with major television networks and websites (e.g. Children of Hoarders; Institute of Challenging Disorganization), and internet advertising and marketing plans, it was anticipated that the methods used for recruitment were more than adequate enough to meet the minimum sampling size.

Participants. Participants were adults recruited via Internet from April 2012 to August 2012. Inclusion criteria for the study were the following: a) adults 18 years of age and older, and b) self-identification as a person who hoards and/or a family member of a person who hoards. No participants were compensated for their participation.

Procedures

Following institutional review board (IRB) review and approval, the survey instruments were entered into an Internet-based software program called SurveyMonkey, an online survey tool that uses an SSL (secure socket layer) web certificate website to

ensure security of data encryption and storage. Participants read an informed consent page and indicated consent by clicking the "next" button on the page. No protected health information was collected, and it was not possible to link study data to an individual or computer. Once removed from the Survey Monkey server, data was stored on the University of Minnesota's Active Directory, a centralized directory used to manage networked computers and file storage across the University.

Data Collection

Data collection spanned five months from April 2012 to August 2012. Participants were able to complete the online questionnaire on a computer in any location that afforded them access to the Internet. After reading and agreeing to an informed consent page, participants were first asked to read a definition of hoarding, stated as: "Hoarding is defined as: excessive acquisition and difficulty discarding a large number of items; clutter than takes over living areas; and significant distress and/or impairment that is caused by the hoarding behaviors." The first question participants were asked was: "Based on the above definition, I would consider myself: a) a person who hoards; b) a family member of a person who hoards; c) BOTH a person who hoards AND a family member of a person who hoards; D) NEITHER a person who hoards NOR a family member of a person who hoards; or E) I'm not sure."

If participants answered D, "NEITHER a person who hoards NOR a family member of a person who hoards, they were excluded from participation in the survey and directed to and page that explained that they did not meet participant criteria for this study. If participants answered A, B, C, or E, they were allowed to continue with the remainder of the survey.

The questionnaires were randomized by page and by items within each page in order to minimize nonrandom missing data. The questionnaires used in this study were as follows: the *Saving Inventory-Revised* (SI-R; Frost, Steketee, & Grisham, 2004); *Relationship Structures Questionnaire* (ECR-RS; Fraley, in press); Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997); Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); and Family Adadptibility and Cohesion Evaluation Scale (FACES) IV Package (Olson, 2011).

After data were collected, data were exported from SurveyMonkey to SPSS version 20 (2011) on a dedicated computer. Data transfer was completed in one bulk export.

Measures

Demographics

Demographic Information was collected regarding the age, sex, race/ethnicity, education, and income of participant. They were also asked to report on whether they consider themselves to be: a) a person who hoards; b) a family member of a person to hoards (and if so, what their relationship to the person who hoards is); c) both; or d) unsure.

Latent and Observed Variables

The current theory that was tested in the proposed model utilizes five concepts: 1) unresolved trauma and loss; 2) psychological distress; 3) attachment security; 4) positive family dynamics; and 5) hoarding severity. Indicators for each of these latent variables were selected based upon the existing research for each variable of interest.

Measures for the Unresolved Trauma and Loss Latent Variable

The indicators for the Unresolved Trauma and Loss latent variable were assessed using the Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997). Participants were asked to focus on the event in their life that they considered to be the "worst event" they have ever experienced and then report on their experience in the past seven days by answering 22-items which reflected the DSM-IV cluster criteria for post-traumatic stress disorder (PTSD) in three subscale areas: intrustive thoughts (e.g. "I thought about it when I didn't mean to"), avoidance ("I stayed away from reminders about it"), and hyperarousal ("I was jumpy and easily startled").

Each item was rated for frequency of occurrence in the past seven days on a weighted 4-point scale (0 = not at all, 1 = rarely, 3 = sometimes, 5 = often). A total score and the three subscale scores were calculated. In previous research,Weiss and Marmar (1997) reported an average test-retest reliability coeffiecient of .91 for a 2-week period and high internal consistency coeffiicients of the intrusion (Cronbach's α = .85), avoidance (Cronbach's α = .85), and hyperarousal (Chronbach's α = .77) subscales. Internal consistency for total score of the items has been found to range from .91 to .95 (Kazak et al., 2003). The three subscales were used to represent the latent variable, "Unresolved Trauma and Loss" as the observed variables, "Instrusion, "Avoidance, and "Hyperarousal." Consistent with previous research, each of the indicator variables in the current study met high reliability and intra-class correlation coefficient standards (see Table 3.1).

Table 3.1

Means, Standard Deviations, and Reliabilities for Indicator Variables

Observed Variable	M	SD	min	max	alpha	IIC
Avoidance Mom	3.568	1.780	1.00	7.00	**0.923**	.483-.898
Anxiety Mom	4.924	1.860	1.00	7.00	**0.888**	.682-.748
Avoidance Dad	3.599	1.705	1.00	7.00	**0.918**	.468-.823
Anxiety Dad	5.006	1.830	1.00	7.00	**0.900**	.723-.778
Intrusion	1.160	1.209	0.00	4.00	**0.929**	.468-.723
Avoidance	1.072	0.926	0.00	3.88	**0.885**	.324-.663
Hypervigilance	0.949	1.100	0.00	4.00	**0.908**	.568-.677
Psych- Parcel 1	0.785	0.676	0.00	3.24	**0.776**	.495-.602
Psych- Parcel 2	1.090	0.831	0.00	3.67	**0.862**	.672-.715
Psych- Parcel 3	0.666	0.654	0.00	2.87	**0.841**	.563-.721
Cohesion	2.115	1.564	0.27	7.73	*	*
Flexibility	1.274	0.800	0.19	5.42	*	*
Communication	30.267	10.047	10.00	50.00	**0.939**	.405-.747
Satisfaction	26.000	9.885	10.00	50.00	**0.957**	.409-.852
Clutter	21.650	10.502	9.00	45.00	**0.962**	.609-.868
Discarding	17.049	6.942	7.00	34.00	**0.950**	.632-.834
Acquisition	15.272	6.103	7.00	32.00	**0.919**	.515-.759

Note. ICC refers to intra-class correlation coefficient. *See ratio for composite variable in (Olson, 2011).

Measures for the Psychological Distress Latent Variable

To assess for psychological distress in participants, the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was be used. The BSI is a reliable self-report 53-item psychometric instrument. The items were rated on a 5-point scale (0 = *not at all,* 1 =

a little bit, 2 = *moderately,* 3 = *quite a bit,* and 4 = *extremely*) to reflect respondents'

distress during the previous week. The items are designed to measure nine specific types

of problems: somatization, obsessive-compulsive problems, interpersonal sensitivity,

depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Test-

retest reliabilities range from .68 to .91 for the nine symptom subscales (Derogatis &

Melisaratos, 1983). Internal consistency estimates for the nine symptom subscales range

from a low of .70-.75 for Psychoticism to a high of .85-.89 for Depression (Boulet &

Boss, 1991; Broday & Mason, 1991; Cheng, Leong, & Geist, 1993; Derogatis &

Melisaratos, 1983).

For the current study, the use of nine subscales as observed variables loading onto

the latent variable, psychological distress, would have resulted in an over-identification

of the model. In order to adapt for the model to be "just-identified"- necessary in order to

run the model- *facet representative parceling* was used to create the indicator variables in

which the subscales were divided into three averaged variables or "parcels" to serve as

indicator variables.

Parceling is a validated process of averaging (or summing) two or more items to

create more reliable indicators of a construct (e.g. Little, Cunningham, Shabar, &

Widaman, 2002). The preponderance of evidence from applied studies, theoretical studies

of item parceling, and studies with known population structure, indicate that item

parceling can be an advantageous tool in the study of the underlying structure among

latent variables (e.g. Bandalos, 2002; Bandalos & Finney, 2001; Hall et al., 1999; Little et

al., 2002; Nasser & Takahashi, 2003). Item parceling can reduce the dimensionality and

number of parameters estimated, resulting in more stable parameter estimates and proper

solutions of model fit (e.g. Bagozzi & Heatherton, 1994; Bandalos & Finney, 2001; Little

et al., 2002; MacCallum et al., 1999).

Psych_Parcel1 included the means of the subscales of Depression, Hostility, and

Somatization; Psych_Parcel2 included the mean scores of the Anxiety, Obsessive-

Compulsive Problems, and Interpersonal Sensitivity subscales; and Psych_Parcel3

included the mean scores of the Phobic Anxiety, Paranoid Ideation, and Psychoticism

subscales. Parcels were created based on theoretically related symptoms related to

psychological distress (e.g. symptoms of sadness, irritability, headaches, etc in Parcel 1;

symptoms of anxiety, intrusive thoughts, etc in Parcel 2; symptoms of delusions,

hallucinations, paranoia, etc in Parcel 3). Each of the parcels met acceptable reliability

and internal validity criteria, with alphas ranging from .0776 to 0.841 and intra-class

correlation coefficient ranging from .495-.721. See Table 3.1 for a more complete

description of the parcel statistics.

Measures for the Attachment Security Latent Variable

For the Attachment Security latent variable, subscales from *The Relationship

Structures Questionnaire* (ECR-RS; Fraley, 2000) were used. The ECR-RS is a self-

report instrument designed to assess attachment patterns in a variety of close

relationships. For the current study, participants completed the same nine items use to

assess attachment styles with respect to each of his or her parental figures on a 7-point

Likert-type scale ranging from 1- "Strongly Disagree" to 7- "Strongly Agree." Some

examples of the questions were: "It helps to turn to this person in times of need" and "I

find it easy to depend on this person." Items were scored on four subscales of

relationship-specific attachment ("Attachment-Related Anxiety- Mom"; "Attachment-related Anxiety- Dad"; "Attachment-related Avoidance- Mom, "Attachment-related Avoidance- Dad"), which are used to represent the latent variable, "Attachment Security.."

In order to create the subscale scores for "Secure Attachment Avoidance Mom (Avoidance Mom)" and "Security Attachment Avoidance- Dad (Avoidance Dad), the mean of items one through six (with items five and six reverse-coded) were calcuated separately for participant responses about their mother-figures and father-figures. For the "Secure Attachment Anxiety" subscales for mom (Anxiety Mom) and dad (Anxiety Dad), items seven, eight, and nine were reverse-coded and means calculated. In previous research, the test-retest reliability of the individual scales were approximately .80 in the parental domain, and the internal validity of the scales were good (Fraley, et al., 2000). In the current study, the reliabilities for the indicator variables (Cronbach's alphas = .923-.900; IIC = .483-.898) were also very good. Please see Table 3.1 for a descriptive summary of the indicator variables.

Measures for the Hoarding Severity Latent Variable

The *Saving Inventory-Revised* (SI-R; Frost, Steketee, & Grisham, 2004) was used to create indicators for the latent variable, Hoarding Severity (HS). The SI-R is a 23-item self-report measure that includes three subscales: acquisition (e.g. "How often do you feel compelled to acquire something you see?"), clutter (e.g. "How much living area in your home is cluttered with posessions?"), and difficulty discarding (e.g. "To what extent do you have difficulty throwing things away?"). Participants answered each question on a 5-point Likert-type scale. The SI-R has been found to have strong internal consistency

(Coles, Frost, Heimberg, & Steketee, 2003), good test-retest reliablity, and satisfactory

convergent validity (Frost et al., 2004). For the current study, the subscales were used in

the analyses as the observed variables, "Acquisition, "Clutter, and "Discarding, to load

onto the latent factor, "Hoarding Severity." As with previous research, the reliabilities for

the subscales were high, ranging from 0.916 to 0.963, and the intra-class correlation

coefficient ranged from .474 to .873. See Table 3.1 for more details on indicator variables

statistics.

Measure for the Positive Family Dynamics Latent Variable

Family dynamics were measured using the Family Adadptibility and Cohesion

Evaluation Scale (FACES) IV Package (Olson, 2011), the latest version of a family self-

report assessment designed to assess family cohesion and family flexibility, which are the

two central dimensions of the Circumplex Model of Marital and Family Systems (Olson,

2000). The package also includes the Family Communication scale and the Family

Satisfaction scale. There are 62 items in the FACES-IV package. In previous research,

reliability of the six FACES-IV scales is good on all six scales: Enmeshed = .77,

Disengaged = .87, Balanced Cohesion = .89, Chaotic = .86, Balanced Flexibility = .84,

and Rigid = .82 (Olson, 2011).

For the proposed project, the observed variables will be "Cohesion, "Flexibility,

"Communication, and "Satisfaction, which will all load onto the latent variable, "Family

Dynamics." The indicators Cohesion and Flexibility were calculated by determining a

ratio score by assessing the balanced/unbalanced score for each dimension (see Olson,

2011 for more information). The Communication and Satisfaction subscales are

calculated by summing the scores in each category. Because the scores of each of the

indicators were on different scales, standardized Z-scores were used for modeling purposes.

Reliability and Validity of the Research Design

The purpose of the study was to determine the validity of a theoretical model of unresolved trauma and loss, family relationships, and hoarding behavior. The cross-sectional approach to data collection was most appropriate at this early stage in the development of the model to isolate the relationships among the variables.

Structural equation modeling (SEM) was the appopropriate choice of analytic techniques available to test the theoretical models that were proposed a priori. Structral equation modeling, using the maximum likelyhood estimation procedure, is a full information technique in that all model parameters are estimated simultaneously and a change in one parameter during the iteration process could result in a change in other parameters in the model (Diamantopoulos & Siguaw, 2005). Additionally, SEM models measurement error as a part of the parameter estimation process and is therefor more germane to testing the model than the use of path analysis, which carries an assumption of measurement of variables without error.

The reliability of the research design was ensured through the consistent application of procedures for data collection, correction, and analyses. The integrity of the research was also enhanced by specifying more than one theoretical model a priori and by making model modifications only if theory-driven, rather than data driven, thereby helping reduce error from over analyzing the data.

Model Identification

Prior to beginning analysis, the number of parameters to be estimated in the

model was calculated and compared to the number of data points. To be testable, the

hypothesized model needed to have fewer parameters than data points. Using Bentler and

Chou's formula (1987), there were 153 data points in the variance/covariance matrix,

which met the criterion of having more data points than parameters to be measured. The

following formula was used to calculate the number of data points in the model:

$p* = p \ (p + 1) \ / \ 2,$

where p was the number of variables and p* was the number of data points. The

caculations for this research were as follows:

$p* = 17(17 + 1) \ / \ 2 = 153$ data points.

This satisfied the requirement to exceed the 60 parameters for the model.

In this case, the model was over-identified (having more data points than

parameters). Had the opposite been true, the model could not have been tested reliably.

Generally under-identified models produce unreliable statistics (Bentler & Chou, 1987)

because the *p*-values for the model might have been too low as a result of under-

identification.

Data Analysis

Structural equation modeling is a causal model in which the paths in a graphic

model are expressed as a series of algebraic equations (Boyd, Frey, & Aaronson, 1988).

Theoretial variables, which are not observable but are presumed to exist, are known as

latent variables. Measureable and observable variables known as manifest variables are

used as indicators for the theoretical constructs. SEM represents a "synthesis" of path analysis with factor analytic procedures, involving the comparison of the hypothesize model covariances with observed covariances (Bollen, 1989). AMOS 20 will be used to run structural equation models specifying the relationships between the multiple latent and observed variables in this study.

The analytic strategy followed steps outlined by Diamantopoulous and Siguaw (2005) for structural equation modeling. Covariance structure analysis is a multivariable statistical technique that combines confirmatory factor analysis and modeling to analyze hypothesized relationships among latent variables and manifest indicators (i.e. observed variables). The typical full covariance structure model contains two parts: a) the measurement model, and b) the structural model. The analysis seeks to confirm that the hypothesized relationships across latent variables and their manifest indictors are consistent with empirical data. This is done by comparing the covariance matrix implied by the structural equation (hypothesized) model to the actual covariance matrix derived from the empirical data.

The goal of SEM is to explain the patterns of covariance observed among the study variables (Kelloway, 1998). In general, the model explains if two or more variables are related. Path diagrams depict the models; a simple path represents the direct relationship between two variables and a compound path represents the product of two or more paths. In turn, the sum of the simple and compound paths linking two latent variables produces the correlation that links the two variables. Decomposition of the correlations produces the beta weights (standardized regression coefficients). These

structural relations are represented by structural equations, which in turn are combined to produce the implied correlation matrix (Kelloway, 1998). Therefore examination of bivariate correlations is a necessary preliminary step.

The manifest indicators are reflective, meaning that they are simply observed characteristics of an underlying construct (Diamantopoulous & Siguaw, 2005). It is the underlying construct's relationship that defines the true value of that concept.

Preliminary analyses included identification of values outside of the range of permissible responses and listwise deletion of outliers, assessment of univariate and multivariate normality, and examination of bivariate relationships among the indicators. Next the measurement model was assessed, including validity and reliability of the model. Once an acceptable fit of the measurement model was obtained, the full structural model as well as associated mediating variables were tested. Model modifications were attempted but not retained, and model cross-validation was not feasible for this single-sample set of data.

Preliminary Analyses

Multivariate normality. Multivariate normality was evaluated using Kline's (2005) test for multivariate normality. One of the assumptions of parameter estimation using the maximum likelihood (ML) estimation method is that departures from multivariate normality are not too severe. While ML estimation is robust to minor violations, severe ones render the ML estimation questionable. Multivariate normality assumption is also needed for interpretation of standard errors and chi-square statistics (Kline, 2005). The tests for univariate normality for continuous variables were assessed. In addition, univariate indices of skewness and kurtosis were examined to determine if

the absolute value of these indices was greater than 2.0, which would denote nonnormality.

Once multivariate normality was assessed, a two-step approach was used to test the proposed theoretical model. First, the measurement model as depicted in Figure X for each latent variable was tested to determine the fit of the model to the data.

Based on the assessment of each measurement model's fit to the data, appropriate modifications were undertaken to improve measurement model fit. The first step was undertaken based on the recommendation of Kelloway (1998) that if the final model does not fit the data, measurement model misfit could be ruled out as a source of the misfit of the model to the data, and attention could be focused on improving model fit through the modification of structural parameters.

Missing Data

The design of the Internet survey gave participants a visual indicator of their progress in the survey. Missing data was minimized by visually presenting only one question matrix at a time, and both pages and items within each page were randomized so as to further minimize missing data. Conditions were set to restrict any unnecessary questions from appearing to the participant by using skip patterns. For example, if they responded that they did not have a family member who hoards, they did not receive subsequent questions reporting on their family member's hoarding behaviors. However, there were no forced responses, so missing data were anticipated.

A number of strategies were undertaken to assess and/or intervene with missing data. First, SPSS was used to count the number of responses for individual items included in the survey. Since the analysis plan included variables expressed as a total subscale

score of a measure, the pattern and quantity of missing data was assessed for each

individual item comprising the respective subscales as well as the aggregate responses for

all items included in all subscale calculations. Participants who did not complete a

majority of the items needed to determine subscale scores for the observed variables were

removed using listwise deletion.

For the remaining cases, data was found to be missing at random due to

participant failure to complete surveys. Because AMOS cannot handle datasets with

missing values, multiple imputation was used in SPSS to impute values for the variables

prior to creating the composite variables used for the modeling analyses. Once composite

variables were calculated in SPSS, any missing data were handled in AMOS with full

information maximum likelihood, which has proven superior in accurately representing

the sample data, compared with listwise or pairwise deletion, similar response pattern,

and mean imputation in simulation studies (Acock, 2005; Enders & Bandalos, 2001).

Item Parceling

Once data was imputed in SPSS, data parceling was used to create composite

observed variables to used for modeling analysis. Bandalos and Finney (2001) report that

the three most common reasons researchers cite for using item parceling are to: increase

the stability of the parameter estimates (29%) improve the variable to sample size ratio

(22.6%), and to remedy small sample sizes (21%). A rationale for item parceling that is

often stated is to reduce the effects of nonnormality and likelihood of forming difficulty

factors in factor analyses with binary items. Thompson and Melancon (1996)

demonstrated that using item parceling with nonnormal data did result in more normally

distributed item parcels and improved model fit. Little, Cunningham, Shahar, and

Widaman (2002) list three reasons that parceling can be advantageous over using the original items: 1) estimating large numbers of items is likely to result in spurious correlations, 2) subsets of items from a large item pool will likely share specific sources of variance that may not be of primary interest, and 3) solutions from item-level data are less likely to yield stable solutions than solutions from parcels of items.

Items were parceled using facet representative parceling, in which each parcel is a 'facet' or singular dimension of the construct (Little, Cunningham, Shahar, & Widaman, 2002) based on the subscales developed my the authors of the various measures used. See Appendix B for item parcel descriptions.

Covariates/Control Variables

Preliminary analyses assessed the relationships between demographic characteristics and outcome variables in order to determine the need to covary sample demographic characteristics in further analyses. Specifically, consistent with previous literature finding links between the following demographic variables and hoarding, gender, age, and income (e.g. Samuels et al., 2008) were examined.

As expected, hoarding severity was significantly correlated with gender, age, and income. Based on these preliminary results, age, gender, and income were entered in subsequent analyses as control variables on the endogenous variable, hoarding severity.

Model Fitting Process

AMOS software was used to estimate parameters for each of the proposed paths, including control variables. This produced a baseline model. Several fit indices were examined to determine the degree to which the conceptual model "fit" the data. In other words, fit indices provided the significance and magnitude of the hypothesized

relationships. As recommended by Kline (1998), the following fit indices were evaluated in determining model fit: Chi-Square Statistic (CMIN), Comparative Fit Index (CFI), and Root Mean Square of Error Approximation (RMSEA).

Generally, a good fit is indicated when the CMIN is non-significant. This indicates that the researcher hypothesized model and the model of the observed data are not significantly different. However, it is important to note that chi-square statistic depends on the assumption of multivariate normality and is sensitive toss sample size and Type II errors (Boyd et al., 1988; Ratner et al., 1988). Therefore, the other fit indices were utilized in combination with the CMIN to determine model fit before any decisions on modifications were made.

The comparative fit index (CFI) indicates the proportion of improvement in the fit of the hypothesized (researcher) model in comparison to the null model (one in which the observed variables are assumed to be uncorrelated; see Kelloway, 1998). The CFI accounts for the number of parameters estimated. Importantly, the CFI is sensitive to the magnitude of correlations; if correlations are low it will be low as well. The CFI (Comparative Fit Index) scores can range from 0 to 1, with higher values indicating better fit and values of at least 0.90 preferred (Diamantopoulos & Siguaw, 2005)

Finally, the RMSEA was utilized to assess model fit. The RMSEA is based on the chi-square statistic. Values that indicate a good fit are those under 0.05; values between 0.05 and 0.08 indicate reasonable fit; values between 0.08 and 0.10 are of mediocre fit; and values > 0.10 indicate poor fit (Diamantopoulos & Siguaw, 2005). It accounts for the

degrees of freedom in the model. Generally, an RMSEA of .08 or less indicates acceptable fit. (Kline, 2005).

After examining model fit, pathways that were non-significant were set to zero in order to increase model fit and attain a more parsimonious model. Next, modification indices were assessed. Larger modification indices signal better model fit if that particular parameter is added to the model (Kline, 1998). Modifications that could potentially improve model fit were considered. If theoretically possible, modifications were made. If modifications were made, model fit indices were re-examined to determine the degree to which the model improved. This process resulted in a final structural model.

It is important to note that in come cases it is not possible to attain model fit indices for particular types of structural equation models. One such case is when estimating model fit for a model involving an interaction with a latent variable. When estimating model fit for a model involving a latent interaction variable, AMOS (as well as other software) is unable to provide traditional model fit statistics including CMIN, CFI, and RMSEA (Muthen, 2010). The reason is that in order to run this sort of model, it is necessary to utilize model estimation (maximum likelihood estimation with robust standard errors or MLR) that allows random slopes and intercepts (where the variance of the y variable varies with the values on the x). This precludes the estimation of chi square and related statistics (Muthen, 2010). Instead, it is necessary to use a nested model technique where one estimates model fit for a particular model, then sets one or more parameters to zero and tests model fit again. After that, the resulting model statistics are

utilized to conduct a log-likelihood difference test, which is in fact chi-square distributed (Muthen, 2010.

Analysis of the traditional fit statistics was utilized in fitting the CFA model and model for the first research question, as described above. However, a nested model technique, utilizing log-likelihoods for the null and alternative models were used in testing the remaining path models, given that all included latent interaction terms.

Measurement Model

A measurement model (See Fig. 3.1) is one in which the hypothesized relations of the observed variables to the underlying constructs is specified (Anderson & Gerbing, 1988). When building measurement models, the use of the multiple indicators is preferred because the meaning given to the underlying construct is less ambiguous with more details; therefore, at least two indicators are desired and at least four are preferred. If an indicator estimates only one construct, it is considered unidimensional and loads on only the one construct; however, if it is multidimensional and loads on more than one construct, it is correlated with the other indicators and becomes problematic in interpretation of meaning (Anderson & Gerbing, 1988). There were 61 parameters to be estimated, using 109 degrees of freedom in the measurement model.

Statistical criteria for determining latent variables included analyzing the standardized factor loadings, Chi-Square Statistic (CMIN); the Steiger-Lind RMSEA (Steiger, 1990), and the Bentler CFI (Bentler, 1990).

Figure 3.1. Hypothesized Measurement Model.
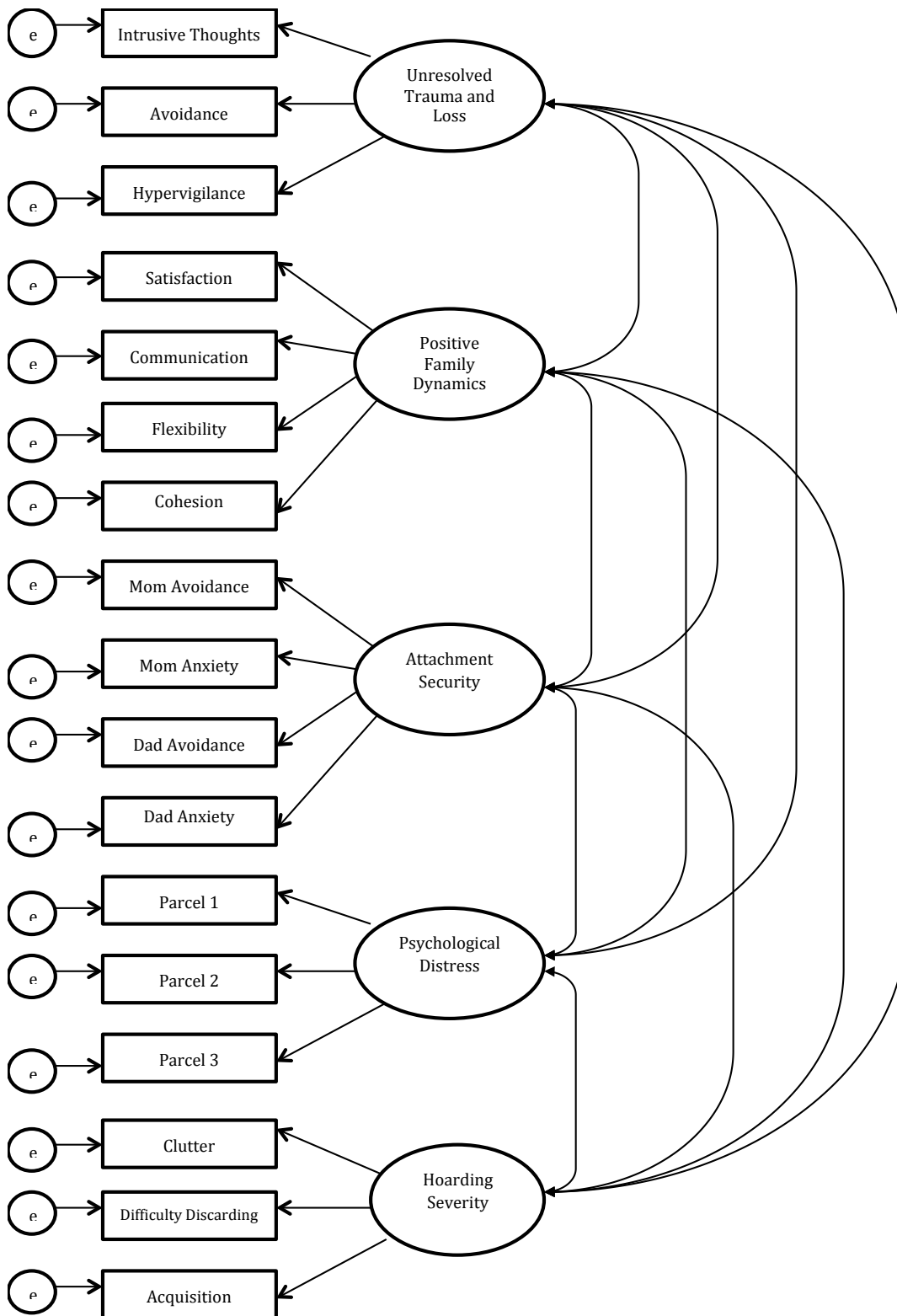
Validity and reliability of the measurement model. Evidence for the validity of the indicators used to represent the constructs was assessed by methods described by Diamantopoulos and Sigauw (2005). First, all indicator loadings were examined for significance (at $p < 0.05$ or better), as indicated by significant t-values. The error variances were examined next; insignificant error variances may indicate specification error. Because of the difficulty in comparing the validity of different indicators, which use different scales and which possibly had different reference scales from others' analyses, the magnitudes of the completely standardized loadings were also inspected.

Evidence for reliability of the indicators used to represent the constructs was assessed also by methods described by Diamantopoulos and Siguaw (2005). First, the square multiple correlations (R^2) were assessed because they showed the proportion of variance in each indicator that is explained by its underlying latent variable, and higher R^2 denotes higher reliability.

Next a composite reliability value (alpha) for each latent variable was calculated to assess construct validity. A construct validity value of greater than 0.6 provided evidence that the indicators were reliable measurements of the construct. And finally, the intra-class correlated coefficient (ICC) was calculated to demonstrate the amount of variance that was captured by the construct in relation to the amount of error variance. The desirable value for the ICC is greater than or equal to 0.50 to show that a substantial amount of variance in the indicators was captured by the construct versus that accounted for by measurement error.

Structural Models

For the remaining research questions, path analyses models were constructed and tested using the nested model approach because latent interaction terms were used in these analyses.

A structural model is one that specifies the hypothesized causal relationships between the latent variables. Once an acceptable fitting measurement model for each latent variable was obtained, the full models were tested using structural equation modeling implemented through AMOS 20. Structural parameters, the relationships between latent variables, were expressed as a series of equations and these equations transformed into an analysis of this model.

Figure 3.2. Full Hypothesized Structural Model.
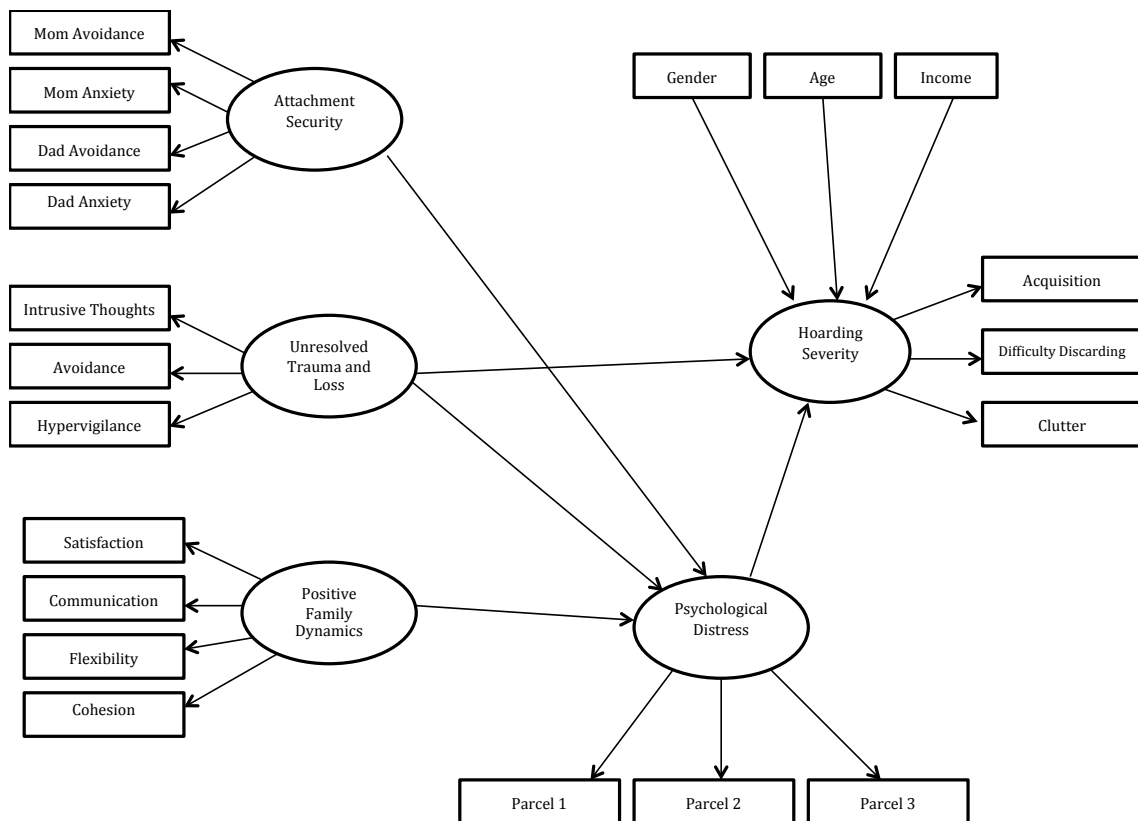
Note: Error variances of observed variables not shown.

The structural model (see Fig. 3.2) underlying the proposed study is based on prior research on the relationships between hoarding behavior, mental health co-morbidity, traumatic life experiences, and past and current family relationships. This framework indicates that past and current relational factors, such as attachment representations, unresolved trauma and loss, mental health co-morbidity, and family dynamics may play a role in the severity of hoarding behavior. As depicted in Figure 3.2, there were three latent exogenous variables and two latent endogenous variables. The structural model had 57 parameters that had to be estimated and 113 degrees of freedom.

Assessment of structural models. For each set of analyses, several steps were undertaken. As a first step, before running the theoretical models for each analysis, a version of the model that did not include the latent interaction term was run. This is recommended as a preliminary step when running models for which is it is not possible to attain traditional fit indices (Muthen, 2010). If the model is a good fit, then one goes on to test whether the interaction term is significant. Secondly, parameter estimates were examined in order to assess the direction and strengths of the relationships of the variables of interest. Not that in those models including latent interaction variables it was not possible to attain standardized parameter estimates, therefore, unstandardized parameter estimates were examined and reported (standard errors are provided below to allow for interpretation). Given the greater ease of interpretability of standardized parameter estimates, these were provided whenever available (i.e. in those models that did not include the latent interaction terms).

Then, the paths from control variables to the dependent variable that did not reach statistical significance were trimmed (by setting the to 0) one-by-one, in distinct iterations of the model. (That is, if two control variable paths were found to be non-significant when the full model was fun, one of them would be trimmed, the model would be run again, and the parameters re-examined. If warranted, the second non-significant path would be trimmed as well in a next step. Trimming non-significant variables one-by-one allows the researcher to diagnose accurately the cause of the changes in model fit and parameter estimates from model to model.) Once a more parsimonious model was achieved through the trimming of non-significant paths between control variables and the dependent variable, significance tests utilizing the log-likelihood values of the new model and subsequent nested models (both the full and nested models must be run with the same MLR estimator in order to conduct these) were conducted. The purpose of these tests is to assess whether then full model (including the interaction) or the simpler, nested model (excluding the interaction) should be chosen as a closer fit to the data structure.

Hypothesis Testing

The current state of study on hoarding behavior rests largely in an individually-based, pathology-oriented framework. Expanding the research on hoarding into the relational realm is an important next step in the literature, particularly since the current understanding of the behavior through an individual lens has lead to a general lack of consistent, empirical understanding of hoarding behavior (Wilbram et al., 2008). Thus, applying a systemic framework to help conceptualize the behavior is particularly important in order to begin to develop effective approaches to treatment and intervention

for individuls who struggle with hoarding behaviors. Given the deep, multi-levels of context in which each person who hoards is embedded, it seems that ignoring the influences of the context is limiting, to say the least, and thus, a systemic, contextually-focused framework might offer a new lens through which to approach research in the area of hoarding behavior.

The purpose of the proposed study will be to test the fit of a proposed model that considers the influences of past and current family experiences on hoarding behavior. This will be accomplished by looking at the effect that relational contextual factors-attachment, unresolved trauma and loss, and family dynamics- have on an individual's hoarding behavior. The proposed study aims to test these effects using structural equation modeling (SEM) to investigate the influences that past and current contextual experiences have on hoarding behavior. This type of advanced analysis will be an improvement on the state of the research methodologies used in this area in the past (e.g. ANOVA, multiple regression), as SEM allows for analyses that are not possible with these other methods, allowing for more meaningful and valid results. Structural Equation Modeling involves testing theories in complex patterns of relationships or differences between many variables and hypotheses simultaneously as a whole, while other methods of analysis frequently require several separate analyses (Schumacker & Lomax, 2010).

Research Questions and Hypotheses

In summary, empirical evidence suggests that attachment, unresolved loss, mental health, and family dynamics may systemically influence hoarding behavior in an individual. However, further investigation is needed to confirm these hypotheses.

This study will attempt to answer the following research questions:

1. Are there direct relationships between the outcome variable, hoarding severity, and the latent variables, unresolved trauma and loss, attachment security, positive family dynamics, and psychological distress?

2. Does psychological distress mediate the relationship between unresolved trauma and loss, attachment security, and/or positive family dynamics?

3. Does attachment security serve as a significant buffer between unresolved trauma and loss, psychological distress, and hoarding severity?

4. Do positive family dynamics serve as a significant buffer between unresolved trauma and loss, psychological distress, and hoarding severity?

Exploratory Question

2. Is there a difference in model fit between participants with low to moderate hoarding severity versus those with moderate to high hoarding severity? If so, how do the groups differ?

For all research questions, SEM results were reported in terms of fit statistics (except for interaction models), path coefficients (β for main effects, b for interaction effects), ratio tests (t), statistical significance ($\alpha = 0.05$), and effect size (R^2).

Power Analysis Post Analysis

Using the method described by Diamantopoulos and Siguaw (2005), power analysis was conducted. This power value indicated the probability that a false null hypothesis would be rejected. This analysis was done post hoc to validate the power analysis.

Chapter 4: RESULTS

Overview of Analytic Strategy

Sample characteristics of participants are presented first, followed by a description of preliminary analyses. These included assessment of data quality, bivariate relationships, and the measurement models. Problems initially encountered with the fit of measurement models are addressed, as are the steps undertaken to deal with these problems. These are followed by reports on hypothesis testing as well as the power analysis.

Preliminary Analysis

Data quality. Five hundred fifty-four adults consented to participate in the current study and submitted surveys. Consistent with current recommendations, before analysis, the data were checked for apparent duplicates (i.e. a participant completing the survey more than once). This was accomplished by comparing duplicate answers across various variables (e.g. gender, location (state/country), age compared with reported "worst event experienced"**);** three participants were excluded through this process. One individual was excluded from the analysis for not meeting the age requirement of 18 years old. Twenty-one individuals reported being neither a person who hoards nor a family member of a person who hoards, and were thus excluded from participating in the study. One hundred forty-four individuals were deleted listwise from analyses because they were missing 80% or more of all possible data points.

Data Preparation and Screening

     Outliers. After all data were exported from SurveyMonkey to SPSS, error-checking procedures were undertaken. Outlier analysis was conducted prior to all major analyses. In relation to outliers, descriptive statistics and histograms were utilized to identify outliers at the univariate level. Individual scales scores which were three standard deviations from the mean were considered and examined as outliers. Multivariate outliers were identified utilizing Cook's distance (measures the effect of deleting a single observation) and Mahalanobis distance (calculates the distance of particular scores to the cluster of cases). Overall, 28 cases were identified as univariate outliers and nine cases were identified as multivariate outliers. Analyses were conducted excluding and including the outliers to determine changes in results and decide whether to exclude outlying cases. Overall, results remained constant after excluding these cases. This indicated that the outliers were not exerting undue influence on model results, therefore, the cases were retained in the analysis.

     Collinearity. Next, extreme collinearity was assessed for by the squared multiple correlation (R^2), tolerance, and variance inflation factor (VIF) statistics. This was evaluated by running several multiple regressions, each with a different observed variable as the criterion and the other variables as predictors. Criterion for acceptable collinearity was met for each of the statistics ($R^2 < .90$; tolerance $> .10$; VIF < 10.0) on all of the variables. It was concluded from the collinearity analysis that the variables each separately measured different constructs and were not redundant enough to necessitate further action. See Table 4.1 for all scales used in final analysis.

Table 4.1. Latent Variable Collinearity Diagnositics Tables.

	R-squared	Tolerance			VIF		
		Intrusion	Avoidance	Hypervigilance	Intrusion	Avoidance	Hypervigilance
Intrusion	0.77	-	0.49	0.49	-	2.03	2.03
Avoidance	0.55	0.25	-	0.25	4.02	-	4.02
Hypervigilance	0.77	0.49	0.49	-	2.06	2.06	-

	R-squared	Tolerance			VIF		
		Psych_Parcel1	Psych_Parcel2	Psych_Parcel 3	Psych_Parcel1	Psych_Parcel2	Psych_Parcel 3
Psych_Parcel1	0.81	-	0.26	0.26	-	3.83	3.83
Psych_Parcel2	0.82	0.28	-	0.28	3.61	-	3.61
Psych_Parcel 3	0.78	0.23	0.23	-	4.44	4.44	-

	R-squared	Tolerance			VIF		
		Clutter	Discarding	Acquisition	Clutter	Discarding	Acquisition
Clutter	0.52	-	0.34	0.34	-	2.96	2.96
Discarding	0.71	0.55	-	0.51	1.82	-	1.82
Acquisition	0.68	0.51	0.51	-	1.96	1.96	-

	R-squared	Tolerance				VIF			
		Cohesion	Flexibility	Communication	Satisfaction	Cohesion	Flexibility	Communication	Satisfaction
Cohesion	0.64	-	0.58	0.22	0.2	-	1.74	4.48	5.05
Flexibility	0.61	0.53	-	0.22	0.21	1.88	-	4.64	4.78
Communication	0.79	0.38	0.39	-	0.51	2.68	2.58	-	2
Satisfaction	0.8	0.36	0.41	0.55	-	2.78	2.43	1.81	-

	R-squared	Tolerance				VIF			
		Avoidance Mom	Anxiety Mom	Avoidance Dad	Anxiety Dad	Avoidance Mom	Anxiety Mom	Avoidance Dad	Anxiety Dad
Avoidance Mom	0.35	-	0.81	0.66	0.56	-	1.23	1.52	1.79
Anxiety Mom	0.43	0.93	-	0.64	0.65	1.08	-	1.56	1.52
Avoidance Dad	0.38	0.7	0.6	-	0.82	1.44	1.68	-	1.23
Anxiety Dad	0.46	0.67	0.69	0.93	-	1.49	1.44	1.08	-

Multivariate normality. Multivariate normality was evaluated using Kline's (2005) test for multivariate normality; the 17 variables met normality assumptions. Multivariate skewness and kurtosis were also examined and the data met the criteria for multivariate normality, according to standards set by Kline (2005).

Missing data. Following the listwise deletion of 144 cases due to missing 80% or more of all possible data points, of the remaining cases, four percent of the overall data was found to be missing at random (MAR) due to participant failure to complete survey items. Multiple imputation was conducted in SPSS to impute values for the variables prior to creating the composite variables used for the modeling analyses. Once composite variables were calculated in SPSS, any missing data were handled in AMOS with full information maximum likelihood (FIML), an estimation method that partitions cases in a raw data file into subsets, each with the same pattern of missing observations. Relevant statistical information, such as means and variances, are extracted from each subset, and parameter estimates and standard errors are calculated directly from the available data without deletion or imputation of missing values. FIML has proven superior in accurately representing the sample data, compared with listwise or pairwise deletion, similar response pattern, and mean imputation in simulation studies (Acock, 2005; Enders & Bandalos, 2001).

Participant Characteristics

The exclusion process resulted in a final data set comprised of 387 unique respondents who self-reported as being either a person who hoards or a family member of a person who hoards. A majority of the participants ($n = 112$, 29.2%) fell into the age

category of 40-49 years old, had a bachelor's degree (n = 126, 32.6%), and were

employed (n = 139, 36.1%), making between $50,000 and $74,999 in annual household

income (n = 73, 18.9%). One hundred forty-nine (38.6%) of participants reported their

current relationship status as being married in their first marriage.

The majority of the respondents were female (n = 346, 90.6%) and Caucasian (*n* =

344; 89.6%). The ethnic breakdown of the remaining participants was as follows: Asian

American (n = 9, 2.3%); Black/African American (n = 3; 0.8%); Hawaiian or Pacific

Islander (n = 1, 0.3%); Hispanic/Latino (n = 13; 3.4%); Native American (n = 6; 1.6%);

Other (n = 7; 1.8%); 13 individuals (3.4%) preferred not to answer.

Geographically, while a majority of respondents came from the United States (n =

320; 84%), 24 participants (6.3%) were from Australia, 15 (3.9%) from Canada, 10

(2.6%) from the United Kingdom, and three percent (*n* = 12) from other countries,

including France, Italy, Ireland, South Korea, the Netherlands, New Zealand, Romania,

Switzerland, Turkey, and the United Arab Emirates. Because of the lack of literature

predicting the effect of ethnicity and culture/geographical location on hoarding severity

along the overrepresentation of White participants from the U.S. and other Western

cultures, neither race/ethnicity nor geographical location were used in the current study as

covariates.

Of the sample, 73 participants (18.9%) reported that they were an individual who

hoards while 242 (63%) reported to be a family member of a person who hoards and 63

(16.6%) identified as BOTH an individual who hoards AND a family member of a person

who hoards. Six people (1.6%) reported that they were unsure about their status as a

person who hoards and/or a family member of someone who hoards.

Table 4.2.

Participant Descriptives.

Variable		Frequency	Percent
Participant			
Type			
	A person who hoards	73	19.0%
	A family member of a person who hoards	242	63.0%
	BOTH a person who hoards AND a family member of a person who	63	16.4%
	I'm not sure	6	1.6%
Age			
	18-20	4	1.0%
	21-29	42	10.9%
	30-39	75	19.5%
	40-49	112	29.2%
	50-59	95	24.7%
	60 or older	52	13.5%
	Prefer not to answer	4	1.0%
Education			
	High school degree or equivalent (e.g., GED)	26	6.8%
	Some college but no degree	71	18.5%
	Associate degree	38	9.9%
	Bachelor degree	125	32.6%
	Graduate degree	114	29.8%

Prefer not to answer	3	80.0%
Less than high school degree	6	1.6%
Missing	1	

Gender

Male	33	8.7%
Female	344	90.5%
Prefer not to answer	3	1.0%
Missing	4	

Race/Ethnicity

Asian American	9	2.3%
Black/African American	3	0.8%
Hawaiian or Pacific Islander	1	0.3%
Hispanic/Latino	13	3.4%
Mixed Race	8	2.1%
Native American	6	1.6%
White/Caucasian	344	89.6%
Other	7	2.1%
Prefer not to answer	13	3.4%

Relationship Status

Single, never married	88	23.1%
Single, divorced	39	10.2%
Single, widowed	5	1.3%
Married, first marriage	148	38.8%
Married, not first marriage	51	13.4%
Life-partnership	16	4.2%
Living together	25	6.6%
Separated	9	2.4%
Missing	3	

Current Living Arrangement

Alone	74	20.4%
With parents	19	5.2%
With partner	122	33.6%
With others	22	6.1%
With children	25	6.9%
With partner and children	101	27.8%
Missing	21	

Employment

Employed, working 40 or more hours per week	139	36.3%
Employed, working 1-39 hours per week	98	25.6%
Not employed, looking for work	49	12.8%
Not employed, NOT looking for work	28	7.3%
Retired	30	7.8%
Disabled, not able to work	24	6.3%
Prefer not to answer	15	3.9%
Missing		

Income

Less than $20,000	45	11.7%
$20,000 to $34,999	35	9.1%
$35,000 to $49,999	53	13.8%
$50,000 to $74,999	73	19.0%
$75,000 to $99,999	52	13.5%
$100,000 to $149,999	46	12.0%
$150,000 or More	27	7.0%
Prefer not to answer	53	13.8%

Bivariate Correlational Analysis

Bivariate correlational analysis was used to make an initial assessment of relationships among the constructs. See Table 4.3 for more detailed information on inter-correlations between indicator variables. Each latent construct had up to four indicator variables, and the inter-correlations between the indicator variables were all strongly correlated (above 0.500). For example, for the latent factor Unresolved Trauma and Loss, indicator scales were correlated .715, .718, & .862. There was one exception in regard to the attachment security latent variable (inter-correlations ranged from .193 to .578). Even though inter-correlations .70 or higher suggest the presence of a common construct and potential problems with multicollinearity, the collinearity statistics (see Table 4.1) found that the variables each separately measured different constructs and were not redundant enough to necessitate further action. However, to make sure to account for the high inter-correlations, in the remaining analyses, error variances of the observed variables were allowed to account for any residual collinearity effects.

Table 4.3

Intercorrelations for Indicator Variables.

Indicator Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Avoidance Mom	-																
2 Anxiety Mom	.548**	-															
3 Avoidance Dad	.266**	.193**	-														
4 Anxiety Dad	.215**	.417**	.578**	-													
5 Intrusion	-.051	-.194**	-.093	-.163**	-												
6 Avoidance	-.077	-.233**	-.191**	-.250**	.718**	-											
7 Hypervigilance	-.073	-.226**	-.140**	-.239**	.862**	.715**	-										
8 Cohesion	.284**	.280**	-.183**	.244**	-.176**	-.175**	-.201**	-									
9 Flexibility	.215**	.257**	.170**	.209**	-.196**	-.199**	-.198**	.759**	-								
10 Commmunication	.251**	.314**	.167**	.238**	-.221**	-.202**	-.228**	.650**	.588**	-							
11 Satisfaction	.240**	.321**	.169**	.212**	-.183**	-.206**	-.185**	.663**	.648**	.881**	-						
12 Parcel 1	-.111	-.296**	-.212**	-.312**	.485**	.496**	.549**	-.293**	-.299**	-.285**	-.289**	-					
13 Parcel 2	-.095	-.286**	-.213*	-.348**	.510**	.514**	.560**	-.281**	-.295**	-.277**	-.265**	.880**	-				
14 Parcel 3	-.155**	-.336**	-.221**	-.323**	.519**	.544**	.578**	-.367**	-.366**	-.346**	-.342**	.854**	.862**	-			
15 Clutter	.098	-.060	-.017	.018	.096	.181**	.141**	-.103*	-.200**	-.159**	-.190**	.326**	.324**	.239**	-		
16 Discarding	.109*	.024	-0.023	-.027	.133*	.198**	.151**	-0.035	-0.111*	-.104*	-.093	.284**	.340**	.216**	.695**	-	
17 Acquisition	.155**	-.017	-.093	-.092	.202**	.299**	.225**	-.057	-.143**	-.122*	-.122*	.400**	.423**	.327**	.666**	.816**	-

Note: ***p < .001; **p < .01; * p < .05

Research Questions

To begin the analysis for the current study, the measurement model of the latent constructs was created in order to examine their relationships to one another.

Confirmatory Factor Analysis: Original Assessment of Measurement Model

Prior to the initial assessment of the measurement model, the composite variable scores for the Positive Family Dynamics latent variable were standardized and converted to z-scores ($M = .00$, $SD = 1.0$) in order to control for variance.

The results of the confirmatory factor analysis for the hypothesized model demonstrated that the model was an improvement over the AMOS generated baseline or independence model (an unrestricted model with a free covariance matrix; in other words, a model in which it is assumed that there are no relationships between the variables). The hypothesized model had a $\chi^2 = 25667.960$ on 109 df, p<.000. Although typically the significant chi-square statistic provides evidence for poor model fit, due to the large sample size, it is expected that this be rejected as a function of sample size (Boyd et al., 1988; Ratner et al., 1988). Examination of the other fit indices confirmed that the hypothesized model was a mediocre to poor fit for the covariance structure of the data (CFI = .895; RMSEA: .110). The standardized factor loadings demonstrated good loadings onto the latent factors (all factors were greater than .518; see Figure 4.1 for a visual of all factor loadings), so in order to attempt to improve model fit of the current measurement model, some modifications were attempted.

Figure 4.1. Hypothesized Measurement Model: Standardized Estimates.
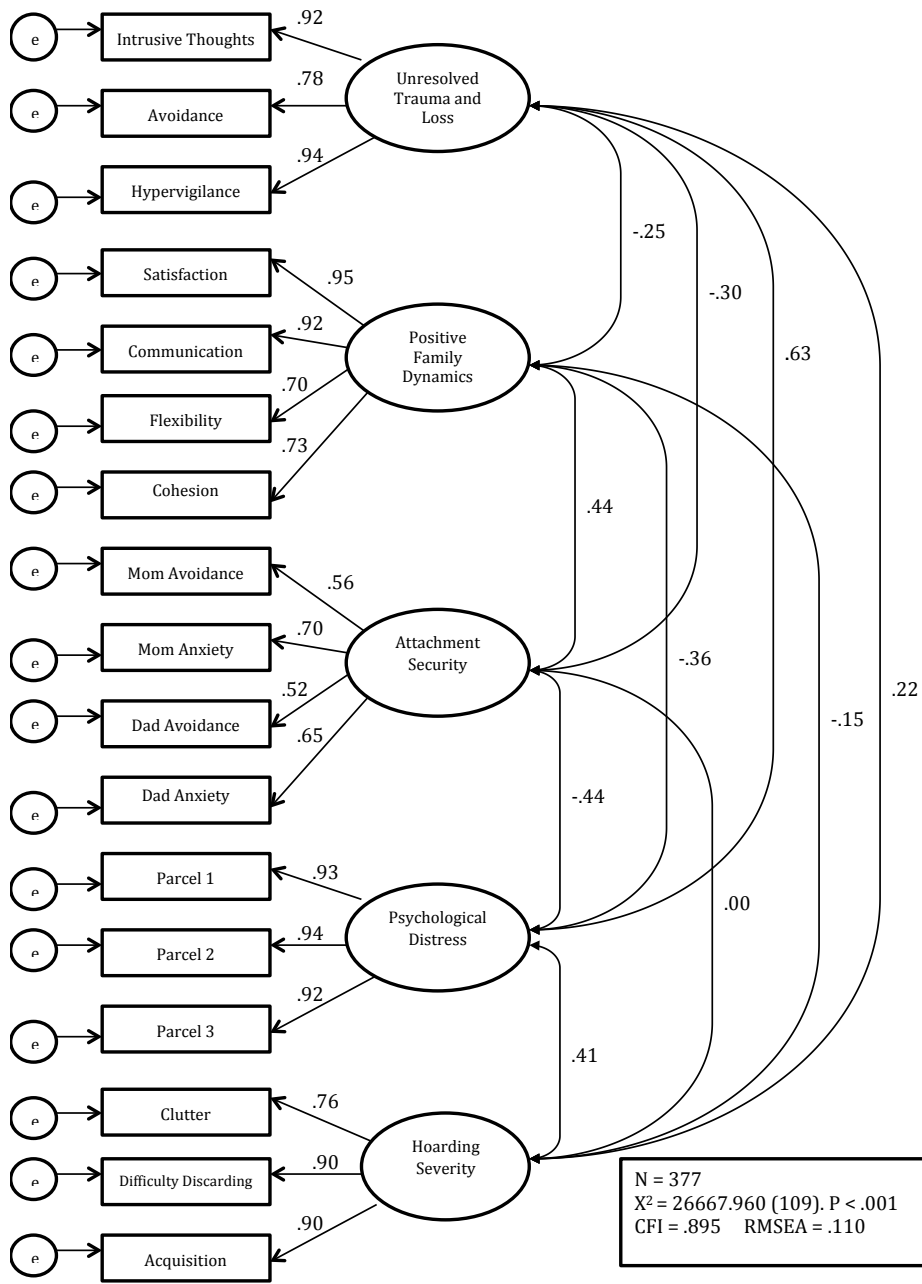
Note. Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root Mean Square of

Error Approximation (RMSEA).

Measurement Model Modification

The next step was the examination of the modification indices. Through this process, it was determined that best model fit occurred when the some of the error variances of the latent factors, were correlated with the other error variances under the respective indicator. Bivariate relationships were again examined and determined that all met good standards for proceeding with re-examination of modification indices (see Figure 4.2).

Figure 4.2. Full Measurement Model: Standardized Results.
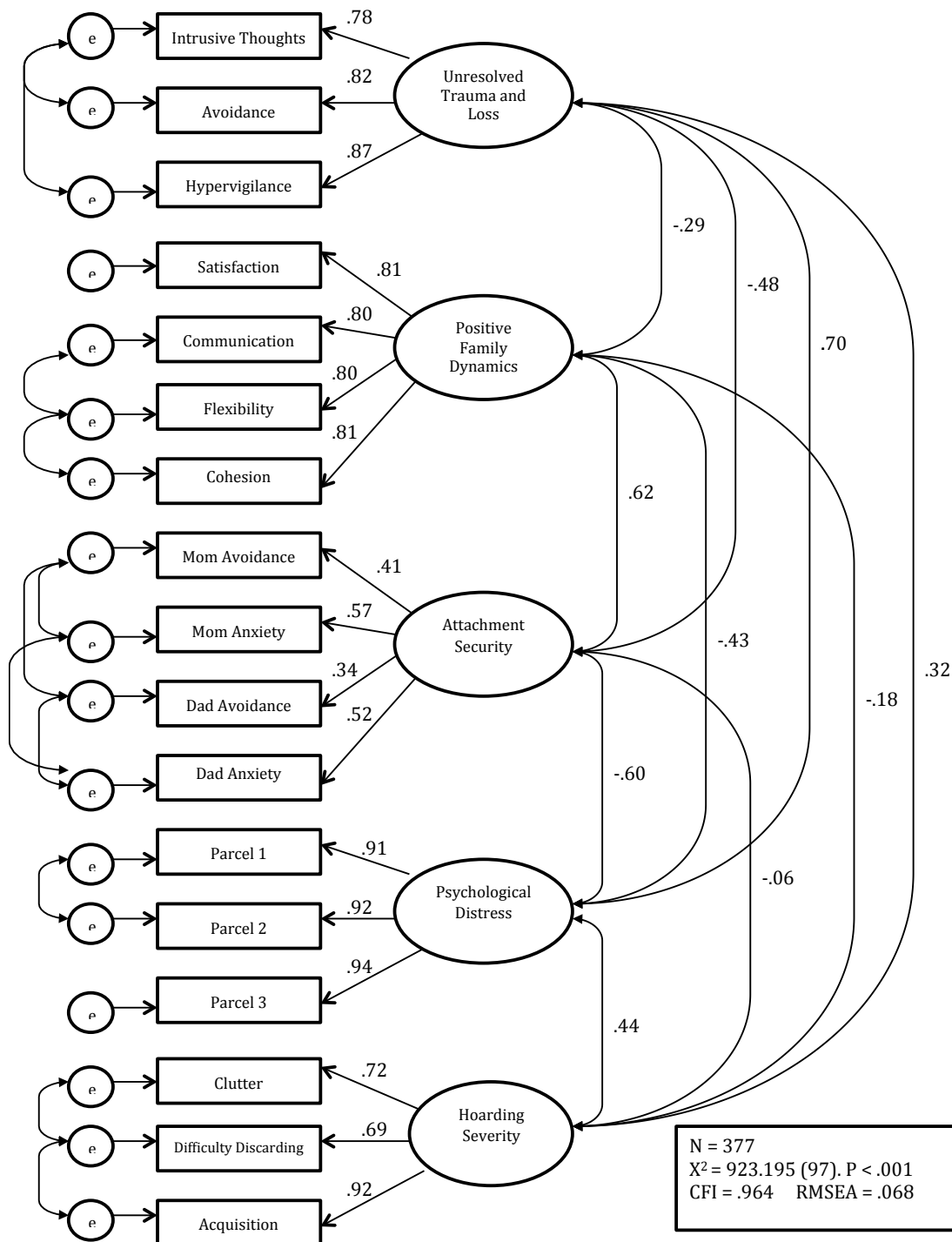
Note. Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root Mean Square of

Error Approximation (RMSEA).

Final Assessment of Measurement Model

   Validity and reliability. Evidence for the validity of the indicators used to

represent the constructs was assessed by methods described by Diamantopoulos and

Siguaw (2005). First of all, indicator loadings were examined for significance (at $p <$

.05). The measurement model with standardized values is depicted in Figure 4.2. All of

the lambda parameters (standardized results) that were freed for estimation were

significantly different than zero and greater than .30 (Kline, 2005). All standardized λ_x

were .516 and higher, with the exception of two of the attachment indicators, Avoidance

Dad (.343) and Avoidance Mom (.413). These λ_x values indicated that 15 of the 17

indicators loaded highly on their respective latent factors.

   Goodness of fit. The fit of the measurement model was evaluated using several

criteria as described in the methods chapter. For the first criterion, that of the chi-squared

statistic, the measurement model was rejected ($\underline{x^2 = (923.195(97), p < .001}$). However,

other fit indices suggested that the model was an acceptable to good fit for the data ($\underline{CFI}$

$\underline{= .964; RMSEA = .068}$). These data suggested that the rejection of the model using the

chi-square statistic was primarily attributable to the larger sample size.

   Next the error variances were examined; nonsignificant error variances may

indicate specification errors (Diamantopoulous & Siguaw, 2005). All of the error

variances in the final measurement model were found to be significant, signifying no

specification errors (See Table 4.4).

Table 4.4.

Proportion of Variance Explained

in Indicator Variables.

Indicator Variable	R-squared
Avoidance Mom	0.170
Anxiety Mom	0.325
Avoidance Dad	0.118
Anxiety Dad	0.266
Intrusion	0.600
Avoidance	0.675
Hypervigilance	0.758
Psych- Parcel 1	0.883
Psych- Parcel 2	0.841
Psych- Parcel 3	0.825
Communication	0.643
Satisfaction	0.663
Flexibility	0.632
Cohesion	0.661
Clutter	0.522
Discarding	0.478
Acquisition	0.850

Next the reliability of the indicators used to represent the constructs was assessed. First,

the squared multiple correlations (R^2) were assessed. The proportions of variance in each

indicator that was explained by its underlying latent variable ranged from .118

(Avoidance Dad, as expected from its lambda), to .883 (Hypervigilance) with 5 of the 17

indicators having an R^2 of greater than .700. With the exception of the attachment

indicators, all of the R^2 were at least .478.

Finally, the composite reliability value (alpha) for each latent variable and its

related average amount of variance extracted was calculated. A composite reliability

greater than .60 provided evidence that indicators were reliable measures of the construct.

Next, the intra-class correlated coefficient (ICC) was calculated to reveal the amount of

variance that was captured by the construct in relation to the amount of error variance. As

expected from the reported values of the lambdas, the composite reliabilities were above

.776. Likewise, the ICCs exceeded the desired .50. In summary, the composite

reliabilities and composite average variances extracted for the constructs were reliable.

See Table 4.5.

Table 4.5

Means, Standard Deviations, and Reliabilities for Indicator Variables

Observed Variable	M	SD	min	max	alpha	IIC
Avoidance Mom	3.568	1.780	1.00	7.00	**0.923**	.483-.898
Anxiety Mom	4.924	1.860	1.00	7.00	**0.888**	.682-.748
Avoidance Dad	3.599	1.705	1.00	7.00	**0.918**	.468-.823
Anxiety Dad	5.006	1.830	1.00	7.00	**0.900**	.723-.778
Intrusion	1.160	1.209	0.00	4.00	**0.929**	.468-.723
Avoidance	1.072	0.926	0.00	3.88	**0.885**	.324-.663
Hypervigilance	0.949	1.100	0.00	4.00	**0.908**	.568-.677
Psych- Parcel 1	0.785	0.676	0.00	3.24	**0.776**	.495-.602
Psych- Parcel 2	1.090	0.831	0.00	3.67	**0.862**	.672-.715
Psych- Parcel 3	0.666	0.654	0.00	2.87	**0.841**	.563-.721
Cohesion	2.115	1.564	0.27	7.73	*	*
Flexibility	1.274	0.800	0.19	5.42	*	*
Communication	30.267	10.047	10.00	50.00	**0.939**	.405-.747
Satisfaction	26.000	9.885	10.00	50.00	**0.957**	.409-.852
Clutter	21.650	10.502	9.00	45.00	**0.962**	.609-.868
Discarding	17.049	6.942	7.00	34.00	**0.950**	.632-.834
Acquisition	15.272	6.103	7.00	32.00	**0.919**	.515-.759

Note. ICC refers to intra-class correlation coefficient. See ratio for composite variable in (Olson, 2011).

Interrelations among latent factors. Standardized covariances among the latent variables were examined in the measurement model as well, and are presented in Figure 2. All of the correlations were in the direction hypothesized.

Structural Equation Analysis Model Results by Research Question

      Assessment of Structural Models. In order to answer the remaining research

questions of interest, a series of path analysis models were constructed and tested. The

purpose of these tests is to assess whether the full model or the simpler, nested model

should be chosen as a closer fit to the data structure. The central hypothesis of this

research was that the relationships as depicted in the proposed structural model (see

Figure 4.3) would be a good fit for the data from people who hoard and their family

members.

Figure 4.3. Full Hypothesized Structural Model.
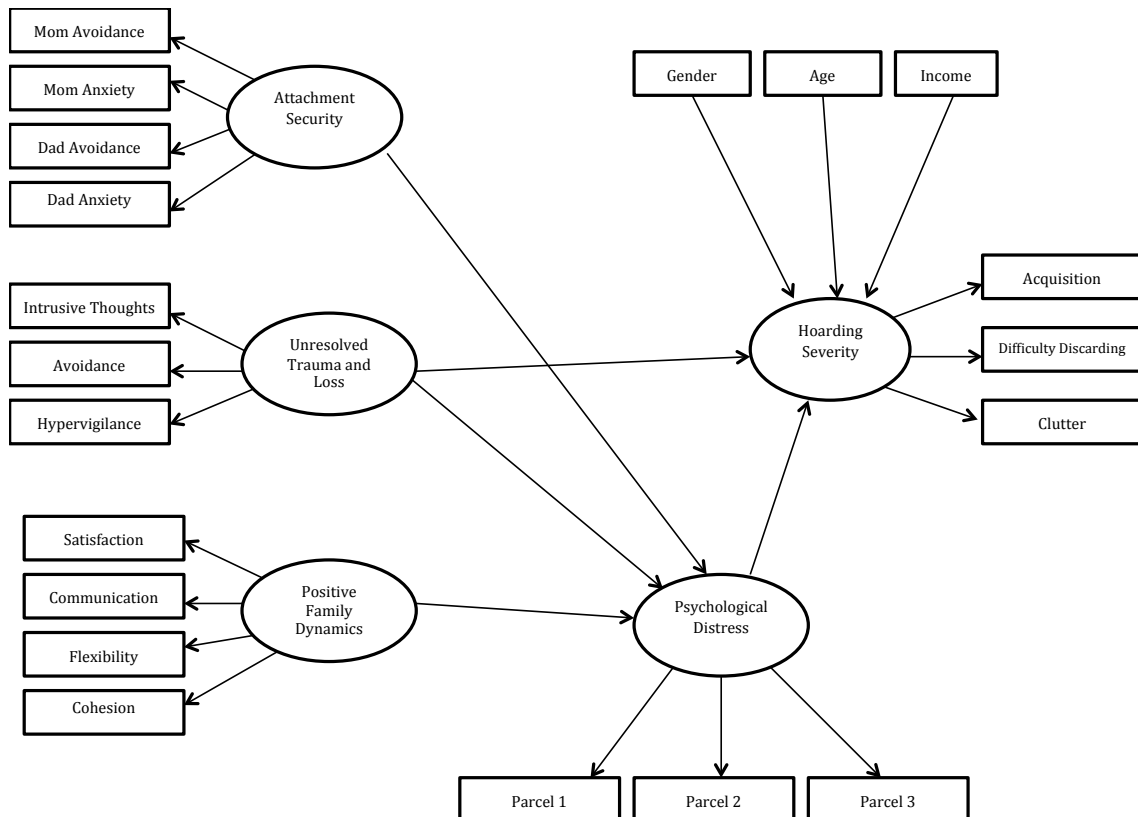
Assessment of Model Fit

  Research Questions. For the first four research questions, model fit analyses were conducted on the hypothesized structural model shown in Figure 4.3. In addition to examining the direct relationships among and between latent variables (RQ #1), particularly between unresolved trauma and loss, psychological distress and hoarding severity (RQ #2), a major aim was to assess whether attachment security (RQ #3) and positive family dynamics (RQ #4) moderate the relationship between unresolved trauma and loss, psychological distress, and hoarding severity. Psychological distress was posited to be a mediator between unresolved trauma and loss and hoarding severity (RQ #2), as well as between attachment security and hoarding severity and positive family dynamics and hoarding severity.

  RQ #2: Does psychological distress mediate the relationship between unresolved trauma and loss, attachment security, and/or positive family dynamics?

  In order to answer research question #2, a first version of the model that tested only the relationship between unresolved trauma and loss and hoarding severity was run in order to assess main effects and attain model fit statistics. This model is shown in Figure 4.4 below.

Figure 4.4. Nested model of Unresolved Trauma and Loss and Hoarding Severity (Standardized Estimates).
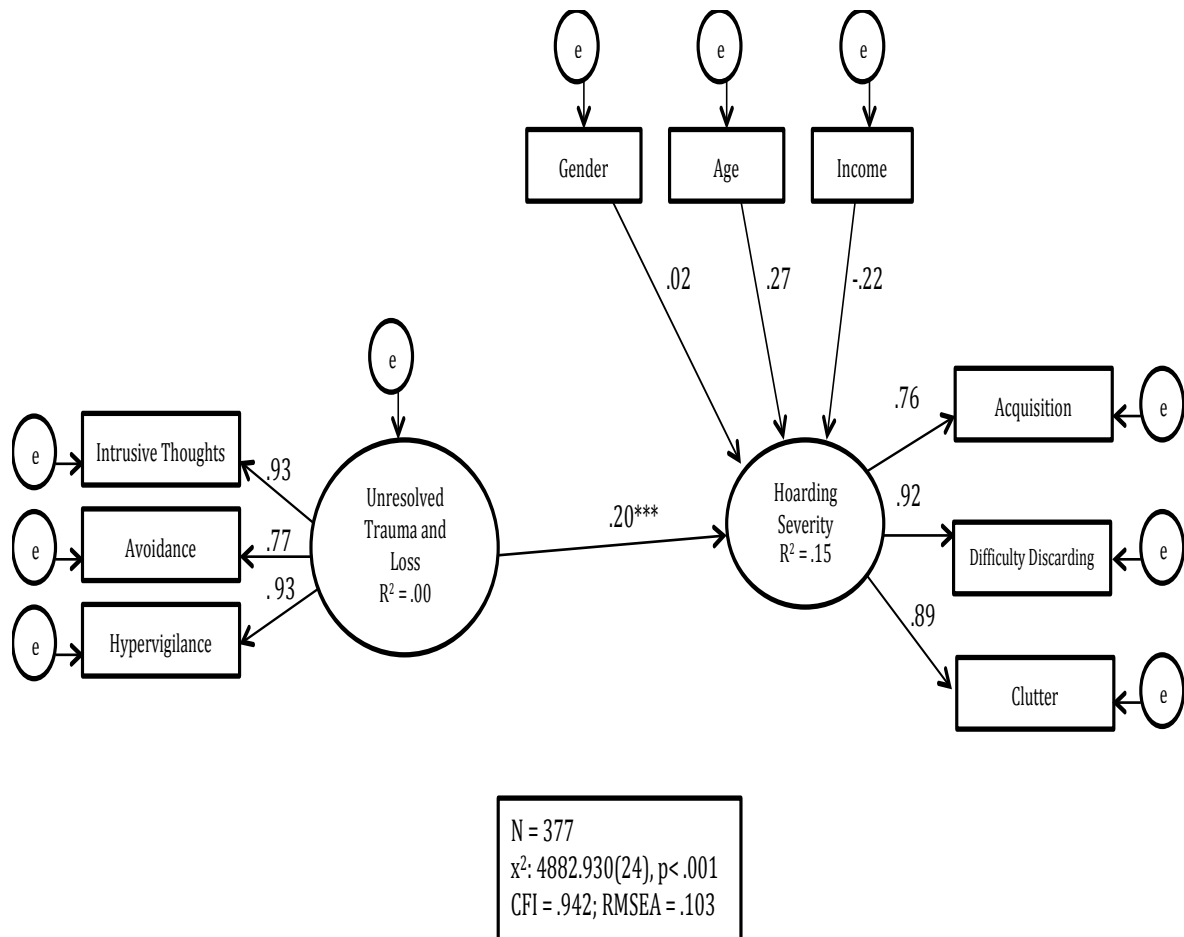
Note: All paths are significant at the p < .001 level. ***Notates the main pathways of interest. Fit indices: Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root Mean Square of Error Approximation (RMSEA). Gender age and income were allowed to co-vary (not shown in model).

As described in Figure 4.4, there was a positive relationship between Unresolved

Trauma and Loss and Hoarding Severity ($\beta = .20$, $p < .001$) Overall, the fit statistics

indicated that the model had mediocre fit to the data. The significant chi-square statistic

rejected the model (x^2: 4882.930(24), p< .001), and the other fit indices demonstrated mediocre to good fit (CFI = .942; RMSEA = .103).

In order to improve model fit, modification indices were examined and non-significant parameters were trimmed one by one in order to achieve a model with better fit for the data. The final model is presented in Figure XX. Overall, the fit was mediocre (x^2 = 2852.999(19), p < .001; CFI = .966, RMSEA = .089).

Figure 4.5. Structural Equation Nested Model of Unresolved Trauma and Loss and Hoarding Severity: Standardized Estimates.

N = 377
x^2: 2852.999(19), p < .001
CFI = .966, RMSEA = .089
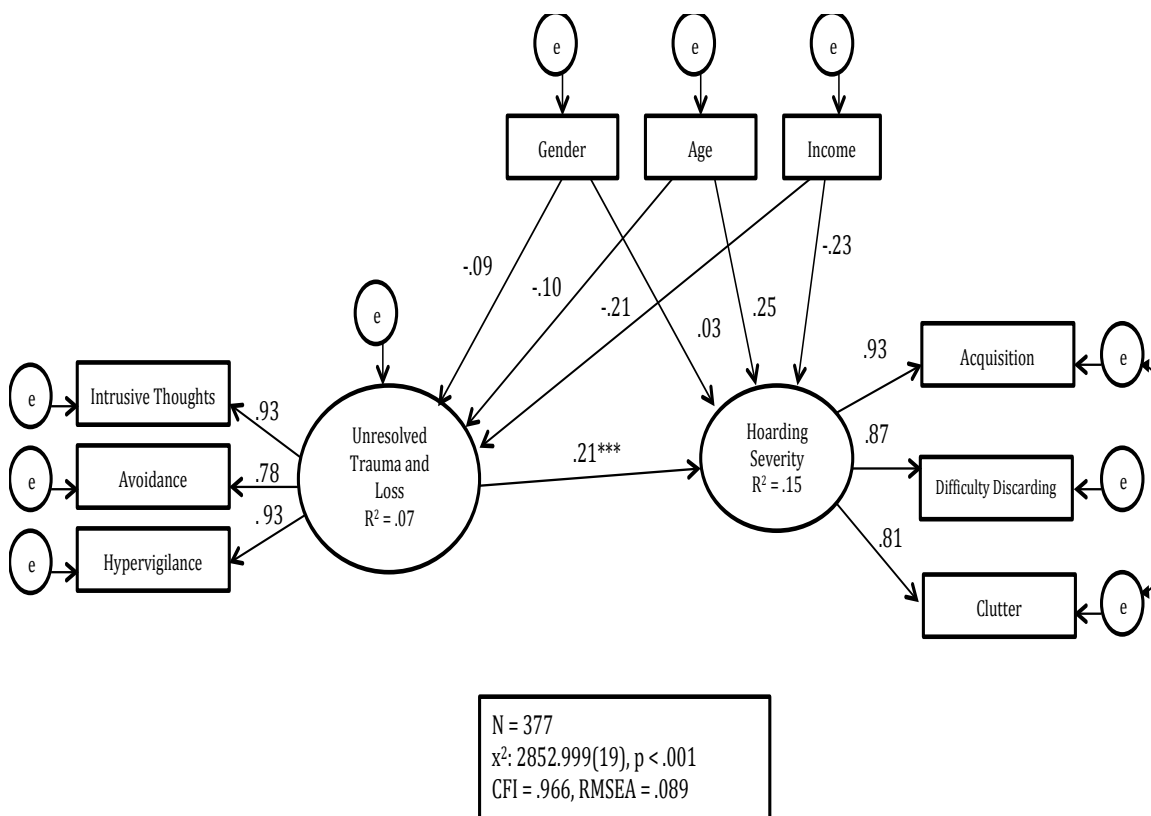
Note: All paths are significant at the p < .001 level. ***Notates the main pathways of interest.. Fit indices: Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root

Mean Square of Error Approximation (RMSEA). Gender age and income were allowed to co-vary (not shown in model).

Of note, the direct path estimate between unresolved trauma and loss and hoarding severity was significant at the .001 level with a standardized regression weight of .21, when controlling for age, income level, and gender. This model accounted for 15% variance in the outcome variable, hoarding severity.

Next, in order to assess for a mediation effect, the mediator variable, psychological distress was added to the model (see Figure 4.6). Initially, the fit statistics indicated that the model had mediocre to poor fit to the data. The significant chi-square statistic rejected the model (x^2 = 7987.706(52), p < .001), and the other fit indices demonstrated mediocre to good fit (CFI= .948, RMSEA = .090). This model accounted for 28% of the variance in the outcome variable, hoarding severity. In order to improve model fit, the model was examined for non-significant parameters. There were no non-significant parameters found in the model, so none were trimmed in order to achieve a model with better fit for the data.

Figure 4.6. Structural Equation Hypothesized Nested Model: Unresolved Trauma and Loss, Psychological Distress, and Hoarding Severity
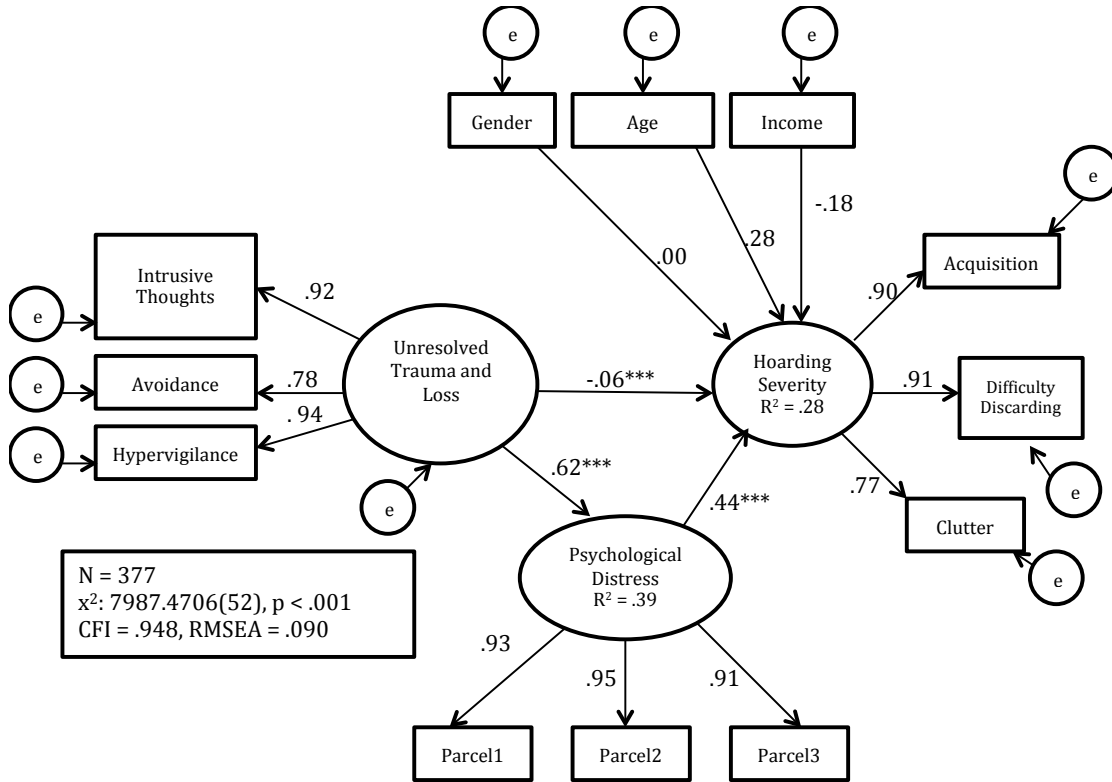
Note: All paths are significant at the p < .001 level. ***Notates the main pathways of interest. Fit indices: Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root Mean Square of Error Approximation (RMSEA). Gender age and income were allowed to co-vary (not shown in model).

The next step was the examination of the modification indices. These revealed that no modifications made by correlating the error variances of the observed variables would significantly improve the model. Although the chi-square statistic was significant for the final model for the first research question ($x^2 = 4543.465(38)$, p < .001), the other fit statistics (CFI= .971, RMSEA = .079) provided evidence that the chi-square rejection of the null was due to the large sample size. The standardized factor loadings demonstrated good loadings onto the latent factors (all factors were greater than .757), so

in order to attempt to improve model fit of the current measurement model, some

modifications were attempted. This model accounted for 32% of variance in the outcome

variable, hoarding severity. Figure 4.7 below illustrates all of the parameter estimates and

error covariances for this model.

Figure 4.7. Structural Model of Relationships between Unresolved Trauma and Loss, Psychological Distress, and Hoarding Severity with Parameter Estimates and Factor Loadings.

Note: All paths are significant at the p < .001 level, with the exception of the path between Unresolved Trauma and Loss and Hoarding Severity (B = .00, p = .759). ***Notates the main pathways of interest.. Fit indices: Chi-Square Statistic (x^2),

Comparative Fit Index (CFI), and Root Mean Square of Error Approximation (RMSEA). Gender age and income were allowed to co-vary (not shown in model).

Of interest to the research question #2, is the direct path regression weight between the latent variables, unresolved trauma and loss and hoarding severity (not significant in the mediator model). To examine mediation effects, change in this path between the two models was examined.

In order to test the significance of the mediated relationship, the Sobel (1982) test for mediated relationships was used. See Table 4.7 for estimates used in calculation.

Table 4.7. Unstandardized Regression Weights and Significance Levels.

Regression Weights	Estimate (unstandardized)	S.E.	p-value
UTL ← PD	0.412	0.005	.001
PD ← HS	3.890	.066	.001

The results of the Sobel test calculated the critical ratio as a test of whether the indirect effect of unresolved trauma and loss on hoarding severity via psychological distress was significantly different than zero, which is was (C.R. = 47.94, p< .001). In other words, psychological distress significantly and completely mediated the relationship between unresolved trauma and loss and hoarding severity.

Other things to note in this model are the significant correlations between the covariates- age (B = .287, p< .001), Income (B = -.195, p < .001), and gender (B = .073, p < .001)- and the output variable, hoarding severity, indicating that older adults and

adults with lower income levels, were more likely to have higher levels of hoarding severity than younger adults and those with higher income levels. Further the observed variables were found to be related to unresolved trauma and loss and psychological distress, as well (Age → UTL = -.073, p < .001; Income → UTL = -.228, p< .001; Gender → UTL = -.077, p< .001; Age → PD = -.061, p < .001; Income → PD = -.078, p< .001; Gender → PD = -.042, p< .001). This suggests that people who are younger and people with lower income have higher levels of unresolved trauma and loss as well as more psychological distress. Women were also found higher levels of unresolved trauma and loss and psychological distress; however, due to the large overrepresentation of this group in the sample, we only tentatively state this finding as conclusive. The full mediated model also accounted for the highest amount of variance (32%) in the outcome variable, hoarding severity.

Nested Model Path Analyses for Models with Interaction Terms

For the remaining research questions, structural equation analysis models were constructed and tested using the nested model approach because latent interaction terms were used in these analyses.

RQ #3: Does attachment security serve as a significant buffer between unresolved trauma and loss, psychological distress, and hoarding severity?

One of the main aims of this study was to test whether attachment security could moderate the relationship between unresolved trauma and loss and psychological distress in this sample of people who hoard and their family members. Figure 4.8 depicts the first path model that was tested which, as described above, excluded the latent interaction

term between unresolved trauma and loss and attachment security. (Note that this model also estimated correlations among residual variances of the observed exogenous variables although these are not shown in Figure 4.8 below.)

It is important to note that FIML can only be used to handle missing data on dependent variables, not on covariates. Therefore, cases that had missing data on the observed variables ("age, "gender, and "income" were allowed to covary in this model) were excluded from the model runs (even if the parameter was set to 0). The model below and subsequent ones had 382 cases instead of 389- still well above the minimum required sample size.

Figure 4.8. Path Model of Unresolved Trauma and Loss and Psychological Distress: Interaction Term Excluded (Standardized Parameter Estimates).
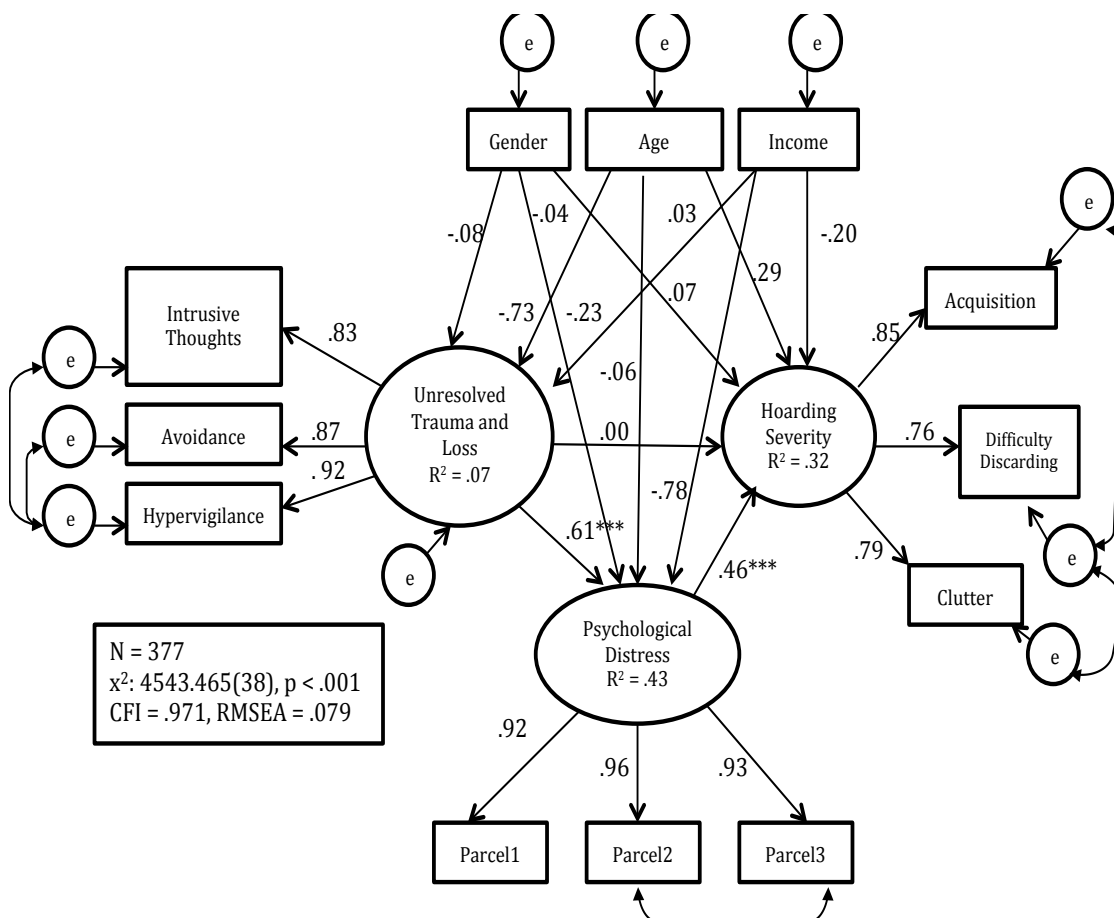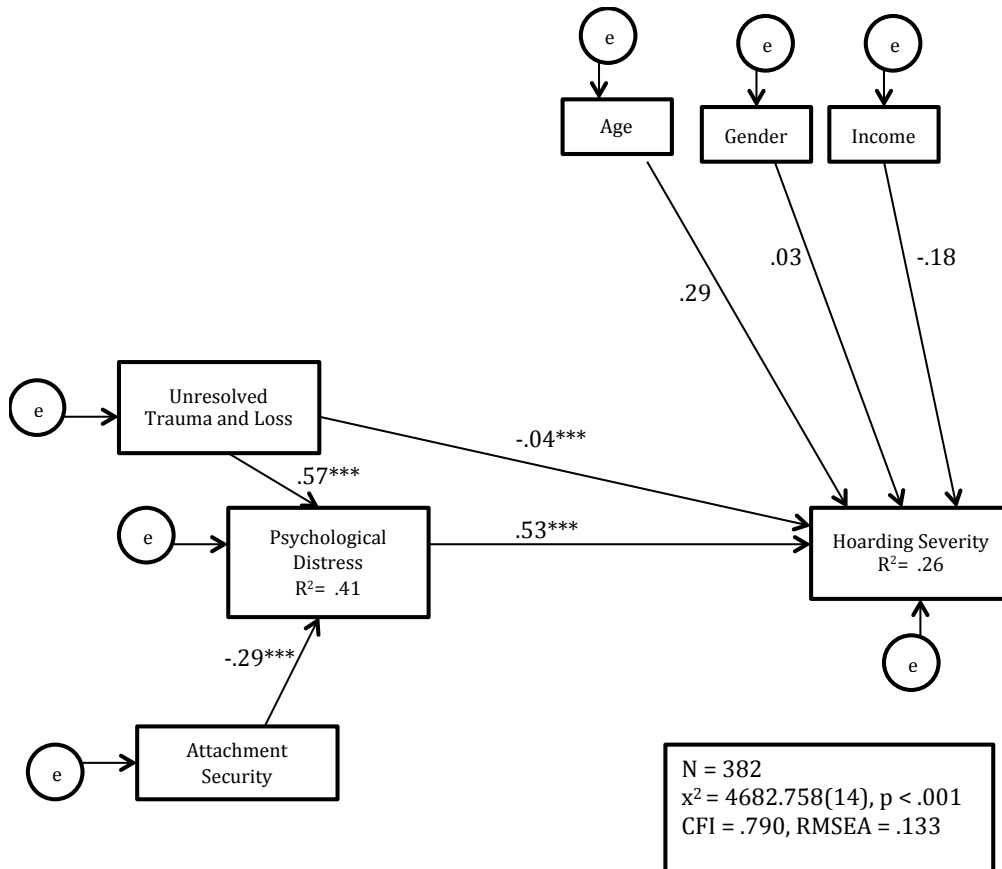

Note: All paths are significant at the p < .001 level. ***Notates the main pathways of interest. Fit indices: Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root Mean Square of Error Approximation (RMSEA). Gender age and income were allowed to co-vary (not shown in model).

Overall, this model had poor fit, $x^2 = 4682.758(14)$, p < .001, CFI = .790, RMSEA = .133. In order to improve model fit, modification indices were examined. Once modifications were made to the model, the resulting model had excellent model fit, $x^2 = 63.044(2)$, p < .001, CFI = .997, RMSEA = .040. All of the hypothesized relationships between variables reached statistical significance, namely the relationships between

unresolved trauma and loss and psychological distress (B = .534, p < .001) and between

attachment security and psychological distress (B = -.264, p < .001). In other words,

those who had higher levels of unresolved trauma and loss were more likely to have

higher levels of psychological distress; also, those who had higher levels of attachment

security were more likely to have decreased level of psychological distress. As expected,

the path between psychological distress and hoarding severity was also significant (B =

.482, p < .001). This model accounted for 29% of the variance in the outcome variable,

hoarding severity.

Figure 4.9. Nested Model of Unresolved Trauma and Loss, Psychological Distress, and Hoarding Severity: Testing for Attachment Security Moderator (No Interaction Term; Standardized Path Estimates.)
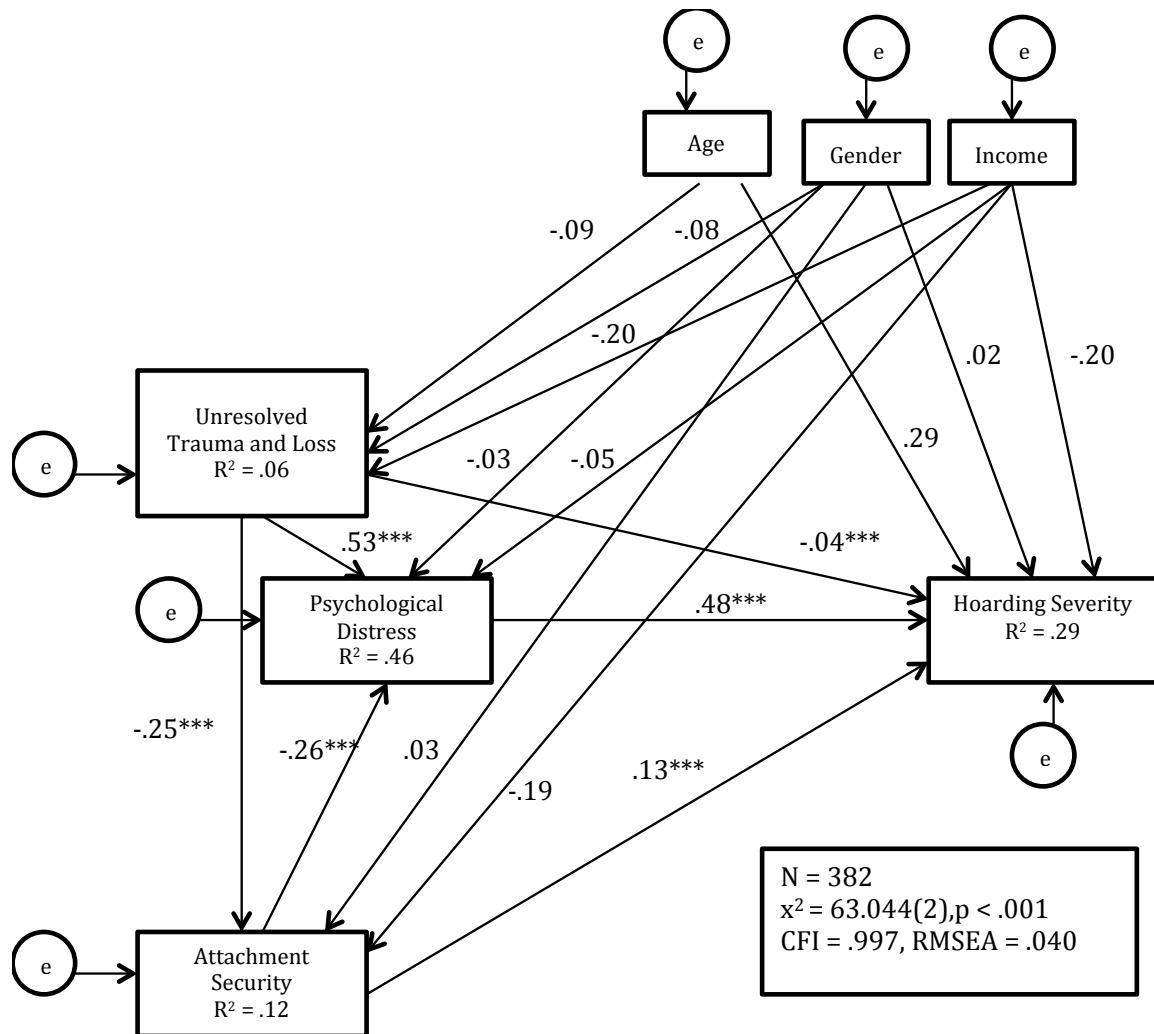
Note: All paths are significant at the p < .001 level. ***Notates the main pathways of interest.. Fit indices: Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root Mean Square of Error Approximation (RMSEA). Gender age and income were allowed to co-vary (not shown in model).

Modification indices suggested that paths between all three observed variables (income, age, and gender)- initially hypothesized simply to be covariates on hoarding severity- be drawn to unresolved trauma and loss, between income and gender and

attachment security, and between income and gender and psychological distress. Each of these paths were significant at the .001 level in the final structural model.

Modification indices also suggested that paths be drawn between unresolved trauma and loss and attachment security (B = -.250, p < .001), and between attachment security and hoarding severity (B = -.264, p < .001). Interestingly, the significance and direction in the relationship between attachment security and hoarding severity was a positive one, suggesting that the more secure an attachment relationship, the higher levels of hoarding severity a person would have. Related to this, the relationship between unresolved trauma and loss was also significant but in the reverse direction as expected (B = -.040, p <.001), suggesting that with higher levels of unresolved trauma and loss, lower levels of hoarding severity could be expected.

After determining that the fit indices suggested in this model, excluding the latent term fit the data relatively well, a series of models were run (beginning with the theoretical or investigator model) which included all of the hypothesized relationships, including the latent interaction term. Table 4.8 below includes the unstandardized parameter estimates for the different model runs. As mentioned above, it is not possible to attain traditional fit indices and standardized estimates for these sorts of models. Therefore, unstandardized parameter estimates and their p-values were examined in order to evaluate model fit.

Table 4.8. Attachment Security Model: Unstandardized Parameter Estimates and Significance Values

	Path Models						
	Latent Interaction Term Omitted			Investigator Model		Nested Model	
	Est.	SE	Std. Est	Est.	SE	Est.	SE
Income - UTL	-0.094	0.003	-0.203	-0.097	0.003	-0.094	0.003
Age - UTL	-0.073	0.006	-0.091	-0.065	0.006	-0.073	0.006
Gender - UTL	-0.288	0.025	-0.082	-0.305	0.024	-0.288	0.025
UTLxAS -- UTL	na	na	na	-0.2	0.007	set to 0	set to 0
UTL -- AS	-0.329	0.009	-0.25	-0.313	0.009	-0.329	0.009
Income -- AS	0.114	0.004	0.188	0.117	0.004	0.114	0.004
Gender -- AS	0.156	0.032	0.034	0.166	0.032	0.156	0.032
UTLxAS -- AS	na	na	na	0.069	0.009	set to 0	set to 0
UTL -- PD	0.33	0.003	0.534	0.317	0.004	0.33	0.003
AS -- PD	-0.124	0.003	-0.264	-0.121	0.003	-0.124	0.003
Income -- PD	-0.014	0.002	-0.049	-0.017	0.002	-0.014	0.002
Gender -- PD	-0.06	0.012	-0.028	-0.07	0.012	-0.06	0.012
UTLxAS -- PD	na	na	na	-0.061	0.003	set to 0	set to 0
Age --HS	1.222	0.027	0.281	1.216	0.027	1.222	0.027
Gender --HS	0.502	0.119	0.026	0.571	0.118	0.502	0.119
Income --HS	-0.501	0.016	-0.199	-0.482	0.016	-0.501	0.016
PD -- HS	4.243	0.074	0.482	4.362	0.074	4.243	0.074
UTL --HS	-0.217	0.043	-0.04	-0.172	0.043	-0.217	0.043
AS -- HS	0.551	0.029	0.133	0.548	0.028	0.551	0.029
HS -- UTLxAS	na	na	na	0.391	0.033	set to 0	set to 0

Note: All direct effects listed above are significant at the p < .001 level. UTL = Unresolved trauma and loss; AS = Attachment Security; PD = Psychological Distress; HS = Hoarding Severity; UTLxAS = Interaction Term- Unresolved Trauma x Attachment Security

As can be seen in Table 4.8 above, all of the direct effects in the investigator model were statistically significant. Further, all paths from observed variables to latent variables were significant, so no model trimming was conducted for this analysis and parameter estimates for the nested model remained very similar to the original model in these iterations.

Figure 4.10. Full Structural Model Accounting for Moderating Effects Attachment Security between Unresolved Trauma and Loss and Psychological Distress on Hoarding Severity.
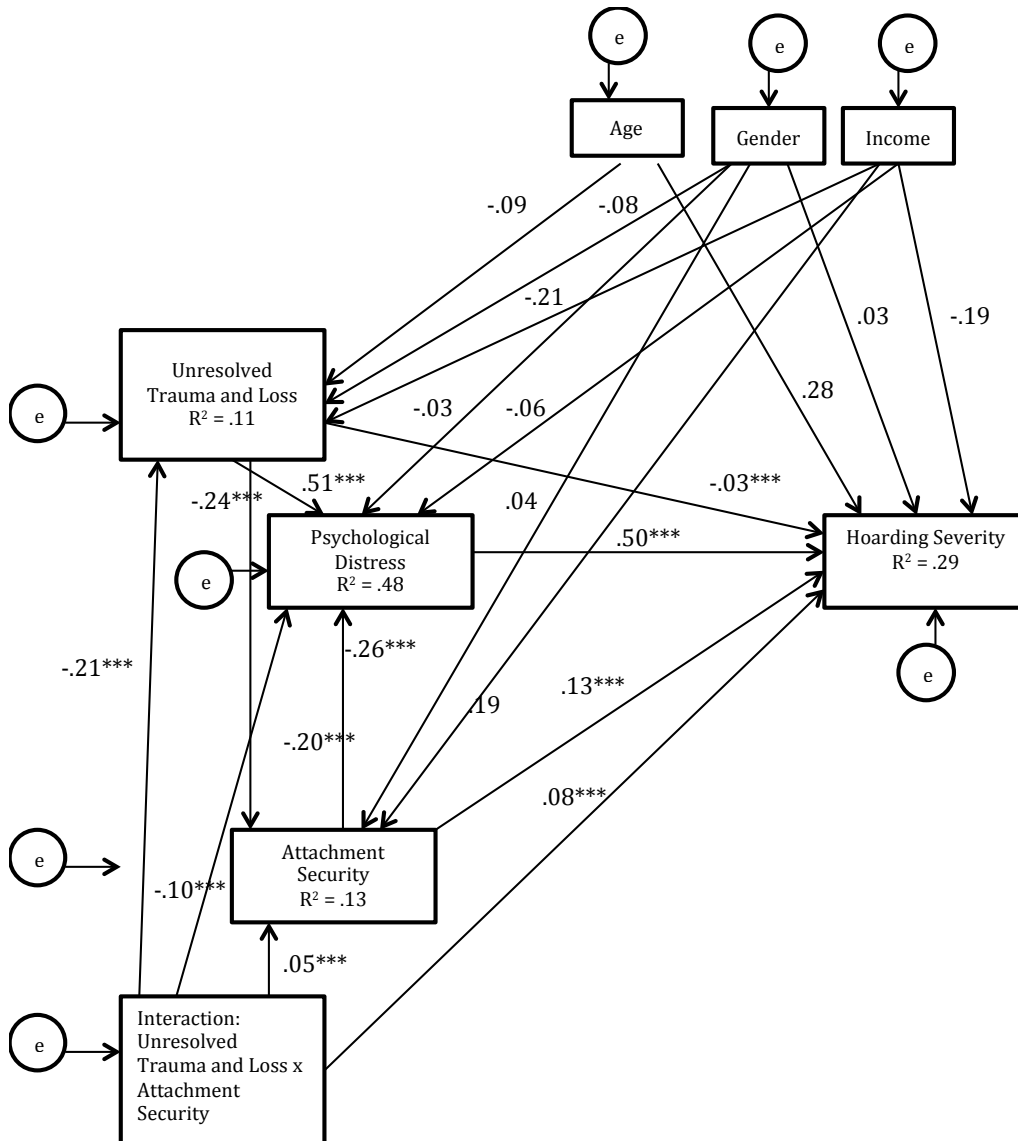
Note: All paths are significant at the p < .001 level. ***Notates the main pathways of interest. N = 378; Gender, age, and income were allowed to co-vary (not shown in model).

Once these models were run, a chi-square difference test utilizing log-likelihoods

values of each model was estimated. Table 4.9 below summarizes this test.

Table 4.9. Chi-square Test for Unresolved Trauma and Loss and Hoarding Model: Testing significance of interaction between Unresolved Trauma and Loss and Attachment Security.

	Loglikelihood Value	Number of Free Parameters (df)
Nested Model	1579.819	9
Full Model	126.112	5
Difference	1453.707	4

Note: Chi-square difference p-value < .001

As can be seen above, the chi-square difference value (TRd) obtained was < .001. Given that for four degrees of freedom, the TRd has to be at least 9.49 (at a p < .05 level of significance) in order for the test to be significant, it was determined that the test was indeed significant and thus, the full model that contains the interaction term should be chosen. In other words, including the interaction term in the structural equation model did improve model fit indicating that attachment security did significantly moderate the relationship between unresolved trauma and loss and psychological distress, with higher levels of attachment security resulting in weaker relationship between unresolved trauma and loss and psychological distress, and with lower levels of attachment security resulting in a stronger relationship between unresolved trauma and loss and psychological distress. This model was able to account for 29% of the variance in the outcome variable, hoarding severity.

RQ #4: Do positive family dynamics serve as a significant buffer between unresolved trauma and loss, psychological distress, and hoarding severity?

For the next research question, the aim was to assess whether positive family dynamics moderated the relationship between unresolved trauma and loss, psychological distress, and hoarding severity for this sample. Figure 4.11 depicts the first path model that was tested which, as described above, excluded the latent interaction term between unresolved trauma and loss and attachment security. (Note that this model also estimated correlations amongst residual variances of the observed exogenous variables although these are not shown in Figure 4.11 below.)

Overall, the initial model had poor fit, $x^2 = 2889.922(9)$, $p < .001$, CFI = .857, RMSEA = .130. In order to improve model fit, modification indices were examined and modifications were made based on these recommendations. Once modifications were made, the resulting model had excellent model fit, $x^2 = 78.5(4)$, $p < .001$, CFI = .996, RMSEA = .031. This model accounted for 28% of the variance of the outcome variable, hoarding severity. All of the hypothesized relationships between variables reached statistical significance, namely the relationships between unresolved trauma and loss and psychological distress (B = .559, $p < .001$) and between positive family dynamics and psychological distress (B = -.201, $p < .001$). In other words, those who had higher levels of unresolved trauma and loss were more likely to have higher levels of psychological distress; also, those who had higher levels of positive family dynamics were more likely to have decreased levels of psychological distress. As expected, the path between psychological distress and hoarding severity was also significant (B = -.042, $p < .001$).

Figure 4.11. Structural Equation Model of Unresolved Trauma and Loss, Psychological Distress, and Hoarding Severity: Positive Family Dynamics x Unresolved Trauma and Loss Interaction Term Excluded (Standardized Parameter Estimates).
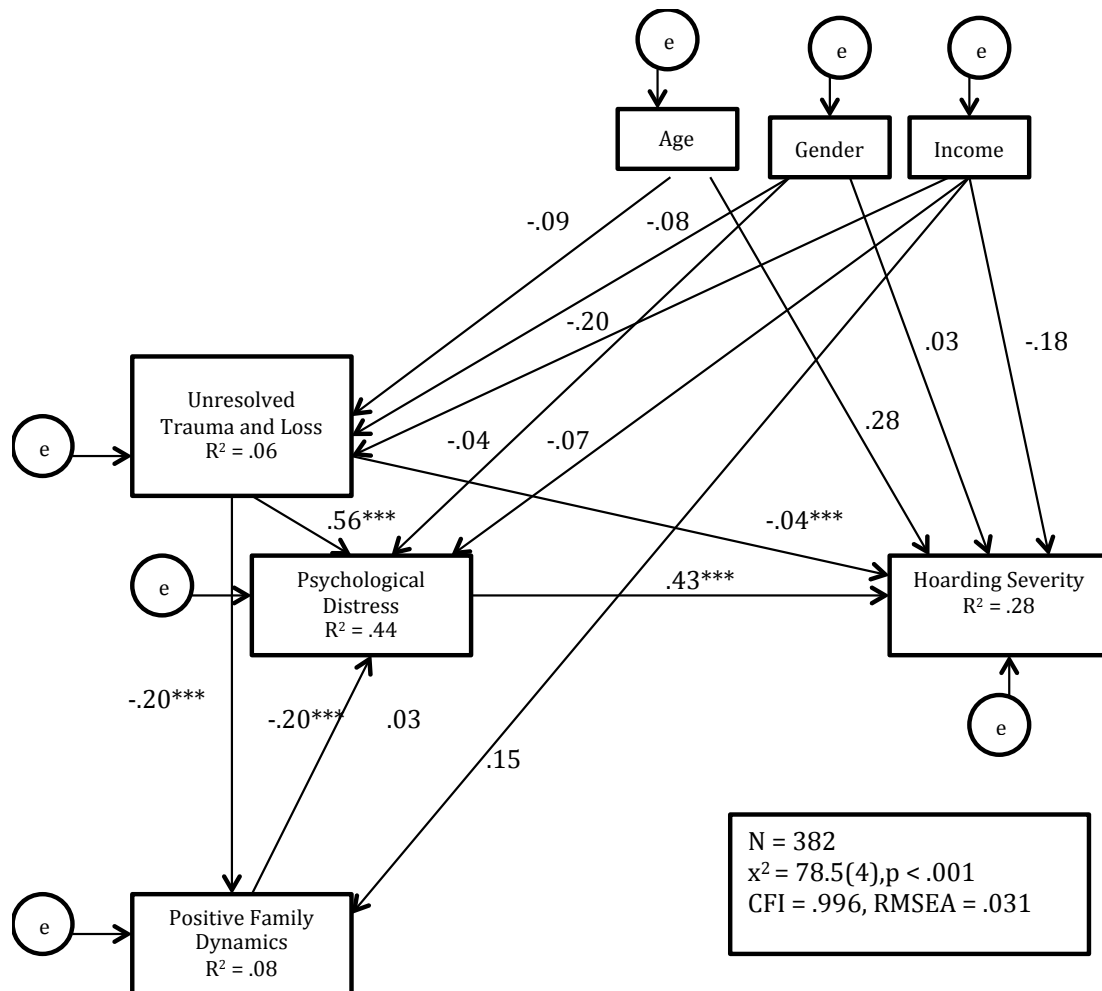
Note: All paths are significant at the p < .001 level. ***Notates the main pathways of interest. Fit indices: Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root Mean Square of Error Approximation (RMSEA). Gender age and income were allowed to co-vary (not shown in model).

Modification indices suggested that paths between all three covariates (income, age, and gender) be drawn to unresolved trauma and loss, between income and gender

and attachment security; between income and positive family dynamics; and between income and gender and psychological distress. Each of these paths was significant at the .001 level in the final structural model. Modification indices also suggested that paths be drawn between unresolved trauma and loss and positive family dynamics (B = -.204, p < .001). This relationship suggests that higher levels of positive family dynamics are related to lower levels of unresolved trauma and loss.

After determining that the fit indices suggested in this model, excluding the latent term, fit the data relatively well, a series of models was run (beginning with the theoretical or investigator model) which included all of the hypothesized relationships, including the latent interaction term. Table 4.10 below includes the unstandardized parameter estimates for the different model runs. As mentioned above, it is not possible to attain traditional fit indices and standardized estimates for these sorts of models. Therefore, unstandardized parameter estimates and their p-values were examined in order to evaluate model fit.

Table 4.10. Positive Family Dynamics Moderator Model: Unstandardized Parameter Estimates and Significance Values

	Path Models						
	Latent Interaction Term Omitted			Investigator Model		Nested Model	
	Est.	SE	Std. Est	Est.	SE	Est.	SE
Income - UTL	-0.094	0.003	-0.203	-0.095	0.003	-0.094	0.003
Gender - UTL	-0.288	0.025	-0.082	-0.282	0.025	-0.288	0.025
Age - UTL	-0.073	0.006	-0.091	-0.073	0.006	-0.073	0.006
UTLxPFD --UTL	na	na	na	-0.092	0.006	set to 0	set to 0
UTL -- PFD	-0.203	0.007	-0.204	-0.198	0.007	-0.203	0.007
Income -- PFD	0.071	0.003	0.154	0.072	0.003	0.071	0.003
UTL -- PD	0.346	0.004	0.559	0.045	0.006	0.346	0.004
Income -- PD	-0.019	0.002	-0.068	0.34	0.004	-0.019	0.002
Gender -- PD	-0.086	0.012	-0.039	-0.083	0.012	-0.086	0.012
PFD -- PD	-0.125	0.004	-0.201	-0.122	0.003	-0.125	0.004
UTLxPFD -- PD	na	na	na	-0.06	0.003	set to 0	set to 0
Age --HS	1.227	0.027	0.281	1.224	0.027	1.227	0.027
Gender --HS	0.552	0.12	0.029	0.553	0.12	0.552	0.12
Income --HS	-0.451	0.016	-0.179	-0.458	0.016	-0.451	0.016
PD -- HS	3.788	0.071	0.43	3.733	0.071	3.788	0.071
UTL --HS	-0.229	0.043	-0.042	-0.228	0.043	-0.229	0.043
HS -- UTLxPFD	na	na	na	-0.167	.032	set to 0	set to 0

Note: All direct effects listed above are significant at the p < .001 level. UTL = Unresolved trauma and loss;PFD = Positive Family Dynamics; PD = Psychological Distress; HS = Hoarding Severity; UTLxPFD = Interaction Term- Unresolved Trauma x Positive Family Dynamics

As can be seen in Table 4.10 above, all of the direct effects in the investigator model were statistically significant. Further, all paths from control variables to latent variables were significant, so no model trimming was conducted for this analysis and parameter estimates for the nested model remained very similar to the original model in these iterations.

Figure 4.12. Hypothesized Model.

Full Structural Model Accounting for Moderating Effects Positive Family Dynamics between Unresolved Trauma and Loss and Psychological Distress on Hoarding Severity.
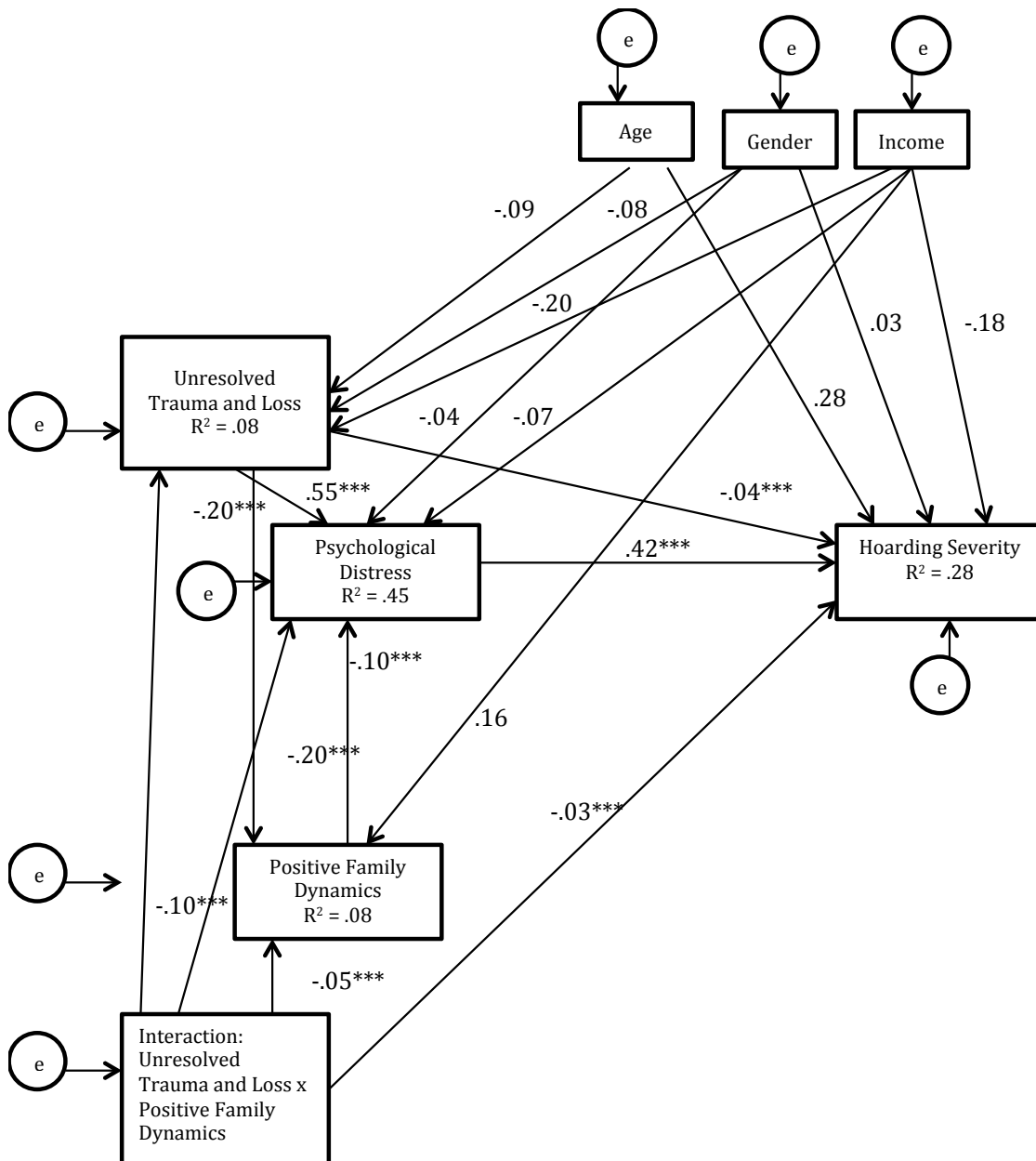
Note: All paths are significant at the p < .001 level. ***Notates the main pathways of interest. N = 378; Gender, age, and income were allowed to co-vary (not shown in model).

Once these models were run, a chi-square difference test utilizing log-likelihoods values of each model was estimated. Table 4.11 below summarizes this test.

Table 4.11. Chi-square Test for Unresolved Trauma and Loss and Hoarding Model: Testing significance of interaction between Unresolved Trauma and Loss and Positive Family Dynamics.

	Loglikelihood Value	Number of Free Parameters (df)
Nested Model	748.034	11
Full Model	105.197	7
Difference	642.837	4

Note: Chi-square difference p-value < .001

As can be seen above, the chi-square difference value (TRd) obtained was < .001. Given that for four degrees of freedom, the TRd has to be at least 9.49 (at a p < .05 level of significance) in order for the test to be significant, it was determined that the test was indeed significant and thus, the full model that contains the interaction term should be chosen. In other words, including the interaction term in the structural equation model did improve model fit indicating that positive family dynamics did significantly moderate the relationship between unresolved trauma and loss and psychological distress. In other

words, higher levels of positive family dynamics predicted a reduced effect of unresolved trauma and loss on a person's level of psychological distress.

RQ#1: Are there direct relationships between the outcome variable, hoarding severity, and the latent variables, unresolved trauma and loss, attachment security, positive family dynamics, and psychological distress?

Based on the results of the analysis of the structural models among latent factors, it can be determined that the answer to research question #1 is that there are there are positive direct relationships (significant at the $p < .001$ level) between the outcome variable, hoarding severity, and the latent variables, unresolved trauma and loss and psychological distress, and psychological distress was found to fully mediate the relationship between unresolved trauma and hoarding, supporting the hypotheses. There was also found to be no significant direct relationship between positive family dynamics and hoarding severity, which did not support the hypothesis. Though attachment security was found to have a direct relationship to the outcome variable, hoarding severity, it was not significant in the direction hypothesized (i.e. it was a positive relationship, rather than a negative one), suggesting the possibility of measurement bias, as well as highlighting the need for future studies.

Exploratory Analysis

Exploratory Question #1: Is there a difference in model fit between participants at different levels of hoarding severity? If so, why do the differences exist?

The main aim of this study was to examine contributors to hoarding behavior and severity; thus, all participants' reports on their own hoarding behavior were examined in

these analyses, despite whether or not they identified themselves as someone who hoards. However, because studies on clinical samples of people who hoard have found significant differences between clinical and non-clinical samples, this study also sought to test whether the model of unresolved trauma, psychological distress, and hoarding severity would fit for participants across levels of hoarding severity, thus comparing those who reported no to low hoarding severity (composite hoarding severity score of 23-38; n = 122, 31.6%), those who reported moderate hoarding severity (composite score: 39-60; n = 123, 31.9%), and those who reported severe hoarding severity (composite score: 61-103; n = 141, 36.5%).

To do this, data was first analyzed for measurement invariance across groups. The goal of testing for measurement invariance is to determine if the same SEM model is applicable across groups. The general procedure is to test measurement invariance between the unconstrained model for all groups combined, then for a model with constrained parameters (parameters are constrained to be equal between groups). If the chi-square statistic is not significant between the original and constrained models, then we conclude that the model has measurement invariance across groups. If invariance was found, multiple group testing would occur.

Although specific hypotheses were not formulated, given the differences that exist between clinical and non-clinical samples (e.g. Samuels et al., 2007), it was expected that relationships between variables in the model would differ between groups. In order to test the difference in model fit between groups, a multi-group comparison was run using AMOS software.

A full model that included the moderating variables that were tested in the main analyses was used in the model comparison between participant groups (those who identified as a person who hoards versus those who did not). Factor loadings were constrained and set to equal across both groups in order to examine model invariance according to the protocol set forth by Kline (2005). The results from this model comparison (x^2 = 1098.090, p < .001; CFI = .957; RMSEA = .069; hoarding severity: R^2 = .28; see Figure 4.13) suggest that imposing the additional restrictions of sixteen equal factor loadings across the participant groups did result in measurement invariance. Thus, the baseline model is rejected and a group-invariant factor pattern is not supported by the sample data. In other words, there appear to be differences in model fit between levels of hoarding severity.

Figure 4.13. Model used for Invariance Testing in Exploratory Analysis.
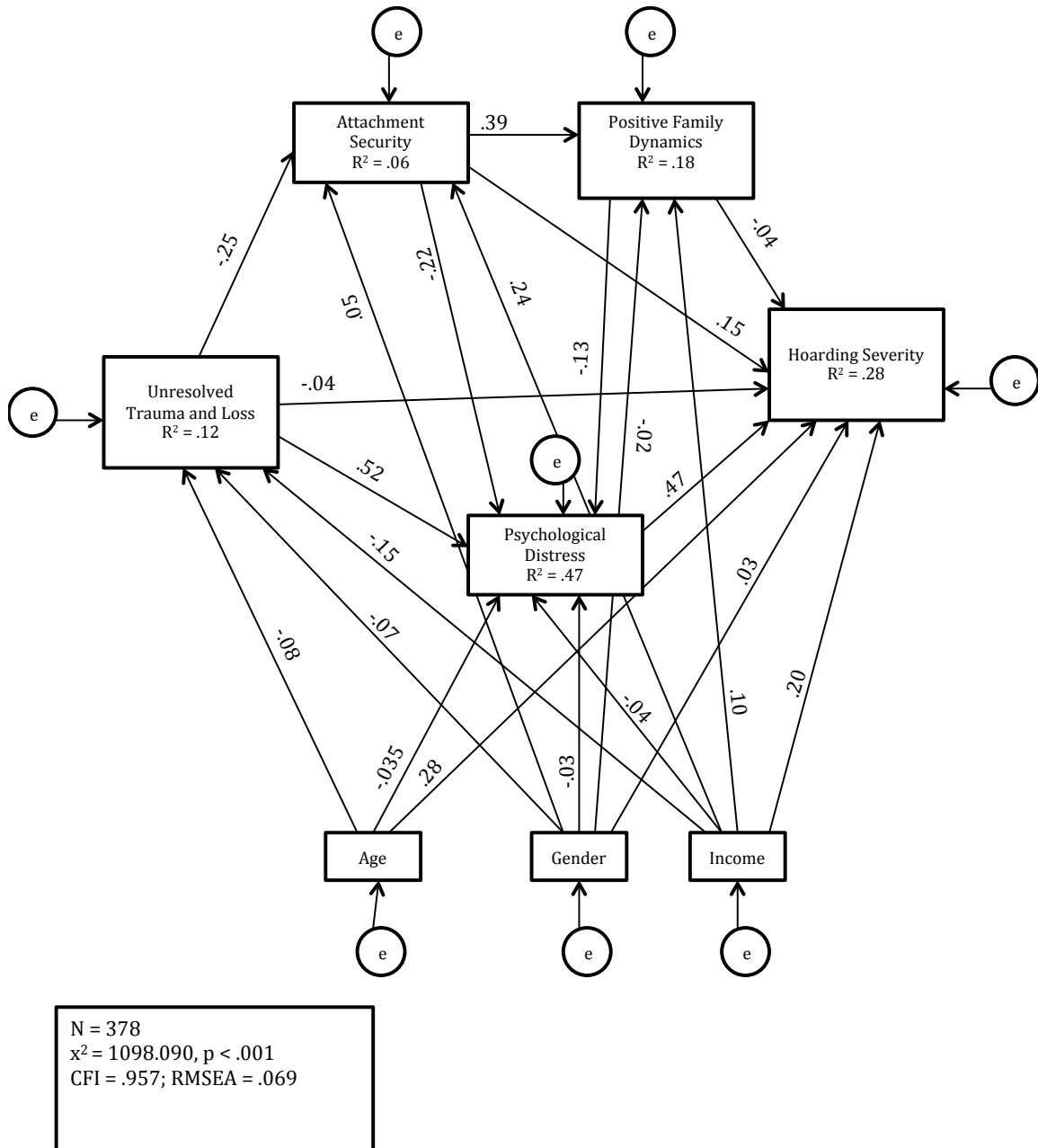
Note: All paths are significant at the $p < .001$ level. Fit indices: Chi-Square Statistic (x^2), Comparative Fit Index (CFI), and Root Mean Square of Error Approximation (RMSEA). Gender age and income were allowed to co-vary (not shown in model).

Since non-invariance was found, we needed to examine what was causing this within the model.

Post hoc tests

A one-way ANOVA was conducted to examine whether there were statistically significant differences among hoarding severity groups in relation to the different latent variables: unresolved trauma and loss, psychological distress, hoarding severity, attachment security, and positive family dynamics (see Table 4.11).

Table 4.11. Group differences (means, standard deviation, and range) of latent variables by levels of hoarding severity.

	No to Low Hoarding				Moderate Hoarding			
	M	SD	Min	Max	M	SD	Min	Max
Unresolved Trauma and Loss	0.91	0.93	0	3.57	1.12	0.96	0.00	3.74
Psychological Distress	0.62	0.61	0	3.2	0.96	0.67	0.00	3.08
Attachment Security	4.22	1.38	1	7	4.36	1.19	1.00	6.79
Positive Family Dynamics	0.09	0.95	-1.52	3	-0.03	0.81	-1.43	2.24
Hoarding Severity	36.17	7.43	23	49	61.02	6.63	50.00	73.00

	High Hoarding				Total			
	M	SD	Min	Max	M	SD	Min	Max
Unresolved Trauma and Loss	1.33	0.92	0.00	3.65	1.06	0.95	0.00	3.74
Psychological Distress	1.20	0.70	0.00	3.15	0.84	0.69	0.00	3.20
Attachment Security	4.21	1.23	1.33	6.96	4.25	1.30	1.00	7.00
Positive Family Dynamics	-0.18	0.76	-1.51	1.73	0.00	0.88	-1.52	3.00

Hoarding Severity	83.38	7.79	74.00	103.00	53.95	21.20	23	103

Group differences for Unresolved Trauma and Loss. The results revealed statistically significant differences in unresolved trauma and loss among the hoarding groups, $F (2, 3857) = 67.219$, $p < .001$. Post hoc Games-Howell tests revealed statistically significant differences between individuals with no to low hoarding severity ($M = .91$, $SD = .93$), those with moderate hoarding severity ($M = 1.12$, $SD = .96$), and those with high hoarding severity ($M = 1.33$, $SD = .92$). Individuals in the no to low severity group reported significantly lower levels of unresolved trauma and loss compared with the moderate severity group ($p < .001$) and the high severity group ($p < .001$); the moderate severity group also reported significantly lower levels of unresolved trauma and loss than the high severity group ($p < .001$).

Group differences for Psychological Distress. The results revealed statistically significant differences in psychological distress among the hoarding groups, $F (2, 3857) = 265.60$, $p < .001$. Post hoc Games-Howell tests revealed statistically significant differences between individuals with no to low hoarding severity ($M = .62$, $SD = .61$), those with moderate hoarding severity ($M = .96$, $SD = .67$), and those with high hoarding severity ($M = 1.20$, $SD = .70$). Individuals in the no to low severity group reported significantly lower levels of psychological distress with the moderate severity group ($p < .001$) and the high severity group ($p < .001$); the moderate severity group also reported significantly lower levels of psychological distress than the high severity group ($p < .001$).

Group differences for Attachment Security. The results revealed statistically significant differences in attachment security among the hoarding groups, F (2, 3857) = 4.65, p < .01. Post hoc Games-Howell tests revealed statistically significant differences between individuals with no to low hoarding severity (M = 4.22 , SD = 1.38), those with moderate hoarding severity (M = 4.36 , SD = 1.19), and those with high hoarding severity (M = 4.21, SD = 1.23). Individuals in the no to low severity group reported significantly lower levels of attachment security than the moderate severity group (p < .05); the moderate severity group also reported significantly higher levels of attachment security than the high severity group (p < .05). The difference between the no to low group and the high group was not statistically significant.

Group differences for Positive Family Dynamics. The results revealed statistically significant differences in psychological distress among the hoarding groups, F (2, 3857) = 30.472, p < .001. Post hoc Games-Howell tests revealed statistically significant differences between individuals with no to low hoarding severity (M = .09, SD = .95), those with moderate hoarding severity (M = -.03, SD = .81), and those with high hoarding severity (M = -.18 , SD = .76). Individuals in the no to low severity group reported significantly higher levels of positive family dynamics than the moderate severity group (p < .001) and the high severity group (p < .001); the moderate severity group also reported significantly higher levels of positive family dynamics than the high severity group (p < .001).

Group differences in hoarding severity. The results revealed statistically significant differences in hoarding severity among the hoarding groups, F (2, 3857) =

14201.75, p < .001. Post hoc Games-Howell tests revealed statistically significant differences between individuals with no to low hoarding severity (M = 36.17; SD = 7.43), those with moderate hoarding severity (M = 61.02 , SD = 6.63), and those with high hoarding severity (M = 83.38 , SD = 7.79). Individuals in the no to low severity group reported significantly lower levels of hoarding severity than the moderate severity group (p < .001) and the high severity group (p < .001); the moderate severity group also reported significantly lower levels of hoarding severity than the high severity group (p < .001).

Path Comparisons between Models

Table 4.12 shows the comparison between path statistics between the three levels of hoarding severity.

Table 4.12. Standardized Path Comparisons Across Levels of Hoarding.

	No to Low Hoarding		Moderate Hoarding		Severe Hoarding	
						P-value
	Std Est.	P-value	Std Est.	P-value	Std Est.	value
AS -- Gender	0.096	***	0.073	***	-0.057	***
AS -- Income	0.282	***	0.332	***	0.019	ns
UTL -- Age	-0.047	***	-0.308	***	-0.057	***
UTL -- Gender	-0.073	***	-0.085	***	-0.114	***
UTL -- Income	-0.052	***	-0.161	***	-0.224	***
PFD -- AS	0.34	***	0.456	***	0.461	***
UTL -- AS	-0.269	***	-0.182	***	-0.28	***
PFD -- Income	0.136	***	0.048	***	0.025	ns
PFD -- Gender	-0.035	***	0.002	ns	0.025	ns
PD -- UTL	0.495	***	0.456	***	0.502	***
PD -- Age	-0.09	***	-0.189	***	-0.052	***
PD -- Gender	-0.022	**	-0.064	*	-0.15	***
PD -- Income	-0.026	**	0.072	***	-0.034	**
PD -- AS	-0.286	***	-0.131	***	-0.333	***
PD -- PFD	-0.076	***	-0.252	***	-0.002	ns
HS -- UTL	-0.044	***	0.071	***	0.11	***
HS -- PD	0.189	***	0.139	***	0.304	***
HS -- Age	0.034	**	0.137	***	0.123	***
HS -- Gender	-0.097	***	-0.026	ns	-0.066	***
HS -- Income	-0.096	***	-0.167	***	-0.131	***
HS -- PFD	-0.051	***	0.079	***	0.055	***
HS -- AS	0.047	***	0.008	ns	0.017	ns

Note: ***p < .001, ** p < .01; * p < .05; ns = not significant

Group Differences

     Income. Lower levels of income predicted higher levels of unresolved trauma and loss and hoarding severity across all three groups. However, some differences related to income presented themselves through the group differences analysis. Higher levels of income were predictive of higher levels of attachment security and higher levels of positive family dynamics in individuals in the no to low hoarding and moderate hoarding groups; for individuals in the severe hoarding group, income was not predictive of higher levels of attachment security or positive family dynamics. Lower levels of income were associated with higher psychological distress in both the no to low hoarding group (λ = -.026, p , .01) and severe hoarding group (λ = -.034, p< .01); in the moderate group, higher levels of income were significantly associated with an increase in psychological distress (λ = .072, p < .001).

     Gender. While gender differences were found to exist within groups, it is extremely important to consider the large overrepresentation of females in the current analysis in interpreting these results. Given the potential importance of understanding the influence of gender and its influence of hoarding behavior, however, the following results are presented as a beginning point for conversation about this variable in relation to hoarding.

     Gender was predictive of psychological distress and unresolved trauma and loss in all three groups, with females being more likely to have higher levels of psychological

distress and unresolved trauma and loss. Some differences in gender as a predictor arose through the analysis.

Participants from the male gender were found to have higher levels of attachment security in the no to low hoarding ($\lambda = 0.096$, p< .001) and the moderate hoarding groups ($\lambda = .073$, p< .001); however, in the severe hoarding group, females were more likely to have higher levels of attachment security.

Gender was also predictive of higher levels of positive family dynamics in the no to low hoarding severity group, with females being more likely to have higher levels of positive family dynamics ($\lambda = -.035$, p < .001); however, in the moderate and severe hoarding groups, gender was not predictive of higher levels of positive family dynamics.

Gender was also linked to changes in psychological distress between all three groups; women across groups were more likely to have higher levels of psychological distress, though significance levels changed across groups (no to low: $\lambda = 0.022$, p < .01; moderate: $\lambda = -.064$, p < .05; severe: -.15, p . 001).

Age. Age was negatively related with unresolved trauma and loss and psychological distress across all three groups, meaning that younger individuals were more likely to have higher levels of unresolved trauma and loss and psychological distress. Age was also found to be positively related to hoarding severity across groups, meaning that for all three categories of hoarding severity, older individuals were more likely to have higher levels of hoarding severity.

Comparisons in latent variable relationships across groups. Some similarities existed across group categories. Positive family dynamics and attachment security were

positively related across all three groups, meaning that higher levels of attachment

security predicted higher levels of positive family dynamics. Unresolved trauma and loss

and psychological distress also had a positive relationship across all three groups; in other

words, higher levels of unresolved trauma and loss predicted higher levels of

psychological distress across groups. Another similarity across groups was that

attachment security seemed to negatively predict unresolved trauma and loss, meaning

that the higher levels of attachment security experienced by an individual in the sample

across all three groups, the lower levels of unresolved trauma and loss he or she

experienced across groups. Further, psychological distress and hoarding were positively

related across groups. In other words, higher levels of psychological distress predicted

higher levels of hoarding across groups. In the severe hoarding sample, the link between

psychological distress and hoarding severity was significantly higher than the other two

groups (severe: $\lambda = .304$, p $<.001$; moderate: $\lambda = .139$, p $< .001$; no to low: $\lambda = 0.189$, $\lambda =$

.001), suggesting that as the level of hoarding severity increases, higher levels of

psychological distress can be expected in this sample population.

Unresolved trauma and loss was found to be significantly related to hoarding

severity across all three groups, with some differences. In the no to low hoarding group,

unresolved trauma and loss was negatively related to hoarding severity, suggesting that

lower levels of unresolved trauma and loss significantly predicted higher levels of

hoarding severity ($\lambda = -.044$, p $< .001$) in this sample, does not support the hypothesis that

unresolved trauma and loss is positively correlated with hoarding severity. In the other

two groups, however, higher levels of unresolved trauma and loss predicted higher levels

of hoarding at the p < .001 level, suggesting that unresolved trauma and loss have an increased effect on hoarding severity as the level of hoarding increases.

The particularly interesting differences existed between the positive family dynamics and psychological distress. In the no to low hoarding group, the path between positive family dynamics and psychological distress was found to be significant (λ = -.076, p < .001), and likewise in the moderate hoarding group, and even to an increased extent (λ = -.252, p < .001). In other words, in both of these groups, the higher levels of positive family dynamics, the lower the levels of psychological distress, which was what was hypothesized in this study. However, in the severe hoarding group, the path between positive family dynamics and psychological distress was not found to be significant (λ = -.002, p = .842). In other words, positive family dynamics no longer had a role in decreasing levels of psychological distress once participants reached a certain level of hoarding severity.

The other moderating variable in the model, attachment security, was only found to be significantly related to hoarding severity in the no to low groups (λ = .047, p < .001); the relationship, while significant, was in the reverse direction than would have been hypothesized, suggesting that for individuals who exhibit no to low hoarding behavior, higher levels of secure attachment actually predict higher levels of hoarding severity. For individuals in this sample in the moderate and high severity groups, attachment security does not predict levels of hoarding severity.

Post Hoc Power Analysis

Using the method described by Diamantopoulos and Siguaw (2005), power analysis was done. This power value indicated the probability that a false null hypothesis, or incorrect H_0, would be rejected. This power analysis used the specifying conditions of alpha = 0.05, RMSEA of null hypothesis = 0.08, df, and sample size to calculate the post-hoc power. For this study, the power to reject the H_0 given that the H_0 was false for the structural model with 153 degrees of freedom was 1.00. Thus, the probability that the incorrect H_0 would be rejected was of ample size. Prior to the study, different sets of guidelines had been used to project the needed sample sizes. A minimum of 285 participants was needed and 285 were sought. The final number of participants after listwise deletion and exclusion of inappropriate data was 387. Thus, this study was well-powered and the rejection of the significant x^2 statistic in the model fit analyses was expected based upon the robust sample size.

Summary

This chapter focused on the results of the data analysis and summarized the analytic procedure. Preliminary analyses including assessment of data quality for outliers and normality, bivariate relationships, and measurement models were done. Problems noted with the original indicator-construct links were discussed. Models were revised after modifications were made. After those changes, hypothesis testing was done. Of the tested models, the final model with moderator variables include had the best evidence of fit. Implications for these findings are discussed in depth in the following chapter, as are plans for future research, suggestions for others, and a brief discussion of lessons learned.

Chapter 5: Interpretation, Conclusions, and Recommendations

This study represents an important step in understanding the influence of unresolved trauma and loss, psychological distress, and past and current family relationships on hoarding severity. This research addressed whether attachment style and positive family dynamics buffered the impact of unresolved trauma and loss on psychological distress and hoarding severity. This chapter discusses key findings and possible explanations associated with those findings, implications for theory, clinical treatment, and public policy, and limitations to the study. Findings that are different from established findings in the literature are highlighted in the discussions.

Model Construct Validity

The current study hypothesized that the indicator variables would accurately comprise the latent variables. With the exception of attachment security, the indicators variables were found to be strongly correlated, accounting for variance within the respective latent variables. Attachment security was conceptualized to include responses to questions about attachment-related anxiety and avoidance for both mothers and fathers, using subscales from the *The Relationship Structures Questionnaire* (ECR-RS; Fraley, Waller, & Brennan, 2000). The intercorrelations between the indicator variables were lower than expected, suggesting some limitations in the measurement of this construct. This may be due to the problems with the assessment tool used. Although the ECR-RS has been tested for reliability and validity (Fraley et al., 2000), it does have limitations. For instance, Fraley et al. (2011) discuss bias toward response acquiescence and self-report measurement bias for the ECR-RS. Further, the narrowed focus on relationship-specific attachments may have limited the application for understanding individual traits.

Fraley and colleagues (2011) found that relationship-specific measures of attachment-like the ECR-RS- are generally better at predicting intra- and interpersonal outcomes than broader measures of attachment, but broader measures predict personality traits better than relationship-specific measures. Thus, in order to make more generalizable claims related to the attachment related findings of the current study, future research should consider investigating the influence of attachment constructs using broader, more established attachment measures.

Research Question #1

For this study, it was hypothesized that there would be direct relationships between the latent outcome variable, hoarding severity, and the latent predictor variables, unresolved trauma and loss, attachment security, positive family dynamics, and psychological distress. Specifically, it was predicted that higher levels of hoarding severity would be linked to: 1) higher unresolved trauma and loss; 2) higher psychological distress; 3) lower positive family dynamics; and 4) lower attachment security.

The following hypotheses were supported: (1) higher levels of unresolved trauma and loss correlated to higher levels of hoarding severity, as has been previously supported in the literature (Cromer et al., 2007; Hartl et al., 2005; Samuels et al., 2008; Tolin et al., 2010); (2) higher levels of psychological distress were also related to higher levels of hoarding severity, reinforcing previous findings (e.g. Frost et al., 2006; Samuels, et al., 2002; Samuels et al., 2007; Samuels et al., 2008); and (3) higher levels of positive family dynamics were related to lower levels of hoarding severity. This last finding provides support for the importance of a systemic, family perspective when considering

contributing factors to hoarding behavior. Since this is the first study to examine the link between positive family dynamics and hoarding, further study in this area will be needed to replicate these results.

The hypothesis that higher levels of attachment security would be related to lower levels of hoarding severity in this sample was not supported. Although the hypothesized relationship was found to be linked in the hypothesized direction, the strength of the direct effect was not found to be significant. Though this is not what was hypothesized for the current study, this finding does support previous exploratory research (Nedelisky & Steele, 2009). However, given the extremely low sample size of Nedelisky and Steele's study, the statistical significance was highly vulnerable to Type II error, making the results disputable. For the current study, the lack of significance may likely be related to measurement limitations on the attachment security construct discussed in the above section. Since previous studies have found attachment representations to be significant protective factors related to various mental health disorders (Barone, 2003), and studies have further indicated a link between hoarding and attachment constructs (Frost , Kyrios, McCarthy, & Matthews, 2007), this area of research merits more investigation with more valid measures of attachment security.

Research Question #2: Psychological Distress as a Mediator between Unresolved Trauma and Loss and Hoarding Severity

For the second research question, it was hypothesized that the data would support the proposed model of unresolved trauma and loss, psychological distress, and hoarding severity. Specifically it was hypothesized that higher levels of unresolved trauma and loss

would contribute to higher levels of psychological distress, which would then in turn predict higher levels of hoarding severity. With slight modifications, this model was supported by the data from the current study.

Though initially considered to be covariates for hoarding severity, the modifications to the model resulted in the observed variables income, age, and gender, being considered as separate independent variables. Each was shown to be predictive to varying extents of unresolved trauma and loss, psychological distress, and hoarding severity.

Income. Income was found to have the highest effect on psychological distress and unresolved trauma and loss and was also inversely linked with hoarding severity. In previous research, the association between socioeconomic status (SES) and psychological distress and mental health disorders is well-documented (Bruce, Takeuchi, & Leaf, 1991; Gazmariarian, James, & Lepkowski, 1995; Gresenz, Sturm, & Tang, 2001; Holzer, Shea, et al., 1986; Robins & Reiger, 1991); further, there is evidence that income level may play a role in vulnerability to particular mental health disorders (Gresenz, Sturm, & Tang, 2001). Larger studies have found that there is a strong social gradient related to mental health as measured by prevalence of specific mental health disorders by family income levels (Strum & Gresenz, 2002), supporting the negative relationship that was found between income and psychological distress in the current study. Further supporting the findings from this study, research has also found that lower income has been linked with higher levels of symptoms of unresolved trauma and loss (Cordova et al., 1995; Vogel & Marshall, 2001), as well as to higher prevalence of hoarding in a large, community-based

sample (Samuels et al., 2008). In fact, Samuels and colleagues found that the odds of hoarding was over four times as great in the poorest, compared with the wealthiest households in the sample of 742 individuals in the study.

The relationship between the latent variables and income can be supported through the use of stress theories. According to Conger's (2000) Family Stress Model of Economic Hardship, hardship conditions in the form of low family per capita income and negative financial events, affect the degree of stress the family experiences. Several studies, including earlier tests of the family stress model, have demonstrated that hardship conditions influence individual well-being and family functioning through the strains or pressures they create in daily living (e.g. Conger et al., 1992, 1993, 1994; Flanagan & Eccles, 1993; Guttman & Eccles, 1999; Kessler, Turner, & House, 1988; Vinokur, Price, & Caplan, 1996). Berkowitz (1989) demonstrated that many stressful, frustrating, punishing, or painful events and conditions are lawfully related to increased emotional arousal or negative affect. Applied to individuals who hoard, if we consider the impact of income as an impediment to positive emotional coping, it can help to explain why for individuals with lower income, that higher levels of unresolved trauma and loss and psychological distress- and thus, higher levels of hoarding- exist in this sample.

Age. Age had the highest effect of the observed variables on hoarding severity, with older individuals being more likely to have higher levels of hoarding severity. This supports the findings of past studies. For instance, Samuels and colleagues (2008) found that the prevalence of hoarding increased with age, from 2.3% in the youngest group of a community sample, to 6.2% in the oldest age groups; the odds of hoarding was nearly

three times as great in the oldest compared to the youngest age group in Samuels' study. Ayers and colleagues (2011) found that, in a sample of 18 older adults over the age of 60, hoarding symptoms gradually increased over the life course, with significant increases occurring with each decade of life.

The current study also found inverse relationships between age and psychological distress and age and unresolved trauma and loss. Research is less clear on the connection between age and these factors. Hodgkinson and Joseph (1995) found no significant association between age and emotional distress related to traumatic events. Other studies have found there to be a curvilinear relationship with higher levels of psychological distress in young adulthood and again in older adulthood (Kessler et al., 1992; Mirowsky & Reynolds, 2000; Mirowsky & Ross, 1992; Schieman, Van Gundy, Taylor, 2001; Wade & Cairney, 1997). However, because hoarding has found to significantly increase with each decade of age, it is unlikely that a u-shaped model of age-distress would apply for this population. Further analysis is needed truly understand the impact of age on this model; however, as it stands currently, the model suggests that age contributes as uniquely to hoarding severity as it does to psychological distress and unresolved trauma and loss.

Gender. Gender was also significantly linked with the three latent variables in this model, with women being more likely to have higher levels of unresolved trauma and loss and psychological distress, and with men more likely to have higher levels of hoarding severity. As was found in this model, gender has been found to be linked to differences in psychological distress in various samples, with women being more likely

to suffer with higher levels of psychological distress, though the gender difference could be partially explained by other factors, including employment (Cleary & Mechanic, 1983). Though some studies have found no gender differences in the emotional impact of traumatic events (Freedman et al., 2002), others support the idea that women are more likely to have traumatizing symptoms become chronic (Breslau et al., 1998) and that women are more likely to express symptoms than men (e.g. Lavik, Hauff, Skrondal, & Solberg, 1996; North, Smith, & Spitznagel, 1997).

However, despite the fact that women may be more likely to experience higher levels of psychological distress and unresolved trauma and loss, findings from this study and past literature suggest that they are less likely than men to have higher levels of hoarding severity. The prevalence of hoarding in a community sample was almost two times as great in men (5.6%) compared with women (2.6%; Samuels et al. 2008). It is important to note that women were overrepresented in the current study, so the ability to generalize findings related to gender are limited. The gender differences between the predictor variables and the latent variable suggest that, while gender may contribute to the differing levels *within* each variable, the variance offered *between* them may not be attributed to gender. In other words, factors that influence why females experienced higher levels psychological distress and unresolved trauma are likely separate from the factors that influence why males exhibit higher hoarding severity in this sample.

Gender socialization theories may help to further explain the gender differences in hoarding severity and prevalence rates. For instance, Mead (1934) proposed that individuals use the definitions of multiple gender roles, both their own and those of

others, to interpret the interaction that takes place around them. Thus, boys and girls rely on expectations about both masculinity and femininity to interpret interaction, develop expectations for themselves and others, and in turn, create a basis for behavior and action.

While some past work has examined reasons for saving and compulsive buying (e.g. Frost et al., 1998), no work has looked at differences between genders in order to determine how gender roles may influence hoarding behaviors or provide a rationale for engaging in hoarding. Future research should examine more closely the gender differences in reasons for hoarding in order to further understand how gender socialization may contribute to the difference in levels of hoarding between men and women.

Psychological distress as a mediator for unresolved trauma and loss.
As hypothesized, psychological distress was found to completely mediate the relationship between unresolved trauma and loss and hoarding severity. When psychological distress was added to the model, the direct path between unresolved trauma and loss to hoarding severity changed from significant in the non-mediated model to non-significant in the mediated model. Thus, we can conclude that, in this sample, unresolved trauma and loss does not account for unique variance in predicting hoarding severity when psychological distress is taken into account.

The link between unresolved trauma and loss and psychological distress is clear in the literature (e.g. Boss, 2006; Crittenden & Landini, 2011; Walker, 2007), as is the link between psychological distress and hoarding (e.g. Frost et al., 2006; Samuels et al., 2002;

Samuels et al., 2007). What is less clear, however, is the link between unresolved trauma and hoarding, which can be explained through psychological distress in this model.

To date the studies connecting traumatic experiences and hoarding are limited, focusing mainly on the number and frequency of traumatic experiences in regard to the onset of hoarding symptoms (e.g. Cromer, Schmidt, & Murphy, 2007; Hartl et al. 2005; Tolin et al., 2010). Sampson (2012) suggested the importance of considering a person's lack of resolution around a traumatic event as a potential significant contributor to hoarding behavior, rather than simply considering the incidence and frequency of events. The current study offers evidence for further exploring this line of research and for understanding *how* traumatic events contribute to predicting hoarding severity. While the findings of the current study did not examine whether the incidence and frequency of events or the unresolved feelings of trauma and loss related to the events are more predictive of hoarding behavior, the current study offers strong evidence that this is worth exploring in future research on this topic.

Research Question #3: Attachment Security as a Protective Factor

For the third research question, the hypothesis that attachment security would serve as a significant moderator in the relationship between unresolved trauma and loss and psychological distress was tested and supported. Similar to the previous model, the modifications to the model resulted in the observed variables of gender, income, and age were each being considered as separate independent variables. Each was shown to be predictive to varying extents of unresolved trauma and loss, psychological distress, and hoarding severity (see previous discussion for explanations). Gender and income were also found to have direct effects on attachment security.

Gender and attachment security. In the current study, gender was found to have a significant, albeit small, effect on attachment security in the model. Past research has found gender to be a moderator of attachment associations (Collins & Read, 1990): for men, attachment security was more predictive of positive relations than their level of anxious attachment, but for women the opposite was true- that the more anxious the woman, the less satisfied and trusting she was found to be. Taking these moderating considerations into account when interpreting these findings is important in understanding the role that attachment security may play in buffering against the effects of traumatic events. The findings of the study support the conclusion that men in this sample were more likely than women to have higher levels of secure attachment; women were more likely to have higher levels of psychological distress, suggesting that attachment security may be more successful as a protective factor against psychological distress for men in this sample.

Income and attachment security. The current study found income to be positively related to attachment security. This is somewhat supported in the literature, as previous research studies which have proposed that lower SES experienced in childhood results in less continuity in their attachments than children in higher SES homes (see review by Shaver & Hazen, 1993). However, studies related to adult attachment and the effect of current income level on attachment security remain to be undertaken. Thus, in order to more fully understand the effect of income on attachment in this particular sample, further research must be conducted.

Attachment security as a protective factor. This study found that attachment security significantly moderates the unresolved trauma and loss to psychological distress relationship, supporting the proposed hypothesis. The unresolved trauma and loss to psychological distress relationship is strongest in cases of low attachment security and highest in cases of high attachment security in this sample of people who hoard and family members of people who hoard. These findings reinforce past work that suggests attachment security relationships with primary caretakers are a protective factor against psychological distress (e.g. Barone, 2003). Due to the lack of research in the area of attachment in this specific population, further research is necessary before firm conclusions and implications can be drawn.

Though attachment security was found to moderate the relationship between unresolved trauma and loss and psychological distress as hypothesized, the addition of the attachment security variable created some unanticipated effects on the other relationships in the model. In particular, when attachment security was accounted for in the model, the relationships between unresolved trauma and loss and hoarding severity were found to be significant again- recalling that in the previous model, the relationship had been completely mediated by psychological distress; however, in the current model, the significant effect was found to be an inverse one, suggesting that lower levels of unresolved trauma and loss actually predicted higher levels of hoarding. Further, the direct effect attachment security had on hoarding severity was a positive one, not supporting our hypothesis; in other words, higher levels of attachment security were in fact predictive of higher levels of hoarding severity in this sample.

Additionally, the effect between psychological distress and hoarding severity actually increased when attachment security was included in the model, compared to when it was excluded, suggesting that when we account for attachment security as a moderating factor between unresolved trauma and loss and psychological distress, it actually amplifies the effect that psychological distress has on hoarding severity.

Theoretically, the findings from this research question seem counterintuitive, suggesting the possibility of measurement error on the attachment security latent variable. The literature connecting hoarding and attachment is still in its infancy, with exploratory studies finding only mixed results thus far (e.g. Frost et al., 2007; Nedelisky & Steele, 2009). Given the previously discussed limitations to the latent construct of attachment security in the current study in conjunction with the strong evidence that past research has supported attachment security being *inversely* linked to increases in psychological distress and psychopathology (e.g. Rosenstein, & Horowitz, 1996; Sroufe, 1995; Sroufe, Carlson, Levy, & Egeland, 1999) and protecting against these outcomes from particular risk factors (e.g. Barone, 2003), deeper investigation into the factors that contribute to attachment's influence on these variables is necessary before making any major conclusion about the role attachment plays in the development and maintenance of hoarding behavior.

Research Question #4: Positive Family Dynamics as a Protective Factor

For the fourth research question, the hypothesis that positive family dynamics would serve as a significant moderator in the relationship between unresolved trauma and loss and psychological distress was tested and supported. Similar to the previous model,

the modifications to the model resulted in the observed variables of gender, income, and age being considered as separate independent variables. All three were shown to be predictive to varying extents of unresolved trauma and loss and hoarding severity. Lower income, female gender, and younger age were all predictive of higher levels of unresolved trauma and loss; lower income, male gender, and older age were predictive of higher levels of hoarding severity; and lower household income was found to have a direct effect on higher psychological distress (see previous section for discussion). Lastly, higher income was predictive of more positive family dynamics, which supports the consideration of the use of a family economic stress model in future studies.

Positive family dynamics as a protective factor. This study found that positive family dynamics significantly moderate the unresolved trauma and loss to psychological distress relationship, supporting the proposed hypothesis. The unresolved trauma and loss to psychological distress relationship is strongest in cases of low positive family dynamics and highest in cases of high positive family dynamics in this sample of people who hoard and family members of people who hoard.

These findings support past work that suggests positive family dynamics are a protective factor against psychological distress and related mental health conditions (e.g. Antonovsky, 1979; Cohen & Wills, 1985; Flannery, 1987). Given past research that has found that poorer family dynamics can lead to poorer response to treatment or relapse following successful treatment of behaviors (Chambless & Steketee, 1999; Leonard, et al., 1993), it is critical that the findings of the current study be considered in the importance of family member inclusion into the therapy process in an area of study has

typically and inordinately focused on individual approaches to treatment. Further research is necessary before generalizations can be drawn to hoarding populations in treatment outcome studies, the findings of this study provide convincing evidence that consideration of the influence of family dynamics is of the utmost importance when conceptualizing contributing factors to hoarding behavior.

Exploratory Research Question #1: Group Differences Among Levels of Hoarding Severity

In general, this study found support for a theoretical model linking unresolved trauma, psychological distress, and hoarding behavior, with factors like positive family dynamics serving as protective factors against the negative impact that traumatic life events can have on individuals who hoard. To understand even further how these factors work together, post hoc analyses were conducted with the sample being split into three groups in order to compare how the latent factors influence one another at different levels of hoarding severity.

The results of these analyses found that invariance existed in the full hypothesized model, meaning that there were significant group mean differences at varying levels of hoarding severity. Most of the factors in the model fit as would be expected with increasing levels of hoarding severity: lower income, older age, increased psychological distress, increased unresolved trauma and loss, lower positive family dynamics and of course, hoarding severity all contributed to higher levels of hoarding in each of the three groups ("no to low hoarding"; "moderate hoarding" and "high hoarding").

However, attachment security did not move as would be expected, with lowest levels of attachment security being found not only in the "high hoarding" group, but also in the "no to low hoarding group"; the "moderate hoarding group had the highest level of attachment security of the three groups. As is clear through the discrepancies related to the attachment findings and hypotheses throughout this study, further research is needed to investigate the relationship between attachment and hoarding to correct for any measurement bias that exists in the current data.

The observed demographic variables, gender and income, each contributed to interesting changes in the model for each of the groups. For example, gender was found to be predictive of higher levels of positive family dynamics in the no to low hoarding severity group, with females being more likely to have higher levels of positive family dynamics; however, in the moderate and severe hoarding groups, gender was not predictive of higher levels of positive family dynamics. Also, lower levels of income were associated with higher psychological distress in both the no to low hoarding and high hoarding group, while in the moderate group, higher levels of income were significantly associated with an increase in psychological distress. In fact, age was the only observed variable that remained consistent with hypothesized directional relationships throughout the analyses. Hoarding research in general needs to go beyond descriptive statistics in order to develop a deeper understanding of how these contextual factors interact with one another to influence the complex features of hoarding disorder.

In general the remaining paths between the latent variables were found to support hypotheses across all three groups: higher levels of attachment security predicted higher

levels of positive family dynamics; higher levels of unresolved trauma and loss predicted higher levels of psychological distress; higher levels of attachment security predicted lower levels of unresolved trauma and loss; and higher levels of psychological distress predicted higher levels of hoarding.

One of the more interesting findings that came out of this exploratory analysis was that, in the severe hoarding sample, the link between psychological distress and hoarding severity was significantly higher than the other two groups, suggesting that as the level of hoarding severity increases, higher levels of psychological distress or mental health symptoms can be expected in this sample population. This may also speak to the diminished capacity for self-soothing and utilizing coping skills that often occurs in higher levels of mental health disorders (e.g. Fallot & Harris, 2002), as well as in trauma survivors (e.g. Bremner, 1999; van der Kolk, 1994). It is important to note this higher level of psychological distress in the "high hoarding severity" group when considering treatment options for hoarding; knowing that distress is higher when hoarding is severe may help direct treatment targets specifically around developing coping skills and self-soothing for these individuals.

Of further interest in the groups with higher levels of hoarding severity are the significantly higher levels of unresolved trauma and loss, with means increasing with each group. Though past research has looked at the connection between incidence of traumatic events, the current study is the first to examine the lack of resolution around specific events considered to be traumatic by the participants. These findings provide evidence that as hoarding severity increases, so does the lack of resolution of traumatic

events. While it is worth considering the role that ineffective coping and self-soothing may play in the processing of traumatic events, another possible explanation is the link between the cognitive deficits we know exist in individuals with hoarding disorder (Hartl et al., 2004; Lawrence et al., 2006; Grisham, et al., 2007; Jang et al., 2010) and their relationship to the ability to process traumatic events.

Daniel Seigel (2003) proposes a theory based in neuroscience findings, arguing that:

> Unresolved trauma involves the impairment of integration of representational processes within the brain. This impairment can lead to an array of findings within PTSD and also may make the individual vulnerable to entering inflexible, reactive "lower mode" states of heightened emotion that lack self-reflection. At the core of "unresolved trauma" is an impairment in a core process of neural integration (p. 28).

Seigel discusses that the presence of unresolved trauma in the mind of an individual- particularly interpersonal traumas related to attachment relationships-actually prevents the necessary bilateral transfer of information from one hemisphere of the brain to the other, which is needed to fully process an experience. The presence of unresolved trauma has a lasting effect on information-processing and self-regulation- both problems that arise in individuals who hoard. As the research in neuroscience in the field of hoarding studies grows, more investigations are needed to explore the interconnectedness of trauma experiences, cognitive deficits, attachment, and hoarding symptoms.

Implications

Theory Implications and Recommendations

The general use of a systemic perspective for the current study was a necessary first step in more deeply understanding the intersection of contextual factors, such as experience of trauma and loss and past and current family relationships, with hoarding behaviors. Specifically, the use of a biopsychosocial model for understanding hoarding disorder acknowledges the hierarchical and interdependent relationships of biological, psychological, individual, family, and community systems (Engel, 1977). Given the findings that contextual factors, like unresolved experiences of trauma and loss, and past and current family dynamics do have a significant impact on hoarding behavior, it is imperative that future research and treatment move in the direction of applying a systemic framework for hoarding work.

Future application of Syndemics to hoarding research. In addition to providing support for the continued use of general systems theory and a biopsychosocial model in hoarding research, the current study also provides some support for the use of a systemic theoretical framework that focuses intentionally on macro-level systems and considers potential social and health disparities in a possible explanation of the phenomenon of hoarding behavior. Research in the public and community health sector has developed the theory of Syndemics (Singer, 1996). According to this theory, individual problems or behaviors are looked at as intersecting health conditions, forming part of a *Syndemic* (Singer, 1996). The Center for Disease Control and Prevention (2005) defines a Syndemic as "two or more afflictions, interacting synergistically, contributing to excess burden of disease in a population." Research lends itself to the notion that the

conditions are a linked entity that occurs in clusters. The intersecting nature of these conditions is the crux of the Syndemic Model. Beyond the interaction between the conditions, the term Syndemic also highlights the importance of social conditions and contexts in which these problems interact and occur (Singer, 1996). Individual, cultural, relational, and socio-environmental factors are assumed to be integral and inseparable parts of understanding a *Syndemic*.

There are strong relationships that have been shown between hoarding behavior and co-morbid mental health conditions (e.g. Frost et al., 2000; Steketee et al., 2000), between hoarding and various traumatic life experiences (e.g. Hartl et al., 2005), and between traumatic life events and co-morbid mental illnesses (e.g. Paykel & Dowlatshahi, 1988); the current study has also supported past research related to potential social and health disparities in hoarding behavior related to age, gender, and income level. It seems appropriate, given the empirical ties that have linked these afflictions and socio-cultural contexts, that a Syndemics model might be applied here as well.

Based on a review of the literature and findings from the current study, consideration of Syndemics as a framework for future research and understanding of hoarding disorder is merited. The application of Syndemics to behavioral health phenomena is a new and innovative theoretical approach to conceptualizing the relationships between the separate conditions and considering contextual factors that may play a role in the development of these problems. According to this model, hoarding behavior, traumatic life experiences, and their comorbidities are intersecting health

conditions set in a variety of social-contextual factors that influence how the three conditions interact with one another.

The evidence provided by the current research- that family factors and unresolved trauma are key contributors to hoarding severity- will not be enough alone to help us understand *why* a certain individual or family is afflicted with hoarding behaviors until the social-contextual factors, such as SES, gender, and culture, are adequately examined. As more variables are added and specific contextual variables are accounted for through upcoming studies, researchers may more accurately approach a predictive model of hoarding behavior that captures the complexity of this disorder by using a broad systemic framework, like Syndemics, in place of an individual model.

Practice Implications and Recommendations

While treatment research on hoarding to date has been largely focused on the use of behavioral therapies (e.g. CBT) as the primary approach to treating hoarding in clients, there is reason to argue that behavioral therapy alone is not effective enough for many hoarding clients, given the relatively modest efficacy rates in laboratory settings (e.g. Abramowitz et al., 2003; Black et al., 1998; Mataix-Cols et al., 2002; Saxena et al., 2002; Tolin, Frost, & Steketee, 2007; Winsberg, Cassic, & Koran, 1992). Further, due to the stage of research, the efficacy studies, based in modular, controlled, laboratory and clinical settings have not been tested in real-life clinical situations, limiting the generalizability of the efficacy studies to treatment effectiveness at large. The current study offers some important findings to support the suggestion to supplement current individual treatment approaches with interventions that focus on some of the contextual factors that have been found to predict higher levels of hoarding severity.

The role of unresolved trauma and loss as a predictor of hoarding behavior is an important one to consider, based on the current findings. Building on past findings that there is an increased incidence of traumatic events in hoarding populations (e.g. Cromer, Schmidt, & Murphy, 2007; Hartl et al. 2005; Tolin et al., 2010), the current study provides evidence that the lack of resolution of these events contributes to hoarding severity. Knowing that the psychological distress caused at least in part by unresolved trauma and loss can predict hoarding severity, it is imperative that clinicians assess for and address issues of grief and loss in therapy alongside of current CBT practices aimed specifically at eliminating hoarding behaviors.

These implications are reinforced when we consider the known neurobiological links to hoarding behavior that have been found in recent studies (e.g. Hartl et al., 2004; Grisham, et al., 2007; Jang et al., 2010; Lawrence et al., 2006) along with work that has been done on the impact of trauma on the brain (e.g. Seigel, 2003, van der Kolk, 1994). Given the significant overlap of the symptoms of trauma, as described above, and in those who struggle with hoarding disorder, there is convincing support for the argument that therapeutic treatment of trauma should be targeted at the forefront of clinical work, in order to be most effective in working with hoarding disorder in clients who also experience psychological distress related to unresolved trauma and loss.

Also, understanding the positive influence that both attachment security and positive family dynamics can have on serving as a buffer against psychological distress in this sample of people who hoard and their family members is one of the most important practice implications that this study offers. In past literature, family members are often

dismissed as "difficult" or "unable to contribute to treatment." However, the current study suggests that positive past and current family relationship experiences can significantly contribute to a reduction in psychological distress as a predictor of hoarding severity.

Previous studies have shown that family members of people who hoard experience their own levels of negative emotions, distress, and feelings of grief and loss (Sampson, 2012; Wilbram, et al., 2008). The current study lends itself to the argument that if treatment providers were able to work *with* family members to resolve their own issues related to their loved one's hoarding, that they may in fact be key to helping the treatment process. We know that family support has been beneficial in treatments of other compulsive disorders (Chambless & Steketee, 1999; Leonard, et al., 1993); this study supports that this could be the case as well for hoarding disorder. Future research should be conducted to determine the efficacy and effectiveness of incorporating family therapy as a supplement for individual treatment of hoarding clients.

Policy Implications and Recommendations

The current study provides some support for the consideration of social justice issues related to public policy. Demographic variables, such as age, income, and gender demonstrated significant differences between groups, with hoarding severity being positively linked to older age, lower income, and the male gender. Though further research is needed to examine and investigate the depth of the potential social and health disparities related to age, gender, and income in hoarding populations, we must consider these contextual factors to inform public policy in the meantime, so as to promote social justice for disadvantaged populations.

Hoarding has long been identified as a community health problem (Frost, Steketee, & Williams, 2000); Frost et al, 1999; Patronek, 1999) and been found to have a significant economic and social burden on communities at large (Tolin et al., 2008). Even though there is a lack of research in general on community-level responses to hoarding situations, it is clear to experts that the current practice of forced full- and partial-cleanouts are not helpful, and may even be harmful to the homeowners who are forced to clear out their homes to avoid serious consequences, like eviction or loss of child custody (e.g. Brace, 2007; Bratiotis, et al., 2012; Tompkins and Hartl, 2009).

The findings of the current study highlight what experts already know about hoarding- that higher levels of mental illness or psychological distress are linked to the severity of hoarding behavior (Frost et al., 2006; Samuels et al., 2002; Samuels et al., 2007), and things like unresolved trauma and loss are also intricately connected (Cromer, Schmidt, & Murphy, 2007; Tolin et al., 2010). In addition, we understand that approaches to forced cleanout also provoke intense emotional responses and psychological distress from people who hoard (e.g. Bratiotis, et al., 2012; Frost & Steketee, 2006; Tompkins & Hartl, 2009), which contribute to lack of success rates in the homeowners maintaining properties that have been cleaned out. Still, despite this knowledge, standard legal interventions are usually focused on the consequences of hoarding (i.e. removing clutter, cleaning the home, etc. through the use of a clean-out approach) while neglecting the mental health problems typically underlying the disorder (Bratitotis et al., 2012); consequently, hoarding has an extremely high rate of recidivism (e.g. Berry, Patronek & Lockwood, 2005; Bratiotis, et al., 2012).

Given what we know from the, albeit, small amount of research on the subject of forced clean-outs, it is imperative the community-level policies be written in order to promote more ethical and effective ways to address hoarding behavior that are cognizant of the impact of contextual factors, such as trauma and loss and psychological distress on hoarding, so as not to continue practices that we know to be harmful to citizens. Funding must be geared to utilize the supportive services of mental health professionals, among other related professionals and agencies, who are trained in hoarding work when addressing hoarding at the community level. The use of mental health practitioners throughout the process when a forced clean-out is indicated due to safety concerns may help to temper the psychological distress on the homeowners, before, during, and after a clean-out. If we can work to diffuse psychological distress during cleanouts through the use of particular management models, we can be more likely to reduce the high level of recidivism rates that can end up costing taxpayers tens of thousands of dollars each year.

One of the ways that we have responded to the need for attention to mental health concerns during community responses to hoarding situations is through the development of a practice called "Safety Days." Through our research on hoarding, we have established *The Hoarding Project*- a non-profit organization aimed at supporting research, education, and effective and ethical management and treatment of hoarding disorder. Safety Day is an idea originated out of the need for an approach to doing forced clean-outs in a compassionate and ethical way , based in the understanding that- for individuals who have a severe hoarding problem and a higher likelihood of having experienced significant trauma in his or her past- the process of having possessions

completely cleaned out of their home is yet another traumatic event. Safety Day promotes

attention to mental health and stress management throughout the process of a clean-out,

utilizing skills of stress management, empowerment, and education, prior to, during, and

after a clean-out situation; safety and stress management are prioritized first, and deeper

therapy work is prioritized once safety is in order (For more information, see

www.thehoardingproject.org). Unlike other current approaches to forced clean-outs, early

evaluation of our work has found this approach to have positive outcomes at each stage

of the clean-out process. It is our hope that through further development and evaluation

research conducted on the Safety Day process, that we can help to shape local and state-

level policy and community response to hoarding situations to include a mental health

component.

Limitations

The implications of this study should, of course, be understood within the context

of its limitations. There were a number of limitations to the study that must be considered

in evaluating the utility and generalizability of this investigation. First, that the study was

of people who hoard and family members of people who hoard via an Internet survey is

an important consideration. Although many limitations of the online survey methodology

are also inherent in other more traditional forms of research, there are some specific

limitations that are unique to the use of the computer medium (Wright, 2005).

When conducting online research, sampling problems can arise (Andrews, et al.,

2003; Howard, Rainie, & Jones, 2001). For example, Wright (2005) discusses the

concern that relatively little may be known about the characteristics of people in online

communities, aside from basic demographics, and even that information may be questionable (Dillman, 2000; Stanton, 1998), due to the fact that, because of the nature of internet research, there is no guarantee that participants provide accurate demographic or characteristic information.

Another limitation of the current study is that the Internet-based sampling method only reached individuals who had computer and Internet access as well as those who are were willing to complete the online survey. Not only does the use of this methodology exclude from the sample those who do not have access to or understanding of how to use a computer or the internet, but the self-selection bias for those who do participate has been found to be another major limitation of online survey research (Stanton, 1998; Thompson et al., 2003; Wittmer et al., 1999). As with any given Internet community, some individuals are more likely than others to complete an online survey, while others ignore it, leading to a systematic bias that can limit generalizability (Wright, 2005). More research is needed on online survey methodologies in order to understand the type and extent of this systematic bias for future studies.

The cross-sectional nature of the survey also limits the findings of the research. Although this method has many benefits, including cost and efficiency, some disadvantages include its difficulty explaining phenomena that occur over time. Future studies using longitudinal methods will be able to help investigate developmental trends that may surface in hoarding behavior.

The model itself may also be a limitation, as some important variables that could have helped to further explain differences detected between hoarding severity groups

were not modeled, in particular, variables that may have measured a biological predisposition or a cognitive deficit related to hoarding behaviors. Though initially considered prior to data collection, it was decided not to include measures related to these items, as the presence of either biological predisposition or cognitive deficits would be extremely difficult to assess for via a self-report Internet survey. Further, given the current study's theoretical focus of family systems theory, examination of contextual issues related to hoarding was more appropriate to the scope of the study. Future studies will certainly benefit from taking a fuller biopsychosocial-spiritual theoretical view for understanding the complexity of the etiology of hoarding behaviors.

Other limitations related to the sample were present as well. The ethnic profile of the respondents was largely Caucasian, which is not representative of a community sample, limiting the generalizability of the findings. Next, women were overrepresented in the sample, as well. Thus, as previously discussed, findings from this study related to gender should be tentatively considered prior to any replication studies. Future investigations should implement a stratified sampling method as a potential to remedy to sampling bias in order to more accurately assess differences in things like gender and ethnicity.

Another limitation of this current study was the original selection of manifest indicators for the latent variables, particularly the attachment security indicator. As discussed previously, the intercorrelations between the indicator variables were lower than expected, suggesting some limitations in the measurement of this construct. This

may be due to the problems with the assessment tool used. Had a more comprehensive pilot study been done, some of these problems may have been averted.

Although the ECR-RS has been tested for reliability and validity (Fraley et al., 2000), it does have limitations. For instance, Fraley et al. (2011) discuss bias toward response acquiescence and self-report measurement bias for the ECR-RS. Further, the narrowed focus on relationship-specific attachments may have limited the application for understanding individual traits. Fraley and colleagues (2011) found that relationship-specific measures of attachment- like the ECR-RS- are generally better at predicting intra- and interpersonal outcomes than broader measures of attachment, but broader measures predict personality traits better than relationship-specific measures. Thus, in order to make more generalizable claims related to the attachment related findings of the current study, future research should consider investigating the influence of attachment constructs using broader, more established attachment measures.

Conclusion

The current study analyzed data from an internet survey of a sample of 387 participants who self-reported as a person who hoards or a family member of a person who hoards. Structural equation modeling (SEM) was used to test the fit of a proposed model that examined the influences that unresolved trauma and loss, psychological distress, attachment security, and positive family dynamics had on hoarding behavior.

Though the study was not without its limitations, the findings suggest a conclusive statement that higher levels of unresolved trauma and loss and psychological distress contribute to predicting hoarding severity, adding to the state of the research on

trauma and hoarding which, to date, has only linked the increased frequency of traumatic events to hoarding. Understanding that it is the lack of resolution of these events that helps explain the higher levels of psychological distress in hoarding individuals will contribute a great deal to the development of treatment for those who hoard.

The study also supports the important role that family relationships have on hoarding behavior. In the current sample, positive family dynamics were found to serve as a protective factor in the relationship between these unresolved trauma and psychological distress. Though there was not a direct effect on hoarding behavior, it is important to know that positive family relationships can diminish the effects that unresolved trauma and loss can have on the psychological well-being of an individual who hoards.

Past family dynamics in the form of attachment security was also examined in this study. Due to likely measurement bias, we were disappointed not to find support for our hypothesis that attachment security could also serve as a buffer against psychological distress and hoarding severity from unresolved trauma and loss. Given the evidence provided by the current findings that contextual factors, like life experiences and family relationships contribute to hoarding, we encourage future researchers interested in examining attachment and hoarding to do so using broader, more generalized measures to solidify our understanding of how these factors may influence one another.

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Appendix A

Recruitment Letter to Area Professionals

Dear Clinical Director/Area Professional,

My name is Jennifer Sampson, and I am the co-founder of The Hoarding Project and a doctoral candidate from the University of Minnesota's Family Social Science Department. I am currently recruiting for an upcoming research project examining the influence of past and current family experiences and unresolved trauma and loss on compulsive hoarding behavior**.** I am interested in recruiting **people who hoard and/or their family members** for participation in my study. You are receiving this letter as a professional person or organization who or which may have contact with such individuals and may be able to refer them to our study.

Though the field of compulsive hoarding research has been steadily growing over the past few decades, the research has been primarily confined to studying the behavior of an individual and has paid limited attention to how context and experiences may influence the behavior. Furthermore, the research specifically on the influence of the family system on hoarding behavior has been scarce and lacks a comprehensive theory-based design that takes into consideration the multiple contextual influences on hoarding behavior. To date, there are no large-scale studies that examine the joint influence that family experiences (i.e. attachment relationships, current family dynamics) and unresolved trauma have on the severity of hoarding behavior. Thus, my study will address this gap in the family and compulsive hoarding literature. Your help with recruitment for participation in my study is very significant.

I am inviting people who compulsively hoard and/or family members of people who compulsively hoard to participate in my study by taking part in an online survey, which will take approximately 20-40 minutes to complete.

If you have any professional or personal contact with people who hoard and/or their family members, I encourage you to pass along this information along to them. They may access the survey at: **www.thehoardingproject.org.** I have attached a recruitment flyer to the back of this letter which can be hung in your lobby or clinic for easy visibility for your clients.

If you have any questions about the study, please contact me, Jennifer Sampson (206-795-8784, samps138@umn.edu) or my academic advisor, Dr. Steven Harris, Research Chair, University of Minnesota, Dept. of Family Social Science (612-625-1900, smharris@umn.edu).

Best regards,

Jennifer Sampson, M.S., LMFT

The Hoarding Project, Co-founder

Doctoral Candidate

University of Minnesota, Dept. of Family Social Science

Appendix B

Item Parcels/Composite Variable and Parcel Item Descriptions

Observed Variable	*Description*	**Item number/question included in Parcel**
Clutter	*Clutter subscale of Saving Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004); sum of the raw scores of the item.*	1. How much of the living area in your home is cluttered with possessions?
		3. How much of your home does clutter prevent you from using?
		5. How much of your home is difficult to walk through because of clutter?
		8. To what extent do you have so many things that your room(s) are cluttered?
		10. How much does clutter in your home interfere with your social, work, or everyday functioning? Think about things you don't do because of clutter.
		12. To what extent does clutter in your home cause you distress?
		15. To what extent do you feel unable to control the clutter in your home?
		20. How frequently does clutter in your home prevent you from inviting people to visit?
		22. To what extent does the clutter in your home prevent you from using parts of your home for their intended purpose? For example, cooking, using furniture, washing dishes, cleaning, etc.

Difficulty Discarding	*Difficulty Discarding subscale of Saving Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004); sum of the raw scores of the item.*	4.* How much control do you have over your urges to save possessions?
		6. To what extent do you have difficulty throwing things away?
		7. How distressing do you find the task of throwing things away?
		13. How strong is your urge to save something you know you may never use?
		17. How often do you avoid trying to discard possessions because it is too stressful or time consuming?
		19. How often do you decide to keep things you do not need and have little space for?
		23. How often are you unable to discard a possession you would like to get rid of?
Acquisition	*Acquisition subscale of Saving Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004); sum of the raw scores of the item.*	2.* How much control do you have over your urges to acquire possessions?
		9. How distressed or uncomfortable would you feel if you could not acquire something you wanted?
		11. How strong is your urge to buy or acquire free things for which you have no immediate use?
		14. How upset or distressed do you feel about your acquiring habits?
		16. To what extent has your saving or compulsive buying resulted in financial difficulties for you?

		18. How often do you feel compelled to acquire something you see? E.g. when shopping or offered free things?
		21. How often do you actually buy (or acquire free things) for which you have no immediate use or need?
Avoidance Mom	*"Secure Attachment Avoidance Mom" subscale of The Relationship Structures Questionnaire (ECR-RS; Fraley, in press); mean of items one through six (with items five and six reverse-coded)*	1. It helps to turn to this person in times of need.
		2. I usually discuss my problems and concerns with this person.
		3. I talk things over with this person.
		4. I find it easy to depend on this person.
		5.* I don't feel comfortable opening up to this person.
		6.*I prefer not to show this person how I feel deep down.
Anxiety Mom	*"Secure Attachment Anxiety Mom" subscale of The Relationship Structures Questionnaire (ECR-RS; Fraley, in press); mean of items seven, eight, and nine (reverse-coded)*	7.* I often worry that this person doesn't really care for me.
		8.* I'm afraid that this person may abandon me.
		9.* I worry that this person won't care about me as much as I care about him or her.

Avoidance Dad	*"Secure Attachment Avoidance Dad" subscale of The Relationship Structures Questionnaire (ECR-RS; Fraley, in press); mean of items one through six (with items five and six reverse-coded)*	1. It helps to turn to this person in times of need.
		2. I usually discuss my problems and concerns with this person.
		3. I talk things over with this person.
		4. I find it easy to depend on this person.
		5.* I don't feel comfortable opening up to this person.
		6.*I prefer not to show this person how I feel deep down.
Anxiety Dad	*"Secure Attachment Anxiety Dad" subscale of The Relationship Structures Questionnaire (ECR-RS; Fraley, in press); mean of items seven, eight, and nine (reverse-coded)*	7.* I often worry that this person doesn't really care for me.
		8.* I'm afraid that this person may abandon me.
		9.* I worry that this person won't care about me as much as I care about him or her.
Intrusion	*Intrusive Thoughts subscale of Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997)*	1. Any reminder brought back feelings about it.
		2. I had trouble staying asleep.
		3. Other things kept making me think about it.
		6. I thought about it when I didn't mean to.
		9. Pictures about it popped into my mind.

Avoidance	*Avoidance subscale of Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997)*	5. I avoided letting myself get upset when I thought about it or was reminded of it.
		7. I felt as if it hadn't happened or wasn't real.
		8. I stayed away from reminders of it.
		11. I tried not to think about it.
		12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.
		13. My feelings about it were kind of numb.
Hypervigilance	*Hyperarousal subscale of Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1997)*	4. I felt irritable and angry.
		10. I was jumpy and easily startled.
		15. I had trouble falling asleep.
		18. I had trouble concentrating.
		19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.
		21. I felt watchful and on guard.
Psych_Parcel1	*Depression Subscale of Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean scores of items 9, 16, 17, 18, 35, 49*	9. Thoughts of ending your life
		16. Feeling lonely
		17. Feeling blue
		18. Feeling no interest in things
		35. Feeling hopeless about the future
		49. Feelings of worthlessness
	Hostility Subscale of	6. Feeling easily annoyed or irritated

	Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean score of items 6, 13, 40, 45	13. Temper outbursts that you could not control
		40. Having urges to break or smash things
		45. Getting into frequent arguments
	Somatization Subscale of Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean score of item 2, 7, 23, 29, 30, 33, 37	2. Faintness or dizziness
		7. Pains in the heart or chest
		23. Nausea or upset stomach
		29. Trouble getting your breath
		30. Hot or cold spells
		33. Numbness or tingling in parts of your body
		37. Feeling weak in parts of your body
Psych_Parcel2	*Anxiety Subscale of Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean score of items 1, 12, 19, 38, 44, 48*	1. Nervousness or shakiness inside
		12. Suddenly scared for no reason
		19. Feeling fearful
		38. Feeling tense or keyed up
		48. Feeling so restless you couldn't sit still
	Obsessive-Compulsive Problems Subscale of Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean score of items	5. Trouble remembering things
		15. Feeling blocked in getting things done
		26. Having to check and double-check what you do
		27. Difficulty making decisions
		32. Your mind going blank
		36. Trouble concentrating

	5, 15, 26, 27, 32, 36	
	Interpersonal Sensitivity Subscale of Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean score of items 20, 21, 22, 41	20. Your feelings being easily hurt
		21. Feeling that people are unfriendly or dislike you
		22. Feeling inferior to others
		41. Feeling very self-conscious with others
Psych_Parcel 3	*Phobic Anxiety Sensitivity Subscale of Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean score of items 8, 28, 31, 42, 46*	8. Feeling afraid in open spaces or on the streets
		28. Feeling afraid to travel on buses, subways, or trains
		31. Having to avoid certain things, places, or activities because they frighten you
		42. Feeling uneasy in crowds, such as shopping or at a movie
		46. Feeling nervous when you are left alone
	Paranoid Ideation Sensitivity Subscale of Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean score of items 4, 10, 24, 47, 50	4. Feeling others are to blame for most of your troubles
		10. Feeling that most people cannot be trusted
		24. Feeling that you are watched or talked about by others
		47. Others not giving you proper credit for your achievements
		50. Feeling that people will take

		advantage of you if you let them
	Psychoticism Sensitivity Subscale of Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983); mean score of items 3, 14, 34, 43, 52	3. The idea that someone else can control your thoughts
		14. Feeling lonely even when you are with people
		34. The idea that you should be punished for your sins
		43. Never feeling close to another person
		52. The idea that something is wrong with your mind
Cohesion; Based on the measure, Family Adaptability and Cohesion Evaluation Scale (FACES) IV Package (Olson, 2011); determining a ratio score by assessing the balanced/unbalanced score (see Olson, 2011 for more information)	*Cohesion Dimension of FACES (Olson, 2011), sum of items 1, 7, 13, 19, 25, 31, 37*	1. Family members are involved in each other's lives.
		7. Family members feel very close to each other.
		13. Family members are supportive of each other during difficult times.
		19. Family members consult other family members on important decisions.
		25. Family members like to spend some of their free time with each other.
		31. Although family members have individual interests, they still participant in family activities.
		37. Our family has a good balance of separateness and closeness.
	Disengaged Dimension of FACES (Olson, 2011), sum	2. Our family tries new ways of dealing with problems.
		9. Family members seem to avoid contact

	of items 2, 9, 15, 22, 27, 33, 39	with each other when at home.
		15. Family members know very little about the friends of other family members.
		22. Family members have little need for friends outside the family.
		27. Our family seldom does things together.
		33. Family members seldom depend on each other.
		39. Family members mainly operate independently.
	Enmeshment Dimension of FACES (Olson, 2011), sum of items 4, 10, 16, 22, 28, 34, 40	4. We spend too much time together.
		10. Family members feel pressured to spend most free time together.
		16. Family members are too dependent on each other.
		22. Family members have little need for friends outside the family.
		28. We feel too connected to each other.
		34. We resent family members doing things outside the family.
		40. Family members feel guilty if they want to spend time away from the family.
Flexibility; Based on the measure, Family Adaptability and Cohesion	*Flexibility Dimension of FACES (Olson, 2011), sum of items 2, 8, 14, 20,*	2. Our family tries new ways of dealing with problems.
		8. Parents equally share leadership in our family.

Evaluation Scale (FACES) IV Package (Olson, 2011); determining a ratio score by assessing the balanced/unbalanced score (see Olson, 2011 for more information)	*26, 32, 38*	14. Discipline is fair in our family.
		20. My family is able to adjust to change when necessary.
		26. We shift household responsibilities from person to person.
		32. We have clear rules and roles in our family.
		38. When problems arise, we compromise.
	Rigid Dimension of FACES (Olson, 2011), sum of items 5, 11, 17, 23, 29, 35, 41	5. There are strict consequences for breaking the rules in our family.
		11. There are clear consequences when a family member does something wrong.
		17. Our family has a rule for almost every possible situation.
		23. Our family is highly organized.
		29. Our family becomes frustrated when there is a change in our plans or routines.
		35. It is important to follow the rules in our family.
		41. Once a decision is made, it is very difficult to modify that decision.
	Chaotic Dimension of FACES (Olson, 2011), sum of items 6, 12, 18, 24, 30, 36, 42	6. We never seem to get organized in our family.
		12. It is hard to know who the leader is in our family.
		18. Things do not get done in our family.
		24. It is unclear who is responsible for things (chores, activities) in our family.

		30. There is no leadership in our family.
		36. Our family has a hard time keeping track of who does various household tasks.
		42. Our family feels hectic and disorganized.
Communication	*Communication Dimension of FACES (Olson, 2011), sum of items 43-52*	43. Family members are satisfied with how they communicate with each other.
		44. Family members are very good listeners.
		45. Family members express affection to each other.
		46. Family members are able to ask each other for what they want.
		47. Family members can calmly discuss problems with each other.
		48. Family members discuss their ideas and beliefs with each other.
		49. When family members ask questions of each other, they get honest answers.
		50. Family members try to understand each other's feelings
		51. When angry, family members seldom say negative things about each other.
		52. Family members express their true feelings to each other.
Satisfaction	*Family Satisfaction Dimension of FACES*	53. The degree of closeness between family members.

	(Olson, 2011), sum of items 53-62	54. Your family's ability to cope with stress.
		55. Your family's ability to be flexible.
		56. Your family's ability to share positive experiences.
		57. The quality of communication between family members.
		58. Your family's ability to resolve conflicts.
		59. The amount of time you spend together as a family.
		60. The way problems are discussed.
		61. The fairness of criticism in your family.
		62. Family members concern for each other.

**Note: Asterisk (*) denotes re-coded item