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Predicting Outcome at Posttreatment for Adolescent Obsessive-Compulsive Disorder in a Residential Treatment Setting

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PREDICTING OUTCOME AT POSTTREATMENT FOR ADOLESCENT OBSESSIVE-COMPULSIVE
DISORDER IN A RESIDENTIAL TREATMENT SETTING

by

Heather M. Jones

A Dissertation Submitted in
Partial Fulfillment of the
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December 2014

ABSTRACT
PREDICTING OUTCOME AT POSTTREATMENT FOR ADOLESCENT OBSESSIVE-COMPULSIVE
DISORDER IN A RESIDENTIAL TREATMENT SETTING

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Heather M. Jones

The University of Wisconsin-Milwaukee, 2014
Under the Supervision of Professor Karen Callan Stoiber

Exposure and response prevention (ERP) paired with psychopharmacological interventions are considered first line treatments for pediatric obsessive compulsive disorder (OCD). Recent literature has emphasized the importance of investigating effectiveness and treatment outcomes for difficult-to-treat cases of pediatric OCD who do not respond to outpatient treatment. Effectiveness studies have found that adolescent patients treated in residential settings have demonstrated gains comparable to those patients included in published outpatient outcomes studies (Bjorgvinsson et al., 2008; Leonard et al., 2014). Current research efforts are needed to 1) better predict gains in real-world clinical settings and 2) identify risk factors for difficult-to-treat patients who have previously failed effective treatment strategies. The purpose of this study was to investigate predictors of residential treatment outcome in 196 adolescent (13-17 years old) patients receiving intensive combined treatment for a primary diagnosis of OCD. Clinical factors within five relevant domains were investigated to determine whether predictors above and beyond baseline symptom severity are able to predict OCD treatment response in this population. Patients were assessed at admission and discharge with standardized self-report measures of OCD symptom severity, depression, anxiety sensitivity, and anxiety-related symptoms. Admission data were used for the prediction of OCD severity at discharge as measured by the Children's Yale-Brown Obsessive-Compulsive Scale – Self Report

(CY-BOCS-SR; Piacentini, Langley, & Roblek, 2007). Results indicated the variables of having received partial hospitalization/day treatment prior to admission to residential and higher severity at admission significantly predicted greater OCD severity at discharge. The relation between treatment history and outcome deserve additional exploration to uncover factors related to previous treatment experience and subsequent treatment outcomes. Differences among subtests on the CY-BOCS-SR in predicting treatment outcome provided evidence for the need for additional investigations of the link between severity of compulsory behaviors at admission and response to treatment. The challenge remains to systematically identify program components that match unique patient needs to increase prescriptive efficacy with this difficult-to-treat population.

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In his book *How Children Succeed*, Paul Tough (2012) defines grit as “a passionate commitment to a single mission and an unswerving dedication to achieve that mission” (p. 74). I would like to think I had grit when I started this project, but what I remember having was fear, uncertainty, pessimism, and self-doubt. The passionate commitment grew with me as I faced and overcame obstacles along my journey and the unswerving dedication was not without the support of some very important people in my life that I would like to now thank.

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CHAPTER 1: Introduction

Obsessive compulsive disorder (OCD) is a pervasive mental disorder that significantly impacts one's family, social, and work or school functioning. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5, American Psychiatric Association, 2013), the diagnostic criteria for obsessive-compulsive disorder are recurrent obsessions and compulsions that significantly impact an individual's functioning. Obsessions are defined as "recurrent and persistent thoughts, urges, or images that are experienced, at some time during the disturbance, as intrusive and unwanted, and that in most individuals cause marked anxiety or distress" (APA, 2013, p. 237). Compulsions are defined as "repetitive behaviors or mental acts that the individual feels driven to perform in response to an obsession or according to rules that must be applied rigidly" (APA, 2013, p.237). The functional relationship between obsessions and compulsions has received considerable empirical support (Rachman & Hodgson, 1980). Kozak and Foa (1996) describe obsessions as thoughts, images, or impulses that generate anxiety while compulsions are overt (behavioral) or covert (mental) actions that are performed to temporarily and artificially reduce the anxiety produced by the obsession.

Historically, the lifetime prevalence of this disorder has been reported to impact between 2-3% of the population and between 1-3% children and adolescents (Flament et al., 1988; Valleni-Basile et al., 1995). More recent reports estimate twelve-month prevalence rates to be 1.2% in adult outpatient settings (Ruscio, Stein, Chiu, & Kessler, 2010) with similar prevalence rates in primary care settings (Veldhuis et al., 2012). Recent studies have estimated prevalence rates among children and adolescents to vary from 2 to 4% (Merlo, Storch, Adkins, Murphy, & Greffken, 2007). A large number of adult OCD patients have their first onset in late childhood or adolescence. Rasmussen and Eisen (1990) found that OCD symptoms persist in 50% of adults who first developed symptoms during childhood or adolescence with a range of

age of onset between 13-24 years. It is suggested that OCD follows a bimodal distribution of incidence in childhood and adulthood with a 3 to 2 ratio of male to female occurrences in childhood, which equally distribute between genders by adolescence. It is not uncommon for people to suffer for several years with OCD prior to seeking treatment. Rasmussen and Tsuang (1986) found that on average most individuals presented for treatment 7 years after first experiencing symptoms. Thus, besides reducing morbidity and functional impairment in pediatric OCD, empirically supported treatments have the potential to reduce OCD symptoms and related dysfunction in adulthood.

Treatment of OCD

Exposure response prevention (ERP), a behavioral component of cognitive behavioral therapy (CBT), paired with psychopharmacological interventions is considered first line treatment for adult and pediatric obsessive compulsive disorder (OCD). The efficaciousness of CBT, pharmacotherapy, and both in combination have been well documented for both adult and pediatric OCD (O'Connor et al., 2006; Eddy, Dutra, Bradley, & Westen, 2004). Often, pediatric patients with OCD receive pharmacological interventions first before behavioral interventions are added. It is hypothesized that this may be because patients and families find ERP "too difficult" or once in treatment find the initial distress so aversive, they discontinue (Franklin, Freeman, & March, 2010). It is worth noting, however, that clinical trials point out important limitations to the effectiveness of pharmacologic interventions alone. These limitations include: variability in the efficacy of pharmacological intervention across individuals, medications side effects, and poor maintenance of gains on medications alone (Kozak, Liebowitz, & Foa, 2000). CBT has received the highest degree of empirical support and is considered the treatment of choice for children, adolescents, and adults with OCD even when pharmacological interventions are unavailable.

ERP is based on the principle that anxiety decreases over time when an individual is in contact with a feared stimulus that is not innately dangerous. Learning theory has identified this process and termed it 'extinction' – the gradual discontinuation of a behavior when reinforcement no longer follows a behavior (operant conditioning) or when a conditioned stimulus is presented alone without the unconditioned stimulus (classical conditioning). For example, a patient with an irrational fear of germs will confront anxiety-producing but objectively low-risk situations (i.e. holding a commonly used door knob) that allow his or her anxiety to decrease naturally over time, a process referred to as habituation within the context of ERP. Successful exposure trials depend on the patient's ability to block the negative reinforcement effect of rituals/compulsions or other avoidance - this process is referred to as ritual prevention. Disengaging from rituals thus removes the negative reinforcement resulting from the compulsion. ERP utilizes components of operant conditioning (approaching, not avoiding aversive stimuli) as well as classical conditioning (presenting a conditioned stimulus repeatedly until the anxiety response has been eliminated).

Patients often have a range of feared stimuli starting with those items or situations that cause little or no anxiety, those that are tolerable, and those items that will almost certainly induce a state of panic. In treatment, patients develop an exposure hierarchy, which is a list of all feared stimuli. This list is comprehensive but not exhaustive as the purpose of ERP is to produce generalization overtime. As part of the hierarchy development, patients are asked to rate their anxiety on a Subjective Units of Distress Scale (SUDS; Wolpe, 1969) with 0 = no anxiety and 100 = panic. Exposures that patients subjectively anticipate causing little anxiety are rated lower on the scale and placed further down in the hierarchy while panic-inducing items are placed at the top. Once the hierarchy is developed, therapists begin to help repeatedly "expose" patient to feared stimuli while the patient is expected to refrain from engaging in rituals in order

to produce habituation to the feared stimuli. Patients are asked to complete the same exposure repeatedly to achieve both within- and between-trial habituation (Grayson, Foa, & Steketee, 1986). Each exposure is continued until the patient's anxiety has reduced by half (within-trial habituation). Over time, each successive trial will produce less anxiety (between-trial habituation). During treatment, the percentage of completed exposures on the hierarchy is used to measure the patient's progress. Alternatively, a rate of habituation can be calculated.

Though ERP emphasizes the behavioral components within the CBT treatment, the cognitive components of CBT serve as a binder that brings together aspects of ERP and teaches useful tools for managing anxiety and obsessions. These include: (1) active thought challenging of irrational OCD thoughts, (2) disassociation or separation of the individual and the disorder, and (3) "cultivating nonattachment" or learning to allow obsessional thoughts to come without acting on them or engaging in mental neutralization of the anxiety (Franklin, Freeman, & March, 2010, p. 82). It has been common practice for clinicians to implement cognitive-only interventions for OCD prior to initiating behaviorally-based interventions (Deacon, & Nelson, 2008). This technique is used to identify feared stimuli, determine the level of insight to the rationality of obsessions, and to start to challenge pathological beliefs. Challenging these pathological beliefs is often difficult for patients due to the cyclical nature of OCD (i.e., obsession → anxiety → compulsion → elimination of anxiety). The elimination of anxiety serves as negative reinforcement for the continued use of compulsions which increases severity of OCD symptoms. Positive reinforcement when offered alone has found to have little impact over OCD symptoms, but reward following exposure tasks has been found to increase ERP compliance which breaks the cycle of the behavioral response (compulsion) that is reinforced negatively by the elimination of anxiety. Additionally, success in ERP produces a reduction of OCD symptoms that promotes continued engagement, generalization, and maintenance of skills gained during

treatment (Franklin, Freeman, & March, 2010). More often than not both behavioral and cognitive components are integrated in treating OCD. Evidence suggests however that taken alone, behaviorally oriented ERP with no cognitive component is able to produce both statistically and clinically significant reductions in OCD symptoms at treatment end and 14-week follow-up (Bolton, & Perrin, 2008).

Due to the pervasive nature of OCD and cyclical nature of the disorder (e.g., engaging in compulsions reduces anxiety and is negatively reinforcing, leading to increased engagement in compulsions), it is not uncommon for individuals to develop debilitating symptoms that limit functionality. As mentioned previously, demographic data suggest that individuals often wait to receive treatment for OCD which is problematic given its progressive nature (Rasmussen, & Tsuang, 1986). Most individuals seek either outpatient treatment, which consists of 1-2 appointments per week by a licensed therapist, or pharmacological intervention, which may include one 15-minute appointment with a licensed psychiatrist or meeting with their primary care physician.

Statement of Problem

There is currently a documented shortage of trained therapists utilizing first line treatments for OCD (i.e., ERP; Franklin, Freeman, & March, 2010). Patients who are unable to receive ERP are likely to experience an increase of OCD symptoms. Even individuals who have been receiving treatment from an outpatient therapist may experience an increase in symptoms due to treatment resistant or difficult-to-treat OCD. Despite evidence demonstrating the effectiveness of exposure-based treatment of OCD, a meta-analysis (Abramowitz, Whiteside, & Deacon, 2005) found that 27% of studies measuring the effectiveness of ERP failed to show significant response to treatment indicating a subset of individuals that fail to respond to typical treatment. Storch et al. (2008) identified the following contributors to treatment resistant OCD

in a group of 60 pediatric outpatients: significantly more obsessions and compulsions, more internalizing symptoms, family dynamics that accommodate the OCD, and a greater degree of functional impairment compared to those individuals who responded to outpatient treatment. For these individuals or for those for whom outpatient treatment is unavailable, intensive or residential treatment is recommended. More intensive CBT allows clinicians to increase the treatment dose (i.e. the number of hours of ERP provided per week), which may be helpful for patients with more severe or complex presentations. These patients may require more focused interventions consisting of multimodal treatments, intensive monitoring due to severe symptoms, and delivery of ERP at a more intensive level than outpatient providers are able to provide.

With need comes the emergence of programs offering intensive treatment for pediatric OCD. Residential treatment meets the needs of these patients with increased duration and intensity of CBT, removal from dynamics within the family setting that has accommodated anxiety, and staff monitoring and therapeutic support to assist with ritual prevention, assigned exposure completion, and other treatment goals. While evidence from naturalistic studies support the benefits of CBT for pediatric OCD (Nakatani, Mataix-Cols, Micali, Turner, & Heyman, 2009; Vande Voort, Svecova, Jacobsen, & Whiteside, 2010) and adults with OCD (Franklin, Abramowitz, Kozak, Levitt, & Foa, 2000; Warren & Thomas, 2001) in traditional outpatient settings, few studies have measured the effectiveness of intensive treatment within a residential setting or variables contributing to success in this setting. Additional research is needed to investigate whether factors exist that can predict effectiveness of treatment within this setting with patients who have severe and complex mental illnesses that have not been successfully addressed with outpatient support.

Residential treatment is often considered a “last resort” for families when all other therapeutic interventions have been exhausted without improvement of symptoms. The demographic of patients receiving residential treatment for OCD are assumed to include individuals with severe, refractory OCD; complex comorbidities; and previous unsuccessful treatment attempts (Leonard et al., 2014; Stewart, Yen, Stack, & Jenike, 2006). Despite these factors, dropout rates in residential settings are low possibly due to the fact that patients are at “the end of the road” in terms of treatment options and patients who are minors, while needing to consent to treatment, receive encouragement from their parents to remain in treatment (Franklin, Freeman, & March, 2010). Buy-in with pediatric patients and their families is an integral part of the admissions and early treatment process. Parents want to know they are making a decision that is in the best interest of their child and want to have some assurance that the time their children are spending in treatment, away from family, friends, school, and “normal” teenage life, is going to be a worthwhile investment. Since, many of the outcome studies investigating the treatment of pediatrics with OCD have utilized weekly therapy sessions, little is known about dosage of treatment for the residential patient. Franklin et al. (1998) found no significant difference between 14 sessions over 12 weeks and 18 sessions over 4 weeks. Storch et al. (2007) provides evidence that patients respond as well to weekly sessions as they do to intensive (daily) doses of ERP. Only two studies to date have evaluated the effectiveness of residentially-based OCD treatment for adolescents (see Bjorgvinsson et al., 2008; Leonard et al., 2014). Both open-trials revealed significant decreases in OCD severity from admission to discharge which were maintained at follow-up, however little is known about the characteristics of the patients who responded to treatment versus those who did not.

The ability to better predict post-treatment outcome from early symptoms is valuable to patients, their families, treatment providers, and funding sources. It has been discussed that

ERP is a difficult labor-intensive and emotionally-intensive treatment; therefore, providing patients with evidence-based information regarding their progress could certainly provide incentive for continued motivation and endurance through treatment. Similarly, patient families who are invested in the treatment progress can benefit from this information as they encourage and support their child's progress through treatment. Another benefit of identifying predictive variables to success is to better inform outpatient therapists on the factors that contribute to gains in residential treatment. At face value this information might seem irrelevant, but to the extent an outpatient therapist could coach and prepare a patient for intensive treatment this information might offer evidence to future patients of what factors contribute to long-term gains. To the extent that patient characteristics predict subsequent reduction in OCD symptoms during the course of treatment and follow-up, clinicians can use this information to guide treatment – either maintaining the steady course of the current treatment strategies or consideration of augmentation with other interventions. Finally, with the availability of intensive treatment for patients with severe OCD comes the reality of funding such treatment. The reality exists that intensive psychiatric treatment is tremendously expensive and families are faced with decisions on how to fund treatment. One study reports the average cost of psychiatric hospitalization has been found to be between \$775 and \$1000 per day (Stensland, Watson, & Grazier, 2012). In the era of managed care, insurance companies, in having to make decisions on length of stay and rate of progress, demand markers of progress asking providers to communicate information such as estimate of treatment duration, rate of response, and sustainability of gains achieved. Having the ability to better estimate response rate in patients, clinicians can more accurately, and with quantitative evidence, advise insurers of the anticipated trajectory of treatment in an effort to contribute to the efficient use of resources.

Purpose of Study

Most published studies reporting the effectiveness of treatment of OCD in adolescents combine inpatient, partial hospitalization, and outpatient treatment modalities. It was only recently that research has demonstrated the effectiveness of treatment for adolescent OCD in a residential setting (Bjorgvinsson et al., 2008; Leonard et al., 2014). Current research efforts are needed to enable clinicians to (1) better predict gains in real-world clinical settings and (2) identify risk factors for difficult-to-treat patients who have previously failed effective treatment strategies. The purpose of this study is to investigate predictors of residential treatment outcome in adolescent patients receiving intensive combined treatment for a primary diagnosis of OCD. This study seeks to empirically examine clinical factors within five relevant domains to determine whether predictors above and beyond baseline symptom severity are able to predict OCD treatment response in this population. The literature has yet to address the relationship between potential predictors and treatment outcomes for pediatric patients receiving residential treatment. The following research questions have been derived based on the literature identifying predictors of treatment outcome of pediatric patients with OCD receiving various types of non-residential treatment and adult patients receiving residential treatment for OCD. The following research questions will be addressed and are labeled to correspond with later outlined methods:

1. What is the relationship of potential predictors by domain (demographics, treatment history, comorbid symptoms, OCD symptom severity, and OCD symptom subtype) to treatment outcome?
 - a. How well do demographic characteristics (age, gender, length-of-stay) at admission predict treatment outcome at discharge?

- b. How well does treatment type prior to admission predict treatment outcome at discharge?
 - c. How well do measures of symptom comorbidity (depression as measured by BDI-II; anxiety as measured by SCARED; anxiety sensitivity as measured by ASI; suicidality as measured by BDI-II Q#9) at admission predict treatment outcome at discharge?
 - d. How well does OCD symptom severity (CY-BOCS-SR, including subtest scores) at admission predict treatment outcome at discharge?
 - e. How well does OCD symptom subtype predict treatment outcome at discharge?
2. How much improvement in prediction of treatment outcome is associated with the addition of identified predictors to OCD symptom severity at admission?
- a. If demographic variables (age, gender, length-of-stay) are found to significantly predict treatment outcome, what is the ability of these variables to predict treatment outcome at discharge, controlling for OCD symptom severity at admission?
 - b. If treatment history is found to significantly predict treatment outcome, what is the ability of treatment history to predict treatment outcome at discharge, controlling for OCD symptom severity at admission?
 - c. If measures of symptom comorbidity (depression, BDI-II; anxiety, SCARED; anxiety sensitivity, ASI; suicidality, BDI-II Q#9) are found to significantly predict treatment outcome, what is the ability of these measures to predict treatment outcome at discharge, controlling for OCD symptom severity at admission?

- d. If OCD symptom subtype is found to significantly predict treatment outcome, what is the ability of OCD symptom subtype to predict treatment outcome at discharge, controlling for OCD symptom severity at admission?

CHAPTER 2: Literature Review

Theoretical Models of OCD

OCD is a disorder often characterized by cognitive and behavioral components (i.e., obsessions and compulsions), thus it makes intuitive sense that treatment follows the same trend. CBT utilizes both behavioral-based therapeutic interventions that follow what is known about the human learning process as well as cognitively-based interventions that take into account the human experience and cognitive component of learning and behavior. The theoretical basis for CBT in combination with ERP, as well as research to support the efficaciousness of this treatment, will be discussed. Further discussion will review what is known about the biological basis of OCD and the history of and current uses of psychopharmacological interventions. The format of discussion will be bottom-up in presentation thus building upon very early theories of learning to discussion of present treatment. Current best practices and evidenced-based research supporting the use of these treatments will also be discussed. Finally, patient response to treatment and predictability of outcome will be presented which will then lead into the purposes of this study.

Learning Theory/Fear Acquisition

The most widely accepted and empirically validated treatments for OCD are based on learning theory. The learning process has been explained by two types of theories: stimulus-response theory and cognitive theory. Both will be briefly discussed. Grounded in the work of Hull, a stimulus-response theorist, Mowrer (1939), presented a two-factor theory of acquisition and maintenance of fear and avoidance learning. He postulated that patients are motivated to escape or avoid anxiety. This avoidance behavior is a learned response to signals or environmental cues that precede anxiety (conditioned stimuli or CS) that have been followed by an aversive event (unconditioned stimuli UCS) in the past. The conditioned fear motivates the

occurrence of an escape response by the patient to eliminate the CS. Additionally, Mowrer recognized that the avoidance behavior is repeatedly negatively reinforced as the patient escapes from the CS that elicits the UCR or fear or anxiety. Based on observation in clinical trials, Mowrer concluded that fears are acquired in accordance with conditioning theory. The strength of the fear is determined based on the intensity of the fear at pairing and the number of repetitions of the association between the fear and the stimuli. It was also noted that this anxious response by an individual can generalize to stimuli similar to the original CS. D'Amato (1966) extends Mowrer's work explaining that individuals can also learn to avoid aversive stimuli (anxiety) through anticipation of the fear response. D'Amato demonstrated that when rats were presented with discontinuous shock at various levels of intensity they displayed increased avoidance behaviors compared to rats receiving similar levels of continuous shock. Cognitive theorists such as Tolman and Rotter believed that organism's behaviors are purposive and goal-directed not solely based on automatic associations. Rotter (1954) proposed that individuals are able to distinguish reward value, estimate probability of obtaining reward, and have expectations of obtaining rewards. He also presented a theory of locus of control that states that individuals have expectations of how much control they have in their environment.

Rachman (1977) proposed revisions to the conditioning theory of fear acquisition in order to account for clinical examples that did not fit earlier theories. Rachman proposed three "pathways" to the acquisition of fear: conditioning, vicarious exposures, and the transmission of information and instruction. Rachman provided support for the conditioning theory but also addressed six scenarios in which individuals' responses did not align with the conditioning theory of fear acquisition. The first is that individuals did not demonstrate fear responses under otherwise fearful situations. Through a systematic inquiry of 8000 individuals who experienced air raids during WWII, Lewis (1942) discovered that not all developed anxiety disorders. In fact,

only 4% were reported as having acute reactions while 96% of individuals experienced anxiety that dissipated spontaneously. Additionally, Rachman noted difficulty in creating conditioned fear in human subjects in laboratory conditions. In an attempt to replicate Watson's landmark study, Bregman (1934) failed in conditioning a group of 15 infants to neutral stimuli in the presence of a loud noise. Similarly, Hallam and Rachman (1976) failed to elicit conditioned fear reactions in individuals who experienced electric shock over those who did not. They found that conditioned fear did not resemble the cardiac responses that phobic patients experience when presented with their phobic stimulus, nor did subjects report the same anxiety or discomfort reported by phobic patients in the presence of the stimulus. Third, equipotentiality, the concept that any two stimuli can become associated, or in this case that any stimulus can elicit a fear response if conditioned and that all stimuli have an equal chance of being transformed into CSs, is unsustainable. For example, a conditioned fear has been obtained for snakes but not human faces (Ohman, Erixon, & Lofberg, 1975), caterpillars but not opera glasses (Valentine, 1946), and rats but not wooden geometric shapes (Watson, & Rayner, 1920; Bregman, 1934). Seligman (1971) instead suggests that equipotentiality be replaced with preparedness and argued that phobias are of biological significance, are acquired readily, generalize broadly, and are more resistant to extinction. The fourth addresses the epidemiological differences in conditioning across populations of individuals. Agras, Sylvester, and Oliveau (1969) found that 390/1000 people fear snakes while only 198/1000 fear a trip to the dentist, an interesting finding considering the exposure to snakes is not as common as dental visits. Some fears are found to be more common than others regardless of exposure (e.g. children tend to have fear of darkness while not of pajamas (Rachman, 1977). Interestingly, the most common obsessions reported for patients with OCD support this theory: fears of contamination, sickness, death/dying, and scrupulosity (i.e. feelings of extreme guilt about religious or moral issues)

(Steketee, 2005). Fifth, conditioning theory fails to account for onset of fears. Clinical observation of children and adolescents support this as they often have no account of the moment in which they developed a fear of germs but can, in hindsight, point out potential precipitating factors. Finally, conditioning theory does not take into account Bandura's observational learning. Lewis (1942) observed correlations between mothers who experienced air raids and the development of anxiety disorders in their children. Correlations of fears between mother and child have been reported between 0.59 and 0.67 (Hagman, 1932; John, 1941). In summary, Rachman provided evidence to suggest that information and instructional processes of fear acquisition explain failures to acquire fear in situations where conditioning theory would have been anticipated. It was also suggested that fear acquisition can not only generalize but also discriminate between stimuli that are not dangerous and therefore not to be feared.

Rachman (1977) provided evidence to lead to acknowledgement of biological differences in acquisition of fears which he calls "ease of connection" (p. 384). He suggested that there is vulnerability and invulnerability between certain people and certain fear stimuli. This biological predisposition will be discussed further in review of biological theory and pharmacological treatment of OCD. In addition to this biological predisposition, Rachman (1977) also hypothesized that "critical moments" may account for fear that is not provoked by recurrence of exposure but by intensity of stimulation in one exposure (p. 385). In other words, one may acquire a fear to a stimulus otherwise categorized as neutral if that person is experiencing intense psychological or physiological states in the presence of that stimulus. For example, individuals with panic disorder may develop agoraphobia after having a panic attack in the grocery store; thus an environment they had frequented hundreds of times in the past becomes a source of fear that thus is avoided. For adolescents, this environment is often school

and other social environments. The conditioning theory of fear acquisition is the basis for the development of behaviorally-based treatments designed to reduce this association between the aversive stimuli and the conditioned response. Based within the Pavlovian fear conditioning framework (1927), researchers have well documented that once fear is acquired through association, the fear can be extinguished through consistent exposure of the neutral stimulus in absence of the unconditioned stimulus (Bouton, & Brooks, 1993; Vanelzakker, Dahlgren, Davis, & Shin, 2013).

In addition to the conditioning theory of fear acquisition, additional theories suggest it is important to take into consideration vicarious acquisition of fear and information and instructional transmission of fear with respect to OCD. This theory suggests that patients with OCD may have a biological predisposition to the development of fear in addition to an experience or critical event (e.g. start of high school, birth of a sibling, move) which increases vulnerability to acquisition of fear. Modern understanding of fear acquisition also acknowledges the early work of cognitive theorists who contributed to our understanding that motivation, expectancy, and perception of control have significant impact on an individual's approach to treatment (Hammond, 2005; Menzies et al., 2007). The importance of the combined cognitive and behavioral approach in the treatment of OCD is that it directly addresses both the irrational belief systems as well as the ritualistic behaviors which plague individuals with OCD.

Habituation Theory

The comprehension of habituation theory is essential when discussing behavioral treatment for anxiety. The process of habituation epitomizes the mind-body connection in that it can be explained both physiologically and psychologically. The physiologist may describe the process in terms of physical reactions to anxiety such as rapid heart rate, dilation of pupils, rapid respiration, and other symptoms occurring when the "fight or flight" response is stimulated by

the sympathetic nervous system which is then eventually countered by the parasympathetic response bringing the body back to a state of homeostasis. Several constructs have been developed in the literature to attempt to explain the decrease in responsiveness to stimuli over time including fatigue (Sherrington, 1906), extinction (Pavlov, 1927), reactive inhibition (Hull, 1943), and satiation (Glanzer, 1953). Two landmark papers (Thompson, & Spencer, 1966; Groves, & Thompson, 1970) are the most commonly cited when describing behavioral characteristics of habituation in the literature. The original work reviewed the existing habituation literature and organized nine characteristics that operationally defined habituation. It was stated that if an organism responded to repeated stimulation in conformance with these characteristics, it habituated (Thompson, & Spencer, 1966). Groves and Thompson's (1970) dual-process theory defined this progression in terms of an organism's behavior such that with repeated stimulation behavioral response will decrease (habituate) in the same way, and with limited stimulation behavioral response will heighten (sensitization).

The two-process theory has been applied minimally to the field of anxiety disorders. However, it has been suggested that the decline in both physiological and psychological anxiety during ERP for patients with phobias or OCD is a necessary condition for treatment benefits to occur (Bolton, & Perrin, 2008; Franklin, Freeman, & March, 2010; Marshall, & Segal, 1988). Lader and Wing (1964) described the decline in anxiety following exposure as habituation and succeeded in maintenance of the term in the literature in describing the phenomenon. There is some discrepancy among theorists regarding degree of exposure and levels of arousal necessary for habituation to occur. It has been theorized that low levels of arousal during exposure would aid in habituation for phobia (Lader, & Wing, 1964) and subsequent research has supported this, finding that high initial arousal during exposure impedes habituation (Foa et al., 1983). These results conflict with the original observations of Lang, Melamed, and Hart (1970) who found that

individuals with high levels of anxious response to stimuli showed greater habituation and benefited from treatment more so than those with lower anxiety.

It has been widely accepted that habituation plays a key role in the treatment of anxiety disorders in general and in OCD specifically. It was not until recently that the principles of systematic desensitization and habituation were examined more closely within the context of the acquisition of fear. In a recent review of literature, Craske, Lio, Brown, and Vervliet (2012) found support for an inhibitory model of fear reduction. Evidence in the literature suggests that anxious individual's fear minimization may occur not necessarily by the process of habituation but by a newly formed association, or re-learning process that occurs when feared stimuli are presented within a safe context.

Treatment of OCD

Rooted in the abovementioned theoretical frameworks, behavioral therapy has been well documented as the "gold standard" of treatment for obsessive-compulsive disorder in adults. Cognitive-behavioral therapy (CBT) in combination with exposure response prevention (ERP), psychopharmacological or biological models, and combined models of treatment are recognized as both efficacious and clinically effective in treating adult OCD across settings (Abramowitz, Franklin, & Foa, 2002; Jenike, 2004; March et al., 1998). Treatment for pediatric OCD has been a downward extension of practices and protocols found efficacious with adults. The progression of study started with single-case studies, case studies, and open clinical trials (Franklin, Freeman, & March, 2010). Uncontrolled clinical trials with significant symptom reductions (e.g. Franklin et al., 1998; March, Mulle, & Herbel, 1994; Piacentini, Bergman, Jacobs, McCracken, & Kretchman, 2002) led to randomized studies evaluating the efficacy of ERP for pediatric OCD (e.g. Barrett, Healy-Farrell, & March, 2004; Bolton, & Perrin, 2008; POTS, 2004; Storch et al., 2007). This will be highlighted below.

Biological Models

Biological models will be briefly discussed providing background for the reader of the evolution of pharmacological intervention for pediatric OCD. Rachman (1977) referred to an “ease of connection” eluding the potential for a genetic or heritability to OCD. Genetic contributions are being investigated; however, researchers do not currently know who will or will not develop OCD based on these factors. It has been established that there is increased risk of OCD in the relatives of individuals with the disorder. Authors of the Obsessive-Compulsive Scale Child Behavior Checklist (OCS CBCL) found that scores are influenced more by genetic factors (approximately 55%) than unique environmental factors (approximately 45%; Hudziak et al., 2004). In other words, these data provided evidence for a genetic influence of symptoms related to OCD in children ages 7-12 years old. Several additional studies have also found support for a genetic component to the development of OCD (Cath, van Grootheest, Willemsen, van Oppen, Boomsma, 2007; Pauls, Alsobrook, Goodman, Rasmussen, & Lechman, 1995; Stewart, et al., 2013; Verkerk et al., 2003).

Examination of brain functioning and pharmacological approaches in individuals with OCD was first completed in adults before examining this among children and adolescents. Through the use of imaging techniques, researchers found evidence for dysregulation in several areas of the brain including serotonin subsystems in the central cortex and orbitofrontal cortex (Breitner et al., 1996; Chamberlain et al., 2008). In early uncontrolled trials, oral administration of serotonergic medications paired with ERP was associated with a reduction in OCD symptoms (Riggs, & Foa, 1993). The hypothesis that serotonergic dysregulation was contributing to OCD symptoms arose out of the observation that clomipramine, a serotonin reuptake inhibitor (SRI), relieved symptoms whereas noradrenergic reuptake inhibitors, those that target norepinephrine, did not. Pharmacological interventions for pediatric OCD were

initiated following intensive studies on the use of Clomipromine Hcl with adult patients with OCD since the 1980s (Flament et al., 1985; Jenike et al., 1989). In 1992, following a multi-center trial of Clomipromine Hcl, the Food and Drug Administration (FDA) approved its use in pediatric populations (Clomipramine Collaborative Study Group, 1991; DeVeough-Geiss et al., 1992). It was found that 50-60% of patients taking clomipromine experienced at least a 35% reduction in OCD symptoms while symptom reduction for individuals in the placebo group was no more than 5%.

The effectiveness of SRIs in treating individuals with OCD supported the serotonin hypothesis (Barr, Goodman, & Price, 1993). The serotonin hypothesis describes OCD pathology as an abnormal decrease of serotonergic (inhibitory) activity in the brain. SRIs work to block the reuptake of serotonin in the synaptic gap thus ensuring an increased level of serotonin available in the synapse. (Rosenzweig, Breedlove, & Leiman, 2002). Thus, while serotonin molecularly is not increased in number, the time spent in the synaptic gap is increased by the presence of the SSRI. It is hypothesized that this increase in serotonin will decrease OCD symptoms. The effectiveness of clomipromine on OCD symptoms led researchers to investigate the utility of other SSRI medications more selective for serotonin (i.e. SSRIs). SRIs including fluoxetine, sertraline, paroxetine, and fluvoxamine have all demonstrated efficacy in symptom reduction and are approved by the FDA for treatment of OCD (Kozak, Liebowitz, & Foa, 2000).

Additional studies measuring the efficacy of ERP alone, pharmacological intervention alone, and combined treatment efficacy and effectiveness in pediatric populations will be discussed. While historically there had been fewer studies showing such efficaciousness and effectiveness for the pediatric population, recent research has well documented the abovementioned treatments as the gold standard for care for pediatric populations. As a result, standard treatments for pediatric OCD include CBT and ERP for mild to moderate cases and CBT

with ERP combined with serotonin reuptake inhibitors (SRIs) for moderate to severe cases (American Academy of Child and Adolescent Psychiatry [AACAP], 2012; National Institute for Health and Clinical Excellence [NICE], 2005).

Treatment Efficacy

Numerous randomized controlled trials (RCTs) have demonstrated the efficacy of CBT alone (e.g., Barrett, Healy-Farrell, & March, 2004; Bolton, & Perrin, 2008; Bolton et al., 2011; de Haan, Hoogduin, Buitelaar, & Keijesers, 1998; Pediatric OCD Treatment Study [POTS] Group, 2004; Piacentini et al., 2011; Storch et al., 2007; Williams et al., 2010) or in combination with SRIs (e.g., Franklin et al., 2011; POTS, 2004) for pediatric OCD. The POTS (2004) study randomly assigned 112 pediatric patients (ages 7-17) to one of four treatment groups: SRI (sertraline), CBT, CBT and SRI, or pill placebo for a 12-week trial. The sample was reportedly representative of youth with OCD seen in general clinical practice with moderate to severe OCD symptoms (as measured by the CY-BOCS-SR), with 80% of the sample having at least one comorbid psychiatric disorder. Combined treatment was superior to CBT alone ($p = .008$), SRI alone ($p = .006$), and to placebo ($p < .001$). The CBT alone and SRI alone conditions did not differ from one another ($p = .80$), and both were superior to placebo (CBT $p = .003$, SRI $p = .007$).

Franklin et al., (2011) found that among 124 pediatric patients with OCD receiving pharmacotherapy with SRIs, the addition of intensive CBT provided by psychologists (MM+CBT) resulted in a significantly greater response rate, whereas augmentation of SRI with simple CBT instruction by psychiatrist (MM+I-CBT) did not. Patients (age 7-17) with a primary diagnosis of OCD were randomly assigned to three conditions: medication management with SRI (MM), MM + instruction on CBT procedures (MM+I-CBT), and MM + intensive CBT for a 12-week trial. MM + CBT was superior to both MM ($p < .0001$) and MM+I-CBT ($p = .001$), and MM+I-CBT and MM were not statistically significant from each other ($p = .45$). In other words, for pediatric patients

already treated with an SRI, treatment that incorporates intensive CBT has been shown to be more efficacious than general CBT instruction alone.

Evidence from the Child/Adolescent Anxiety Multimodal Study (CAMS) (Ginsberg et al., 2011) also supports the efficacy of CBT and SRI as treatment of pediatric anxiety disorders. A sample of 488 children and adolescents (ages 7-17) were randomly assigned to one of four treatment groups: SRT (sertraline), CBT, CBT and SRT (COMB), and placebo (PBO) for a 12-week trial measuring remission of symptoms of anxiety. Results found that COMB treatment demonstrated significantly greater remission rates than CBT alone ($p = .04$), SRT ($p = .03$), and placebo ($p = .01$). CBT alone and SRT alone did not significantly differ ($p = .93$) and both were superior to placebo (CBT $p = .05$, SRT $p = .05$). Several meta-analyses provide additional support for the efficacy of CBT (Abramowitz, Whiteside, & Deacon, 2005; Olatunji, Davis, Powers, & Smits, 2013; Watson, & Rees, 2008).

Storch et al. (2007) completed the only RCT to date examining intensive CBT for pediatric OCD. In this study, forty children and adolescents (aged 7-17) with a primary diagnosis of OCD were randomly assigned to either: 1) 14 weekly traditional sessions or 2) 14 intensive 90-minute sessions each weekday for three weeks. The intensive delivery of CBT through concurrent weekday sessions over three weeks resulted in slightly better remission and improvement rates at post-treatment. While there were no significant differences across conditions by three-month follow-up, at post-treatment 75% of youth in the intensive group compared to 50% in the weekly group met remission status criteria. Overall, while no between group differences were obtained ($p = .15$), a significant within group main effect was identified for the CY-BOCS from pre-to post-treatment ($p = .001$) demonstrating that intensive CBT was equally as effective as weekly CBT sessions for this sample.

Although CBT has been identified as an efficacious treatment for pediatric OCD, many adolescents are unable to access treatment because of barriers such as shortage of trained professionals and geography (Storch et al., 2007). The solution sought by many parents of children and adolescents with OCD is intensive OCD treatment. With need comes the emergence of programs offering intensive treatment for pediatric OCD and the need for effectiveness studies targeting this population. While RCTs have provided the field with evidence supporting the efficacy of CBT in treating pediatric OCD, such studies are often lacking in external validity. For example, unlike patients treated in clinical settings, RCT subjects are typically required to consent to one of several conditions of treatment, limiting them to either SRI or CBT treatment (e.g., Barrett, Healy-Farrell, & March, 2004; Storch et al., 2007). Furthermore, RCTs often prescribe exclusionary criteria to subjects which excludes most patients who have failed an SRI trial or CBT historically (e.g. Franklin et al., 2011; POTS, 2004), patients without a “stable” dose of SRI (Bolton et al., 2011), or patients with comorbid psychiatric disorders (e.g. Storch et al., 2007) or learning disabilities (Bolton et al., 2011). Therefore, examination of pediatric OCD treatment outcomes in naturalistic settings is warranted to test the limits of these treatments beyond the academic medical context to examine its effects with more complex patients who would not meet criteria for RCTs.

Treatment Effectiveness

There is very little research to date investigating the effectiveness of intensive CBT treatment in pediatric populations with OCD. Franklin et al. (1998) and Storch et al. (2006) have demonstrated significant symptom reduction in open trials investigating the effectiveness of intensive CBT while others have reported significant improvement with shorter-term intensive treatment (Whiteside, Brown, & Abramowitz, 2008; Whiteside, & Jacobsen, 2010) which was sustained at five-month follow-up (Whiteside, & Jacobsen, 2010). Evidence also exists to

support the effectiveness of intensive outpatient group settings for treatment of pediatric OCD (Olino et al., 2011).

More intensive CBT allows clinicians to increase the treatment “dose,” which may be helpful for patients with more severe or complex presentations. These patients may require more focused interventions consisting of multimodal treatments, intensive monitoring due to severe symptoms, and delivery of ERP at a more intensive level than outpatient providers, and parents, are able to provide. Typically acute inpatient settings focus on short-term mood stabilization and do not provide the type of specialized treatment these patients require. Residential treatment meets the needs of these patients with increased duration and intensity of CBT, removal from dynamics within the family setting that has accommodated anxiety, and constant staff monitoring and therapeutic support to assist with ritual prevention, assigned exposure completion, and other treatment goals.

While research has shown the effectiveness of combined treatment with adult patients with OCD in intensive residential settings (e.g. Stewart et al., 2004), there is little evidence examining the effectiveness of CBT provided to adolescents with OCD in residential settings. One open clinical trial measured the effectiveness of CBT with adolescents receiving treatment within a residential setting during 2005 and 2006 (Bjorgvinsson et al., 2008). A total of 49 patients were admitted during this time period, 23 of which were included in the study due to having a primary diagnosis of OCD. Participants (aged 13-17) included 11 girls and 12 boys who were primarily Caucasian (95.9%). Sixty-five percent had comorbid diagnoses (mood disorder 35%, ADHD 17%, developmental disorder 17%, other anxiety disorder 13%, and other psychiatric disorders 18%) and the average length of stay was 9.5 weeks ($SD = 3.96$). Almost all of the adolescents admitted to the program had previously failed to respond to outpatient treatment. The CY-BOCS (Scahill et al., 1997) was used to measure OCD symptom severity and

identify OCD-related thoughts and beliefs. Results indicated significant decreases in OCD symptom severity from pre- to post-treatment, with a large effect size (Cohen's $d = 1.15$). Consistent with tests of statistical significance, the Reliable Change Index (RCI) (Jacobson, & Truax, 1991) showed that 70% of the patients demonstrated clinically significant decrease in their CY-BOCS scores. In other words, this study provided initial support for the effectiveness of residential treatment for a small sample of adolescents with OCD.

Leonard et al. (2014) examined outcomes from a larger sample of adolescents who received residential treatment for OCD. Participants included 172 adolescents with primary OCD who received CBT in combination with ERP in a residential treatment program between 2005 and 2013. Participants included 89 (51.7%) males and 83 (48.3%) females whose primary ethnicity was Caucasian (89%), who were on average 15.45 years old, and had an average length of stay of 78 days ($SD = 36$). Eighty-two percent of participants had comorbid diagnoses with 45% of patients with three or more diagnoses. The most common co-occurring diagnoses were: mood disorder not otherwise specified 82%, attention deficit/hyperactivity disorder 36%, major mood disorder 36%, autism spectrum disorder 20%, generalized anxiety disorder 19%, and social anxiety disorder 17%. Most of the patients had failed outpatient treatment (90.1%), received inpatient treatment (39.5%), or been enrolled in another type of intensive outpatient or residential program (40%). Treatment consisted of CBT in combination with ERP with patients receiving approximately 26.5 hours of ERP work weekly. Results demonstrated significant decreases in OCD symptom severity, as measured by the CY-BOCS-SR, from admission to discharge ($p < .001$). Reliable Change Index (RCI) analysis is consistent with the tests of statistical significance in that 64% of patients met criteria for clinically significant change. Follow-up data $t(43) = 0.602$, $p = .55$ demonstrated that gains in OCD symptom severity were maintained from post-treatment ($M = 11.00$, $SD = 5.96$) to follow-up ($M = 10.30$, $SD = 7.88$).

Predictors of Treatment Response

Although evidence exists for the effectiveness of a combination treatment for pediatric OCD, many patients do not respond to various levels of treatment. Rates of response have been reported ranging from 67-86% at post treatment (Franklin et al., 1998; Whiteside, & Jacobsen, 2010; Storch et al, 2006) and 50-62% at follow-up (Franklin et al., 1998; Storch et al, 2006). Despite favorable responses in these trials, an alarming 33-50% of patients do not respond to various levels of treatment. More specific to residential treatment for pediatric OCD, Bjorgvinsson et al. (2008) reported that 70% of their patient sample demonstrated clinical significant decreases in symptoms leaving 30% of patients with seemingly unchanged symptom severity at after intensive treatment. Similarly, Leonard et al. (2014) reported 64% of patients met criteria for clinically significant change while 36% did not. Residential treatment has been identified as the most restrictive placement for individuals with OCD when all other therapeutic interventions have been exhausted without improvement of symptoms. It is unknown what factors contribute to poor response rate in 30-36% of adolescent patients in residential treatment most of whom have failed numerous SRI trials and treatment modalities prior to seeking this intensive treatment. Identification of factors that predict response to treatment in this population is valuable information for clinicians. If patients with certain “risk factors” known can be identified at admission, treatment providers can preemptively offer modifications or augmentations of treatment prior to poor treatment response. This strategy will also aid in the careful allocation of resources at this level of care. Given the costliness of residential psychiatric programs it is imperative to consider effective but efficient delivery of treatment in these programs.

The literature examining predictors of combined treatment outcomes for pediatric patients with OCD is limited. Many studies attempting to identify predictors of response in

pediatric patients have started by investigating predictors from adult literature (Keeley, Storch, Merlo, & Geffken, 2008). In a systematic review of the adult literature, Knopp, Knowles, Bee, Lovell, and Bower (2013) found that the most commonly assessed predictors of treatment outcome for primary OCD are symptom severity, illness duration, symptom subtypes and symptom-specific variables, obsessive-compulsive beliefs, age of onset, depression severity, medication use, past treatment, and anxiety severity. Additionally, of the demographic variables investigated, age, gender, employment, education, relationship status, and treatment expectancy were most commonly assessed. None of the studies reviewed evaluated patients within a residential treatment setting and, despite the commonality among factors identified as potential predictors, conflicting results are reported. Ginsburg, Kingery, Drake, and Grados (2008) present the only review to date investigating potential predictors of treatment response in pediatric patients with OCD. Included in the review were a total of 21 studies. Studies included RCTs and uncontrolled studies measuring the effectiveness of CBT alone, medication alone, and CBT in combination with medication. Nine predictors were identified and included: gender, age, duration of illness/age of onset, baseline severity of OCD symptoms, type of OCD symptoms, comorbid disorders, psychophysiological factors, neuropsychological factors, and family factors.

Demographic. A total of 11 of the 21 studies reviewed by Ginsburg et al. (2008) investigated gender as a predictor of treatment outcome. Only one study (RCT – medication only) found that gender was a significant predictor of treatment response (Flament et al., 1985). Males showed a greater response to treatment than females ($p=.05$) but results need to be interpreted with caution due to the unequal distribution of patients and patient attrition. Twelve of the 21 studies reviewed investigated age as a predictor of treatment response. In the CBT-only and combination studies, age was not found to be a significant predictor. Only one

study (medication-only RCT) found a significant relationship between age and treatment response (Riddle et al., 2001). It was found that younger patients responded more favorably to SRI than did older patients.

Age and gender have found to be significant predictors of compulsive symptoms in a population of 350 German patients in a child and adolescent clinic (Kirkcaldy, Furnham, & Siefen, 2010). In this population, females were found to be more likely than males to exhibit high levels of compulsive behavior which may explain why Flament et al. (1985) found males to respond better when compared to females. In a more recent outpatient sample (N = 112) of pediatric patients with primary OCD, neither age nor gender were found to significantly predict or moderate treatment outcome (age, $F = .51$; gender, $F = .03$; $p > .05$) (Garcia et al., 2010).

Treatment history. No study to date has investigated previous treatment attempts in relationship to future treatment outcome with adolescents with OCD. This is likely because most outcome studies are measuring the effectiveness of their program most of which are treating patients either for the first time or patients that have sought a higher level of care after outpatient treatment was ineffective. Patients in residential treatment have often tried various intensities of treatment without success. Due to the specificity of this population and the lack of empirical data in the literature, it is of interest whether previous treatment attempts (by program type) are able to predict residential treatment outcome in adolescent patients with OCD. Program types vary in their intensity; this is especially the case for outpatient treatment (e.g. Franklin et al., 1998; Storch et al., 2006). For the purposes of this study, categorization of treatment type will be discussed in the next chapter.

Comorbid symptoms. Psychiatric comorbidity was examined in 10 of the 21 studies reviewed by Ginsburg et al (2008). Barrett et al. (2005) found that baseline self-reported levels of anxiety and depression (Multidimensional Anxiety Scale for Children, Children's Depression

Inventory) did not predict treatment outcome at 18-months. Flament et al. (1985) reported change in OCD symptoms at 11-weeks was independent of baseline depression scores. However, Piacentini et al. (2002) found that higher levels of child anxiety as reported by parents were associated with poorer outcomes at posttreatment. Storch et al. (2010) found that depressive symptoms predicted impairment after accounting for OCD symptom severity. Theories indicate that depressive symptoms may create information processing biases or contribute to negative cognitive styles which impact self-reported symptoms or impact children's ability to clearly identify irrational thinking (Timbremont, & Braet, 2004; Storch et al., 2010). Despite evidence in the literature demonstrating association between other anxiety symptoms and impairment of functioning in pediatrics (Angst et al., 2005; Grabe, Thiel, & Freyberger, 2000; Storch et al., 2009), Storch et al. (2010b) did not find predictive validity in non-OCD anxiety symptoms to predict OCD functional impairment over and above OCD symptom severity. In another sample, Garcia et al. (2010) did not find predictive value of anxiety symptoms as measured by the Multidimensional Anxiety Scale but did find that externalizing symptoms (ADHD), when rated by parents, were predictive of poorer treatment outcome (CPRS-L – Global Index Score).

When symptoms of anxiety and depression were used as a predictor for compulsive behaviors alone, both were found to be significant predictors (Kirkcaldy et al., 2010). The authors provide an interesting hypothesis in that the adolescent population in the study may be exhibiting heightened social anxieties due to elevated levels of insecurity resulting from their disorders. Typically developing adolescents are experiencing a heightened level of social insecurity but when compounded by psychiatric illness this developmental trajectory may increase the likelihood of comorbid anxiety and depressive symptomology that may impact treatment outcome differently for adolescents than other populations with psychiatric illness.

While suicidality was not used as a predictive factor in analysis Kirkcaldy et al. (2010) found that almost 40% of their sample of pediatric patients with OCD had reported previous suicidal behavior. No other study to date has investigated suicidal ideation as a related factor to treatment outcome in adolescents with OCD. Similarly, anxiety sensitivity, as measured by the ASI, has been found to be significantly associated with OCD symptoms severity across OCD symptom subgroups (Calamari, Rector, Woodard, Cohen, & Chik, 2008).

OCD severity. OCD symptom severity has consistently been found to significantly predict overall impairment in pediatric populations (Piacentini, Bergman, Keller, & McCracken, 2003; Piacentini, Peris, Bergman, Chang, & Jaffer, 2007; Storch et al., 2010; Valderhaug & Ivarsson, 2005) and is associated with longer time to remission (Bloch et al., 2009). Twelve of the 21 studies examined by Ginsburg et al. (2008) investigated baseline severity of OCD symptoms as a predictor of treatment response. Two CBT-only studies found severity of OCD symptoms at baseline was associated with a poorer treatment response (Piacentini et al., 2002; Barrett, Farrell, Dadds, & Boulter, 2005). Piacentini et al. found that more severe obsessions on the CY-BOCS and poor OCD-related academic impairments (Child OCD Impact Scale School score) significantly predicted poorer treatment outcomes at post-treatment (NIMH Global OCD Scale score). Following an RTC, Barrett et al. (2005) investigated how well pretreatment OCD severity, self-reported depression and anxiety, and parent-reported family functioning predicted outcome in a population of 48 children and adolescents (8-19 years of age). Significant predictors of long-term treatment outcome (18-month) included more severe obsessions, more severe compulsions, and a higher level of family dysfunction when compared to baseline depression and comorbid anxiety (Barrett, Farrell, Dadds, & Boulter, 2005). In an open SRI trial, Wagner et al. (2003) investigated the predictability of age, duration of illness, and baseline CY-BOCS scores as potential predictors of remission (CY-BOCS score of ≤ 8). Only baseline CY-BOCS

scores were found to be a significant predictor ($p < .001$). More recently, baseline OCD symptoms was found to significantly predict treatment outcome ($F = 41.12, p < .001$) above and beyond demographic and all other comorbid symptoms except externalizing disorders ($F = 8.52, p < .01$) (Garcia et al., 2010). Additionally, parental report of functionality (as measured by the Child OCD Impact Scale – Parent report), externalizing symptoms (as measured by the Conners Parent Report Scale – Long Version), and child insight (as measured by the Fixity of Beliefs Scale) were found to be significant predictors of treatment outcome for this sample.

OCD symptom subtype. Type of OCD symptom presentation refers to the subtypes of obsessions and compulsions that may be related to treatment response. Examples are contamination obsessions that are related to cleaning obsessions or compulsive behaviors such as hoarding. Symptoms have been found to cluster around five subtypes including: symmetry/ordering, contamination/cleaning, sexual/religious obsessions, aggressive/checking, and hoarding dimensions (Mataiz-Cols, Rosario-Campos, & Leckman, 2005). The literature has consistently found poorer treatment outcome for patients with hoarding symptoms (Abramowitz, Franklin, Schwartz, & Furr, 2003; Bloch et al., 2009; Masi et al., 2005) and primary obsessional symptoms with associated “mental” rituals (Alonso et al., 2001; Rufer, Fricke, Moritz, Kloss, & Hand, 2006). Overall remission rates of childhood-onset of OCD by adulthood has found to range from 40-59% (Stewart et al., 2004) but that rate decreases to 10% of children with primary hoarding symptoms (Bloch et al., 2009). Contamination and checking symptoms have generally been found to respond the best to treatment (CBT; Abramowitz et al., 2003; Masi et al., 2005) with one exception of pediatric patients with aggressive/checking symptoms who responded better to CBT when compared to patients without this feature (Storch et al., 2008). Despite evidence of better response to treatment contamination/cleaning and aggressive/checking symptoms have been found to be significantly associated with greater

functional impairment (Storch et al., 2010b). Similarly, Masi et al. (2005) found that children with predominately contamination/cleaning symptoms were more impaired at baseline ($p = .008$) but had the highest response rate (78%) to pharmacotherapy when compared to other groups. This rate was significantly better than the response rate of patients with hoarding symptoms (14%, $p = .008$).

To date, no clear statistical evidence exists in the literature that provides strong support for the predictability of treatment outcome for OCD. The literature on the predictive factors of OCD treatment outcomes is inconclusive and lacking in the pediatric literature. The strongest factor across all studies reviewed was pre-treatment symptom severity. No studies investigated predictors of treatment in residential settings and very few predictive factors in adolescent patients. One benefit from the investigation of predictors within a residential setting is the controlled nature of treatment delivery and environmental influences (i.e. parental accommodation) when compared to outpatient studies. This information, while lacking in external validity due to the scarcity of such programs, has strong internal validity and clinical use for this specific population.

CHAPTER 3: Method and Procedure

This study is retroactive in nature, in that a sample was drawn from data collected by Rogers Memorial Hospital Outcomes Department between January 2009 and May 2014. The data used in this study is part of a larger existing set of data collected by the Hospital for the purposes of measuring program outcomes as well as other research projects. Approval was obtained by Rogers Memorial Hospital Research Review Committee to access data and complete analysis. This chapter will describe the participants, setting, treatment, measures, and procedures.

Participants

Table 1 presents demographic data for the participants in the study. Participants from this study were recruited from 230 adolescent patients with a primary diagnosis of OCD, as outlined in the DSM-IV-TR (APA, 2000), who were admitted to the Child and Adolescent Center at Rogers Memorial Hospital between January 2009 and May 2014. Diagnoses made during this time period were based on the DSM-IV-TR but as minimal change has occurred for diagnostic criteria for OCD with the updated version of the DSM (that is, DSM V), cross version diagnoses should not differ. OCD is established as the primary diagnosis at admission and is based upon the Center Medical Director's review of pre-admission screenings as well as a clinical intake interview from the attending physician, both of whom are licensed child and adolescent psychiatrists with expertise in OCD. Only patients who completed the Children's Yale-Brown Obsessive-Compulsive Scale – Self Report (CY-BOCS-SR; Piacentini, Langley, & Roblek, 2007) at admission and discharge and have a score of 16 or greater on the CY-BOCS-SR at admission (indicating clinically significant symptoms) were included in the sample. In the rare case that a participant had multiple admissions to the program, their first admission meeting the inclusion criteria were included in the sample.

Based on the inclusion criteria, 196 participants were included in the sample.

Participants range from 13 to 17 years of age with a mean of 15.41(1.20). There are 99 males and 97 females in the sample with average ages 15.52(1.15) and 15.31(1.24) respectively. All participants were taking medications for OCD or another psychological disorder during their hospital treatment. Length of stay for patients in the current intent-to-treat sample ranged from 5 to 208 days with an average length of stay of 76.67 days ($SD = 35.10$).

Table 1

Demographic Characteristics of Participants (N=196)

	N	%age of total sample
Gender		
Male	99	50.5
Female	97	49.5
Treatment History		
Outpatient	132	67.3
Inpatient	88	44.9
IOP	61	31.1
PHP	68	34.7
Res	61	31.1
Symptom Subtype		
SORC	82	41.8
CCAS	36	18.4
H	20	10.2
SR	20	10.2

Note. IOP=intensive outpatient program; PHP=partial hospitalization or day treatment program; Res=residential treatment; SORC=symmetry, ordering, repeating, and checking; CCAS=contamination, cleaning, and aggressive and somatic symptoms; H=hoarding obsessions and compulsions; SR=sexual and religious symptoms; N for treatment history and symptom subtype do not equal total sample due to patients having received multiple treatments or endorsing simultaneous symptom subtypes.

Setting

The Child and Adolescent Center is a 24-bed residential treatment facility designed to treat adolescents (age 14 to 18) with OCD and other coexisting disorders who have not responded to outpatient treatment. The Center is divided into two co-ed wings with 12 beds each. Each wing has at least two staff present from 0700 to 2300 and one night staff present

overnight. On the first full day of participation in the intensive program, patient receives education regarding the theory and rationale of ERP, a detailed explanation of how to conduct exposures and ritual prevention, and orientation to the unit including rules and responsibilities.

Treatment

Treatment is represented and will be categorized into three distinct and on-going phases of the residential program: assessment, treatment, and follow-up. Procedure for each stage is described in detail below.

Assessment. Table 2 presents a list of assessments by treatment provider during phases of the program. Most patients are referred to the program by therapists, psychologists, psychiatrists, educational consultants, or former patients while some parents or patients themselves find the program independently. Regardless, each potential patient or patient's family contacts the program admissions specialist and completes a comprehensive screening process via phone prior to consideration for the program. This screening is then reviewed with the Medical Director, the program's manager, and the program's admissions specialist. Patients with active psychosis, mania, suicidality or homicidality; electroconvulsive therapy within the past 30 days; mental retardation; or history of physical violence are not recommended for admission into the program.

Once admission is scheduled, the attending psychiatrist, RN, and therapist will meet with the patient and family for 1-2 hours each to complete a comprehensive clinical interview (including pertinent medical, family, psychiatric, treatment, and medication history) reviewing presenting problems and confirming the OCD diagnosis. Also at this time, parents are provided with admissions assessments and both patients and parents are offered informed consent (see Appendix A) for assessment data to be used for outcome research. New admissions are assigned a primary therapist, an educational specialist, and a behavioral specialist. Primary

therapists are masters-level licensed clinicians who specialize in CBT and other psychotherapeutic modalities. Therapists assess presenting problems including social, educational, and familial impacts of diagnosis and formulate a treatment plan to present to the multidisciplinary team. Educational therapists complete the Wide Range Test of Achievement (WRAT), contact the patient's school, and collect pertinent educational materials upon admission.

The behavioral specialist administers a battery of admission assessments including the CY-BOCS-SR Symptom Checklist and Severity Rating Scale. The Symptom Checklist includes more than 50 examples of obsessions and compulsions. The Symptom Checklist is administered through a semi-structured interview process and is intended to facilitate symptom identification which aids hierarchy construction. This measure is not designed to be scored nor is it usually necessary to re-administer during the course of treatment. Using the information from the admissions assessments and from an admissions interview, the behavioral specialist begins to develop an exposure hierarchy with the patient. The behavioral specialist asks patients to rate their perceived anxiety when given examples of in-vivo or imaginary exercises. Patients are asked to rate their anxiety from zero to seven, with zero being "no anxiety" and seven being "in a state of panic". This scale is based on the Subjective Units of Distress Scale (SUDS) developed by Wolpe (1990).

Table 2

Assessment by Treatment Provider per Patient through Program Phases

Treatment Provider	Pre-Treatment	Admission	Discharge
Admissions Specialist	Phone Screening CY-BOCS-SR	Screening	
Program Manager	Review of Screening	Introduction to Program	
Psychiatrist	Review of Screening	Clinical Interview	Discharge Summary
Primary Therapist		Admissions Assessment Treatment Plan	
Registered Nurse		Admission Assessment Suicide Risk Assessment	
Behavioral Specialist		Patient: CY-BOCS-SR BDI-II/QIDS-SR LSAS-SR ASI CSDS MFQ-Child PQ-LES-Q BADS-SF SCARED-Child Child Disgust Scale *Child Behavior Checklist *CSDS-P *SCARED-Parent *MFQ-Parent	Patient: CY-BOCS-SR BDI-II/QIDS-SR LSAS-SR ASI CSDS MFQ-Child PQ-LES-Q BADS-SF SCARED-Child Child Disgust Scale *Child Behavior Checklist *CSDS-P *SCARED-Parent *MFQ-Parent
Education Therapist		WRAT	
Dietician		Dietary Survey	

*denotes assessments completed by parents

Treatment. Residential treatment described below provides CBT based on components found in the CBT Treatment Manual (March, Mulle, & Herbel, 1998) and has been used in previous collaborative studies of treatment for pediatric OCD (POTS, 2004; Franklin et al., 2011).

Components include 1) psychoeducation, 2) cognitive training, 3) development of treatment hierarchies to arrange feared situations from least to most anxiety provoking to guide exposure treatment, and 4) ERP. Table 3 provides a summary of treatment delivered by provider with estimated duration. Similar to CBT procedures described by Freeman et al. (2009) sessions (5x per week) generally consist of a statement of treatment goals, review of previous exposure trials, provision of new information, therapist-assisted practice, homework, and monitoring of therapeutic work.

Table 3

Treatment Delivery by Treatment Provider

Psychiatrist	Medication management	
	Psychoeducation, Psychotherapy	2-3hrs/week
	Family Therapy	1hr/week
Primary Therapist	Individual CBT Therapy/Psychotherapy	1-2hrs/week
	Group Therapy	5hrs/week
	Family Therapy	1hr/week
Registered Nurse	Medical Monitoring	as needed
Behavioral Specialist	Bi-monthly Assessment per diagnosis	
	Family Therapy	15-30min/week
	Supervision of Independent Exposure Work	15hrs/week
	Individual ERP	75min/week
	Group CBT	3hrs/week
Educational Therapist	Schoolwork Support	7hrs/week
Dietician	Dietary Assessment/Meal Development	as needed
Experiential Therapist	Adventure-based Therapy	7.5-10hrs/week
	Art Therapy	2-3hrs/week

The ERP program is delivered each week-day in a three-hour block of time. Table 4

presents the sequential components of ERP. During this block patients participate in (1) a check in group (15-20 minutes) where patients report their recorded exposure trials and “bans,” (2)

*individual sessions with their behavioral specialist (each lasting 30-45 minutes), (3) supervised exposure work with other staff, and (4) self-exposures. They are also assigned 90-minutes of exposure homework each day to practice assigned exposures without ritualizing. All behavioral specialists underwent intensive 6-month training and receive weekly individual supervision from a licensed psychologist.

Table 4

Components of Exposure Response Prevention (ERP) in Treatment

Exposure (E)

1. Patients complete the CY-BOCS-SR Symptom Checklist.
2. BS asks patient to rate examples of proposed exposures based on 0-7 SUDS scale.
3. Less anxiety-producing exposures are placed lower in the hierarchy while panic-inducing exposures are placed at the top.
4. BS assign patients level 3 exposures that are challenging yet manageable.
5. Patients are asked to expose themselves to their feared stimuli, rate their peak anxiety, and continue until their peak anxiety has decreased by half to achieve within-trial habituation.
6. Patients complete the same exposure in succession five times to achieve between trial habituation.
7. Patients are then asked to record their peak anxiety, the lapsed time, and ending anxiety rating.
8. Patients are to wait at least two minutes between trials before starting a subsequent trial.
9. BS instruct patients to discontinue an exposure if the patient has achieved zero anxiety on at least three trials on two separate days.

Response Prevention (RP)

1. Simultaneously, patients are asked to disengage in compulsions.
 2. BS assigns the patient “bans” which is short banned behaviors or compulsions.
 3. Patients are asked to keep a daily tally of when they *submit* to an urge to perform a compulsion and *resists* when they have an urge to perform a compulsion and do not.
-

Psychiatrists see patients at least weekly to monitor medications. Nurses see patients

as needed regarding general medical conditions. Primary therapists meet with patients once or twice per week independently (to provide psychotherapy) and in a group format every weekday for 60-minutes (to obtain statement of goals, provide psychoeducation, and facilitate peer support). In addition, therapists hold weekly family sessions to provide psychoeducation to families, to discuss how members of patient’s family can support treatment, to update the family on patient progress, and to discuss follow-up treatment. Primary therapists receive bi-weekly individual supervision and bi-weekly group supervision. The educational therapist

attends to patient's educational needs, facilitating school work between home-school and program, seeing each patient for approximately 1.5-2 hours each weekday. In addition to the abovementioned, patients received art therapy two times per week for a total of 4 hours and experiential therapy either three or five times per week for a total of 15 hours per week.

Each patient's CBT treatment is individualized and constructed to maintain developmental appropriateness (Freeman et al., 2009). Behavioral specialist and primary therapists maintain flexibility adjusting the level of discourse to specific interests, level of cognitive functioning, social maturity, and capacity for sustained attention for each patient. For example, adolescents who are more sensitive to the impact their OCD symptoms have on social interactions, are less likely to utilize a persona for their OCD, and take a more active role in directing their treatment than children of a younger age. Additional differentiation in treatment is necessary for patients whose OCD has become entangled with family members (e.g. excessive reassurance, parental accommodation, etc.) requiring greater attention to family involvement in exposure work.

Typically, patients are discharged when they had achieved 70-75% completion of their hierarchy with ritual prevention. Patients are discharged prior to this benchmark sometimes due to parental preference, termination of funding, or refusal of treatment by patient. Within 48 hours of discharge, patients are asked to complete the same battery of assessments that they completed upon admission, with the exception of the CY-BOCS-SR Symptom Checklist. Both patient and parent are again provided with informed consent (see Appendix B) to be contacted post-discharge for follow-up assessment.

Measures and Procedures

Dependent measure. The CY-BOCS (Scahill et al., 1997) is a well-established measure to assess OCD that was developed following the establishment of the Yale-Brown Obsessive-

Compulsive Scale for adults (Goodman et al., 1989a; Goodman et al., 1989b). The self-report administration of the CY-BOCS, the CY-BOCS-SR, was used in the present study. The CY-BOCS-SR has demonstrated strong psychometric properties and is significantly correlated with the interview-based CY-BOCS ($r = .77$; Conelea, Schmidt, Leonard, Riemann, & Cahill, 2012). The CY-BOCS-SR includes a Symptom Checklist and a Severity Rating Scale. The CY-BOCS-SR Symptom Checklist is a self-report survey covering 54 obsessions and compulsions rated for their current and past presence. The Severity Rating Scale is a 10-item self-report assessment that includes 5 questions related to obsessions and 5 questions related to compulsions. Severity of obsessions and compulsions are rated on a five-point Likert scale (0-4) that outlines time spent, interference with functioning, distress, resistance, and control over symptoms within the past two-weeks. A total severity score is calculated ranging from 0 to 40 (0-7=subclinical, 8-15=mild, 16-23=moderate, 24-31=severe, and 32-40=extreme; Goodman et al., 1989b) by adding subscales for obsessions (0-20) and compulsions (0-20). Unless otherwise indicated, reference to the CY-BOCS-SR throughout this proposal will be referring to the Severity Rating Scale by patient self-report.

Considered the 'gold standard' measurement of pediatric OCD, the CY-BOCS has demonstrated strong reliability, validity, and treatment sensitivity. Internal consistency has been reported to be high for the total ($r = 0.87$), obsessions ($r = 0.91$), and compulsions ($r = 0.68$) scales (Scahill et al., 1997; Storch et al., 2004b). The CY-BOCS has shown excellent interrater agreement (interclass correlations ICCS 0.66-0.91) (Scahill et al., 1997) and good 6-week stability (ICC 0.79; Storch et al., 2004b). The measure has demonstrated treatment sensitivity (e.g., POTS, 2004) and convergent and discriminant validity (Scahill et al., 1997; Storch et al., 2004b). CY-BOCS-SR scores were entered as a continuous variable.

Potential predictors by domain. Predictors are categorized by the following five domains: demographic, treatment history, comorbid symptoms, OCD severity, and OCD symptom subtype.

Demographic. Age at admission, in years, was recorded at admission and was entered into the regression model as a continuous variable. Gender was recorded at admission and was entered into the regression model as a dichotomous categorical variable and dummy coded (male = 0, female = 1). Length-of-stay was a summation of number of days patients were in the program from day of admission to day of discharge. Length-of-stay was entered into the regression model as a continuous variable.

Treatment history. Treatment history was obtained at admission during the psychiatric clinical interview. A systematic review of the archival data was performed to categorize patients who have received various types of treatment prior to presenting for residential admission. Types of treatment identified include: outpatient, inpatient, intensive outpatient, partial hospitalization or day treatment, and residential. Each treatment type was entered into the regression model simultaneously as separate dichotomous categorical variables and dummy coded (having previously received treatment type = 1, not having received treatment type = 0).

Comorbid symptoms. Measures of comorbid symptoms were based on the subscales of the Screen for Child Anxiety-Related Emotional Disorders, Child Report (SCARED-C; Birmaher et al., 1997), total score of the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1968), total score of the Beck Depression Inventory-Second Edition (BDI-II), and the BDI-II marker for suicidal ideation (Beck, Steer, Ball, & Ranieri, 1996). The SCARED-C was developed as an instrument to screen the severity of anxiety symptoms in children and adolescents (age 9-18 years). It is a 41-item self-report measure divided into five factors: generalized anxiety (9 items), separation anxiety (8 items), social phobia (7 items), school phobia (4 items), and panic/somatic

symptoms (13 items). Each item is rated on a 3-point scale based on feelings during the past 3 months (0 = not true or hardly ever true, 1 = sometimes true, 2 = true or often true). Total SCARED-C scores range from 0 to 82, with higher scores reflecting higher levels of anxiety. Previous research demonstrates evidence of good psychometric properties, including internal consistency and divergent and convergent validity (Birmaher et al., 1997). The SCARED-C was administered at admission and measures overall anxiety symptom severity; symptoms of generalized, social, separation, and school anxiety; as well as somatic symptoms associated with anxiety at time of admission. SCARED-C subtest scores were entered as continuous variables into the regression analysis. Table 5 displays the internal consistency (coefficient alpha) for the subscales within the SCARED-C and reliability (Cronbach's alpha) for the current study sample.

The ASI (Reiss, Peterson, Gursky, & McNally, 1968) is a 16-item self-report measure of beliefs and fears of physiological sensations associated with anxiety. Items are rated on a 5-point Likert scale (0 = very little, 1 = a little, 2 = some, 4 = much, 5 = very much) with total scores ranging from 1 to 64. Each item describes a possible negative outcome of anxiety symptoms and includes three factors: somatic, psychological, and social consequences of anxiety (Zinbarg, Barlow, & Brown, 1997). Reported reliability ranges from .71 to .85 (Peterson, & Heilbronner, 1987; Reiss et al., 1986). The ASI composite score was entered as a continuous variable.

The BDI-II (Beck, Steer, Ball, & Ranieri, 1996) is a 21-item, self-report measure of depressive symptoms experienced during the past week. Items are rated on a 4-point Likert scale ranging from 0-3 with higher scores representing greater depressive symptom severity. Extensive reliability and validity data have been reported for clinical and non-clinical samples (Beck et al., 1996; Storch et al., 2004b). Reliability coefficients for the BDI-II for adolescent psychiatric patients range between .92 and .94 (Krefetz, Steer, Gulab, & Beck, 2002; Kumar, Steer, Teitelman, & Villacis, 2002; Steer, Kumar, Ranieri, & Beck, 1998). BDI score was entered as

a continuous variable. The BDI-II also contains a marker for suicidal ideation. Item 9 on the BDI-II asks patients to rate "Suicidal Thoughts or Wishes" and was used as a marker for suicidality. It is noted that the utilization of a single-item question (BDI-II Q9) in measuring a construct (suicidality) can elicit problems with reliability. This variable was entered into the regression model as a continuous variable.

OCD symptom severity. The CY-BOCS-SR, as described above, was administered upon admission. For the proposed study, subscales for obsessions and compulsions were considered separately from overall combined symptom score as potential predictors of outcome. Composite scores on the CY-BOCS-SR at admission were used as a measure of baseline symptom severity and entered into the regression model as continuous variables. Table 5 displays the internal consistency (coefficient alpha) for the subscales within the CY-BOCS-SR and reliability (Cronbach's alpha) for the current study sample.

OCD symptom subtype. The CY-BOCS-SR Symptom Checklist was used to categorize OCD symptom subtype at baseline. Based on the four-factor solution presented by Stewart et al. (2008) seven categories of obsessions and six categories of compulsions on the CY-BOCS-SR were used in creating the following symptom subtypes: 1) symmetry, ordering, repeating, and checking (SORC); 2) contamination, cleaning, and aggressive and somatic symptoms (CCAS); 3) hoarding obsessions and compulsions (H); and 4) sexual and religious symptoms (SR). Each was entered into the regression analysis as dichotomous variables (0 = no reported symptom, 1 = symptom reported at admission).

Table 5

Internal Consistency Reliability Coefficient alphas for all independent variables

	Number of Participants	Number of Items	Reliability Coefficient	Current Sample (Cronbach's α)
SCARED-C	178	41	.89 - .91	.96
SCARED-Panic	81	13	.70 - .92	.92
SCARED-GAD	88	9	.71 - .78	.89
SCARED-SAD	86	8	.54 - .86	.87
SCARED-SoAD	86	7	.75 - .89	.89
SCARED-SA	85	4	.43 - .76	.80
ASI ^a	195	--	.75 - .85	--
BDI-II ^a	129	--	.92 - .94	--
OCD Severity	196	10	.87 - .90	.80
Obsessions	196	5	.78 - .81	.70
Compulsions	196	5	.78 - .81	.70

Note. SCARED-C=composite SCARED score; SCARED-Panic=panic or somatic symptoms; SCARED-GAD=generalized anxiety; SCARED-SAD=separation anxiety; SCARED-SoAD=social anxiety; SCARED-SA=school avoidance; ASI=anxiety sensitivity index, BDI-II=Beck Depression Inventory

^a Item analysis was not available in the archival data.

Table 5 displays the internal consistency for the subscales of the SCARED-C, ASI, BDI, and CY-BOCS-SR as well as the reliability coefficients for the current sample. Reliability is moderate to high for the SCARED-C (internal consistency reliability coefficient = .43-.92) and was found to be high for the current sample (Cronbach's alpha = .80-.96). Reliability is high for the CY-BOCS-SR (internal consistency reliability coefficient = .78-.81) and was found to be high for the current sample (Cronbach's alpha = .70). This level indicates a moderate to high level of consistency of the items within each subscale. Reliability is also high for the ASI and BDI-II is reported (internal consistency reliability coefficients = .75-.85 and .92-.94 respectively), but was not available for this sample as individual items were not available in the archival data set. The number of items of each scale is included to aid in interpretation of alpha. Scales can appear more homogeneous (increased alpha) by adding items which may artificially inflate composite scores of instruments measuring distinct attributes.

Data Analysis. Preliminary analyses were conducted to evaluate intercorrelations among independent variables and correlations between all independent variables and the outcome measure. Chi-square and t-tests were conducted to identify statistically significant differences and to check for independence between variables. Finally, a paired samples t-test was conducted to identify statistically significant differences between of patient scores on the CY-BOCS-SR from admission to discharge.

Separate standard multiple regression analyses were run by domain to assess the ability of each set of independent variables to predict patient outcome (CY-BOCS-SR score at discharge) in order to address research Question 1: What is the relationship of potential predictors by domain (demographic, treatment history, comorbid symptoms, OCD symptom severity, and OCD symptom subtype) to treatment outcome? All IVs within each domain were entered simultaneously to determine the predictive validity accounted for by the domain. R^2 was examined in each model to determine what percentage of the variance in treatment outcome is explained by the model. Each independent variable was then evaluated for its overall contribution to the prediction of treatment outcome. Standardized coefficients (Beta) were inspected to determine the variable with the largest coefficient. Significance was determined based on $\alpha = .05$. This indicated which variable in the domain made a significant unique contribution to explaining treatment outcome when variances from all other potential predictors in the model are controlled. Additionally, the semipartial correlation coefficient was squared to determine how much of the total variance in treatment outcome was uniquely explained by the variable. Due to the potential for independent variables to be moderately correlated, it is necessary to determine unique contribution with shared variance removed from the model. This resulted in five (demographic, treatment history, comorbid symptoms, OCD severity, OCD symptom subtype) separate regression analyses.

Separate hierarchical regression analyses were planned in order to answer research Question 2: How much improvement in prediction of treatment outcome is associated with the addition of identified predictors to OCD symptom severity at admission? No models from Question 1 were found to significantly predict treatment outcome thus research Question 2 was irrelevant. It was hypothesized that elimination of inpatient treatment from the treatment history model could increase predictive validity of the model. The following research questions were developed in order to further investigate results of research Question 1: (a) Can the prediction of treatment outcome by treatment history be improved by elimination of inpatient hospitalization from the regression model? and (b) If, with inpatient hospitalization removed, treatment history is found to significantly predict treatment outcome, what is the ability of this model to then predict treatment outcome at discharge, controlling for OCD symptom severity (CY-BOCS-SR composite) at admission? A standard multiple regression analysis was run to assess the ability of treatment history with the removal of inpatient hospitalization to predict patient outcome (CY-BOCS-SR score at discharge). R^2 was examined to determine what percentage of the variance in treatment outcome was explained by the model. In order to answer research Question 2b, a hierarchical multiple regression analysis was used to assess the ability of previous treatment to predict OCD symptoms at discharge, after controlling for the influence of CY-BOCS-SR scores at admission. Baseline symptoms severity (CY-BOCS-SR) was entered into the first block of the regression followed by treatment history into the second block. R^2 was examined in the second block of the model to determine what percentage of the variance in treatment outcome was explained by the addition of treatment history to baseline severity. To determine how much additional variance in treatment outcome is explained by the predictor(s) in the second block above and beyond symptom severity, R^2 change scores were

examined and checked for significance. The significant unique contribution of each predictor was evaluated by examining the standardized coefficients (Beta).

CHAPTER 4: Results

The following are results from the present study. The Statistical Package for the Social Sciences (SPSS 22 for Windows) program was used to conduct the statistical analyses for this study. Results are organized as follows: (1) preliminary analyses including correlations, t-tests, and Chi-square tests of data; (2) standard multiple regression for research question 1; and (3) hierarchical multiple regression analyses for research question 2.

Preliminary Analyses

Correlational analyses were performed using Pearson Product-moment correlation coefficients and Spearman rho to examine the relationships between independent variables and independent variables and the outcome variable. Intercorrelations between the independent variables were computed to check for a high relation between predictors because this would result in a biased estimation of regression statistics (i.e., collinearity). Intercorrelations, presented in Table 6, suggest a wide range of relationships among continuous independent variables. The intercorrelations among SCARED-C and SCARED-Panic ($r = .861$), SCARED-C and SCARED-GAD ($r = .867$), SCARED-GAD and SCARED-SA ($r = .737$), SCARED-Panic and BDI-II ($r = .754$), SCARED-GAD and BDI-II ($r = .764$), SCARED-SA and BDI-II ($r = .721$), CY-BOCS-SR and Obsessions ($r = .869$), and Obsessions and Compulsions ($r = .875$) suggest a strong relationship among these variables. Due to the violation of the assumption of multicollinearity ($VIF > 10$), only the SCARED-C composite was entered into the regression model.

Table 6

Intercorrelations among Continuous Variables

	2	3	4	5	6	7	8	9	10	11
SCARED-C	.861**	.867**	.792**	.715**	.808**	.727**	.727**	.325**	.220**	.307**
2. SCARED-Panic		.669**	.610**	.443**	.588**	.537**	.754**	.171	.067	.134
3. SCARED-GAD			.567**	.561**	.737**	.629**	.764**	.235**	.151	.247*
4. SCARED-SAD				.438**	.560**	.581**	.446*	.307**	.069	.210
5. SCARED-SoAD					.600**	.447**	.583**	.241*	.037	.154
6. SCARED-SA						.574**	.721**	.359**	.105	.258*
7. ASI							.578**	.341**	.212**	.307**
8. BDI-II								.413**	.312**	.421**
9. CY-BOCS-SR Admit									.544**	.869**
10. Obsessions										.875**
11. Compulsions										

Note. SCARED-C=composite SCARED score; SCARED-Panic=panic or somatic symptoms; SCARED-GAD=generalized anxiety; SCARED-SAD=separation anxiety; SCARED-SoAD=social anxiety; SCARED-SA=school avoidance; ASI=anxiety sensitivity index, BDI-II=Beck Depression Inventory

* $p < .05$, ** $p < .01$

Correlations between independent variables and the outcome measure (CY-BOCS-SR)

are presented in Table 7. Inspection of the relationships between independent variables and the outcome measure reveal statistically significant correlations between length-of-stay ($r = .219$), SCARED-C ($r = .119$), CY-BOCS-SR ($r = .176$), CY-BOCS-SR obsession subtest ($r = .314$), CY-BOCS-SR compulsion subtest ($r = .279$), and hoarding symptoms ($r = -.244$). Results indicate higher scores on the SCARED-C, CY-BOCS-SR composite, obsession subtest, and compulsion subtest are associated with higher CY-BOCS-SR scores at discharge. Conversely, endorsement of hoarding symptoms on the CY-BOCS-SR Symptom Checklist at admission was correlated with lower CY-BOCS-SR scores at discharge. Inspection of correlation coefficients indicate a longer length-of-stay was associated with higher CY-BOCS-SR scores at discharge. This finding should be interpreted with caution considering the variability of this variable in this intent-to-treat sample.

Table 7

Correlations between Independent Variables and Outcome Measure

	Discharge CY-BOCS-SR
1. Age	.063
2. Gender	.060
3. Length-of-stay	.219**
4. Outpatient	.098
5. Inpatient	.058
6. IOP	.100
7. PHP	.150
8. Res	.125
9. SCARED-C	.119**
10. ASI	.135
11. BDI-II	.168
12. BDI-II Q9	.162
13. CY-BOCS-SR Admit	.176*
14. Obsessions	.314**
15. Compulsions	.279**
16. SORC	-.217
17. CCAS	-.100
18. H	-.244*
19. SR	-.107

Note. IOP=intensive outpatient program; PHP=partial hospitalization or day treatment program; Res=residential treatment; SCARED-C=composite SCARED score; ASI=anxiety sensitivity index, BDI-II=Beck Depression Inventory; BDI-II Q9=suicidality marker on the BDI-II; SORC=symmetry, ordering, repeating, and checking; CCAS=contamination, cleaning, and aggressive and somatic symptoms; H=hoarding obsessions and compulsions; SR=sexual and religious symptoms

* $p < .05$, ** $p < .01$

As shown in Table 8 chi-square tests for independence (with Yates Continuity Correction)

indicated no significant association between gender and history of outpatient treatment ($\chi^2 (1, n = 137) = .15, p = .703, phi = -.058$), intensive outpatient treatment ($\chi^2 (1, n = 137) = .00, p = 1.00, phi = -.014$), partial or day treatment ($\chi^2 (1, n=137) = 2.21, p = .137, phi = .147$), or previous residential treatment $\chi^2 (1, n = 137) = .121, p = .728, phi = .050$). A significant association was found between gender and previous inpatient treatment $\chi^2 (1, n = 137) = 7.14, p = .008, phi = .243$) indicating, in the current sample, a significantly greater proportion of females ($n = 33, 49.3\%$) had received inpatient treatment when compared to males ($n = 18, 25.7\%$). Chi-square tests for independence revealed no significant association between gender and presentation by

symptom subtype at admission (CCAS, $\chi^2 (1, n = 84) = .110, p = .204, \phi = -.138$; H, $\chi^2 (1, n = 84) = .026, p = .873, \phi = -.046$; SR, $\chi^2 (1, n = 84) = .026, p = .873, \phi = -.046$). Results of the association of subtype SORC were not reported due to the violation of minimum expected cell frequency (at least 80% of cells must have expected frequencies of 5 or more) (Pallant, 2007). This violation occurred as a result of the high rate of endorsement of symptoms by both males (yes, $n = 45$; no, $n = 2$) and females (yes, $n = 37$; no, $n = 0$) on this symptom subtype.

Table 8

Clinical Characteristics: Chi-square Tests for Independence Total Sample and Comparisons between Genders

	Total sample (n=196)	Males (n= 99)	Females (n=97)	χ^2	p
Treatment History					
Outpatient	125(63.8)	65(33.2)	60(30.6)	.146[1]	.703
Inpatient	51(37.2)	18(9.2)	33(16.8)	7.14[1]	.008*
IOP	17(8.7)	9(4.6)	8(4.1)	.000[1]	1.000
PHP	23(11.7)	8(4.1)	15(6.6)	2.21[1]	.137
Res	20(10.2)	9(4.6)	11(5.6)	.121[1]	.728
OCD Symptom Subtype					
SORC	82(41.8)	45(23.0)	37(18.9)	--	--
CCAS	36(18.4)	23(11.7)	13(6.6)	1.10[1]	.204
H	84(42.9)	12(6.1)	8(4.1)	.026[1]	.873
SR	20(10.2)	12(6.1)	8(4.1)	.026[1]	.873

Note. Data presented as number of patients (percentage based on overall sample). Values in square brackets indicate degrees of freedom. IOP=intensive outpatient program; PHP=partial hospitalization or day treatment program; Res=residential treatment; SORC=symmetry, ordering, repeating, and checking; CCAS=contamination, cleaning, and aggressive and somatic symptoms; H=hoarding obsessions and compulsions; SR=sexual and religious symptoms

* $p < .05$.

Independent t-tests were conducted to identify statistically significant differences between continuous variables by gender. Table 9 displays results of t-test analysis. Results indicate that there were no significant mean differences in length of stay (LOS) for males ($M = 78.67, SD = 37.08$) and females ($M = 74.64, SD = 33.03; t(194) = .802, p = .423$). Results indicate that there were no significant mean differences for age at admission for males ($M = 15.53, SD = 1.15$) and females ($M = 15.31, SD = 1.24; t(194) = 1.26, p = .209$). Subscales of the CY-BOCS-SR

indicate higher but non-significant mean differences in obsessions for females ($M = 13.05$, $SD = 3.16$) when compared to males ($M = 12.45$, $SD = 2.74$; $t(194) = -1.41$, $p = .159$). Mean differences between gender for compulsive symptoms were also non-significant with females having slightly higher scores at admission (males $M = 12.12$, $SD = 2.85$; females $M = 12.82$, $SD = 3.14$; $t(194) = -1.64$, $p = .102$). Finally, no significant mean differences by gender were found for composite CY-BOCS-SR scores with females ($M = 25.96$, $SD = 5.56$) again having a slightly higher composite score at admission compared to males ($M = 24.58$, $SD = 5.03$; $t(194) = -1.83$, $p = .069$).

Results did indicate that there were significant mean differences in SCARED-C scores at admission for males ($M = 29.11$, $SD = 17.61$) and females ($M = 38.10$, $SD = 18.59$; $t(176) = -3.31$, $p = .001$) showing females with significantly higher symptoms of anxiety. The magnitude of the differences in the means (mean difference = -8.99 , 95% CI: -14.34 to -3.63) was moderate (eta squared = $.059$). Significant mean differences were also noted in SCARED-Panic scores at admission for males ($M = 6.81$, $SD = 6.83$) and females ($M = 10.41$, $SD = 6.75$; $t(78.7) = -2.39$, $p = .019$). The magnitude of the differences in the means (mean difference = -3.60 , 95% CI: -6.61 to $-.59$) was moderate (eta squared = $.067$). Significant mean differences were noted in SCARED-GAD scores at admission for males ($M = 8.96$, $SD = 5.16$) and females ($M = 12.76$, $SD = 4.85$; $t(86) = -3.56$, $p = .001$). The magnitude of the differences in the means (mean difference = -3.81 , 95% CI: -5.93 to -1.68) was moderate (eta squared = $.128$). Significant mean differences were also noted in SCARED-SAD scores at admission for males ($M = 4.02$, $SD = 3.60$) and females ($M = 6.78$, $SD = 4.93$; $t(72.6) = -2.94$, $p = .004$). The magnitude of the differences in the means (mean difference = -2.76 , 95% CI: -4.63 to $-.89$) was moderate (eta squared = $.096$). There was no significant difference in SCARED-SoAD scores at admission for males ($M = 6.07$, $SD = 4.15$) and females ($M = 7.20$, $SD = 4.36$; $t(84) = -1.23$, $p = .221$). Significant mean differences were also noted in SCARED-SA scores at admission for males ($M = 2.76$, $SD = 2.33$) and females ($M = 4.05$,

$SD = 2.68$; $t(83) = -2.38$, $p = .019$). The magnitude of the differences in the means (mean difference = -1.29 , 95% CI: -2.37 to $-.21$) was moderate (eta squared = $.064$). Significant mean differences were also noted in ASI scores at admission for males ($M = 17.61$, $SD = 11.79$) and females ($M = 24.04$, $SD = 13.92$; $t(193) = -3.49$, $p = .001$). The magnitude of the differences in the means (mean difference = -6.44 , 95% CI: -10.09 to -2.79) was moderate (eta squared = $.059$). Results indicate that there were significant mean differences in BDI-II scores at admission for males ($M = 16.39$, $SD = 12.58$) and females ($M = 25.22$, $SD = 12.77$; $t(127) = -3.95$, $p < .001$). The magnitude of the differences in the means (mean difference = 2.23 , 95% CI: -13.24 to 4.41) was moderate (eta squared = $.110$). Finally, results revealed no significant mean differences in BDI-IIQ9 scores at admission for males ($M = .61$, $SD = .79$) and females ($M = .97$, $SD = .91$; $t(60) = -1.67$, $p = .100$). The magnitude of the differences in the means (mean difference = $-.36$, 95% CI: $-.79$ to $.07$) was moderate (eta squared = $.044$). Overall, females reported higher symptoms of anxiety and depression at admission when compared to their male counterparts, with the exception of social anxiety and suicidal ideation which were not significant differences but did show higher scores for female patients.

Table 9

Clinical Characteristics: t-Tests for Total Sample and Comparisons between Genders

	Total sample (N=196)	Males (n= 99)	Females (n=97)	<i>t</i>	<i>p</i>
LOS		78.67±37.08	74.64±33.03	.80[194]	.423
Age, years		15.52±1.15	15.31±1.24	1.26[194]	.209
Cormorbid Symptoms					
SCARED-C	n=178	29.11±17.61	38.10±18.59	-3.31[176]	.001*
SCARED-Panic		6.81±6.83	10.41±6.75	-2.38[79]	.020*
SCARED-GAD		8.96±5.16	12.76±4.85	-3.56[86]	.001*
SCARED-SAD		4.02±3.60	6.78±4.93	-2.94[84]	.004*
SCARED-SoAD		6.07±4.15	7.20±4.36	-1.23[84]	.221
SCARED-SA		2.76±2.33	4.05±2.68	-2.38[83]	.019*
ASI	n=195	17.60±11.79	24.04±13.92	-3.48[193]	.001*
BDI-II	n=129	16.39±12.58	25.22±12.78	-3.95[127]	.000*
BDI-II Q9	n=62	.61±.79	.97±.91	-1.671[60]	.100
OCD Severity	n=196	24.58±5.03	25.96±5.56	-1.83[194]	.069
Obsessions		12.45±2.74	13.05±3.16	-1.41[194]	.159
Compulsions		12.12±2.85	12.82±3.14	-1.64[194]	.102

Note. Data presented as mean ± SD. Values in square brackets indicate degrees of freedom. LOS=length of stay; IOP=intensive outpatient program; PHP=partial hospitalization or day treatment program; Res=residential treatment; SCARED-C=composite SCARED score; SCARED-Panic=panic or somatic symptoms; SCARED-GAD=generalized anxiety; SCARED-SAD=separation anxiety; SCARED-SoAD=social anxiety; SCARED-SA= school avoidance; ASI=anxiety sensitivity index; BDI-II=Beck Depression Inventory; BDI-II Q9=suicidality marker on the BDI-II

**p* < .05.

A paired samples t-test was conducted to identify statistically significant differences between of patient scores on the CY-BOCS-SR from admission to discharge. There was a statistically significant decrease in OCD symptom severity from admission ($M = 24.98$, $SD = 5.19$) to discharge ($M = 12.74$, $SD = 7.65$), $t(179) = 20.63$, $p < .001$). The mean decrease in CY-BOCS-SR scores was 12.23 with a 95% confidence interval ranging from 11.06 to 13.40. The eta squared statistic indicated a large effect size (eta squared = .70).

Table 10

Paired Samples t-Test CY-BOCS-SR Scores Admission to Discharge

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Admit CY-BOCS-SR	24.98	5.19	20.63	.000**
Discharge CY-BOCS-SR	12.74	7.65		

Data Analysis

All additional data screening required to meet appropriate statistical assumptions for analyses were performed including: outliers, normality, linearity, homoscedasticity, and independence of residuals. In order to explore potential predictors, standard and hierarchical regression procedures were planned to determine the predictive validity accounted for by each set of independent variables. Methods are outlined based on research questions.

Question 1. In order to address research question 1a-e, separate standard multiple regression analyses were run by domain to assess the ability of each set of independent variables to predict patient outcome (CY-BOCS-SR score at discharge). All IVs within each domain were entered simultaneously to determine the predictive validity accounted for by the domain. Each independent variable was then evaluated for its overall contribution to the prediction of treatment outcome. Due to the high-to-moderate intercorrelations amongst some independent variables, semipartial correlation coefficients were squared to determine unique contribution of each variable with shared variance removed from each model.

Table 11

Standard Regression Analysis Demographics Predicting Treatment Outcome

	<i>B</i>	<i>SE B</i>	<i>β</i>	<i>p</i>	<i>R</i> ²
Model 1:					.061*
(Constant)	-1.433	7.705		.853	
Age, years	.558	.467	.088	.233	
Gender	1.202	1.122	.079	.285	
Length-of-stay	.049	.016	.226	.002**	

* $p < .05$, ** $p < .01$

Displayed in Table 9, a standard multiple regression analysis was conducted to evaluate how well demographic variables predicted treatment outcome (CY-BOCS-SR score at discharge). The overall model explained 6.1% of the variance of treatment outcome and was statistically significant, $F(3,176) = 3.793$, $p = .011$. Length-of-stay was found to make the strongest and

statistically significant unique contribution to explaining treatment outcome when controlling for all other variables ($\beta = .226, p = .002$). Further examination of beta statistics revealed greater length-of-stay was associated with greater symptom severity at discharge. Neither age nor gender emerged as significant predictors of treatment outcome within the model. Analysis of semipartial correlation coefficients revealed length-of-stay uniquely explains 5% of the variance in treatment outcome. The contribution of age and gender was negligible.

Table 12

Standard Regression Analysis Treatment History Predicting Treatment Outcome

	<i>B</i>	<i>SE B</i>	β	<i>p</i>	R^2
Model 2:					.075
(Constant)	8.860	2.418		.000	
Outpatient	2.739	2.394	.102	.255	
Inpatient	-.255	1.415	-.014	.874	
IOP	2.636	2.064	.114	.204	
PHP	4.007	1.760	.196	.024*	
Res	3.212	1.942	.149	.101	

Note. IOP=intensive outpatient program; PHP=partial hospitalization or day treatment program; Res=residential treatment

* $p < .05$, ** $p < .01$

In order to evaluate how well treatment history predicted treatment outcome (CY-BOCS-SR score at discharge) a standard multiple regression analysis was conducted (see Table 10). The linear combination of outpatient, inpatient, IOP, PHP, and residential treatment explained 7.5% of the variance of treatment outcome but was not significantly related to treatment outcome, $F(5,127) = 2.054, p = .075$. A history of PHP treatment was found to make the strongest and statistically significant unique contribution to explaining treatment outcome when controlling for all other treatment types ($\beta = .196, p = .024$). Further examination of beta statistics revealed patients who had received inpatient treatment prior to residential admission were more likely to have lower symptom severity at discharge whereas history of other types of treatment was associated to higher OCD severity at discharge. Analysis of semipartial

correlation coefficients revealed that outpatient uniquely explains 1%, IOP uniquely explains 1%, PHP uniquely explains 4%, and residential uniquely explains 2% of the variance in treatment outcome respectively. The contribution of having a history of inpatient treatment was negligible.

Table 13

Standard Regression Analysis Comorbid Symptoms Predicting Treatment Outcome

	<i>B</i>	<i>SE B</i>	β	<i>p</i>	<i>R</i> ²
Model 3:					.041
(Constant)	9.920	2.318		.000	
SCARED-C	.074	.101	.181	.466	
ASI	-.016	.120	-.027	.897	
BDI-II	.035	.153	.061	.820	
BDI-II Q9	-.103	1.918	-.012	.957	

* $p < .05$, ** $p < .01$

Results of a standard multiple regression analysis to evaluate how well comorbid symptoms are presented in Table 11. The linear combination of scores on the SCARED-C, ASI, BDI-II, and indicator for suicidality (BDI-II Q9) explained 4.1% of the variance of treatment outcome but was not significantly related to treatment outcome, $F(4, 48) = .517, p = .724$. An inspection of individual predictors revealed that scores on the SCARED-C were found to make the strongest unique contribution to explaining treatment outcome when controlling for all other scales; this was not a statistically significant contribution ($\beta = .181, p = .466$). An examination of beta statistics revealed higher SCARED-C scores and BDI-II scores at admission was associated with greater symptom severity at discharge whereas higher ASI scores and greater suicidality was associated with lower reported OCD severity at discharge. Analysis of semipartial correlation coefficients revealed that SCARED-C uniquely explains 1% of the variance in treatment outcome. All other variables contribution was negligible.

Table 14

Standard Regression Analysis OCD Severity at Admission Predicting Treatment Outcome

	<i>B</i>	<i>SE B</i>	<i>β</i>	<i>p</i>	<i>R</i> ²
Model 4:					.032*
(Constant)	6.885	2.492		.006	
Obsessions	.460	.190	.178	.017*	
	<i>B</i>	<i>SE B</i>	<i>β</i>	<i>p</i>	<i>R</i> ²
Model 5:					.099**
(Constant)	2.793	2.319		.230	
Compulsions	.798	.181	.314	<.001**	
	<i>B</i>	<i>SE B</i>	<i>β</i>	<i>p</i>	<i>R</i> ²
Model 6:					.099**
(Constant)	2.635	2.680		.327	
Obsessions	.026	.373	.010	.906	
Compulsions	.784	.216	.309	<.001**	
	<i>B</i>	<i>SE B</i>	<i>β</i>	<i>p</i>	<i>R</i> ²
Model 7:					.078**
(Constant)	2.616	2.665		.328	
CY-BOCS-SR	.401	.103	.279	<.001**	

* $p < .05$, ** $p < .01$

In order to investigate how well OCD symptom at admission was able predict treatment outcome at discharge separate standard multiple regression analyses (Table 12) were performed. Variables were entered into regression models separately and together to determine predictive validity of each combination of this measure. Variance inflation factor (VIF) was calculated to test for multicollinearity of the subtests due to high correlations and were found to be acceptable (VIF = 1.42). Results of the first standard regression (Model 4) indicate the obsessions subtest of the CY-BOCS-SR explained 3.2% of the variance of treatment outcome and was significantly related to outcome scores $F(1, 178) = 5.83, p = .017$. Results of the second standard regression (Model 5) indicate the compulsions subtest of the CY-BOCS-SR explained 9.9% of the variance of treatment outcome and was significantly related to outcome scores $F(1, 178) = 19.490, p < .001$. The linear combination of obsessions and compulsions was

found to explain 9.9% of the variance of treatment outcome and was significantly related to treatment outcome, $F(2, 179) = 9.698, p < .001$. An inspection of individual predictors in Model 6 revealed that compulsion subtest scores made the strongest and statistically significant unique contribution to explaining treatment outcome when controlling for the obsession subtest ($\beta = .309, p < .001$). Analysis of semipartial correlation coefficients revealed that compulsion subtest scores uniquely explain 6.7% of the variance in treatment outcome. The contribution of the obsession subtest was negligible. Results of the fourth standard regression (Model 7) reveal CY-BOCS-SR composite scores explained 7.8% of the variance of treatment outcome and was also significantly related to outcome scores $F(1, 179) = 15.081, p < .001$. Analyses of beta statistics revealed higher scores on subtests and the composite CY-BOCS-SR at admission was related to higher reported OCD severity at discharge.

Table 15

Standard Regression Analysis Symptom Subtype Predicting Treatment Outcome

	<i>B</i>	<i>SE B</i>	β	<i>p</i>	R^2
Model 8:					.120
(Constant)	24.504	6.267		<.001	
SORC	-11.044	6.165	-.221	.078	
CCAS	.155	2.954	.010	.958	
H	-4.578	2.735	-.256	.099	
SR	.190	2.735	.011	.069	

Note. SORC=symmetry, ordering, repeating, and checking; CCAS=contamination, cleaning, and aggressive and somatic symptoms; H=hoarding obsessions and compulsions; SR=sexual and religious symptoms

* $p < .05$, ** $p < .01$

Table 13 displays the final standard multiple regression analysis that was conducted to evaluate how well OCD symptom subtype predicted treatment outcome (CY-BOCS-SR score at discharge). The linear combination of SORC, CCAS, H, and SR explained approximately 12% of the variance of treatment outcome, and although explained more variance than any of the other regression models, was not significantly related to treatment outcome, $F(4, 70) = 2.383, p = .060$. Hoarding symptoms made the strongest unique contribution ($\beta = -.256$) to explaining

treatment outcome when controlling for all other symptom type, but was not a statistically significant unique contribution. An examination of beta statistics revealed patients endorsing SORC and hoarding symptoms at admission reported lower symptom severity at discharge whereas patients reporting symptoms of CCAS and SR at admission were likely to report higher OCD severity at discharge. Analysis of semipartial correlation coefficients revealed that OCD symptom subtypes which includes symmetry, ordering, repeating, and checking (SORC) and hoarding (H) each uniquely explains 4% of the variance in treatment outcome. All other variables contribution was negligible.

Question 2. In order to address research Question 2a, as all other models under Question 1 revealed non-significant prediction models, a hierarchical regression analysis was conducted to determine the ability of demographic variables (age, gender, length-of-stay) to predict treatment outcome at discharge, controlling for OCD symptom severity at admission. Also, the investigation of treatment history as a potential predictor in Question 1b revealed, with all variables included in the model, explained 7.5% of the variance in treatment outcome. A history of PHP treatment was the only variable among potential predictors to make a significant unique contribution to the regression model. It is hypothesized that elimination of inpatient treatment from the model could increase predictive validity of the model. First, patients who have received inpatient treatment typically display a level of psychiatric acuity different from patients receiving the other types of treatment. The very nature of inpatient hospitalization is to serve individuals who have the inability to keep themselves or others around them safe whereas this is frequently exclusionary criteria for the other levels of treatment included in the model. Also, a history of inpatient hospitalization was found to make the lowest unique contribution to explaining treatment outcome when controlling for all other

treatment types ($\beta = -.014, p = .874$). The following research questions were developed in order to further investigate results:

- a) Can the prediction of treatment outcome by treatment history be improved by elimination of inpatient hospitalization from the regression model?
- b) If, with inpatient hospitalization removed, treatment history is found to significantly predict treatment outcome, what is the ability of this model to then predict treatment outcome at discharge, controlling for OCD symptom severity (CY-BOCS-SR composite) at admission?

Table 16

Hierarchical Regression Analysis Predicting Treatment Outcome by Demographic Variables (Model 1) Controlling for Baseline Symptom Severity

	<i>B</i>	<i>SE B</i>	β	R^2	ΔR^2
Model ##:					
Step 1:				.078**	
(Constant)	2.616	3.107			
CY-BOCS-SR	.401	.120	.279**		
Step 2:				.119**	.041*
(Constant)	-8.407	7.762			
CY-BOCS-SR	.353	.104	.246**		
Age	.526	.454	.083		
Gender	.674	1.101	.044		
Length-of-stay	.041	.016	.187*		

* $p < .05$, ** $p < .01$

CY-BOCS-SR composite admission scores were entered into Step 1, explaining 7.8% of the variance in CY-BOCS-SR scores at discharge. After entry of previous treatment in Step 2, the total variance explained by the model as a whole was 11.9% $F(4, 175) = 5.891, p < .001$. Demographic variables explained an additional 4.1% of the variance in CY-BOCS-SR discharge scores, after controlling for CY-BOCS-SR admission scores, R squared change = .041, F change (3, 175) = 2.684, $p = .048$. The final model revealed that a length-of-stay was found to make the

strongest and statistically significant unique contribution to the model when controlling for all other treatment types and symptom severity at admission ($\beta = .178$, $t = 2.604$, $p = .010$).

Table 17

Standard Regression Analyses Treatment History, Excluding Inpatient, Predicting Treatment Outcome

	<i>B</i>	<i>SE B</i>	β	<i>p</i>	R^2
Model 9:					.075*
(Constant)	8.801	2.380		.000	
Outpatient	2.732	2.385	.101	.254	
IOP	2.649	2.054	.115	.200	
PHP	3.971	1.739	.195	.024*	
Res	3.121	1.849	.145	.094	

Note. IOP=intensive outpatient program; PHP=partial hospitalization or day treatment program; Res=residential treatment

* $p < .05$, ** $p < .01$

In order to investigate the ability of treatment history, with inpatient hospitalization removed, to predict treatment outcome a standard regression model was conducted (see Table 14). The linear combination of treatment history with inpatient hospitalization removed continued to explain 7.5% of the variance of treatment outcome but was now found to significantly predict treatment outcome, $F(4,128) = 2.581$, $p = .040$. Again, a history of PHP treatment was found to make the strongest and statistically significant unique contribution to the model when controlling for all other treatment types ($\beta = .195$, $p = .024$). This indicates that inclusion of inpatient hospitalization into the original regression model did not contribute to predictive validity of the model. Thus for patients in this sample having received inpatient hospitalization prior to admission to the residential program is not an important piece of information in predicting treatment outcome as measured by OCD symptom severity.

With the exclusion of inpatient hospitalization, treatment history was found to significantly predict treatment outcome but the amount of variance explained did not change ($R^2 = .075$). In order to answer research Question 2b, a hierarchical multiple regression analysis

was used to assess the ability of previous treatment (Model 9) to predict OCD symptoms at discharge (CY-BOCS-SR), after controlling for the influence of CY-BOCS-SR scores at admission (see Table 14). Composite CY-BOCS-SR scores were chosen as a control despite the variability in predictive validity in composite score and individual subtests found in previous regression models. The composite CY-BOCS-SR was chosen to provide a consistent control since the dependent measure is composite CY-BOCS-SR scores.

Table 18

Hierarchical Regression Analysis Predicting Treatment Outcome by Treatment Type (Model 9) Controlling for Baseline Symptom Severity

	<i>B</i>	<i>SE B</i>	β	R^2	ΔR^2
Model 10:					
Step 1:				.078**	
(Constant)	2.616	3.107			
CY-BOCS-SR	.401	.120	.279**		
Step 2:				.170**	.092*
(Constant)	-3.028	3.828			
CY-BOCS-SR	.448	.117	.312**		
Outpatient	3.125	2.269	.116		
IOP	2.888	1.954	.125		
PHP/Day	4.757	1.666	.223*		
Res	3.023	1.758	.140		

* $p < .05$, ** $p < .01$

CY-BOCS-SR composite admission scores were entered into Step 1, explaining 7.8% of the variance in CY-BOCS-SR scores at discharge. After entry of previous treatment in Step 2, the total variance explained by the model as a whole was 17% $F(5, 132) = 5.220, p < .001$. Prior treatment explained an additional 9.2% of the variance in CY-BOCS-SR discharge scores, after controlling for CY-BOCS-SR admission scores, R squared change = .092, F change (4, 127) = 3.536, $p = .009$. The final model revealed that a previous history of PHP was found to make the strongest and statistically significant unique contribution to the model when controlling for all other treatment types and symptom severity at admission ($\beta = .223, t = 2.856, p = .005$).

CHAPTER 5: Discussion

This chapter will review the present investigation and examine results to develop meaningful explanations and interpretations relevant to both clinical practice and future research. Finally, the strengths and limitations of the study will be discussed.

Review of the Study

The present study sought to investigate potential predictors of treatment outcome in a population of adolescent patients receiving treatment in a unique residential setting. Participants included 196 adolescents with primary diagnosis of OCD who received treatment during January 2009 and May 2014 at the Child and Adolescent Center at Rogers Memorial Hospital. Patients were administered treatment outcome measures at admission and again at discharge. The primary measures used were the Children's Yale-Brown Obsessive Compulsive Scale, self-report (CY-BOCS-SR), CY-BOCS-SR Symptom Checklist, Beck Depression Inventory (BDI-II), Anxiety Sensitivity Index (ASI), and the Screen for Child Anxiety-Related Emotional Disorders – Child Report (SCARED-C). Factors with potential associations with treatment outcomes were divided into five relevant domains (demographic, treatment history, comorbid symptoms, OCD severity, and OCD symptom subtype) and standard regression analyses were conducted to explore potential for predictability. Only one (symptom severity) of the five domains investigated revealed models that significantly predicted treatment outcome. An additional hypothesis was posed and explored to improve the predictive validity of treatment history for treatment outcome.

Interpretation of Results and Recommendations for Future Research and Practice

Response rates of adolescent patients in residential treatment have been reported between 64-70% (Bjorgvinsson et al., 2008; Leonard et al., 2014) however the literature examining predictors of combined treatment outcomes for pediatric patients with OCD is

limited. The current study sought to investigate potential predictors in a heterogeneous population of adolescents receiving treatment in an intensive residential treatment setting. No clear statistical evidence exists providing strong support for the predictability of treatment outcome for pediatric OCD. Consistent with the literature, baseline symptom severity was the strongest predictor of treatment outcome in the current sample. A contribution to the literature was the investigation of treatment history as a potential predictor of treatment outcome. As previously stated many factors were included that have been found to be inconclusive previously in the literature but were determined important to include due to the exclusivity of the population being investigated.

Predictors of Treatment Outcome

Demographics. In this clinical sample, demographic variables significantly predicted treatment outcome. Specifically, length-of-stay was found to significantly predict higher OCD severity at discharge while neither age nor gender emerged as significant predictors of treatment outcome within the model. Previous studies investigating the ability of demographic variables such as age and gender to predict outcome in similar populations have reported inconsistent results (Ginsburg et al., 2008). Females reported higher anxiety and depression and were significantly more likely to have received inpatient hospitalization prior to admission when compared to their male counterparts. It is possible demographic characteristics interact with other factors but were not observed with the current statistical investigation.

The average length-of-stay for the current sample was similar to other investigations of residential treatment for adolescent patients with OCD (Bjorgvinsson et al., 2008; Leonard et al., 2014). The positive correlation between length-of-stay and OCD severity at discharge is surprising assuming increased time in treatment would ameliorate symptoms. The relationship between length-of-stay and outcome could be related to several variables. The contribution of

additional factors such as decreased level of functioning, more comorbid diagnoses, or lack of motivation could contribute to a longer length-of-stay. A patient who lacks motivation for change may stay in treatment despite willingness to actively engage in treatment designed to lessen symptoms. The literature suggests clinically significant improvement does not necessarily increase as a function of treatment sessions, which may speak to decreased patient investment in treatment over time (Barkham et al., 2006). Also, patients in the current sample may have demonstrated psychological or functional improvements not captured by the CY-BOCS-SR at discharge. Finally, this was an intent-to-treat sample who was largely dependent on a third party funding for access to a very costly treatment. Some patients may have left the program endorsing severe OCD symptoms but lacked the resources to continue treatment. Due to the scarcity of adolescent residential treatment centers for OCD, there is very little empirical evidence to predict what type of patient will seek out such intensive intervention. It would be worthwhile to investigate the differences in characteristics of the current patient sample against adolescents receiving non-residential treatment.

Treatment history. To this author's knowledge, this is the first study to investigate previous treatment type as a predictive factor of OCD treatment outcome in a residential setting making it difficult to compare this current finding to existing literature. It is interesting that the removal of inpatient treatment into the treatment history model significantly predicted treatment outcome in residential treatment even after controlling for OCD severity at admission (CY-BOCS-SR). It could be possible that patients, in the current sample, who have a history of inpatient treatment, and who have experienced a higher level of psychiatric acuity, are systematically different from patients receiving the other types of treatment, thus contributing to the current results. While a history of inpatient hospitalization at admission may not contribute to predictability of OCD symptom severity at discharge in the current program, it is

hypothesized patients with primary diagnosis of OCD who have a history of inpatient hospitalization may have notable differences from other patients that deserve further investigation. It is also possible that despite differences in patient experience prior to admission to the residential program, components of the current program buffer these differences reducing power to predict symptom severity at discharge.

A history of partial hospitalization or day treatment continued to make the strongest and statistically significant unique contribution to each model even when controlling for all other treatment types and symptom severity at admission. This finding is interpreted with caution as there is likely shared variance among the variables included in the final model. As previously mentioned, it is not uncommon for individuals who present for residential treatment to have extensive history of treatment failure (as reported by parents and previous treatment providers upon admission). One possible explanation for the contribution of PHP might be that individuals who seek intensive treatment are experiencing significantly greater functional impairments (Piacentini, Bergman, Keller, & McCracken, 2003; i.e. ,conflict with caregivers, poor ADLs, inability to attend school, poor or no social interactions) compared to individuals receiving outpatient treatment. Although the CY-BOCS-SR includes questions about time occupied and interference in one's daily life, these items may not contribute enough robustness to capture the level of functional impairment characterized in patients seeking residential treatment. The functional impairment of the sample might explain why, even when all other treatment types and symptom severity was controlled, history of PHP treatment continued to predict outcome. Patients with high CY-BOCS-SR scores who have not received PHP treatment might be those patients who, despite severe OCD, do not have as significant functional impairments as those who seek more intensive (PHP) treatment. In other words, it is possible that individuals with greater functional impairment seek out more intense programs which may be one explanation

to the predictive validity of PHP in this study. It may also be useful to investigate whether overall functional impairment could predict treatment outcome better than symptom severity for patients who receive treatment for OCD in this residential setting. One way to investigate this with the current data would be parceling out questions on the CY-BOCS-SR that target functionality (questions 1, 2, 6, 7) to determine if reported levels of time occupied and interference has greater ability to predict treatment outcome than composite symptom severity. Additionally, adding a measure of functional impairment to the battery of assessments completed by patients and parents at admission and discharge could specifically target this construct for future investigations.

It could be assumed if patients who receive PHP treatment are subsequently seeking a more intense level of treatment (residential), similar factors may exist related to poor treatment response (as measured by symptom severity reduction) in either setting. These factors might include motivation, readiness to change, insight, family accommodation, etc. While there is evidence in the literature to support the predictive validity of these types of factors (Merlo, Lehmkuhl, Geffeken, & Storch, 2009; Storch et al., 2007) these data are not available for the patients in the program investigated in this study. It would be of benefit to include tools to measure constructions like patient readiness for treatment, level of parental accommodation, and motivation for treatment to help build treatment plans as well as screen for appropriateness for the program.

Cormorbid symptoms. Measures of symptom comorbidity did not significantly predict symptom severity at discharge. In one sample, symptoms of depression have negatively impacted treatment outcome (Storch et al., 2010), however others have not found anxiety or depression assessment scores to predict OCD treatment outcome (Barrett, Farrell, Dadds, & Boulter, 2005; Flament et al., 1985). It is possible that gender could serve as a moderating

variable in the current patient sample because females reported significantly higher anxiety and depression symptoms severity at admission (Maher et al., 2010). The inability of ancillary symptoms to predict outcome may provide support for this treatment setting to demonstrate positive outcomes of symptom reduction regardless of secondary symptoms or diagnoses. The nature of the residential program in this investigation may contain protective factors in non-ERP treatment components or a combination of ERP and additional treatment components which serve to buffer patients from the impact of these additional psychiatric symptoms.

It has been previously found when symptoms of anxiety and depression have been used as predictors for compulsive behaviors alone, both were found to be significant predictors (Kirkcaldy et al., 2010). Noting the predictive validity of compulsion subtest scores on the CY-BOCS-SR at admission, it would be interesting to investigate whether comorbid symptoms would predict severity in compulsive behaviors at discharge. Also of interest and clinical utility would be the investigation of self-report versus parental report of externalizing and internalizing symptoms of anxiety or depression. It is suggested that depressive and anxiety and anxiety may create information processing biases or contribute to negative cognitive styles which impact self-reported symptoms or impact children's ability to clearly identify irrational thinking (Beck, & Clark, 1997; Storch et al., 2010 Timbremont, & Braet, 2004; Garcia et al., 2010). Inclusion of quantitative parental report of additional symptoms at admission and discharge might serve as evidence of therapeutic progress for the patient as well as important information for follow-up providers on rate of change.

OCD symptom severity. Consistent with the literature, OCD symptom severity demonstrated the greatest predictability of treatment outcome in the current study. Both obsessions and compulsions alone significantly predicted OCD severity at discharge. The predictive validity of all four models to investigate severity at discharge only ranged from 3.2%

to 9.9%, but interestingly the compulsion subtest alone predicted as well as both subtests together and the composite CY-BOCS-SR score alone. Given that the compulsions subtest explained only 9.9% of the variance in discharge composite CY-BOCS-SR scores, this finding is small but may be worth further investigation. While OCD symptom severity has consistently been found to significantly predict overall impairment in pediatric populations (Piacentini et al., 2003; Piacentini, Peris, Bergman, Chang, & Jaffer, 2007; Storch et al., 2010; Valderhaug, & Ivarsson, 2005) it is unclear as to the specificity of functional impairment in the current patient sample. In contrast to the current findings, Piacentini et al. (2002) found that more severe obsessions, not compulsions, were related to poorer treatment outcomes. In the same sample, however, academic impairments were also significantly associated with poor outcome offering a specific area of functionality impacted. It is likely that increased obsessional severity may also be related to poor school performance due to the degree of concentration needed to succeed academically. This begs the question of what differences exist between outpatients with moderate to severe OCD symptoms and patients receiving intensive residential treatment with the same range of reported severity. Perhaps patients receiving care on an outpatient basis are in an earlier stage of OCD onset whereas patients seeking residential treatment have been fully engulfed in compulsions, which consequently impact overall functioning.

OCD symptom subtype. OCD symptom presentation was not found to significantly predict treatment outcome in the current investigation. There is some support for the combination of factors as being predictive in that they explained approximately 12% of the variance in CY-BOCS-SR scores at discharge, higher than all other models including symptom severity; however, they were found to be non-significant. Individuals with symmetry, ordering, repeating, and checking symptoms (SORC) had a negative relationship with CY-BOCS-SR outcome scores as did individuals with symptoms of hoarding (H). Not surprising, symptoms of

hoarding made the strongest unique contribution in explaining treatment outcome as hoarding has been linked to poorer outcomes historically (Abramowitz, Franklin, Schwartz, & Furr, 2003; Bloch et al., 2009; Masi et al., 2005). It was surprising that the symptom cluster contamination, cleaning, and aggressive/somatic symptoms (CCAS) did not show greater predictability of outcomes as it has generally been found to respond the best to treatment (Abramowitz et al., 2003).

Strengths and Weaknesses of Research Design

This was an intent-to-treat sample so only patients who completed the measures of interest at admission and had discharge CY-BOCS-SR scores were included in the sample. Additionally, only patients with a CY-BOCS-SR score of 16 or above (to indicate moderate severity) were included in the study. Individuals were not excluded based on medication history, psychiatric co-morbidity, duration of treatment, response to treatment, or circumstances of discharge (i.e. insurance denial, treatment refusal, etc.). Patient reporting may have been influenced by a desire to emphasize the need for treatment at admission by over reporting, a lack of insight which led to underreporting, or ambivalence about the treatment stay which also impacted scores. Self-report CY-BOCS scores have been found to be a valid measure of OCD severity when compared to interviewer-rated CY-BOCS. Conelea, Schmidt, Leonard, & Riemann (2010) found pediatric patients actually tended to slightly under report symptoms on the CY-BOCS-SR. Future research may wish to include parent report (CY-BOCS-PR) when psychometric properties are well established (Storch et al., 2006). Additionally, it may be useful to supplement the CY-BOCS-SR with other measures assessing OCD specific symptoms and impairments including quality of life and academic, social, and family functioning (e.g. Storch et al., 2010b).

The present study has several limitations. First, the determination of OCD as the primary diagnoses for the purposes of this study was not systematically determined using a structured clinical interview. Diagnoses were based on information from referents, pre-admission screenings that included the CY-BOCS-SR Severity Scale and Symptom Checklist, and admissions interviews that were conducted by an experienced board-certified child and adolescent psychiatrist and were later reviewed by a clinical psychologist with extensive expertise in the assessment and treatment of pediatric OCD.

Second, this sample was drawn from a residential-based clinical setting (the only one of its kind) representing a subgroup of particularly impaired patients in terms of clinical severity and comorbid presentation. One benefit from the investigation of predictors within a residential setting is the controlled nature of treatment delivery and environmental influences when compared to outpatient studies. This information, while lacking in external validity due to the scarcity of such programs, has some internal validity and clinical utility for this specific population. Thus, the generalizability of the study findings and conclusions of this study may be limited to the population of patients served by this present treatment program.

Most patients included in the study were prescribed psychotropic medications for primary OCD or co-occurring conditions as part of their treatment. Medication type, dosage, or changes throughout treatment were not included in this study therefore knowledge of the impact on treatment outcome is unknown. Historically, as described above, medications alone have not been found to contribute to symptom reduction, especially in severe cases of OCD, as well as a combined method of treatment (Franklin et al., 2011). Additionally, all patients were prescribed approximately 26.5 hours of ERP per week in addition to group, individual psychotherapy, and experiential therapies totaling upwards of 45 hours of intensive treatment

weekly. It is difficult to partial out factors such as patient adherence to protocols of ERP as well as the impact of other less-structured but impactful program components.

It is possible that the absence of reliable predictors for OCD treatment outcome may have been limited by the number of variables initially examined. Factors noted in the literature, like family accommodation and psychiatric illness (Merlo, Lehmkuhl, Geffken, & Storch, 2009; Storch et al., 2007), patient insight, psychiatric comorbidity, Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections (PANDAS), cognitive and developmental issues (Storch et al., 2010a), and overall functional impairments were not included as these types of information were not collected at the site of interest. Investigating of each of these potentially contributing factors was outside the realm of this study due to the retroactive nature of the data utilized, but provides direction to follow-up research that would be a valuable contribution to the literature. Few studies have reported quantitative impact of these issues on treatment of pediatric OCD and to this writer's knowledge no evidence exists as to the implications of these commonly occurring issues on intensive treatment for OCD with adolescents.

Finally, while the results from the study are informative, it is important to exercise caution in interpreting the unique predictive value of certain factors as variables do not operate in isolation but rather interact with other variables impacting treatment response. Perhaps gender was a moderating variable of outcome. Females in this sample reported significantly higher scores on measures of comorbid symptoms so the relation between comorbid symptoms and OCD severity at discharge could be greater for females than males (e.g., Maher et al., 2010). Previous treatment type might be a mediator variable of outcome in that patients who have failed previous treatment may experience increased symptoms of depression which impact their success in residential treatment. Future research should examine moderators, meditational

factors, and interactions of pertinent factors for the population of interest as it is likely complex relationships exist between biopsychosocial characteristics and impact response to treatment.

Summary and Conclusion

The complex nature of the program investigated and complexities of the patients served make prediction of treatment outcome a challenge. Despite difficulty in isolating predictive factors to treatment outcome in this sample, 64% of patients in similar samples receiving treatment in residential settings have demonstrated clinically significant improvements of OCD symptoms (Leonard et al., 2014). ERP paired with psychopharmacological interventions continues to be the gold standard of treatment for pediatric OCD and is supported in the literature. It is possible that for patients with OCD, and other comorbid symptoms which constitute residential treatment, ERP may be the single most contributing factor to treatment success. The additional program components could provide patients with qualitative psychological or behavioral improvements that increase their availability for ERP treatment. Due to the enumerable factors (peer relationships, therapeutic rapport, isolation of individual from family dynamics, etc.) and various program components (individual, group, experiential therapy, etc.) it is difficult to determine how much ERP contributes to treatment outcome in this residential setting without a systematic investigation with controlled groups. The challenge remains to systematically identify program components that match unique patient needs to increase prescriptive efficacy with this difficult-to-treat population.

In summary, the findings from the current study contribute to the literature on OCD treatment outcomes investigating whether and how various factors predict outcomes for adolescent patients with OCD receiving CBT treatment in a residential setting. The current investigation revealed the difficulty of predicting treatment outcome within a complex treatment modality with a heterogeneous patient population but also set the stage for further

inquiry. The difference found among subtests on the CY-BOCS-SR in predicting treatment outcome provides evidence for the need for additional investigations of the link between severity of compulsory behaviors at admission and response to treatment. Additionally, studies of the relation between treatment history and outcome deserve additional exploration to uncover factors related to type of treatment received prior to admission and treatment response. Better understanding of the predictors of treatment outcome for this unique population should lead to further investigation of effective and targeted treatment techniques.

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Appendix A

Admissions Assessment Packet Cover Sheet



OUTCOMES MEASURES ASSESSMENT PACKET

The materials in this assessment packet are used to monitor the impact of treatment and evaluate the outcomes of therapy in patients receiving care at Rogers Memorial Hospital. These measures help us assess and monitor the severity of your symptoms (such as anxiety and depression), your quality of life, and whether you are affected by substance use or dependence.

The data obtained from these packets will be available to your therapist and to individuals monitoring your treatment progress.

It is important for us to get a full assessment of your treatment needs.

You will be asked to fill out this packet within 48-72 hours of your admission and again 48-72 hours before discharge so we can monitor your progress. These measures can help us target areas in which you may need additional help. You may also be asked to fill out some of the measures in this packet throughout your treatment to monitor if your symptoms are changing.

It is important for us to know if we are helping you.

Sometimes your answers may be used for research aimed at improving our treatment programs. All personal and clinical information about our patients and research participants is treated in a confidential manner. When we share our research results, the collected data is reported only in an aggregate form.

Personal information such as your name or initials will never be used in any report. The aggregated data may also be presented at scientific meetings or posted on the Rogers Memorial Hospital website so individuals interested in being admitted to the program can learn how successful the program has been for individuals like themselves.

It is important for you to complete the entire packet and return it to your counselor.

We recommend that you find a quiet place where you can review this packet and complete all of the enclosed surveys. Once the surveys are completed, return the entire packet to your counselor. If you have any questions, please contact your therapist or counselor and he/she will help you.

Patient Signature _____ Date _____

Patient name (print) _____

Parent Signature _____ Date _____

Parent name (print) _____

HEATHER M. JONES, EdS, LPC

EDUCATION

University of Wisconsin-Milwaukee 2007-Present

Ph.D. Educational Psychology | Minor in Clinical Psychology

Emphasis: School Psychology

to be Conferred 2014

Dissertation: *Predicting Outcome at Posttreatment for Adolescent Obsessive-Compulsive*

Disorder in a Residential Treatment Setting

Dissertation defense: December 01, 2014

University of Nevada, Las Vegas

2004-2007

Ed.S. Educational Psychology, Emphasis: School Psychology

Professional Paper: *Effectiveness of Social Skills Interventions for Children with Autism Spectrum Disorders*

University of Nevada, Las Vegas

2004-2005

M.S. Educational Psychology, Emphasis: School Psychology

Carroll College, Waukesha, WI

2000-2004

B.S. Psychology, Emphasis: Clinical/Counseling Psychology

CLINICAL EXPERIENCE

Primary Therapist, Child & Adolescent Center

2012-Present

Rogers Memorial Hospital: Oconomowoc, WI

Supervisor: Jonna Pestka

- Individual, group, and family therapy; crisis management and risk assessment; clinical assessment, treatment planning and ongoing case management; integration of scientific knowledge with the day to day practice of ethical and professional standards; awareness of and sensitivity to identifying the needs of a diverse patient population; participation in professional development, supervision sessions and inter-disciplinary team meetings.
- Specialization: children and teens ages 8 to 18 dealing with broad spectrum of mental health concerns: Attention Deficit/Hyperactivity Disorder (ADHD); Obsessive-Compulsive Disorder (OCD) and OC spectrum disorders (trichotillomania, Tourette syndrome); social anxiety disorder, panic disorder with agoraphobia and other anxiety disorders; depression and other mood disorders.
- Specialized Skills: psychotherapy (cognitive-behavioral therapy); psychoeducation; parent/family therapy; diagnostic interviewing with an emphasis on tailoring techniques for developmental needs; group psychotherapy for children and adolescents; therapeutic group for the ADHD population; behavioral de-escalation and cooperative problem solving techniques; techniques for working with traumatized youth in a group therapy setting; group therapy for conduct disordered adolescents; group therapy for internalizing behaviors; attachment disorders and current treatment modalities; PTSD in children and adolescents; differential diagnosis in children and teens; working with

families of adolescents; diagnosis and treatment of mood disorders; and emerging identity issues in teens and ways to address in group therapy

Pre-Doctoral Internship

2011-2012

Rogers Memorial Hospital: Oconomowoc, WI

Supervisor: David Jacobi, PhD

- Provide patient and parent psychoeducation; participate in family therapy and treatment update sessions; provide direct intensive cognitive-behavioral therapy and exposure-response prevention to children and adolescents with anxiety disorders, mood disorders, and other pediatric psychopathology; utilize diagnostic interviewing, behavioral de-escalation, and cooperative problem solving for developmental needs; utilize specialized training in behavioral activation, crisis management, risk assessment, and techniques for working with traumatized youth in a therapeutic setting; provide supervision and professional development of behavioral specialists working with residents assigned to cognitive behavioral therapy programs; lead staffing when related to the assessment, treatment and discharge planning of residents who receive services; participate in weekly supervision; conduct formal training within areas of expertise as relevant to clinical care and best practice; offer ongoing training, support and coaching to staff members less familiar with the cognitive behavioral model for anxiety.

Doctoral Student Practitioner Therapist

2010

Family Options Counseling, LLC.: Wauwatosa, WI

Supervisor: Kimberly Young, PhD

- Conducted clinical interviews; provided therapy to families, individuals and children in both individual and group settings; developed therapeutic goals and assessed outcomes based on those goals; investigated diagnostic hypotheses utilizing knowledge of the DSM-IV-TR; implemented psychological interventions based on clients needs including sexual deviancy, mood disorders, and anger management.

School Psychologist Intern

2006-2007

Clark County School District: Las Vegas, NV

Supervisor: Donald Blagg, EdD

- Administered psycho-educational assessments, wrote comprehensive psycho-educational reports, ran both pre and post-eligibility multidisciplinary team meetings, observed students in classroom and alternative settings, formulated assessment plans, consulted with student intervention teams and various special and regular education faculty, communicated special education rights and laws to parents, scheduled meetings, communicated evaluation procedures to parents, organized and documented psycho-educational activities, consulted with pre-intervention teams, collaborated with teachers to match interventions to deficits, monitored progress of students receiving interventions.

Student Assessor: Integrated Assessment Practicum

2006

University of Nevada, Las Vegas School Psychology Clinic: Las Vegas, NV

Supervisor: Scott Loe, PhD, NCSP

- Administered psycho-educational assessments, wrote comprehensive reports for clients, observed students in classroom settings, observed several eligibility team meetings, and used teacher and parent interview information to formulate assessment plans.

Educational Legal Advocate**2005-2006**

*Education & Child Welfare Department, Thomas & Legal Clinic
Boyd School of Law, University of Nevada, Las Vegas: Las Vegas, NV*
Supervisor: Rebecca Nathanson, PhD and Pam Mohr, JD

- Participated as part of a legal team to advise parents and students on legal matters pertaining to education, reviewed present levels, aided school staff in writing appropriate goals, objectives, and benchmarks, met with school personnel regarding student placement, observed students in classrooms.

Contract Consultant**2004-2006**

Self, Henderson, NV

- Implemented behavioral modification therapy for children with autism and aided in modifying child-specific curriculum and behavior plans.

School Psychology Practicum Student**2004-2006**

Clark County School District, Las Vegas, NV
Supervisor: Joe Crank, PhD, NCSP

- Performed psychological and achievement tests, conducted classroom observations, created comprehensive reports, and provided individual counseling for elementary and middle age students.

In-Home Behavioral Lead Therapist**2002-2004**

Wisconsin Early Autism Project: Brookfield, WI
Supervisor: Maggie Doman

- Implemented behavioral modification therapy for children with autism, aided in modifying child-specific curricular and behavior programs, observed/provided feedback to primary lead therapists, and facilitated peer-related play with clients.

RESEARCH EXPERIENCE

Project Assistant**2007-2011**

*Center for Mathematics and Science Education Research
University of Wisconsin-Milwaukee, Milwaukee, WI*
Supervisor: DeAnn Huinker, PhD

- Aided in the development of presentations for national conferences, collected qualitative data at various project sites, assisted in qualitative data analysis, maintained anecdotal information for research archive, communicated scheduling changes to team of project assistants, observed K-12 learning team meetings and department meetings for adherence to project mission.

Graduate Student Researcher**2005-2006**

Department of Research & Evaluation, Clark County School District: Las Vegas, NV
Supervisor: Robert P. Parker, PhD

- Developed a research brief for Clark County School District teachers, presented brief to district administrators as part of professional development strand, assisted in research design, data collection, and analysis large-scale program evaluation, aided in the

development and administration of student surveys, engaged in qualitative data collection and analysis techniques, aided in the development of several evaluation research design models, wrote summary of research study.

Program Evaluation Assistant

2006

Clark County School District: Las Vegas, NV

Supervisor: Allison Williams, PhD

- Administered several pre-school language and literacy-skill assessments to disadvantaged students in Title I preschool programs, observed classroom teachers' literacy lessons, and interviewed teachers.

Research Assistant

2006

Self-Instruction in Counseling: A Follow-Up Study

University of Nevada, Las Vegas, School Psychology Clinic: Las Vegas, NV

Supervisor: Paul Jones, PhD

- Provided first-year school psychology students with live mock counseling scenarios, assisted with data collection through video analysis of students' therapeutic skills, and scheduled appointments with students for sessions.

Graduate Student Researcher

2005-2006

Department of Educational Psychology, University of Nevada, Las Vegas: Las Vegas, NV

Supervisors: Paul Jones, PhD; Scott Loe, PhD; & Kathleen Krach, PhD (Co-PIs)

- Administered various intellectual and neuropsychological tests with the Neuroticism-Extroversion-Openness Personality Inventory (NEO-PI) to determine a correlation between the big five personality traits, academic achievement, and IQ. Developed skills in psychological testing administration, data collection procedures, and confidential maintenance of psychological records created for research purposes.

Student Assessor

2005-2006

Department of Educational Psychology, University of Nevada, Las Vegas: Las Vegas, NV

Supervisors: Kathleen Krach, PhD; Scott Loe, PhD; & Paul Jones, PhD (Co-PIs)

- Assisted with data collection through administration of Reynolds Intelligence Adult Scale (RIAS) and Woodcock-Johnson III (WJ-III) for a validity study determining the concurrent validity between the two assessments and CHC (Carroll-Horn-Cattell) factors.

Program Assessment Assistant

2004-2005

Research, Accountability, and Innovation Division, Clark County School District: Las Vegas, NV

Supervisor: Robert P. Parker, PhD

- Observed the integrity of the implementation of a literacy program in kindergarten classrooms, completed protocols while observing various components of a primary literacy program taught in kindergarten classrooms, and interviewed teachers on their perception of program components.

PUBLICATIONS AND PRESENTATIONS

Jones, H.M., Kasimatis, P., Acken, K., Rafael, M. (2012, May) *Evaluation of Combinational Strategy versus Control in Reducing Test Anxiety*. Presentation given at the Midwest Psychological Association Conference, Chicago, IL.

- Jones, H.M. & Huffman, J. (2010, February). *A model for educating students on diversity*. Presentation given at the National Association for School Psychologists.
- Huffman, J. & Jones, H.M. (2010, February). *Early childcare & education: A program comparison of child performance*. Presentation given at the American Psychological Association Conference, New Orleans, LA.
- Jones, H.M. (2010, March). *Diversity education: Results of a first-year seminar titled 'Beginning Steps toward Cultural Competency'*. Presentation given at the University of Wisconsin-Milwaukee School of Education Research Conference, Milwaukee, WI.
- Jones, W.P., Loe, S., Krach, S.K., Rager, R. & Jones, H.M. (2008). Automated Neuropsychological Assessment Matrices (ANAM) and Woodcock-Johnson III Test of Cognitive Abilities: A concurrent validity study. *The Clinical Neuropsychologist*, 22, 305-320.
- Parker, R.P., Jordan, M.E., Jones, H.M., & Martin, D.A. (2006, February). *Educational action research*. Presented as a professional development workshop to East Region administrators in Clark County School District, Las Vegas, Nevada.
- Jones, H.M., Jordan, M.E., & Parker, R.P. (2006, February). *Action research*. Clark County School District, Las Vegas, Nevada.
- Krach, S.K., Loe, S., Rager, R., Jones, H.M., & Speer, J.M. (2006, August). *Validity study comparing the Woodcock-Johnson Tests of Cognitive Ability (WJ-III: COG) and the Reynolds Intelligence Assessment Scale (RIAS)*. Presentation given at the American Psychological Association Conference, New Orleans, LA.

ACADEMIC HONORS AND AWARDS

Nationally Certified School Psychologist – National Association of School Psychologists
 Cum Laude Honors – Carroll College, Waukesha, Wisconsin
 Deans Academic Honor List – Carroll College, Waukesha, Wisconsin
 Presidential Scholarship – Carroll College, Waukesha, Wisconsin
 Academic All-Conference (Women's Basketball) – Midwest Conference, Ripon, Wisconsin
 WAA Academic Scholarship – Middleton, Wisconsin

TEACHING EXPERIENCE

Adjunct Professor

2008-Present

Division of Natural and Health Sciences, Carroll University: Waukesha, WI

Supervisor: Joseph Piatt, PhD

- PSY 101: Introduction to Psychology
- PSY 201: Abnormal Psychology
- PSY 205: Statistics for the Behavioral Sciences

Masters Theses Technical Reviewer**2006***Sierra Nevada College: Las Vegas, NV*

Supervisor: Robert P. Parker, PhD

- Technically reviewed students' masters theses based on the APA writing style standards, provided feedback for students wishing to publish their thesis.

PROFESSIONAL AFFILIATIONS

Student Affiliate, Midwest Psychological Association (MPA)	Since 2011
Student Affiliate, American Psychological Association (APA), Division 16	Since 2007
Member, American Psychological Association of Graduate Students	Since 2007
Past-President, School Psychologist Student Association (SPSA)	Since 2007

SERVICE

School Psychology Program Student Representative <i>University of Wisconsin-Milwaukee: Milwaukee, WI</i>	2008-2009
President, School Psychologist Student Association (SPSA) <i>University of Wisconsin-Milwaukee: Milwaukee, WI</i>	2008-2009
NASP Nationally Certified School Psychologist (NCSP) Portfolio Reviewer	Since 2008
Research Assistant, Department of Educational Psychology <i>University of Nevada, Las Vegas: Las Vegas, NV</i>	2005-2006
Volunteer, Council for Learning Disabilities Annual Conference <i>Las Vegas, NV</i>	2004

Personal and professional references will be furnished upon request.