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A Long Term Follow Up to a Randomized Controlled Trial of Comprehensive Behavioral Intervention for Tics

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A LONG TERM FOLLOW UP TO A RANDOMIZED CONTROLLED TRIAL OF COMPREHENSIVE BEHAVIORAL INTERVENTION FOR TICS

by

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ABSTRACT

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Tourette Syndrome (TS) is a neuropsychiatric disorder characterized by stereotyped involuntary movements called tics. Tics can be movements or sounds and usually present first during childhood. Although tics may wax and wane throughout life, few long-term follow up studies of tic disorders have been conducted. In the past decade, behavior therapy has become a promising treatment for individuals with TS. Studies on behavior therapy for tics show favorable results at post treatment, but no studies have examined the long-term effects of such treatments beyond 10 months. The current study aimed to address this lack of research by conducting assessments with a group of adolescents and young adults who participated in a randomized controlled trial (RCT) of behavior therapy for tic disorders over six years ago. Results from 15 subjects indicated tics decreased in severity into late adolescence and adulthood and treatment gains were maintained between post treatment and follow up. These effects were even more pronounced for the group traditionally assigned to behavior therapy. Many of the predictors of long-term tic severity identified in the literature did not predict tic severity or general functioning at follow up, and there were no significant differences between baseline and follow up scores on measures related to other psychological and behavior problems. Subjects also reported how long they continued using various treatment components and which

strategies were more helpful than others. Implications for future studies on the course of tic disorders and treatment follow-up assessments are discussed.

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A Long Term Follow Up to a Randomized Controlled Trial of Comprehensive Behavioral Intervention for Tics

Originally classified in a comprehensive case series by Gilles de Tourette in 1885, the group of behaviors now known as Tourette Syndrome (TS) has been studied within medicine, biology, and psychology. Although early psychoanalytic approaches centered on resolving unconscious conflicts presumed to be the cause of tics (Kushner, 1999), poor response rates from such treatments led to the use of biological treatments that became the treatment of choice, mainly through the ability of antipsychotics to suppress tics (Shapiro & Shapiro, 1968). The biological approach became the primary treatment for TS in the latter part of the 20th century, although behavioral approaches to treatment had been developed during this same period (e.g., Azrin & Nunn, 1973). The past twenty years have seen an increase in behavioral research for TS (Bate, Malouf, Thorsteinsson, & Bhullar, 2011; Cook & Blacher, 2007; Himle, Piacentini, Woods, & Walkup, 2006), and behavior therapy is now considered an efficacious and feasible treatment option for individuals with TS. However, few studies exist on the long-term effects of treatment, including whether or not gains are maintained and whether treatment affects the overall course of TS. One goal of this study was to potentially help clarify the question of whether or not patients who receive behavior therapy maintain gains after several years of treatment.

Phenomenology of Tics

Tics are rapid, unintentional movements or vocalizations that occur frequently. Between two and twenty percent of children have at least one tic for a month or longer at some point in their lives (Costello et al., 1996). Motor tics (e.g., blinking, head jerking, and facial grimacing) involve repetitive movements of muscles and vocal, or phonic, tics

involve repetitive sounds (e.g., sniffing, grunting, throat clearing, and barking). Vocal tics also include vocalizations such as words, phrases, or syllables. Tics may wax and wane over the course of development (Budman, Mensud, & Bruun, 1997), with the most severe tic presentation occurring around ages 10-12 (Lin et al., 2002). For many, tics are benign, transient phenomena that cause little distress or change in daily functioning. Many children who present with tics do not end up having them as adults (Costello et al., 1996).

For others, tics may continue over extended periods of time and into adulthood. Tics may also cause significant distress and impairment in home, school, occupational, and social functioning. These patterns of persistent, chronic, difficult-to-deal-with tics represent the various tic disorders described in the DSM-V. To diagnose TS, the patient must have at least one vocal tic in the presence of two or more motor tics for at least one year. Age of onset must be prior to 18 years, and the tics cannot be due to the physiological effects of substances or general medical conditions. If patients have histories of only motor or only vocal tics, then a diagnosis of Persistent (Chronic) Motor Tic Disorder or Persistent (Chronic) Vocal Tic Disorder is given, respectively. If single or multiple motor and/or vocal tics have been present for less than a year since onset, then patients meet criteria for Provisional Tic Disorder .

In addition to the tics themselves, both adults and adolescents diagnosed with tic disorders often report experiencing a somatosensory warning prior to performing a tic. This “warning sign” is known as a premonitory urge, and serves as a signal to perform a given tic. Individuals with CTDs often report this urge will remit after performing the appropriate tic, but may soon return (Leckman, Walker, & Cohen, 1993). Premonitory urges are typically reported at around the age of 10 (Leckman et al., 1993) but may occur

earlier (Woods et al., 2005) and are believed to play a central role in the expression of tics (Conelea & Woods, 2008; Kane, 1994; Leckman et al., 1993; Scahill, Leckman, & Marek, 1995). Consistent with these findings, patients often report that tics are not "involuntary" actions, but rather "semi voluntary" behaviors that occur in response to premonitory urges (Koller & Biary, 1989).

Prevalence and Developmental Course

Studies estimate the lifetime prevalence of TS between 0.4% and 3.8% (Robertson, 2008), which is much higher than originally thought. TS occurs more commonly in males than females, and most studies estimate the ratio to be between two to one and six to one (Coffey et al., 2000; Kadesjo & Gillberg, 2000). Tics most often begin around age five or six (Leckman et al., 1998). With TS transition into early adulthood, tics tend to become less severe. One longitudinal study (Leckman et al., 1998) followed 42 youth diagnosed with TS an average of 7.4 years after they had originally been diagnosed and evaluated at a university clinic. Patients reported tics becoming more severe during puberty, especially around the ages 10-12 (M = 10). Fifty-seven percent of individuals with a history of TS were nearly or completely tic free by age 18. However, Leckman and colleagues (1998) did not assess the extent to which participants had sought out treatment for tics over the years. At follow up, 27% of those assessed continued to experience fairly moderate tic symptoms, and 11% experienced severe symptoms. Tic severity early on was not a good predictor of later tic severity. Over 90% of those with high tic severity during the initial evaluation had mild or no tics by 18 years of age.

In their review of over 16 studies on the course of TS, Coffey et al. (2000) note the need for more longitudinal research to identify predictors of remission or persistence

of tic disorders. The authors note the discrepancies in findings across several older studies. For example, some studies (Corbett, Mathews, Connell, & Shapiro, 1969) reported symptoms such as coprolalia and lower limb tics as a predictor of poorer prognosis. Others (De Groot, Bornstein, Spetie, & Burriss, 1994) cited complex tics or patterns of comorbid disorders as predictors of later tic disorder severity. Another study by Coffey et al. (2004) of 50 youth with TS ages 6-17 years found that at two-year follow-up, tics were still persistent but were associated with less tic-associated dysfunction. Although 82% of youth still met criteria for tic persistence, tic-associated impairment had dropped from 30% to 14%. These findings are consistent with those of Burd and colleagues (2001), who found that tic severity declined by 59% in 39 individuals roughly 12 years after being diagnosed with TS. Also consistent with earlier findings, initial tic severity was not a significant predictor of later tic severity. Unfortunately, few predictors of future remission have been identified, although some evidence suggests that children with poor fine motor abilities have a somewhat poorer prognosis in regard to future tic severity (Bloch, Sukhodolsky, Leckman, & Schultz, 2006).

Comorbidity

Individuals with CTDs often present with other Axis I psychopathology. Attention deficit hyperactivity disorder (ADHD) and obsessive compulsive disorder (OCD) are often the most common comorbidities among individuals with CTDs (Bloch & Leckman, 2009; Bruun & Budman, 1997). In a review of a large, international sample of over 3,500 children with CTDs, Freeman and colleagues (2000) found that 55% of children also had ADHD. Three large-scale epidemiological studies (Kadesjo and

Gillberg, 2000; Khalifa & von Knorring, 2006; Scahill, Bitsko, Visser, & Blumberg, 2007) found that 64%- 68% children with tics also met diagnostic criteria for ADHD. Two of these studies also specifically examined the prevalence of OCD among children with CTDs and found higher rates compared to the general pediatric population.

Spencer et al. (1999) conducted a four-year follow-up study of 128 male children diagnosed with ADHD to determine the long-term course of tic disorders. Although tic disorders were more common in boys diagnosed with ADHD compared to a matched control group of 110 without ADHD, the presence of a tic disorder did not have a significant effect on ADHD outcome. Kadesjo and Gillberg (2000) found a 38% prevalence rate of OCD in children with a CTD, and Khalifa and von Knorring (2006) noted a 10% coincidence. Peterson, Pine, Cohen, and Brook (2001) conducted follow-up reassessments at eight, ten, and fifteen years post baseline in a large, longitudinal study of 776 children aged 1-10 years. Young adolescents with tics were more likely to develop OCD, conduct disorder, and depressive symptoms. Young adolescents with tics and comorbid ADHD symptoms were also more likely to retain tics into later adolescence, while comorbid OCD and phobias predicted tic persistence into adulthood (Peterson et al., 2001).

Additionally, recent evidence suggests that the prevalence of these two conditions among individuals with CTDs may be somewhat lower among individuals who present for psychological treatment of their tics (26% for ADHD and 19% for OCD; Specht et al., 2011). Specht and colleagues (2011) found that social anxiety and generalized anxiety disorder were also highly prevalent among the pediatric sample (20% and 21%, respectively). In the Avon Longitudinal Study of Parents and Children (ALSPAC; Scharf,

Miller, Mathews, & Ben-Shlomo, 2012), rates of comorbid OCD and ADHD were higher in those with TS but lower than has been previously reported. Only 8.2% of those with TS had both OCD and ADHD, and 69% of those with TS did not have either OCD or ADHD. Other studies (e.g., Kadesjo & Gillberg, 2000; Scahill et al., 2007) have also noted relatively high rates of anxiety and other problems within CTD populations, but have assessed these issues less systematically.

Empirically Validated Interventions

Over the past 40 years, many behavioral interventions for CTDs have been developed and tested. Ultimately, Habit Reversal Training (HRT) and Comprehensive Behavioral Intervention for Tics (CBIT) have emerged as the most efficacious options for TS (Cook & Blacher, 2007; Himle et al., 2006; Piacentini et al., 2010).

Habit Reversal Training. HRT, the longest-standing behavioral treatment for tics, teaches skills to minimize and manage tics as they occur in daily life. HRT was first developed by Azrin and Nunn (1973) and consists of three primary components: awareness training, competing response training (CRT) and social support. These components are applied sequentially to each tic, one at a time, starting with the tic the patient finds most bothersome.

During awareness training, clinicians work with patients to help develop awareness of both the tic and premonitory urge. Older patients may be more aware of their tics and urges compared to younger, pediatric patients. Depending on the patient's level of awareness, time spent on developing awareness may vary. Therapists begin the process by working with patients to develop an operational definition of the target tic. Patients then practice detecting tics as they occur in real time during a non-tic related-

conversation. Therapists provide verbal praise for successful detections of tics and prompt recognition of any missed tics should they occur. After the patient is able to reliably detect tics and premonitory sensations for the target tic, CRT begins.

In CRT, the patient and therapist work together to select a physical "exercise" to be used when tics and/or premonitory sensations occur. The exercise involves engaging in a specific behavior that is physically incompatible with the tic, relatively inconspicuous, and able to be used in any situation. Patients are instructed to hold the exercise for at least one minute or until the urge to tic ceases—whichever is longer in duration. Patients also use the exercise whenever the tic occurs, in order to prevent multiple tics from happening. Therapists provide prompts and positive feedback in a manner similar to that used during awareness training.

To encourage use of competing response exercises outside of the therapeutic context, social support is also included as part of the HRT protocol (Azrin & Nunn, 1973). This involves finding a support person (e.g. parent, spouse, roommate) who is trained both to praise the patient for using the competing response when done correctly and non-judgmentally prompting the patient to use the competing response when a tic occurs, but the patient does not engage in the exercise. With children, social support may also involve providing tangible rewards contingent on regular competing response use. Social support is not contingent on occurrence or non-occurrence of tics, but rather on the use of competing response exercises.

Comprehensive Behavioral Intervention for Tics (CBIT). CBIT is an elaborated CBT treatment package that combines traditional HRT components with other techniques suggested by a contemporary behavioral understanding of CTDs (Woods et al., 2008).

In addition to HRT, CBIT includes a functional assessment/function-based intervention protocol to address the contextual factors that impact tic expression. The assessment process identifies common tic antecedents and potentially tic-reinforcing consequences. During the functional assessment, the therapist develops a list of common factors present and potentially influencing tics during periods of tic exacerbation and constructs a working model of the patient's unique pattern of tic-exacerbating environmental factors. This working model is the basis for function-based interventions, or changes in environmental factors designed to minimize contact with tic-triggering events.

CBIT also includes relaxation training and psychoeducation. Relaxation training involves teaching diaphragmatic breathing and progressive muscle relaxation. Although relaxation has been shown to be ineffective as a standalone treatment for TS (Bergin, Waranch, Brown, Carson, & Singer, 1998), this component is added, as it is thought to facilitate successful use of competing response exercises. This idea is based on evidence showing that tic suppression abilities decrease when individuals experience stress (Conelea et al., 2011). Psychoeducation in CBIT involves educating the patient (and parents of pediatric patients) about the nature of TS. During this component, the clinician provides information about the prevalence, course, common phenomenological characteristics, and underlying neuropathology of TS. Psychoeducation has demonstrated beneficial effects for various psychiatric conditions (e.g. Kendall et al., 2008; Miklowitz, George, Richards. Simoneau, & Suddath, 2003) and provides a logical starting point for beginning psychological treatment.

HRT/CBIT Outcomes and Follow Up

A review of the literature on HRT shows that many of the studies do not include long term follow-up. A review by Himle, Woods, Piacentini, and Walkup (2006) of studies on HRT for CTDs conducted between 1973 and 2006 shows treatment follow-up time periods range from 1 week to 2 years. Treatment studies conducted on other disorders common in childhood and adolescence have used much longer follow-up periods. Long-term follow-up times range from two years for Obsessive-Compulsive Disorder (Barrett, Farrell, Pina, Peris, & Piacentini, 2008) and Depression (Gortner, Gollan, Dobson, & Jacobson, 1998) to seven years for Anxiety Disorders (Barrett, Duffy, Dadds, & Rapee, 2001).

In the original study of HRT, Azrin and Nunn (1973) treated three subjects with tics and nine subjects with habit disorders. Subjects used self-monitoring to record frequencies of these behaviors before and after treatment. Results from the open trial indicated dramatic reduction of tics and nervous habits for all 12 subjects. These reductions were assessed at a one-week post treatment assessment.

Azrin, Nunn, and Frantz (1980) later conducted a study of HRT versus Massed Negative Practice (MNP) to determine which was more effective in reducing tic frequency. MNP is a behavioral treatment in which the participant repeatedly acts out a given behavior on a practice schedule (Dunlap, 1932). Participants were instructed to act out their tics according to a practice schedule for 30-second periods over a 1-hour period of time each day, until the tic began to wane (Azrin et al., 1980). Using self-reported tic counts, results showed that was HRT more effective in reducing tics than MNP at a 4-week follow-up. The authors followed up with subjects in the HRT condition again after 18 months and found a 97% reduction of tics.

Finney, Rapoff, Hall, and Christophersen (1983) used direct observation to evaluate the effects of HRT on two children with motor tics in a single subject, multiple-baseline design. Tics occurred less often and were rated as less distracting subjectively by judges at post treatment compared to baseline. Reductions in tics continued to hold for both children at 5 months post treatment. Tics were occurring rarely, if at all, at a 12-month follow up.

O'Connor, Gareau, and Borgeat (1997) conducted a series of two studies to determine the effectiveness of HRT against a traditional cognitive behavioral therapy (CBT) approach to help reduce tic frequency. The CBT approach involved modifying anticipations of situations in which tics occur more frequently, and subjects between conditions were matched on several demographic characteristics. After 10 weeks of treatment (one session per week), both groups showed significant reductions in tics. The HRT group reported a 77% reduction and the CBT group reported an 86% reduction in tics at a three month follow-up. The authors also conducted a 2-year follow up over the phone with 11 of the subjects to determine whether any gains had been maintained. Three of the subjects in the CBT group reported maintenance or improvement, one person in each group had partially relapsed, and three subjects in the HRT group relapsed to baseline levels and were no longer implementing their competing responses (O'Connor et al., 1997).

Using a multiple baseline across individuals with follow up procedure, Clarke, Bray, and Kehle (2001) examined the efficacy of a school-based intervention to reduce tic frequency in four children with TS. The authors combined HRT with a self-modeling intervention. The self-modeling intervention consisted of three 5-minute edited video

segments of the subjects performing non-tic behaviors. Reductions in tic frequency were assessed using both direct observation and scores on the Yale Global Tic Severity Scale (YGTSS; Leckman et al., 1989). Tic frequency reduced 50-71% as measured by direct observation after two weeks of treatment. YGTSS scores showed a reduction of 12-35 points for three of the four children. These overall gains from treatment were maintained by two of the children at both five and eight-week follow-up assessments.

In a randomized control trial of HRT versus Supportive Psychotherapy (SP), Wilhelm, Deckersbach, Coffey, Peterseon, and Baer (2003) also used the YGTSS to evaluate treatment outcome in 32 adults with TS. After 14 sessions, results indicated HRT was the more effective treatment. Compared to SP, HRT had lower YGTSS scores (M = 19.8 versus M = 26.88). This difference in tic severity, however, was no longer significant when subjects were assessed again at 10-month follow-up. In a similar randomized controlled trial of HRT versus SP, Deckersbach, Rauch, Buhlmann, and Wilhelm (2006) included an investigation into whether or not impairments in response inhibition impacted treatment response. Response inhibition was measured using the Visuospatial Priming Task (VSP), a computer task that used reaction time and attention demands to measure subjects' ability to inhibit behavior. Thirty adults with TS received 14 sessions of either HRT or SP. Results showed that HRT, but not SP, significantly reduced tic severity at post treatment. Pre-treatment response inhibition impairment in the HRT group significantly predicted treatment response. Gains in tic reduction were maintained by all subjects at 6-month follow-up.

Woods, Twohig, Flessner, and Roloff (2003) used a single subject multiple baseline study to determine whether HRT was effective in treating vocal tics. Five

children with TS participated in three sessions of HRT to focus on reducing vocal tics. All five children exhibited a reduction in vocal tics at post treatment (38-96%). At a three month follow-up, four of the five children had either maintained or improved upon the gains recorded at post treatment.

In the largest randomized controlled trial of HRT for CTDs to date, Piacentini et al. (2010) evaluated the efficacy of CBIT versus SP in 126 children diagnosed with either TS or CTD. Subjects were recruited from Johns Hopkins University (n = 41), the University of California, Los Angeles (n = 45), and the University of Wisconsin—Milwaukee (n = 40). Subjects completed eight sessions over ten weeks, followed by three monthly booster sessions and follow-up assessments at both three months and six months. Pre, post, and follow-up tic severity was assessed by scores on the Yale Global Tic Severity Scale (YGTSS)—a clinician assisted interview used to assess tic severity in the past week. Secondary outcome measures included parental ratings via the Parent Tic Questionnaire (PTQ; Chang, Himle, Tucker, Woods, & Piacentini, 2009), and independent evaluator ratings using the Children's Global Assessment Scale (CGAS; Shaffer et al., 1983).

YGTSS scores at the end of 10 weeks of treatment were significantly reduced in the CBIT group compared to the SP group (Piacentini et al., 2010). Reductions in severity were also found in scores on the PTQ and CGAS, and were significantly greater in the CBIT group. Of the positive responders to CBIT, 87% (9 children lost to follow-up) maintained treatment gains at six months post-treatment. Among positive responders to SP, 75% (4 children lost to follow-up) maintained treatment gains at six months post-treatment. Further analyses of the three and six-month follow-up data revealed that at six

months post treatment, a positive response to CBIT was associated with decreases in anxiety, disruptive behavior, family stress, and increased social functioning (Woods et al., 2011).

To date, behavioral treatment studies on tic disorders show favorable outcomes for HRT and CBIT. These studies also show treatment durability in the acute outcome, 3 month, 6 month, and even 10 month follow-up periods. Unfortunately, no treatment study to date has expanded follow-up periods greater than one year. Not only does this raise questions of long-term treatment durability, but it also fails to provide information about predictors of long term treatment outcomes. The proposed study seeks to build on the findings of this original CBIT trial by conducting a long-term follow-up of the subjects treated at one of the three clinics. Those treated at the University of Wisconsin-Milwaukee clinic will complete a follow-up assessment in order to determine the long-term effects of CBIT. Subjects will either be assessed in the original clinic at the University of Wisconsin-Milwaukee, or over the internet using telecommunications equipment. In addition to a general qualitative interview, subjects will answer questions related to current tic severity, life functioning, knowledge and application of treatment components, and feedback regarding acceptability of the original CBIT trial. In order to determine which predictors may be important to examine, what follows is a review of predictors examined in other studies of long-term treatment outcomes.

Predictors of Poor Long-Term Treatment Outcomes

With the exception of response inhibition (Deckersbach et al., 2006), no studies have examined predictors of long-term treatment outcomes for CTDs. However, predictors of long-term treatment outcome have been studied in childhood disorders often

comorbid with CTDs, including OCD (Barrett, Farrell, Dadds, & Boulter, 2005; Farrell, Waters, Milliner, & Ollendick, 2012) and other anxiety disorders (Barrett et al., 2001; Kendall, Safford, Flannery-Schroeder, & Webb, 2004).

Barrett and colleagues (2001) conducted a six-year follow-up to evaluate the long-term effectiveness of CBT for childhood anxiety disorders. A combination of diagnostic interviews, clinician ratings, and self and parent report were used to reassess the presence of anxiety disorders in 52 patients treated with CBT an average of six years prior. In order to compare current and past functioning, evaluators used normative comparisons on all measures. Results showed that gains were largely maintained across patients, and neither diagnosis at pretreatment nor comorbidity status affected long-term outcome (Barrett et al., 2001).

A similar study by Kendall et al. (2004) evaluated long-term outcomes of childhood anxiety disorder treatment an average of 7.4 years later. Eighty-six participants (ages 15-22 years) and their parents completed a similar battery of assessments used by Barrett et al. (2001). The authors used several pretreatment predictor variables to evaluate long term treatment maintenance including child and parent-reported anxiety levels, child's age, child's gender, parent's marital status, and number of diagnoses. They also included the number of negative and positive life events reported at long-term follow-up.

The only variables that significantly predicted child-reported levels of anxiety at long-term follow-up were the number of negative life events and receipt of additional treatment since the original treatment. For parent report of child anxiety, only externalizing symptoms on the CBCL and receipt of additional treatment were significant predictors at long-term follow-up (Kendall et al., 2004). Additionally, the presence of one

or more primary anxiety disorder diagnoses and receipt of additional treatment were both significant risk factors for a diagnosis of depression at long-term follow-up. Level of treatment success at post treatment, however, was not a significant predictor of later occurrence of depression.

In a study of CBT for child and adolescent OCD, Barrett et al. (2005) investigated whether OCD severity, self-reported depression and anxiety, and parent-report family functioning predicted long-term treatment outcome. Forty-eight participants ages (8-19) years were assessed at 12 and 18 months post treatment using standardized assessments, interviews, and child and parent-report measures of anxiety and depression. Four variables significantly predicted poorer long-term treatment outcome, including more severe obsessions, more severe compulsions, greater levels of family dysfunction reported by mothers, and as reported by fathers (Barrett et al., 2005).

Farrell et al. (2012) recently published a study on the effectiveness of CBT for children and adolescents presenting with both primary OCD and complex comorbid disorders such as depression, ADHD, and pervasive developmental disorder (PDD). The authors hypothesized that these comorbid disorders would be associated with greater treatment remission following a group-based CBT treatment protocol. Forty-three children and adolescents completed 13 sessions of CBT followed by two booster sessions at one and three months post treatment. Results showed no significant difference in treatment outcome between those diagnosed with one or more comorbid disorders and those without comorbid disorders. At six-month follow-up, however, the presence of comorbid ADHD was associated with significantly poorer remission rates (Farrell et al., 2012).

In addition to the presence of comorbid disorders, the passage of time may also contribute to long-term outcomes for individuals treated for tic disorders. Factors such as memory and forgetting as well as the extinction of learned treatment strategies could potentially decrease the likelihood of longstanding treatment gains. An overview of the general principles of learning and forgetting, the similar phenomenon of operant extinction, and specific learning deficits found in individuals with tic disorders follows.

Learning and Memory

Although various definitions exist for the concept of memory, the general consensus among experts is that memory consists of a sequence of operations set in motion during learning that continue until remembering is required, a storehouse for the residual of one's experiences with neuroanatomical locations, and an individual's internal representation of a specific learned episode (Spear & Riccio, 1994). Scientists use several methods to study memory, but the primary variable measured across studies is retention. Retention is the expression of previously acquired information at some point after an organism is removed from the presence of that information. Various factors can affect retention such as the rate of learning (fast vs. slow), familiarity with the material being retained, the distribution of practice trials with the material (spacing of trials), and the maturity of the organism (Spear & Ricco, 1994).

Studies use recall, recognition, and relearning as ways to assess retention. The extent to which subjects can recall previously learned stimuli, such as word lists, was first used by Ebbinghaus (1913) and continues to be a popular way to assess retention. In his original study of recall, Ebbinghaus memorized a list of nonsense syllables and then attempted to recall them at later dates. He found very rapid forgetting occurred in the first

24 hours, and continued as more time passed (Spear & Ricco, 1994). In addition to recall, recognition is also used to assess retention. In word recall tasks, subjects may not always recognize words being shown, but can still identify them more accurately compared to words not shown. In a 50-year study of the retention of names and faces of high school classmates, the ability to recall names of classmates decreased by over 60%, but the ability to recognize names and faces only decreased by 15% and 18%, respectively (Bahrick, Bahrick, & Wittlinger, 1975). Relearning of information is also a way to assess retention. Organisms tend to exhibit a faster rate of learning information the second time around when compared to initial exposure; an effect often seen in vocabulary tests and known as savings (Spear & Ricco, 1994).

Decrements in retention are known as forgetting. Forgetting may not always reflect a loss or weakening of learning, but a failure to retrieve a memory or behavior. This can occur because of age, practice, motivation, time between trials, and lack of reinforcement (Spear & Ricco, 1994). The most common variable attributed to poorer retention is time. Longer retention intervals, or intervals of relative inactivity during which no practice of learning can occur, are associated with more forgetting (Spear & Ricco, 1994). As discussed in the Ebbinghaus (1913) study, forgetting occurs rapidly at first and slows to a steady decline afterward. A study by Thompson (1982) demonstrated this principle by assessing college students' ability to recall unique daily events. The rate of forgetting was more rapid for the students in the first few weeks compared to two and three months later.

The effect of longer retention intervals is also found in animals. In studies of instrumental learning, rats spend more time completing T-maze discrimination tasks

under longer retention intervals than shorter retention intervals (Hill et al., 1969). In key-pecking discrimination tasks, pigeons also show more incorrect pecking responses for longer retention intervals compared to shorter intervals (Kraemer, 1984). In both studies the rate of errors was more rapid initially compared to later trials.

Regardless of time, a general assumption about memory retrieval and forgetting is that whatever is learned is permanent, as long as an individual remains neurophysiologically intact. Given this assumption, scientists recognize three general ideas that, although not fully developed, tend to characterize memory retrieval: (1) memory is most likely expressed in circumstances similar to those in which it was learned, (2) what is acquired while learning is multidimensional, or consists of specific stimuli and responses, target tasks, and internal and external contexts, and (3) memory is retrieved and manifested when a threshold is reached when the number, kind, or percentage of attributes of that memory are aroused by events sufficiently similar to that memory (Spear & Ricco, 1994). The overarching theme across these ideas is that context, or the setting in which learning occurs, is also important for retrieval.

Context can refer to any number of attributes associated with memory retrieval including the physical background or setting (external context), the internal state of the organism (internal context), and even the language used to describe various experiences while learning (linguistic context; Spear & Ricco, 1994). Regardless of type of context, the general idea behind context learning is that higher congruence between the learning and retrieval contexts typically yields more accurate memory retrieval. If the two contexts are less similar, then the memory retrieval is often less accurate (Spear & Ricco, 1994). Just as context sets the stage for learning, it also sets the stage for retrieval.

Individuals often use the expression of "bringing back a flood of memories" to describe their experiences in various contexts. Common examples of this effect may include revisiting a former school, an old friend, or another place from one's past.

Linguistic context, or the context in which words are used, can affect the ability to retrieve memories after various retention intervals. Several classic studies using story titles (e.g., Alba et al., 1981, Summers, Horton, & Diehl, 1985) indicate that the type and context in which words are presented can affect learning, retention, and retrieval of memories. For example, calling a story about hunting "The Most Dangerous Game" may help individuals recall the suspenseful components of the classic story about a human who hunts other humans. Readers may have a more difficult time remembering details of the story if a non-related title were used. Additionally, presenting words together in certain contexts can influence recall. If the word *jam* is first presented with the word *traffic* and later with the word *strawberry*, recall of *jam* will be stronger than if presented in the same semantic context both times (Light & Carter-Sobell, 1970).

Internal context, or the internal hormonal and emotional states including effects of substances on an organism, is also important in learning and retrieval. Overton (1964) was one of the first researchers to demonstrate this effect. He trained rats to accurately choose left or right to avoid shock in a T-maze discriminate task. Before training, some rats were injected with sodium pentobarbital, a short-acting barbiturate. The other rats were injected with a saline solution prior to training sessions. Results indicated rats made very little to no errors when tested in the same state (with the injection) as training for both conditions. When tested in a different state than training, however, the rats performed more randomly and made more errors (Overton, 1964). Similar effects of

internal context-dependent learning have been observed using a variety of blood-brain barrier crossing substances in studies on humans (e.g., Eich, 1980; Goodwin et al., 1969; Weingartner & Faillace, 1971). Other internal states shown to have an effect on internal context-dependent learning include state of arousal (Spear & Gordon, 1981) and hunger and thirst drive state (Capaldi, Viveiros, & Davidson, 1981).

Although linguistic and internal contexts can affect learning and memory retrieval, the context most relevant to the purposes of this study is the external context. The external environment in which learning occurs impacts the accuracy in which memories are recalled in both declarative (knowing the information) and procedural (demonstrating the behavior) tests. Godden and Baddeley (1975) conducted a series of experiments in which deep sea divers memorized a list of words either underwater or above water. They asked to recall words from the lists in either the same or opposite context in which the words were learned (under or above water). Results showed the divers who learned and then recalled the words in the same context performed better than those who recalled the words in a different context. This effect has been replicated using various physical contexts such as room type (Smith et al., 1978), environment novelty (Smith, 1979), and auditory context (Smith, 1985).

A concept related to external context, known as cuing, can alleviate forgetting and increase performances on memory tasks. Cuing involves presenting individuals with stimuli related to the conditions under which learning originally took place prior to testing. Deweer, Sara, and Hars (1980) cued rats by placing them in a holding cage next to a maze the rats had learned 25 days earlier. The rats placed in the holding cage performed significantly better than a control group of rats not placed in the holding cages

prior to running the maze. Those placed in the holding cage also performed at levels comparable to their performance when original training was terminated.

Similar effects of cuing are observed in humans. In his study of how room context between acquisition and testing affects retention of a list of words, Smith (1979) asked a group of subjects being tested in a room different from where the list was studied to picture the room where they had learned the list; the other group also received instructions but was also given several pictures of the previous room. A third, control, group was given instructions to picture an irrelevant room (e.g., home kitchen) prior to being tested. The two groups asked to imagine the acquisition room performed significantly better than the control group (Smith, 1979).

Taken as a whole, the studies on learning and memory would suggest that the passage of time since the original CBIT study ended should affect subjects' ability to recall aspects of the treatment. This effect of time should be partially mitigated in subjects who continue to use the skills learned during treatments or have received additional treatments. To account for the effects of time and continued treatments on current functioning, subjects in the proposed study will complete a treatment knowledge test. Subjects who more recently use treatment techniques should score higher on this test compared to subjects who have not recently used treatment techniques.

Extinction

Although forgetting is important to consider when organisms fail to retrieve a previously learned memory or behavior, such failures can also be attributable to a widely-studied behavioral concept known as extinction. Extinction can be either respondent (Pavlov, 1927) or operant (Skinner, 1938) in nature. For the purposes of this paper,

however, the following overview is limited to extinction within operant learning. Although several years old, the findings from the following classic studies on extinction are still relevant today (Pierce & Cheney, 2008).

Operant extinction is the cessation of a previously reinforced response following the omission of that reinforcement. For example, if a pigeon learns that pecking a key will result in the presentation of food, experimenters may then elect to withhold that food in order to extinguish the pecking. Within the behavioral literature exist several theories to account for why extinction occurs. Capaldi (1967), purported extinction to be the result of a difference in conditions compared to those present during acquisition of the previously-learned response. This theory is now known as Generalization Decrement Theory. Extinction occurs because a set of non-reinforced trials (N) gradually replaces memories of reinforced trials (R). Within this paradigm, the more conditions differ in the N trials compared to the R trials, the more rapidly the response will extinguish (Mackintosh, 1974). Within an extinction trial, the most dramatic change is the withholding of the reinforcer. The more this and other conditions differ from the acquisition trials, the less the organism is able to generalize and perform the previously-learned response. Examples of the effects of changing other conditions include the interval of time between trials (ITI; Capaldi & Minkoff, 1966; Sheffield, 1950; Teichner, 1952), the amount of time rats are detained in the goal box after running an alley (Hulse, 1958; Tombaugh, 1966), wavelengths of light projected on to pigeon response keys (Azrin & Holz, 1966), and subjects' innate drive level (Barry, 1958).

Another theory of extinction, interference theory, holds that extinction occurs because a new set of responses develop that compete with the originally reinforced

response (Mackintosh, 1974). An example of other behaviors within studies of pigeons might include birds preening their feathers or drinking water in between key pecks. For interference theory to hold, one must determine whether these other behaviors actually compete with the original response (key pecking) or merely appear for other reasons. A series of studies by McFarland (1969; McFarland & L'Angellier, 1967) explored this distinction by independently manipulating these other responses (e.g., limiting water prior to trials) to see if it affected extinction rates accordingly. Results of these studies showed that manipulation of these variables did not significantly change the frequency of pauses or the amount of time before the first pause.

Other responses documented in animal studies during extinction trials include behaviors such as biting, turning away, and even aggressively attacking the response key. First suggested by Zener (1937), these behaviors are sometimes considered to be emotional responses generated by frustration due to the omission of the expected reinforcer. This interpretation is now known as Amsel (1958; 1972) and Spence's (1960) frustration theory of extinction. Frustration theory may be a more sophisticated example of Interference Theory, because both hold to the stringent criterion that the other behaviors compete with the previously learned response. Under frustration theory, the omission of the expected reinforcer elicits a variety of other responses, all of which compete with and eventually replace the previous response. Unfortunately, findings for this theory are mixed, and no decisive trials could be found in the literature to prove that such new responses actually compete with the old response.

The third major class of theories, inhibition theory, holds that non-reinforcement in extinction trials is sufficient for organisms to learn that the expected reinforcer is no

longer contingent on a particular response (Mackintosh, 1974). This eventually leads to the suppression of the original response. One well-regarded theory under this model is Hull's (1943) theory of reactive inhibition. This theory purports two factors are accountable for a decline in responding during extinction trials, one transient and one permanent. A transient state of reciprocal inhibition is the temporary lower probability of making a response again immediately after making that particular response. This transient state can be characterized as fatigue, and measured in a lever-pressing study as the time between presses. Hull (1943) argued that during acquisition, the effects of the reinforcer sufficiently outweigh the effects of the transient state but during extinction, the reinforcer is withheld and unable to outweigh the effects of the transient state. Over several trials the transient state of inhibition eventually shifts into a permanent state of inhibition, signaling the extinction of the response. Due to a number of methodological problems in studies of reciprocal inhibition and several studies showing responses are not necessary for extinction to occur (e.g., Robinson & Capaldi, 1958; Seward & Levy, 1949), Hull's theory is not widely accepted.

The failure of predominant theories to fully account for the phenomenology of extinction led many researches to focus instead on variables affecting extinction (Mackintosh, 1974). Using variable schedules of reinforcement (reinforcer presented after a variable number of responses or after the first response given a variable amount of time), several studies found effects on extinction by manipulating conditions during response acquisition and response extinction trials. These variables include the number of N trials, patterning of trials, partial delay of reinforcement, and the size of the reinforcer.

When longer ITIs are used, the proportion of N trials becomes more important in predicting extinction than transitions. As the number of N trials increases during acquisition, so does resistance to extinction (Haggbloom & Williams, 1971; Mackintosh, 1974). Tyler, Wortz, and Bitterman (1953) found that resistance to extinction is also stronger if the N and R trials are randomly presented during acquisition instead of presented in some predictable, learnable pattern (e.g., N-R-N-R-N-R…). Partially delaying the reinforcer (Capaldi & Poynor, 1966) and using larger rewards to reinforce behavior (Hulse, 1958) will also increase resistance to extinction when using longer ITIs.

Although the above studies all used longer ITIs, the time between trials during acquisition never exceeded more than 30 minutes. Skinner (1950) used a much longer period of time to retest pigeons and found that the maximum amount of retention across four birds was 25-50% when tested several days after acquisition. Similarly, Gleitman and Steinman (1963) trained rats to run an alley for food. They retested the rats one day after acquisition, and then again 60 days after acquisition. Results showed the rats performed significantly worse at 60 days compared to one day. A study by Gleitman and Bernheim (1963) found similar results for rats using a lever press task when tested 24 days later.

As a whole, results from these tasks show findings similar to those seen in studies on learning and memory—performance tends to decline with longer ITIs, or longer periods of time between acquisition and testing. In addition to time, stimuli present during acquisition can also affect resistance to extinction. Estes (1955) found that when extinction trials occurred in stimulus situations different from those present during acquisition, the reinstatement of acquisition stimuli could promote partial recovery of a

previously extinguished response. This effect is similar to the findings on being asked to recall word lists in settings similar or different than the setting where word lists are first learned. Additionally, Logan (1961) found that rats trained in one apparatus using a specific discriminative stimulus (in this case, light brightness) had to completely relearn the task when the discriminative stimulus (the lights) was moved.

Overall, the literature on extinction is consistent with the literature on general learning and memory. No longer reinforcing a previously-reinforced response leads to a lower probability of that response occurring in the future, and this process can be hastened by manipulating the number of N trials, patterning of trials, partial delay of reinforcement, and the size of the reinforcer. Extrapolating these results to the current study, subjects should be less likely to use responses learned during treatment (in this case, the competing response taught during the habit reversal portion of treatment) if few N trials were used while acquiring the competing responses, if reinforcement of competing responses was continuous prior to extinction, reinforcement trials occurred relatively soon after one another (short ITI), the reinforcer was delivered relatively soon after the competing response was used, and the reinforcer (reward) was of low value. In the current study, subjects will answer a series of six questions that address these reinforcement variables as part of the general interview. Answers on each question will be summed into a composite numerical score, with higher overall scores indicating more resistance to extinction. It is hypothesized that those with more resistance to extinction of treatment skill will present with lower overall scores on measures of tic severity on the YGTSS.

Learning and Memory Deficits in Tourette Syndrome

In addition to the general concepts of learning, memory, and extinction, there may be some evidence that people with TS experience unique deficits in learning and memory. Unfortunately, findings from such studies of learning and memory within individuals with TS are mixed. Some authors suggest those with TS experience deficits on measures of visual memory performance (Sutherland et al., 1982; Watkins et al., 2005), while other authors fail to corroborate these findings in similar samples (Channon, Pratt, & Robertson, 2003). Similarly, Stebbins et al. (1995) reported procedural memory deficits in adults with TS. Marsh and colleagues (2005) however, found no difference between 50 children and adults with TS and 55 controls who completed a similar motor learning task.

As of the writing of this paper, the most widely-accepted deficit found in such individuals involves deficits in habit learning. Keri et al. (2002) examined 20 children's performance on a task related to probabilistic classification learning—the ability to correctly identify probabilistic relationships between variables and make informed decisions from those relationships. The authors used the weather prediction task to study this type of learning. The task requires participants to learn that different geometric shapes differentially predict different types of weather. Results of the study showed that the 20 children with TS performed significantly poorer than 20 healthy control children when assigning probabilities to the various shapes (Keri et al., 2002). Additionally, more severe motor tics predicted greater decrements in performance, and these results held even when controlling for comorbid diagnoses.

These results were corroborated by Marsh and colleagues (2004) in a study of habit learning, reaction time, and declarative memory in 56 children with TS recruited

through a tic disorders clinic. Compared to healthy controls (n = 65), children with TS performed significantly worse in a prediction task and a reaction time task. Similar to the findings of Keri et al. (2002), tic severity was significantly negatively correlated with performance on the prediction task. As severity increased, performance decreased. There was no significant difference between the two groups on the declarative memory task, and results held even when controlling for comorbid diagnoses.

In addition to deficits in habit learning, some researchers have questioned whether or not the effort needed to suppress tics is related to attention, and if individuals with TS have impairments in such systems. Shucard et al. (1997) studied attention in 22 boys with TS using a computer-administered continuous performance test. Such tasks are commonly used to test/diagnose children with ADHD, and yield scores related to hits (correct response), misses (errors of omission), false-alarms (errors of commission), and reaction time. There was no significant difference on ability to discriminate between targets and non-targets between the boys with TS and a group of 22 matched control subjects without TS. Those with TS, however, did display significantly longer reaction times, which was significantly negatively correlated with tic severity (Shucard et al., 1997).

There is some evidence that type of task may also be a factor in reaction time findings. Mueller et al. (2006) used a task-switching paradigm instead of a continuous performance test in order to measure cognitive control in individuals with TS. Subjects visually defined targets using their eyes in an oculomotor task in which they either looked towards (prosaccade response) targets or away from (antisaccade response) nontargets. Additionally, subjects had to repeatedly switch between these two modes of responding

after every two trials. Compared to 19 healthy control subjects, those diagnosed with TS (n=9) made significantly fewer errors on switch trials and displayed faster reaction times on switch trials. There was also no difference in the overall number of errors on tasks between the two groups (Mueller et al., 2006). These findings suggest that individuals with TS may have enhanced cognitive control on tasks involving motor responses.

As a whole, the literature on learning and memory phenomenology among individuals with TS suggests general deficits in habit learning, with mixed findings on attention and reaction time. Given these findings, there is not sufficient evidence to suggest that subjects treated using CBIT would display any long-term deficits in memory or learning specific to their diagnosis of TS. If deficits in learning and memory do exist within individuals with TS, however, such deficits could impair recall of treatment components when needed later in life.

Objectives of Current Study

The current study was a long-term treatment follow-up of CBIT. Data were collected on subjects' general course of TS since the study ended, knowledge of treatment, and current functioning. Based on research about the long-term course of TS and predictors of long-term gains from studies of similar disorders, four primary and two exploratory hypotheses were tested.

Primary Hypotheses

1. Given the data suggesting tics naturally improve, the first primary hypothesis was that subjects will either not differ or drop from post treatment to follow up. To test this hypothesis, post treatment and follow up tic severity scores were compared. To control for other variables that may have influenced tic severity over the years, additional

tic therapy and tic medication use since post treatment were controlled for in the analysis for primary hypothesis one

2. The second primary hypothesis was that five baseline variables identified as predictors of longitudinal severity in other studies (e.g., Barret et al., 2005, Farrell et al., 2012), will predict long term tic severity and life functioning at follow up. These variables should predict higher tic severity and poorer life functioning at follow up, even after controlling for the effects of tic treatments including assignment to the original treatment arms, participation in the original study, additional tic therapies since post treatment, and medication use since post treatment. The baseline predictor variables were total tic severity scores and the presence of coprolalia or lower limb tic, externalizing behaviors, comorbid disorders, and family functioning. The presence of at least one comorbid disorder, coprolalia or a lower limb tic, and higher scores on each of the other measures should predict higher tic severity and lower general functioning at follow up.

3. The third primary hypothesis is that among those who received CBIT (either initially assigned or crossed over after finishing PST), remembering more treatment skills would predict lower tic severity and better quality of life at follow up. Consistent with the learning and memory literature both declarative and procedural recall becomes more difficult with longer inter-trial intervals (Hill et al., 1969; Kraemer, 1984; Spear & Ricco, 1994; Thompson, 1982). This effect may be mitigated, however, in those who have continued using treatment skills or received additional treatments since the original RCT ended. This effect might also be mitigated by differences in initial tic severity and quality of life at post treatment. It was necessary, therefore, to control for the potential effects of tic severity at post treatment and use of additional tic therapy and tic medication since

post treatment. After accounting for those potential effects, shorter time periods since treatment and greater knowledge of treatment should predict lower tic severity and better overall functioning at follow-up.

4. The fourth primary hypothesis was that among those who received CBIT (either initially assigned or crossed over after finishing PST), stronger schedules of reinforcement for using treatment skills would predict lower tic severity and better quality of life at follow up, even when controlling for the effects of post treatment scores on tic severity and quality of life and additional tic therapy and tic medication use since post treatment. Consistent with literature on extinction; a history of reinforcement for using treatment skills, the use of high-value rewards (Hulse, 1958), spending more time practicing competing responses (Haggbloom & Williams, 1971), intermittent reinforcement (Tyler et al., 1953), and delay in delivery of reinforcement after using a competing response (Capaldi & Poyner, 1966) should all predict greater resistance to the extinction of treatment skills—specifically use of competing responses, the key element to the management of tic severity. As mentioned previously, because pre-existing differences in tic severity and quality of life at post treatment and additional treatments for tics such as therapy and medication since post treatment could influence tic severity and life functioning scores at follow up, these three variables were controlled for when evaluating primary hypothesis four.

Exploratory Hypotheses

In addition to the four primary hypotheses, two exploratory hypotheses were tested to evaluate potential effects of treatment assignment on follow-up outcome variables.

1. The first exploratory hypothesis was that tic severity scores at follow up would be significantly lower in the CBIT group compared to the PST group. These scores would be lower even when controlling for differences in tic severity at post treatment, and use of additional tic medication or therapy. The justification for this analysis was that differences in scores at follow-up could be due to the effects of treatment, and may not capture any additional changes that have occurred since the study ended. By controlling for initial treatment effects on tic severity scores, the present study could explore whether there are any long-term effects of treatment condition on tic severity. If tic severity scores are significantly different between groups conditional probabilities will be calculated for each group to determine the probability of remaining a responder at follow up given responder status at post.

2. The second exploratory hypothesis was that subjects assigned to CBIT would have significantly higher quality of life scores at follow up compared to those assigned to PST, even when controlling for post treatment quality of life scores, additional meds, and additional tic treatment. Consistent with the rationale detailed for exploratory hypothesis one, the purpose of this hypothesis was to explore whether there are any long-term effects of treatment condition on general functioning after accounting for differences at post treatment.

METHOD

Participants

Participants were recruited from the children and adults who participated in the original CBIT study at the University of Wisconsin-Milwaukee site. Participants from both treatment conditions (CBIT and PST) were invited to participate.

Procedure

Participants were contacted over the telephone using the original contact information from the CBIT study. After a brief introduction and overview, subjects (or their parents if under 18) were invited to participate in the follow-up study. If subjects no longer lived at home, parents contacted their children independently to confirm interest before providing relevant contact information for scheduling purposes. If they agreed to participate, a 1.5 hour interview was scheduled to take place either in person at the UW-Milwaukee psychology clinic or through over Skype©, an internet telecommunications program. For the five subjects who were under 18 years of age, a parent also actively participated in the consent, interview, and assessment process.

Upon arrival at the clinic, both the participant and parent/guardian (if applicable) reviewed the consent/assent forms. If they agree to participate, both parent and subject completed a series of self-report forms. These forms assessed various aspects of current functioning. Both adult and child versions of forms were used for the respective age of the subject. The clinician completed a general interview and an evaluator, blind to subjects' original treatment condition, administered the YGTSS. If the interview was completed over Skype then the consent forms and self-report measures were mailed in advance and completed at the beginning of the online interview.

Measures

The same assessment battery used in the original CBIT trial was used to assess current and past tic severity, the presence of any comorbid psychological disorders, and general psychosocial functioning. Age-appropriate measures of the same constructs were used for subjects who were 18 years and older (e.g., the Beck Depression Inventory

instead of the Child Depression Inventory). Normative comparison data for each measure were used to determine clinical elevations. This procedure is consistent with methods used in other long-term follow-up studies of children who may have aged into adulthood since post treatment (Barrett et al., 2001). The following interviews and self-report measures were administered by the principal investigator during individual assessments.

Clinician-Administered (Appendix A)

General Interview. The principal investigator conducted a general interview to obtain information related to current and past diagnoses including ADHD and OCD. The interview consisted of questions regarding treatment knowledge, feedback regarding helpful and unhelpful treatment components, any additional treatment for tics or other disorders since the study, and any physical adverse events occurring now or in the past. Subjects also recalled whether or not they received rewards for using treatment skills after treatment ended and if so, what types of rewards they typically receive(d).

Yale Global Tic Severity Scale (YGTSS). The primary outcome variable to assess current tic severity in the current study, the YGTSS (Leckman et al., 1987) is a clinician-rated scale used to assess tic severity in the past week. Motor and phonic tics are rated separately from 0 to 5 on several scales including number, frequency, intensity, complexity, and interference. Thus, Motor and Phonic Tic scores can range from 0 to 25; the combined Total Tic Score ranges from 0 to 50. There is also an Impairment score that rates the overall burden due to tics. The Impairment scale yields a single score from 0 to 50 with higher scores indicating higher levels of overall impairment associated with tics. The YGTSS has demonstrated excellent psychometric properties with solid internal

consistency, excellent inter-rater reliability, and excellent convergent and divergent validity (Leckman et al., 1989).

Clinical Global Impression (CGI). The CGI (Guy et al., 1976) is a clinician-rated scale that has been adapted and used in several studies with TS patients (e.g. Scahill et al., 2001). The rater assesses the global severity of tics based on a 7-point scale (ranging from normal, not ill to extremely ill), with higher numbers indicating greater severity. The blind evaluator assigned ratings of current severity (CGI-S), as well as improvement (CGI-I) from post treatment scores for all participants.

<u>All Participants – Self Report (Appendix B)</u>

Demographics Form. The same form from the original study, modified for adults when necessary, was used to collect background information on the participant including as age, gender, race/ethnicity, SES, marital status, occupational status, medical history, psychological history, treatment history, current medication status, and availability of social support. If under 18 years of age, parents or guardians completed the parent version of the form. Participants 18 years of age and older completed the adult version of this form.

Social Adjustment Scale – Self Report (SAS-SR). The SAS-SR (Weissman et al., 1978; Weissman et al., 1980) is a self-report measure assessing social adjustment across four major areas (spare-time, school behavior, peer relations, family behavior). Subjects rate 54 items on a five-point scale with higher scores reflecting more impairment in each domain. Gameroff, Wickramaratne, and Weissman (2012) developed a shortened, 24-item version (SAS-SR: Short) shown to have high correlations with full SAS-SR scores (r = .81-.95 across scales) and sensitive to longitudinal changes in clinical status. Separate

versions exist for both children/adolescent and adult populations. The SAS-SR Short has acceptable levels of reliability (Cronbach's alpha = .88), factorial validity, and high correlation with overall scores on the full SAS-SR (r = .93; Gameroff et al., 2012).

Premonitory Urge for Tics Scale (PUTS). The PUTS (Woods, Piacentini, Himle, & Chang, 2005) is a 9-item self-report scale designed to measure the severity of the premonitory urge in children with TS. Each of nine items is rated on a 1-4 point scale, for a total possible score of 36. An initial psychometric study in a sample of 42 children (age range: 8-16 years) with TS showed a mean urge severity of score of 18.5 (*SD*=6.1) and the scale demonstrated acceptable internal consistency (α =.81), temporal stability (e.g., 1 week stability = .79), and concurrent validity through significant correlations with the YGTSS total severity score (r=.31) and CYBOCS total score (r=.31). The PUTS was also validated for use in adult populations in a study by Crossley and colleagues (2012). The authors found acceptable levels of internal consistency (Cronbach's alpha = .85) and satisfactory convergent and discriminant validity using Spearman's correlations in a sample of 102 adults age 16 and older (M = 30, SD = 12.7).

Gilles de la Tourette Syndrome –Quality of Life Scale (GTS-QOL). The GTS-QOL (Cavanna et al., 2008) is a 27-item self-report measure used to measure quality of life in individuals with TS. Subjects answer questions on quality of life in the past month. Questions may be broad (e.g., "Had trouble with daily life activities or hobbies..?") or tic specific (e.g., "Had to repeat words over and over?") in design. In a study of 136 individuals with TS (ages 16 and older), the instrument demonstrated acceptable levels of internal consistency (Cronbach's alpha > .80 across subscales). Scores among the

various subscales were also positively correlated (range .50 - .70), and the authors also reported acceptable convergent and discriminate construct validity (Cavanna et al., 2008).

Family Assessment Measure-III, Short form (Brief FAM-III). The FAM-III (Skinner, Steinhauer, & Santa-Barbara, 1995) is a 14-item scale which is independently administered to each family member and provides a global index of family dysfunction. The Brief FAM-III was derived from the original FAM-III which possesses good psychometric performance in terms of both internal consistency (Cronbach's alpha = .93) and test-retest reliability (r = .45 for 138 children retested after 12 days).

CBIT Treatment Knowledge Test. The Treatment Knowledge Test is a 12-item multiple choice test designed for the purposes of the current study. Correct answers are summed to calculate the total score. Each of the items reflects knowledge obtained during CBIT, with higher summed scores representing greater levels of treatment knowledge.

Patient Satisfaction Questionnaire. The Patient Satisfaction Questionnaire is an 8-item self-report measure designed to assess subjects' satisfaction with the treatment received. Each question consists of four response choices, corresponding to numbers from one to four. Higher scores on the measure indicate higher levels of satisfaction with the treatment. Subjects also completed this questionnaire in the original RCT.

Holmes-Rahe Stress Scale for Students, Teenagers, and Young Adults. The Holmes and Rahe Stress Scale for Students, Teenagers, and Young Adults is a 39-item self-report measure designed to assess risk of illness in young populations based on the frequency of stressful events that occurred during the past year. The scale is adapted from the original Holmes and Rahe Stress scale (Holmes & Rahe, 1967) for use in young adult and teen populations. Each event is worth a set number of points and all events are added

for a cumulative total. Total scores below 150 indicate a slight risk of illness. Scores from 150-299 indicate moderate risk of illness. Scores 300 and above indicate a pronounced risk of illness. The scale was used within the proposed study to determine whether more negative life events positively correlate with higher tic frequencies.

Participants Under 18-Years Old – Parent Report (Appendix C)

Child Behavior Checklist (CBCL). The CBCL (Achenbach, 1991), a 118-item parent-report measure of child psychopathology, is one of the most extensively tested and normed rating scales available and possesses excellent psychometrics. T-scores allow for normative comparisons across three broadband factors (social competence, and internalizing and externalizing behavior problems) and eleven narrowband subscales (Achenbach, 1991). T-Scores from the externalizing scale were calculated and used for the purposes of the current study.

Participants Under 18 Years Old – Self Report (Appendix D)

Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS) Checklist. The CY-BOCS (Scahill et al., 1997) is a reliable and valid semi-structured clinical interview assessing OCD severity and change over time in youth ages 6-17. The interview contains separate sections for obsessions and compulsions and each section includes a checklist of symptoms as well as items to rate frequency/duration, interference, distress, resistance, and control related to OCD symptoms. Separate scores, ranging from 0 to 20, are obtained for obsessions and compulsions, with a combined total of 0 to 40. A score of 16 is often used to indicate clinically significant OCD. Based on its reliability, validity and sensitivity to treatment effects, the CY-BOCS has become the standard for assessing overall OCD severity. It was administered because of the common co-occurrence of OCD

with TS. Because research supports the psychometric validity of the CY-BOCS checklist when used in a self-report format (Conelea, Schmidt, Leonard, Riemann, & Cahill, 2012), participants completed the self-report versions of this measure.

Children's Depression Inventory (CDI). The CDI (Kovacs, 1992) is a 27-item (rated 0-2) child self-report questionnaire assessing depressive symptomatology over the preceding two weeks. Age and gender-based T-scores are generated for five factors: negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem. Reliability and concurrent validity have been found to be high and age- and gender-based norms are available (Kovacs, 1992). The CDI was completed by the participant at the screen, post treatment, and again at follow up in the present study.

Screen for Childhood Anxiety Related Emotional Disorders (SCARED). The SCARED is a 38-item self-report questionnaire shown to be an acceptable measure of child and adolescent anxiety disorders in children and adolescents (Birmaher et al., 1997). The SCARED consists of five anxiety dimension subscales including panic disorder symptoms, generalized anxiety disorder symptoms, separation anxiety disorder symptoms, social phobia symptoms, and school anxiety symptoms. The SCARED demonstrated good internal consistency (alpha = .74 to .93) across subscales, as well as acceptable levels of test-retest reliability (r = .70-.90), and discriminative validity (Birmaher et al., 1997).

<u>Participants 18 Years and Older – Self Report (Appendix E)</u>

Yale-Brown Obsessive-Compulsive Scale (Y-BOCS). The Y-BOCS (Goodman et al., 1989) is a clinician-rated, 10-item scale used to assess the presence and severity of OCD in subjects 18 and older. The original study on the development, use, and

psychometrics of the Y-BOCS was based on 42 patients with OCD and demonstrated acceptable levels of interrater reliability and internal consistency (Goodman et al., 1989). For the purpose of this study, the full interview was not conducted, but subjects instead completed the shortened, checklist version to indicate the presence or absence of OCD symptoms. As mentioned above, research supports the psychometric validity of using the measure in self-report format (Conelea et al., 2012).

Adult Self Report (ASR). The ASR is a 126-item self-report questionnaire used to assess current functioning in adults ages 18-59 (Achenbach & Rescorla, 2003). Data are scored on various subscales including the syndrome scales, DSM-oriented scales, and critical items scales. National samples, factor-analytic methodology, diagnostic categories, and a panel of expert clinicians all contributed to the development of these subscales. Test-retest reliability varies across each scale, but results from a national study indicate ranges between .80 and .90 over an average of seven days. Internal consistency scores also varied by item subscale with alphas ranging between .60-.78 (Achenbach & Rescorla, 2003). T-scores on the externalizing scale were calculated for use in the current study.

Beck Depression Inventory- Second Edition (BDI-II). The BDI is a 21-item self-report instrument used to assess the presence and severity of symptoms of major depression. Each of the items corresponds to a symptom of depression and are summed to give a total score. Items are rated on a scale of 0-3 and cut scores are provided to determine severity of symptoms—ranging from mild to severe (Beck & Steer, 1984, Beck, Steer, & Margery, 1988). Studies on the psychometric properties of the BDI show high levels of internal consistency (alpha = .80) and test-retest reliability (r = .93) when

tested one week apart (Beck & Steer, 1984). Studies have also established acceptable convergent, discriminant, and factorial validity of the BDI (Beck & Steer, 1984).

Beck Anxiety Inventory (BAI). The BAI is a 21-item self-report instrument used to assess the presence and severity of anxiety symptoms (Beck, Epstein, Brown, & Steer 1988). Similar to the BDI, each item is rated on a 4-point scale ranging from 0-3 and items are summed to yield a total score. Total scores fall into range of severity from mild to severe based on normative data. Recent studies on the psychometrics of the BAI show acceptable levels of internal consistency (.90), convergent validity with other measures of anxiety (r = .35 - .69, and discriminant validity with measures of depression (r = .24 - .54; Osman, Kopper, Barrios, Osman, & Wade, 1997).

Data Analysis

Below is a data analytic strategy for all four primary hypotheses and both exploratory hypotheses (Table 1). All power analyses were conducted using G*Power according to guidelines set forth by Mayr, Erdfelder, Buchner, and Faul (2007). In addition to the primary and exploratory hypotheses, general descriptive statistics were computed and reported for the sample at follow up (n = 15) and for those subjects (n = 25) who did not participate in the current study. Baseline data from these groups were compared to evaluate group selection biases in the current study. Complete details of each exploratory hypothesis, independent and dependent variables, covariates, and statistical analysis see Tables 1and 2.

Primary hypotheses. The first primary hypothesis was that subjects' tic severity will not differ or will drop from post treatment to follow up. A repeated-measures Analysis of Covariance (ANCOVA) was conducted comparing YGTSS total tic scores at

post treatment and scores at follow up, while controlling for the effects of additional tic therapies and tic medications. Time (post treatment vs follow up) was the independent variable. Additional tic therapy and medications were entered as covariates.

A potential problem with this data analysis strategy is affirming the null hypothesis (no change over time). In similar cases, several authors (Rogers, Howard, & Vessey; 1993; Seaman & Serlin; 1998) suggest using tests of equivalence instead of traditional t-tests. Based on recommendations by Cribbie, Gruman, and Arpin-Cribbie (2004), however, tests of equivalence were inappropriate given the smaller group sample size ($n < 50$) and potential for inflated variance. Additionally, to account for the potential effects of other interventions (current medication status and utilization of additional treatment for tics) on current tic severity and functioning, a repeated-measures ANCOVA was a more appropriate test for the continuous outcome variable of YGTSS score.

The second primary hypothesis was that the five baseline predictor variables identified in the literature on the longitudinal course of disorders would predict tic severity and life functioning at follow up. The two dependent variables of tic severity and life functioning were YGTSS and SAS-SR total scores at follow up, respectively. Higher scores on these measures indicate greater levels of severity (YGTSS) and impairment (SAS-SR). The five predictor variables taken from baseline were YGTSS total score, presence of coprolalia or lower limb tics., total scores on the Brief Fam-III, total externalizing score on the CBCL, and comorbidity status (comorbidity is present vs. absent). The presence of at least one comorbid disorder, the presence of coprolalia or a lower limb tic, and higher scores on each of the other measures should predict higher total YGTSS scores and higher SAS-SR scores at follow up. These five variables were

simultaneously entered into the second block of a hierarchical regression analysis order to evaluate the role of each in predicting total tic severity and general functioning at follow up. To control for any variance in the developmental course of TS due to treatment effects, treatment assignment from the original study, current tic medication use, and receiving additional tic therapy were entered into the first block of the model.

The third primary hypothesis was that among the 12 subjects who received CBIT (assigned or crossed over after finishing PST), forgetting treatment skills would predict higher tic severity and lower quality of life at follow up, even when controlling for the effects of additional tic therapy or medication. Ability to recall treatment skills was assessed using subjects' total scores on the treatment knowledge test at follow-up. Because 3 of the 15 participants (10 were assigned to CBIT, 2 of the 5 assigned to PST crossed over after finishing PST) in the current study were never exposed to the CBIT treatment components assessed by the test, they were excluded from the analysis. Given that both declarative and procedural recall becomes more difficult with longer inter-trial intervals (Hill et al., 1969; Kraemer, 1984; Spear & Ricco, 1994; Thompson, 1982), the latency between baseline and follow up was calculated to evaluate the general effect of time on recall. Both treatment knowledge score and time since baseline were entered into the second block of a hierarchical regression analysis. Post treatment YGTSS scores, additional tic therapy, and tic medication status since post treatment were entered into the first block to control for tic severity at post treatment and effects of additional tic treatment since post treatment. Follow-up YGTSS and SAS-SR total scores were entered as the dependent variables for each respective analysis.

The fourth hypothesis was that among those who received CBIT (assigned or crossed over), stronger schedules of reinforcement for treatment engagement should predict lower tic severity and better quality of life at follow up, even when controlling for the effects of additional tic therapy or medication. To test this hypothesis, two hierarchical regression analyses were conducted. In the first regression analysis, the dependent variable of tic severity was YGTSS total score at follow up. In the second regression analysis, the dependent variable was SAS-SR total score at follow up. Each of the items from the resistance to extinction portion of the interview was entered simultaneously into the second block of each hierarchical regression analysis to determine its relative contribution in predicting follow-up tic severity and quality of life. To control for the effects of initial quality of life and other treatments on tic severity and life functioning, post treatment SAS-SR scores, tic medication statusc and additional tic therapy were entered into the first block of each analysis. Higher scores on the extinction questions should predict lower YGTSS total scores and lower scores (better functioning) on the SAS-SR at follow up. Because 3 of the 15 participants in the current study were never exposed to the CBIT treatment components addressed in the extinction questions, they were excluded from the analysis.

Exploratory hypotheses. The first exploratory hypothesis was that tic severity scores (YGTSS total score) at follow up would be significantly lower in the CBIT group compared to the PST group. The purpose of this analysis was to determine whether those assigned to CBIT (n = 10) present with significantly lower YGTSS total scores than those assigned to PST (n = 5) at follow up, after accounting for differences at post treatment and any additional treatments received. To control for differences in post

treatment YGTSS scores and the use of additional tic therapy or medication since post treatment, these three variables were entered as covariates into a One-way Analysis of Covariance (ANCOVA). YGTSS total score at follow up was entered as the dependent variable (within subjects factor) and treatment assignment was entered as the independent variable (between subjects factor).

If the exploratory hypothesis is supported, and there is a significant difference between the two groups at follow up, individual CGI-I scores will be used to classify subjects as responders (CGI-I < 3) and non-responders (CGI-I > 2). The conditional probability of being considered a responder (CGI <) at both post treatment and follow up will be calculated by dividing the number of subjects who continue to meet responder status at follow up by the number of subjects meeting criteria for responder status at post treatment. This calculation will represent subjects' probability of maintaining treatment gains from post to follow up and will be reported for both treatment groups.

The second exploratory hypothesis was that overall life functioning (SAS-SR total score) at follow up would be significantly better in the CBIT group compared to the PST group. The purpose of this analysis was the same as exploratory hypothesis one; to determine whether those assigned to CBIT (n = 10) present with significantly lower (lower scores = higher quality of life) SAS-SR scores than those assigned to PST (n = 5) at follow up. To control for differences in post treatment SAS-SR scores and the effects of additional tic therapy or medication use since post treatment, these three variables were entered as covariates into a One-way Analysis of Covariance (ANCOVA). Follow-up SAS-SR score was entered as the dependent variable (within subjects) and treatment assignment was the independent (between subjects) variable

RESULTS

Participant Characteristics

Forty participants participated at the University of Wisconsin-Milwaukee site in the original CBIT trial. Of these subjects, 9 could no longer be reached due to disconnected numbers or ambiguous answering machines, 9 failed to return phone calls after multiple attempts to contact, 2 declined participation in the study, and 20 agreed to participate (Figure 1). Of those who agreed to participate, 5 did not show for the appointment and did not return phone calls. Of the 15 who completed the study, one subject completed the interview over Skype©, and the remaining 14 completed the interview in the clinic. A total of 10 participants from the CBIT condition and 5 from the PST condition participated in the current study. Ages ranged from 17-25 (M = 18.67, SD = 2.35) across participants. All ten adult subjects completed the interview without a parent present. All five adolescent subjects completed the interview with one parent present. For female and one male parent participated with their children in the present study. The average amount of time since baseline was 8.13 years (SD = .74), but ranged from 7-9 years. A total of 11 males and 4 females participated in the study. One participant reported Asian/Pacific Islander ethnic background, and the other fourteen indicated Caucasian/White descent (n = 14). For a complete breakdown of demographics, see Table 4.

Diagnoses and Treatments

At baseline, 14 subjects met diagnostic criteria for Tourette Syndrome and one met for Chronic Motor Tic Disorder. At follow up, 6 people met for a diagnosis of Tourette Syndrome, 7 met for Chronic Motor Tic Disorder, and 2 did not meet for any tic

disorder based on tic presentation in the week prior to participating. At follow up, ten subjects indicated being diagnosed with at least one current comorbid psychological disorder; including OCD (n=4), ADHD (n=6), Substance Use Disorder (n = 3), Generalized Anxiety Disorder (n = 2), Major Depressive Disorder (n = 3), and Oppositional Defiant Disorder (n = 1). One subject was currently taking medication for tics at follow up (Risperidone), and four others indicated taking psychotropic medication for other problems.

Of the 15 subjects who participated in the current study, nine were classified as post treatment responders (1 or 2 on the CGI-I). Seven of the post treatment responders were assigned to CBIT and two were assigned to PST. At follow up, nine of the fifteen subjects were again considered responders, but all nine were originally assigned to CBIT. Overall, 7 of the 15 (46.67%) subjects' YGTSS total scores were below the original study entrance cutoff (i.e., YGTSS total score > 10) at post. Eight of the 15 (53.33%) YGTSS total scores were below the cutoff at follow up.

One of the subjects originally assigned to CBIT reported seeking out additional treatment (Habit Reversal Therapy) for tics approximately one year prior to the current study. None of the participants assigned to PST reported seeking out additional tic treatment, but two subjects crossed over to receive CBIT after finishing PST in the original trial. Six participants from CBIT and two participants from PST indicated seeking out treatment for other psychological or behavioral problems. Subjects reported seeking treatment for addictions, anxiety, major depressive disorder, and oppositional defiant disorder. For an individual breakdown of age, diagnoses, and scores on outcome measures, see Table 3.

At follow up, overall means and standard deviations were calculated for all self-report measures (see Table 6. These scores are also broken down by treatment assignment. Baseline comparisons were also calculated for measures related to psychological and behavioral traits (including those mentioned below). Scores on all baseline measures of other psychological problems were compared between the sample in the current study and the group who did not participate. There were no significant differences between those who participated (n = 15) and those who did not participate (n = 25) in the current study on any of the psychological or behavioral measures administered at baseline in the original study.

Clinician-Administered Measures

On average, subjects indicated their tics were worst at age 11.40 (SD = 2.39), and best at 17.73 (SD = 2.01). Average number of new tics since the study ended was 1.40 (SD = 1.68), with an overall range of 0-5. Overall, self-reported tic severity decreased with time. The average tic severity (rated on a 0 to 10 point scale) across time periods were 5.78 (SD = 1.88) for middle school, 4.35 (SD = 1.78) for beginning high school, 3.33 (SD = 1.79) during high school, 3.2 (SD = 1.98) for graduating high school and transitioning into college or work, and 2.75 (SD = 1.98) for adulthood.

After summing responses from the resistance to extinction items in the general interview, total scores (out of a possible 21) ranged from 0-4 (M = 1.13, SD = 1.35). Overall, the scale demonstrated very poor reliability (Alpha = .21). Participants provided zero responses (“no” or “not applicable”) for all but items one, four, and six. One subject indicated using the rewards program for up to 6 months after treatment ended (question 1), and eight subjects indicated receiving praise at least weekly for using their competing

responses (question 4). For question six, one subject indicated practicing competing responses for 30-90 minutes per week, one subject indicated practicing for 90-120 minutes, and a third subject indicated practicing for over 120 minutes each week.

Responses from the treatment durability questions were summed into total scores. The scores ranged from 0-34 (M = 17.40, SD = 9.40) out of a possible 44. Overall, the treatment durability scale demonstrated moderately acceptable internal consistency (alpha = .71) in the present study. On average, subjects reported using competing responses for up to 5 years, two subjects reported developing new competing responses, and subjects were most often prompted to use competing responses on a monthly basis. Only one subject continued to monitor tics after treatment. One subject continued using functional interventions for up to five years, and 7 subjects reported using functional interventions for tics in the past week. Several participants indicated receiving help from at least one support person since treatment ended. Of these subjects, one received help for up to six months, another for up to one year, five for up to five years, and five subjects indicated receiving help from a support person in the past week. The number of treatment components used in the past week ranged from 0-4 (M = 1.73, SD = 1.16). Ten participants indicated positive or neutral reactions from others when learning to manage tics. Eleven and seven subjects reported receiving positive or neutral reactions to changes in tics at post treatment, and using competing responses, respectively.

Total scores from the vocal (M = 3.80, SD = 4.91) and motor (M = 9.06, SD = 5.47) scales of the YGTSS summed for an overall average of 12.86 (SD = 9.59, range 0-30). Total averages were 8.40 (SD = 8.57) for the CBIT group and 21.80 (SD = 2.68) for the PST group. Average CGI severity scores were 2.80 (SD = 1.20) overall, 2.4 (SD =

1.26) for the CBIT group and 3.6 (SD = .54) for the PST group. For a complete breakdown of tic severity, treatments, and comorbidity, see Table 5.

In order to assess for group selection biases, outcome measure comparisons were calculated between those who participated in the current study and those who did not. There was no significant difference between the group who agreed to participate (n=15) and those who either declined participation or could not be contacted (n = 25) on outcome measures including post treatment YGTSS Total Severity Scores, $t(34) = 2.18$, $p > .05$, and post treatment CGI-I scores, $t(30.40) = 1.65$, $p > .05$.

Self-Report Measures – All Participants

Scores on the SAS-SR ranged from 1.25-3.05 (M = 1.88, SD = .58), and indicate no concerns across social domains in the current sample. The mean scores for the PUTS was 22.60 (SD = 6.36, range = 12-36) overall, which is comparable to the sample used to validate the measure in the original study (M = 18.5, SD = 6.1; Woods, Piacentini, & Himle, 2005). Subjects reported less interference (M = 14.60, SD = 9.14) and higher overall life satisfaction scores (M = 74.33, SD = 17.30) than those reported in the original sample used to validate the GTS-QOL (Cavanna et al., 2008).

T-scores on the Brief Fam-III ranged from 38-66 but on average (M = 49.86, SD = 9.08), were well below clinical levels of problematic family relationships (T-score < 65). Scores on the treatment knowledge test ranged from 5-10 (M = 8, SD = 1.46), and were higher but not statistically different in the CBIT group (M = 8.50, SD = 1.35) compared to the PST group (M =7.00 , SD = 1.22). Scores on the patient satisfaction questionnaire ranged from 23-32 but were generally on the higher end (M = 28.40, SD = 2.89), and similar to the scores obtained at post treatment. Subjects indicated the number

of negative events occurring since participation in the original study (M = 6.73, SD = 6.38) and in the year prior to the current assessment (M = 2.8, SD = 2.73) on the Holmes Rahe.

Self-Report Measures – Parent and Child/Adolescent Forms

Subjects' data from the CBCL were used to calculate externalizing scale T-scores. Externalizing behavior T-Scores ranged from 34-61 (M =47, SD = 12.56), and none were in the clinical range. Mean T-scores were 53.66 (SD = 11.84) for the CBIT and 37 (SD = 4.24) for the PST group. Of the subjects who completed the child and adolescent forms, only one indicated a diagnosis of OCD. That subject's total CYBOCS score was an 11. Subject's CDI scores ranged from 4-23 (M = 11.20, SD = 7.88) with one score in the clinical range (T > 65). The average score across groups for the SCARED was 15.60 (SD = 4.21) with a range of 13-23. No scores were in the clinical range. For a comprehensive summary of all self-report measures, including breakdown by treatment condition, see Table 6.

Self-Report Measures – Adult Report

Of the adults who completed the study, only three indicated a diagnosis of OCD. The overall mean for the three scores was 10.66 (SD = 10.26). Subjects' data from the ASR were used to calculate externalizing T-scores. Externalizing behavior T-scores ranged from 30-70 (M = 51.4, SD = 11.76), with one score in the clinical range (T > 65). Scores on the BDI ranged from 0-21 (M = 6.20, SD = 6.72), with one score in the clinical range (x > 20). Scores on the BAI ranged from 1-19 (M = 6.40, SD = 5.27), with one score in the clinical range (x >15).

Primary Hypotheses

Primary Hypothesis One: Subjects will maintain treatment gains between post treatment and follow up. A repeated measures ANCOVA was conducted to examine the effect of time on YGTSS total scores (Table 7). The repeated measures variable was the YGTSS total score at time of assessment (post treatment vs. follow up). The dependent variable was YGTSS total score. The number of additional tic treatments and tic medication status were used as the covariates. Assumptions of homogeneity and sphericity were both met. After controlling for the effects of additional tic treatment and tic medication, there was no significant effect of time on YGTSS total scores, Wilks' Lambda = .99, $F(1, 13) = .13$, $p > .05$, *partial* $\eta^2 = .01$, between post treatment ($M = 13.33$, $SD = 6.62$) and follow-up ($M = 12.86$, $SD = 9.59$) YGTSS total scores.

Primary Hypothesis Two: Five baseline predictors cited in previous literature will predict tic severity and quality of life at follow up. Hierarchical multiple regression was used to assess the ability of five baseline variables (YGTSS total score, presence of coprolalia or lower limb tics, total scores on the Brief Fam-III, total externalizing score on the CBCL, and comorbidity status) to predict levels of tic severity (YGTSS total score at follow up), after controlling for the influence of treatment in the original study, additional tic therapies, and tic medication status. Preliminary analyses were conducted to ensure no violations of the assumptions of the test. Treatment assignment in the original study, additional tic treatment, and tic medication were entered into block 1, explaining 86.6% of the variance in follow-up YGTSS scores. After entering the five predictor variables in block 2, the total variance explained by the model as a whole was 93.5%, $F(7, 7) = 15.03$, $p < .05$. The five predictors did not significantly explain any of the

variance in YGTSS follow-up scores, F change (5, 7) = 1.6, p > .05, after controlling for treatment assignment, additional tic treatment, and tic medication (Table 8).

A second hierarchical multiple regression was used to assess the ability of five baseline variables (YGTSS total score, presence of coprolalia or lower limb tics, total scores on the Brief Fam-III, total externalizing score on the CBCL, and comorbidity status) to predict levels of quality of life (SAS-SR total score at follow up), after controlling for the influence of treatment in the original study, additional tic therapies, and tic medication status. Preliminary analyses were conducted to ensure no violations of the assumptions of the test. Treatment assignment in the original study, additional tic treatment, and tic medication were entered into block 1, but did not significantly explain any of the variance in follow-up SAS-SR scores. After entering the five predictor variables in block 2, the model did not significantly explain any variance in follow-up SAS-SR scores, F (7, 7) = 1.63, p > .05. The five predictors did not significantly explain any of the variance in SAS-SR follow-up scores, F change (5, 7) = 1.17, p > .05, after controlling for treatment assignment, additional tic treatment, and tic medication (Table 8). Taken together, the findings from these two regression analyses indicate there is not enough evidence to support primary hypothesis 2. Baseline YGTSS total score, presence of coprolalia or lower limb tics, total scores on the Brief Fam-III, total externalizing score on the CBCL, and comorbidity status were not significant predictors of follow-up YGTSS or SAS-SR total scores when controlling for treatment effects.

Primary Hypothesis Three: Among those subjects who received CBIT, forgetting treatment skills will predict higher tic severity and lower quality of life at follow up. Hierarchical multiple regression was used to assess the ability of treatment knowledge

test scores at follow up and latency between baseline and follow up to predict levels of tic severity (YGTSS total score at follow up), after controlling for the influence of post treatment severity scores, additional tic therapies, and tic medication status. Preliminary analyses were conducted to ensure no violations of the assumptions of the test. YGTSS post treatment score and additional tic treatment and tic medication since post treatment were entered into block 1, explaining 75.1% of the variance in follow-up YGTSS scores. After entering the two predictor variables in block 2, the total variance explained by the model as a whole was not significant, $F(3, 8) = 1.86$, $p > .05$. The two predictors did not significantly explain any of the variance in YGTSS follow-up scores, F change $(2, 8) = .11$, $p > .05$, after controlling for YGTSS post treatment scores, and additional tic treatment and tic medication since post (Table 9).

A second hierarchical multiple regression was used to assess the ability of treatment knowledge test scores at follow up and latency between baseline and follow up to predict levels of quality of life (SAS-SR total score at follow up), after controlling for the influence of additional tic therapies and tic medication status. Preliminary analyses were conducted to ensure no violations of the assumptions of the test. Additional tic treatment and tic medication were entered into block 1, but did not significantly explain any of the variance in follow-up SAS-SR scores. After entering the two predictor variables in block 2, the model did not significantly explain any variance in follow-up SAS-SR scores, $F(3, 8) = 1.54$, $p > .05$. The two predictors did not significantly explain any of the variance in SAS-SR follow-up scores, F change $(2, 8) = .43$, $p > .05$, after controlling for additional tic treatment, and tic medication (Table 9). Taken together, the results of these two hierarchical regressions suggest there is not enough evidence to

support primary hypothesis 3. Lower scores on the treatment knowledge test at follow up and greater latency between baseline and follow up did not significantly predict higher YGTSS and lower SAS-SR total scores at follow up after controlling for post treatment SAS-SR scores, and additional tic treatments and tic medications since post.

Primary Hypothesis Four: Among those who received CBIT, stronger schedules of reinforcement for treatment engagement will predict lower tic severity and better quality of life at follow up. Hierarchical multiple regression was used to assess the ability of scores from the six resistance to extinction questions at follow up to predict levels of tic severity (YGTSS total score at follow up), after controlling for the influence of post treatment YGTSS scores and additional tic therapies and tic medication status after post treatment. Preliminary analyses were conducted to ensure no violations of the assumptions of the test. Post treatment YGTSS score, additional tic treatment, and tic medication were entered into block 1, explaining 75.1% of the variance in follow-up YGTSS scores. After entering the six predictor variables in block 2, the total variance explained by the model as a whole was not significant, $F(4, 7) = 1.36$, $p > .05$. The six predictors did not significantly explain any of the variance in YGTSS follow-up scores, F change $(3, 7) = .18$, $p > .05$, after controlling for additional tic treatment and tic medication (Table 10).

A second hierarchical multiple regression was used to assess the ability of scores from the six resistance to extinction questions at follow up to predict levels of quality of life (SAS-SR total score at follow up), after controlling for the influence of post treatment SAS-SR scores and additional tic therapies and tic medication status after post treatment. Preliminary analyses were conducted to ensure no violations of the assumptions of the

test. SAS-SR post treatment scores, additional tic treatment, and tic medication were entered into block 1, but did not significantly explain any of the variance in follow-up SAS-SR scores. After entering the six predictor variables in block 2, the model did not significantly explain any variance in follow-up SAS-SR scores, $F(4, 7) = 2.48$, $p > .05$. The six predictors did not significantly explain any of the variance in SAS-SR follow-up scores, F change $(3, 7) = 1.61$, $p > .05$, after controlling for additional tic treatment, and tic medication (Table 10). Taken together, the results of these two hierarchical regressions suggest there is not enough evidence to support primary hypothesis 4. Lower scores on the resistance to extinction questions at follow up did not significantly predict higher YGTSS and lower SAS-SR total scores at follow up after controlling for additional tic treatments and tic medications.

Exploratory Hypotheses

Exploratory Hypothesis One: Tic severity scores at follow up will be significantly lower in the CBIT group compared to the PST group. A one-way between groups analysis of covariance (ANCOVA) was conducted to compare the effect of treatment assignment on follow-up YGTSS scores. The between subjects variable was the treatment (CBIT vs. PST), and the dependent variable was the follow-up YGTSS total scores. Subjects' YGTSS total scores at post treatment, additional tic therapies, and tic medication status were used as the covariates in this analysis.

Preliminary checks were conducted to make sure there were no violations of normality, homogeneity of variances, and linearity. After adjusting for post treatment YGTSS scores, additional tic therapies, and tic medication status, there was a significant difference between the two treatment groups on follow-up YGTSS scores, $F(1, 11) =$

14.82, $p < .001$, *partial* $\eta^2 = .80$. Those in the CBIT group (M = 8.4, SD = 8.57) had significantly lower YGTSS total scores at follow up compared to those in the PST group (M = 21.8, SD = 2.68) after controlling for the effects of total YGTSS scores at post treatment, additional tic therapies, and tic medication status (Table 11). These results support exploratory hypothesis one, that tic severity would be lower in the CBIT group compared to the PST group at follow up. The conditional probability of remaining treatment responder (CGI-I < 3) was calculated by dividing the number of subjects who remained responders at follow up by the number of subjects considered responders at post treatment. If a subject was a responder to treatment at post, the probability of that subject being a responder to treatment at follow up was .77. If a subject from CBIT was a responder at post (n = 7), the probability of that CBIT subject being a responder at follow up was 1.00. If a PST subject was a responder at post (n = 2), the probability of that PST subject being a responder at follow up was 0.00.

Exploratory Hypothesis Two: Overall life functioning scores at follow up will be significantly better (lower) in the CBIT group compared to the PST group. A one-way between groups analysis of covariance (ANCOVA) was conducted to compare the effect of treatment assignment on follow-up SAS-SR scores. The independent variable was the treatment (CBIT vs. PST), and the dependent variable consisted of SAS-SR total scores at follow up. Subjects' SAS-SR total scores at post treatment, additional tic therapies, and tic medication status were used as the covariates in this analysis.

Preliminary checks were conducted to make sure there were no violations of normality, homogeneity of variances, and linearity. After adjusting for post treatment SAS-SR scores, additional tic therapies, and tic medication status, there was no

significant difference between the two treatment groups on follow-up SAS-SR scores, $F(1, 11) = .02$, $p > .05$, *partial* $\eta^2 = .001$. There was not enough evidence to support exploratory hypothesis two. Subjects in the CBIT group (M = 1.91, SD = .72) did not score significantly lower on the SAS-SR than subjects in the PST group (M = 1.83, SD = .13) at follow up after controlling for the effects of total YGTSS scores at post treatment, additional tic therapies, and tic medication status (Table 12).

General Interview Responses

To understand how tic severity, tic-triggers, and tic management strategies change over time, interview responses were summed and reported in Table 13 along with Figures 2-4. Tics were rated as most severe in middle school (M = 5.78, SD = 1.88) and around the age of onset of puberty (M = 11.4, SD = 2.38). Common tic antecedents during this period included being stressed or overwhelmed (e.g., over school workload), feeling tired or run down, performance evaluations (e.g., giving a speech or presentation, taking tests), frustration or anger, social situations (e.g., meeting new people, around groups of others), boredom (e.g., in class, watching television), anticipating or waiting for something to happen (e.g., around the holidays, near the end of the school day, before competing in a sporting event), being at home, stimulant use (caffeine or medication), worrying about the future, any worsening in comorbid disorder symptoms, and transitions such as school beginning or ending. Common tic consequences during middle school included being prompted by a support person (e.g., a parent or a teacher), comments from others (e.g., asked to stop, told to pay attention, teased by peers), and physical pain or soreness from ticcing. Common tic management strategies reported for this period were implementing functional interventions, using competing responses, diaphragmatic

breathing, progressive muscle relaxation, engaging in physical activities, and deliberate attempts to suppress or distract oneself (e.g., go for a walk).

Tics became less severe when subjects transitioned into high school (M = 4.35, SD = 1.78). In addition those identified during middle school, common tic antecedents when beginning high school included dating or being around members of the opposite sex, being around new students, going to school functions (e.g., dances, sporting events, activity nights), and being at home. There was also an increase in reported tic antecedents of performance evaluations, general stress, and being in social situations. New tic consequences during the transition into high school included being told to stop or having to leave a situation. Management strategies were the same as before, but more subjects reported using competing responses and deliberate attempts to suppress their urges to tic.

Tics also became less severe as subjects transitioned into later grades in high school (M = 3.33, SD = 1.79). New tic antecedents during this period of time included big tests (e.g., ACTs or SATs, finals), college applications, and talking about their tics. New consequences to ticcing included leaving the classroom or taking online courses. Tics were slightly less severe around the time of high school graduation (M = 3.20, SD = 1.98). Graduation, uncertainty about the future, and getting ready to go to college or begin working (and the stress that accompanied this transition) were the primary tic antecedents reported during this time period. Subjects continued to report the same consequences and management strategies, but overall frequency of responses decreased during this time period.

Subjects rated the beginning of college or work as the period of time at which tics were least severe (M = 2.75, SD = 1.98). No additional antecedents to or consequences of

ticcing were reported, and subjects generally indicated fewer strategies were necessary to manage tics.

In order to examine which types of strategies are used over time, reported tic management strategies were grouped into four categories: direct methods (competing responses and disguising tics), relaxation methods (diaphragmatic breathing and progressive muscle relaxation), cognitive methods (deliberately trying to suppress tics or distracting oneself), and environmental methods (implementing functional interventions or engaging in a physical activity). Figure 5 displays the frequency of each category across the various time points (middle school through college/work). Direct and environmental methods were more commonly reported at earlier ages (e.g., middle school and beginning high school) but tended to decrease with age. Cognitive methods remained fairly stable throughout reported time periods, and relaxation techniques did not follow a consistent trend.

In the final portion of the interview, subjects indicated what they liked most about treatment, liked least about treatment, was most helpful, was least helpful, and what they might add or change to the treatment based on their experiences since the study ended. The same process used to categorize tic antecedents and consequences was used to categorize these responses. Subjects indicated liking the experiences of talking to their therapists, learning about new tics, and obtaining rewards (i.e., compensation for participating). They reported not liking the weekly tic monitoring, 15-minute videotaped observation sessions (conducted for study purposes), and completing questionnaires. The most commonly reported aspects of treatment considered helpful were the competing responses, diaphragmatic breathing, talking to the therapist about tics. Subjects explained

the least helpful aspects of treatment were the 15-minute videotaped observation sessions, diaphragmatic breathing, and progressive muscle relaxation. Examples of what subjects would change or add to the treatment include adding more rewards, more diaphragmatic breathing practice, teaching ways to distract oneself to prevent ticcing, adding diet and exercise suggestions, and others. For a full list of all categories, see Table 14.

DISCUSSION

The purpose of present study was to provide more data on the long term course of TS and long term efficacy of CBIT. Past authors (e.g., Coffey et al., 2000) have noted the need for more longitudinal research to identify predictors of persistence of tic disorders. Few studies have followed up with people with TS beyond two years, and among studies with longer follow-ups findings on predictors of severity are mixed (Burd et al., 2001, Coffey et al., 2004). The first aim of the present study was to address this understudied area of TS research by examining tic severity and general functioning across several domains in subjects originally treated 6-8 years ago in a randomized controlled trial of behavior therapy for tics. The second aim of the present study was to provide more information on the long-term efficacy of CBIT. Of the treatment studies that examine the efficacy of Habit Reversal or CBIT for tics, several do not include long-term follow up (Himle et al., 2006). Of the studies that include long-term follow up, none have examined treatment maintenance beyond 2 years (O'connor et al., 1997).

Longitudinal Course of TS

Tic Severity at Follow Up. Findings from the current study indicate that in general, tic severity scores decreased or did not change with age. This finding was consistent across clinician assisted measures such as the YGTSS, self-report measures of tic impairment and premonitory urges, and responses from the general interview. Scores of tic severity and impairment were lower on the CGI-I and YGTSS at follow up, but not significantly different from post treatment. Subjects also indicated mild levels of impairment due to tics at follow up. Lower scores on measures were also corroborated by diagnosis at follow up from an independent evaluator. Although all 15 subjects met

criteria for a diagnosis of TS at baseline, only six met criteria at follow up and two subjects did not meet criteria for any tic disorder (based on symptom report for the week prior to the assessment). The only measure of tic severity that increased at follow up was the total score on the PUTS. Even though the change was not significant, subjects reported higher ratings of urge at follow up compared to post treatment. This finding may reflect a growing awareness of urge as subjects grow older. Not all subjects remained stable or improved, however; some subjects' tics became worse when assessed at follow up. Five subjects' YGTSS scores at follow up were higher than post treatment, and two subjects were no longer considered responders at follow up.

Course of Tic Phenomenology after Post Treatment. Subjects' ratings of tic severity across developmental periods decreased with time. Middle school was rated as the time period in which tics were worst, and tics were rated as being most severe, on average, around the ages of 10-12 and least severe around the ages of 16-18. These findings are consistent with other studies on the course of tic disorders (Lin et al., 2002). Although tics tended to decrease in general, there were a few exceptions. For some subjects tic severity increased and new tics occurred after post treatment. Although new tics were rare, two subjects reported developing new tics in the years since post treatment. These findings suggest that new tics may occur more during earlier developmental periods compared to later periods, but more research is needed to explore this hypothesis.

Other Psychological and Behavioral Findings. Subjects were more likely to report a comorbid diagnosis at follow up compared to baseline. The higher proportion of comorbid disorders in the sample at follow up (n = 15) compared to the sample at

baseline was consistent with the literature on comorbidity, and individual scores on measures of such disorders (e.g., CDI for depression) were not significantly different between those who participated at follow up and those who did not. In general subjects indicated being satisfied with their overall quality of life at both baseline and follow up. Overall levels of anxiety, depression, and behavioral problems continued to remain low as subjects became older, and family functioning and interaction improved over time. Given that scores on these measures remained stable from baseline to follow up, it was not surprising that these scores failed to predict long-term tic severity at follow up. This finding may represent a true phenomenon in the population of people with tic disorders, but it may also be attributable to sample size considerations. Given the small sample size in the present study, there was not enough statistical power to detect even large effects if present in the data. In addition to general functioning and psychopathology, both OCD and ADHD were the two most commonly reported comorbid disorders at follow-up, which is also consistent with other studies on the course of TS (Specht et al., 2011). Taken as a whole, the findings from the present study suggest that children with TS tend to get better as they grow into adolescents and young adults, but predictors of how this occurs remain to be identified.

Long-Term Efficacy of CBIT

Ratings between Treatment Groups. Given that most subjects' tics became less severe over time, the next question becomes "how well does CBIT works eight years later?" Perhaps the most compelling support for the long-term efficacy of CBIT in the current study are the results from exploratory hypothesis one. Follow-up YGTSS scores were significantly lower for subjects assigned to CBIT compared to subjects assigned to

PST, even when controlling for post treatment YGTSS scores and additional tic therapies and medications. These data suggest that, regardless of differences at post treatment, subjects in CBIT were rated less severe than subjects in PST on measures of tic severity 6-8 years later. For subject participating in the current study, the probability of remaining a responder from post treatment to follow up was .77. Seven of the nine subjects continued to meet responder criteria at follow up, and two subjects who were not considered responders at post treatment met responder criteria at follow up. All seven of the CBIT responders at post treatment remained responders at follow up while both of the PST responders at post treatment became nonresponders at follow up.

Results from all ratings of tic severity also reflected this trend. Compared to the PST group, the subjects in the CBIT group rated as less severe by the independent evaluator on the YGTSS and CGI-S. Self-report on the PUTS, and GTS-QOL also indicated more lower urge intensity and less tic interference among those in CBIT compared to those in PST. At follow up, only 1/10 CBIT subjects met criteria for TS, 7 met criteria for chronic motor tic disorder, and 2 did not meet criteria for any tic disorder in the past week. All 5 PST subjects met criteria for TS in the past week. None of the subjects in the CBIT group reported a need to seek out additional tic treatments but one of the PST subjects indicated receiving additional tic treatment. Those in the CBIT group also reported a gradual decrease in severity ratings for each of the time points (middle school through college) in the qualitative interview. Those in the PST condition, however, reported a much narrower range (6.75-5) than those in the CBIT group (5.4–1.4). Given that scores on self-report measures of other problems (e.g., anxiety, depression, family problems) were not significantly different between post treatment and

follow up, these differences can be ruled out as potential reasons why tic severity might be different between the groups (i.e., tic severity differences were not due to contributions of other psychological or behavioral problems). Future studies, with greater sample sizes, should explore whether meaningful differences on other tic measures (GTS-QOL, PUTS, etc.) do exist at follow up based on treatment assignment.

Treatment Mechanisms Affecting Change. Given that tics were less severe for those in CBIT compared to PST at follow up, it follows that this difference may be due to mechanisms unique to the CBIT treatment package. Specifically, it was hypothesized that remembering and using treatment components more often and being rewarded for doing so might be the mechanisms for lower tic severity several years later. Ability to remember treatment components, however, did not significantly predict tic severity. Both longer periods of time since treatment and specific knowledge of treatment skills failed to account for subjects' severity scores at follow up. Although subjects continued to use competing responses and functional interventions to manage tics from middle school to young adulthood, additional practice of treatment skills and rewards for engaging in treatment also failed to predict tic severity at follow up. Taken together, these findings indicate that those originally assigned to CBIT continued to do well in the long term, but findings from the present study cannot be used to determine who will stay improved versus not stay improved. Additionally, the mechanisms hypothesized to predict who will continue to do well (knowledge of treatment and resistance to extinction) do not seem to impact long-term maintenance given the measures and design of the present study.

Limitations of the Current Study

Statistical Power. A primary theme in the current study is the statistical weakness due to small sample size. The enrolled number (n = 15) of participants fell short of the 20 people who originally agreed to participate. A priori power analyses indicated a sample size of 20 would be sufficient to detect a large effect size for all hypotheses. Insufficient sample size may explain the lack of support for many hypotheses. There may be many small, medium, or even large effects between time points, or even treatment groups, that could not be detected in the current study. The small sample size also limits the generalizability of these findings. Using data from only 15 of the original 126 included in the results from all three treatment sites may not be representative, and provides merely a preliminary look at the long-term effects of treatment and course of tic disorders.

Treatment Mechanisms. Another methodological limitation was developing new measures for the constructs of treatment knowledge and resistance to extinction, two measures used for predictive purposes in hypotheses three and four, respectively. Although the primary purpose of these measures was to determine what people remember, continue to use, and for how long, responses were limited on these measures. For example, although longer ITIs make procedural recall more difficult, the present study did not determine average ITIs for participants. Time since baseline was used as a general measure substitute, but future studies might develop more accurate ways of determining memory-specific variables. Additionally, the treatment knowledge test may not have accurately assessed ability to recall treatment components. There was only a 1.5 point difference between the mean scores of the CBIT and PST group. Given that the

PST group did not receive CBIT, and therefore, should presumably be guessing on each item, their scores should not have been so similar to the CBIT subjects' scores.

Subjects rarely endorsed any of the items on the resistance to extinction questions, and only three of the questions had enough variability among scores to be included in the analysis for primary hypothesis four. This greatly reduced the ability to examine reinforcement history as a mechanism of treatment maintenance over time. A closer look at individual item responses revealed "receiving praise" from a support person as the primary reward category endorsed, and only one individual indicated receiving a reward outside of the standard compensation provided for study participation.

This shortcoming in the resistance to extinction questions may be due, in part, to the underlying structure of the original randomized controlled trial. Rewards were already built into the structure of the study, with participants receiving monetary compensation for completing various stages (e.g., baseline, post, etc.), but not for weekly engagement in treatment work. Subjects also received a gift card at the end of treatment regardless of motivation to participate, and no rewards programs were developed for the purposes of treatment maintenance (by study staff or independently by parents). With all subjects on the same schedule of reinforcement it was not possible to examine various nuances between subjects such as immediacy or size of reward. These data indicate that rewards may be used more to establish motivation and ensure treatment completion, and less to assist in treatment maintenance over time. Rewards might also be discontinued if tics are occurring very rarely. Although the goal of any behavioral reward system is to eventually fade out the reinforcer, it would be interesting to examine how this phenomenon occurs in typical outpatient tic treatment settings. Rewards systems in such

settings are individually constructed on a patient-by-patient case, and therefore, might introduce more variability in the extinction variables highlighted earlier. Regardless, future studies should examine factors related to resistance to extinction within the rewards programs developed in outpatient CBIT treatment.

Implications for CBIT Use and Development

Results from the current study represent the longest tic treatment follow up data ever collected, and provide several findings noteworthy in clinical settings. Although results should be interpreted with caution, there is some evidence to suggest learning CBIT treatment skills during youth may lead to lower tic severity, or better tic management, in late adolescence and early adulthood. This study also corroborates findings from past studies showing that tics tend to decrease overall with the passage of time for most individuals (Bloch et al., 2006, Gorman et al., 2010, Leckman et al., 1998). Although the sample was small, it was generally representative of the overall study sample in terms of comorbid diagnoses historically associated with tic disorders, gender, and baseline psychological and behavioral characteristics.

Implications for Treatment Providers. The responses from the qualitative interview questions provide a unique look at the course of tic disorders over time and may be useful when treating individuals with tic disorders. The list of reported antecedents and consequences to ticcing could help provide areas to explore when completing functional assessments within the CBIT treatment protocol. This list may be useful during the relapse prevention portion of treatment to identify and discuss which antecedents and consequences tend to persist or develop later in life and may need to be monitored by patients. For example, stress and performance evaluations were frequently

reported as ticcing antecedents and increased from middle school to high school but decreased as subjects graduated high school and moved on to work or college.

Given the potential for these variables to exacerbate tics, clinicians could take special note of what types of general stressors and performance situations younger patients might face and develop appropriate functional interventions to help in those situations. Clinicians with younger patients could use a similar list when discussing future applications of HRT and functional interventions. Using data from responses about the tic consequences, other people are more likely to comment or ask about tics at earlier ages. As such, treatment providers might place a greater emphasis on managing reactions of others when working with younger clients.

Implications for Future Research. In addition to those cited above, these data provide several directions for future research. Data collection could be expanded to the other treatment sites involved in the original study. Given the sample size and implications for statistical power in the current study, collecting additional data from subjects seen at the other two sites would provide a more comprehensive and representative picture of the long-term effects of treatment as well as the longitudinal course of tics in general. More meaningful analyses could also be conducted, such as between group (e.g., CBIT vs. PST, baseline vs. post vs. follow up) differences on self-report and tic severity measures.

More general implications for future studies of tic disorders include developing procedures to follow up with subjects at future time points. These might include retaining contact information and routinely checking in to evaluate functioning or to ensure contact information is still accurate (for future follow-up studies). Scheduled follow-up sessions

could not only include assessments of severity and functioning, but also serve the function of booster sessions to help maintain treatment gains. Booster sessions could include more discussions of relapse prevention strategies, common antecedents or consequences reported by others with tic disorders at similar time points or transitions, and a general review of treatment strategies. Given advances in technology, these could be conducted using teleconference, Skype, or other secure mediums of communication. Adding additional follow ups to future studies of tic treatment could also address the questions of whether direct management strategies (competing response use) and environmental strategies (functional interventions) decrease with age because tics become less severe, are forgotten, or replaced by other techniques. Findings from such studies could answer treatment-related questions of how long competing responses might be needed or if other strategies might work if more direct management strategies fail.

Future studies could also examine whether or not rewards programs do anything in the long run beyond increasing motivation to participate. For example, subjects in one condition would end the rewards program after the last therapy session, while subjects in another condition would gradually phase out a reward program over a designated period of time. Different schedules of reinforcement for using treatment components (i.e., competing responses) could be examined using direct observation from parents or study personnel both in the clinic and at home to determine whether treatment gains can be maintained or increased. The goal of any reward program, however, would be to eventually transition from tangible rewards to praise in an effort to reward using treatment skills.

Implications for CBIT Development. Subjects overwhelmingly identified the competing response as being the most helpful aspect of treatment, but did not consider it likeable. Subjects identified monitoring as one of the most aversive aspects of treatment, but not as unhelpful. In other words, subjects did not like the process of learning the competing response and monitoring tics, but recognized the importance of both in learning to manage tics. These two primary treatment components may represent the more challenging, helpful, aspects of treatment in the CBIT protocol. Attempts to make this process more user friendly, or accessible to patients depending on their age and developmental level, might be a potential direction for future CBIT development, especially considering they were the most frequently reported components of treatment considered helpful. In other words, although subjects didn't enjoy the process of learning competing responses, they recognized the utility of competing responses in tic management. Subjects also reported disliking the 15-minute videotaped observation session and monitoring tics weekly. Because the observation session was part of the study, and not included in CBIT protocol, it is not an issue for the treatment going forward.

Subjects also identified several ways they might change or add treatment components. Among these were adding more booster sessions and relapse prevention strategies. Given the data collected in the current study, relapse prevention could be expanded to include a discussion of specific antecedents/consequences that may need to be addressed in the future. Another subject recommended making treatment more accessible in order to eliminate traveling long distances as a barrier to treatment. This recommendation is already being addressed in studies of the effectiveness of CBIT via

videoconference delivery (Himle et al., 2012; Himle et al., 2010). Finally, subjects also offered suggestions not yet explored in well-controlled studies such as using diet and exercise or general mindfulness strategies to help manage tics. These suggestions could be incorporated into future studies on treating tic disorders.

Summary

Overall, subjects reported lower levels of tic severity and tic-related problems eight years after participating in a treatment study for tic disorders. As the first study to follow up beyond two years after post treatment, results indicated participants' tics were less severe at follow up, with those in the CBIT treatment condition even less severe than those originally assigned to PST. These results warrant further investigation by expanding data collection to the remaining subjects from the original trial, and by conducting future studies to determine ways to improve outcomes for children and adolescents with tic disorders.

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Table 1

Primary Hypotheses and Data Analytic Strategy

Objective	Independent Variable(s)	Dependent Variable(s)	Variables Controlled For	Analysis
1) Subjects tic severity will not differ or drop from posttreatment to follow-up.	Time of Assessment (post treatment vs. follow-up)	YGTSS Total Score	1.Current Med Status (yes/no) 2. Other tic treatments since study completion (yes/no)	Repeated Measures Analysis of Covariance
2) Five baseline variables identified in other long-term follow up studies will predict higher tic severity and poorer life functioning at follow-up.	1. YGTSS Total Score 2. Coprolalia or lower limb tics (Yes/No) 3. CBCL Externalizing scale score. 4. Brief Fam III score 5. Comorbid disorder (Yes/No)	1. YGTSS Total Score at Follow-Up. 2. SAS-SR Total Score at Follow-Up.	1.Current Med Status (yes/no) 2. Other tic treatments since study completion (yes/no) 3. Treatment Assignment (CBIT/PST)	Hierarchical Regression <u>Blocks</u> 1:Control Variables 2: Six Independent Variable
3) For subjects who received CBIT (n = 12), failure to remember treatment skills and more time since post treatment should be associated with higher tic severity and poorer overall life functioning.	1. Time since treatment. 2. Scores on treatment knowledge test.	1. CBIT YGTSS Total Score at Follow-Up. 2. CBIT SAS-SR Total Score at Follow-Up	1.Current Med Status (yes/no) 2. Utilization of other treatments for tics since study completion (yes/no) 3a. Post treatment YGTSS scores. 3b. Post treatment SAS-SR scores.	Hierarchical Regression <u>Blocks</u> 1:Control Variables 2: Two Independent Variables

Table 1 *continued*

Objective	Independent Variable(s)	Dependent Variable(s)	Variables Controlled For	Analysis
4) For subjects who received CBIT (n = 12), higher scores on the resistance to extinction test should predict lower tic severity and better overall functioning at follow-up.	Scores from each of the six questions related to reinforcement variables known to increase resistance to extinction.	1. CBIT YGTSS Total Score at Follow-Up. 2. CBIT SAS-SR Total Score at Follow-Up.	1.Current Med Status (yes/no) 2. Utilization of other treatments for tics since study completion (yes/no) 3a. Post treatment YGTSS scores 3b. Post treatment SAS-SR scores.	Hierarchical Regression <u>Blocks</u> 1:Control variables 2: Six Independent Variables

Table 2

Exploratory Hypotheses and Data Analytic Strategy

Objective	Independent Variable(s)	Dependent Variable(s)	Variables Controlled For	Analysis
E1) At follow up, subjects assigned to CBIT (n = 10) will have lower tic severity than subjects assigned to PST (n = 5).	Treatment Assignment (CBIT vs PST)	YGTSS Total at Follow Up.	1. YGTSS Total at Post Treatment 2.Current Med Status (yes/no) 3. Utilization of other treatments for tics since study completion (yes/no)	Analysis of Covariance
E2) At follow up, subjects assigned to CBIT (n = 10) will have better overall functioning than subjects assigned to PST (n = 5).	Treatment Assignment (CBIT vs PST)	SAS-SR Total Score at Follow-Up.	1. SAS-SR Total at Post Treatment 2.Current Med Status (yes/no) 3. Utilization of other treatments for tics since study completion (yes/no)	Analysis of Covariance

Table 3

Individual Tic and Comorbid Disorder Presentation in Follow-Up Sample

Subject	Current Age (years)	Treatment assignment	Tic Diagnosis		Current Comorbidity	Other Tic Treatment	Current Psychotropic Medications	Responder Status		YGTSS Total		
			BL	Follow Up				Post	Follow Up	BL	Post	Follow Up
1	20	CBIT	TS	CMT	SU	No		Yes	Yes	23	9	9
2	18	CBIT	TS	CMT	None	No		No	Yes	19	16	9
3	18	CBIT	TS	None	None	No		No	Yes	18	15	0
4	19	CBIT	TS	CMT	None	No		Yes	Yes	27	11	7
5	17	CBIT	TS	CMT	ADHD	No		Yes	Yes	25	16	13
6	17	CBIT	TS	CMT	ODD	No		Yes	Yes	18	5	4
7	18	CBIT	TS	CMT	ADHD, MDD	No	Prozac	Yes	Yes	18	8	6
8	18	CBIT	TS	None	ADHD, GAD	No	Celexa, Vivance	Yes	Yes	21	9	0
9	21	CBIT	TS	CMT	OCD, ADHD, MDD	No	Prozac	Yes	Yes	27	9	6
10	17	CBIT	TS	TS	ADHD, MDD	No	Risperidone	No	No	29	26	30
11	22	PST	TS	TS	OCD, SU	Yes, CBIT	Suboxone	Yes	No	18	9	25
12	17	PST	TS	TS	OCD	No, Crossover		No	No	22	19	23
13	25	PST	TS	TS	OCD, ADHD, GAD, SU	No, Crossover		No	No	29	25	23
14	16	PST	TS	TS	None	No		Yes	No	10	5	19
15	19	PST	TS	TS	None	No		No	No	20	18	19

Note: CBIT = Comprehensive Behavioral Intervention for Tics; PST = Psychoeducation and Supportive Therapy; TS = Tourette Syndrome; CMT = Chronic Motor Tics; SU = Substance Use Disorder; ADHD = Attention Deficit Hyperactivity Disorder; OCD = Obsessive-Compulsive Disorder.

Table 4

Participant Demographics by Group

	Follow Up			Original BL
Category	CBIT (n = 10)	PST (n = 5)	Total (n = 15)	Total (n = 40)
Age, mean (SD)	18 (1.25)	20 (3.53)	18.6 (2.35)	11.6 (2.1)
Gender				
Male	7 (70%)	4 (80%)	11 (73.3%)	34 (85%)
Female	3 (30%)	1 (20%)	4 (26.7%)	6 (15%)
Race/Ethnicity				
White, non-Hispanic	9 (90%)	5 (100%)	14 (93.3)	33 (82.5%)
Asian/Pacific Islander	1 (10%)	-	1 (6.7%)	2 (5%)
Black/African American	-	-	-	1 (2.5%)
Hispanic	-	-	-	3 (7.5%)
Parent highest occupation				
No response	-	1 (20%)	1 (6.7%)	1 (2.5%)
Laborer/Homemaker/Clerical	-	-	-	3 (7.5%
Craftsperson/artist	-	1 (20%)	1 (6.7%)	2 (5%)
Technical/skilled laborer	1 (10%)	-	1 (6.7%)	5 (12.5%)
Professional	9 (90%)	3 (60%)	12 (80%)	29 (72.5%)
Parent highest education				
High school diploma	-	-	-	2 (5%)
Technical college	1 (10%)	-	1 (6.7%)	6 (15%)
Partial college	-	2 (40%)	2 (13.3%)	5 (12.5%)
College graduate	5 (50%)	1 (20%)	6 (40%)	13 (32.5%)
Professional degree	4 (40%)	2 (40%)	6 (40%)	14 (35%)
Education				
High school diploma	4 (40%)	2 (40%)	6 (40%)	-
Partial college	3 (30%)	-	3 (20%)	-
Years since baseline, mean (SD)	8.13 (.74)	8.13 (.)	8.13 (.74)	8.13 (.)
Tic disorder				
Tourette syndrome	1 (10%)	5 (100%)	6 (40%)	37 (92.5%)
Chronic motor tic	7 (70%)	-	7 (46.7%)	3(7.5%)
Chronic vocal tic	-	-	-	-
No criteria met (past week)	2 (20%)	-	2 (13.3%)	-
Other diagnoses				
Attention-deficit/hyperactivity disorder	5 (50%)	-	5 (33.3%)	13 (32.5%)
Obsessive-compulsive disorder	1 (10%)	3 (60%)	4 (26.7%)	9 (22.5%)
Substance use disorder	1 (10%)	2 (40%)	3 (20%)	-
Anxiety disorder	1 (10%)	1 (20%)	2(13.3%)	23 (57%)
Major depressive disorder	3 (20%)	-	3 (20%)	3 (7.5%)
Oppositional Defiant disorder	1 (10%)	-	1 (6.7%)	7 (17.5%)
Tic Medications since post				
Risperidone	1 (6.7%)	-	1 (6.7%)	-
Other Medications since post				
Stimulants	5 (50%)	1 (20%)	6 (40%)	-
Mood stabilizers	2 (20%)	3 (60%)	5 (33.3%)	-
Antipsychotics	-	1 (20%)	1 (6.7%)	-
Benzodiazepines	2 (20%)	-	2 (13.3%)	-
Synthetic opioids	-	1 (20%)	1 (6.7%)	-

Table 5

Clinician-Rated and Self-Reported Tic Severity Ratings

Measure	CBIT (n = 10)	PST (n = 5)	Total (n = 15)
Yale Global Tic Severity Scale			
Total tic score			
Baseline	22.5 (4.27)	19.8 (6.87)	21.6 (5.19)
Follow-up	8.4 (8.57)	21.8 (2.68)	12.7 (9.6)
Total motor score			
Baseline	11.2 (2.09)	10.8 (3.56)	12.93 (3.19)
Follow-up	7.3 (5.73)	12.6 (2.7)	9 (5.47)
Total vocal score			
Baseline	8 (1.82)	5.8 (4.38)	8.66 (3.43)
Follow-up	1.1 (3.47)	8 (1.82)	3.8 (4.91)
Clinical Global Impressions Scale			
Total severity score			
Baseline	4.5 (.52)	4.4 (.54)	4.47 (.51)
Follow-up	2.4 (1.26)	3.6 (.54)	2.8 (1.2)
Total improvement score			
Post treatment	2.2 (1.54)	3 (1.58)	2.47 (1.5)
Follow-up	1.8 (1.54)	3.6 (.89)	2.4 (1.59)
Premonitory Urge for Tics Scale			
Total score			
Baseline	16.8 (6.32)	24.2 (5.89)	19.26 (6.97)
Follow-up	20.8 (5.53)	26.2 (6.97)	22.6 (6.36)
Gilles de la Tourette Syndrome –QOL Scale			
Total impairment score	n/a	n/a	
Baseline			n/a
Follow-up	14.5 (9.14)	14.8 (9.83)	14.6 (9.14)
Total life satisfaction score			
Baseline	n/a	n/a	n/a
Follow-up	71.5 (14.72)	80 (22.36)	74.33 (17.3)

Table 6

Self-Report Total Scores at Baseline and Follow-up across Groups

	Scores at Follow Up		Scores at Baseline	
Measure	CBIT (n =10)	PST (n = 5)	F/U Group (n = 15)	Not in F/U (n = 25)
Social Adjustment Scale	1.91 (.72)	1.83 (.13)	1.69 (.37)	1.80 (.46)
Brief Family Assessment Measure-III*	52 (9.28)	45.6 (4.79)	24.36 (3.36)	27.68 (6.19)
Treatment Knowledge Test	8.5 (1.35)	7 (1.22)	-	-
Patient Satisfaction Questionnaire	28.2 (2.65)	28.8 (3.63)	29.43 (3.36)	27.35 (3.71)
Holmes Rahe Negative Life Events				
Past Year	3.4 (3.16)	1.6 (.89)	-	-
Since Study	5 (7.25)	4.2 (3.49)	-	-
Child Depression Inventory	14.33 (9.01)	6.5 (3.53)	7.2 (5.97)	7.0 (5.97)
Beck Depression Inventory	5.14 (5.04)	8.66 (10.69)	-	-
Screen for Childhood Anxiety Related Emotional Disorders	13.66 (1.15)	18.5 (6.36)	20.14 (10.7)	17.8 (11.22)
Beck Anxiety Inventory	4.71 (3.25)	10.33 (7.76)	-	-
Child Behavior Checklist Externalizing Scale*	53.66 (11.84)	37 (4.24)	50.66 (9.36)	50.4 (10.83)
Adult Self Report Externalizing Scale*	49.71 (11.25)	53.33 (14.50)	-	-

* T-scores; F/U = Follow Up,

Table 7

Primary Hypothesis 1: Effect of Time on YGTSS Scores

	SS	df	MS	F-cal	Sig	η^2
Time	4.32	1	4.32	.13	.723	.01
Error (time)	429.17	13	33.01			
Total	433.49	14				

Table 8

Primary Hypothesis 2: Baseline Predictors of Longitudinal Course of Tic Severity and General Functioning at Follow Up (n = 15)

	YGTSS Total						SAS-SR Total					
Variable	β	t	sr^2	R	R^2	ΔR^2	β	t	sr^2	R	R^2	ΔR^2
Block 1				.93	.86	.86				.55	.3	.3
Tic Medication Status	.80	6***	.63									
Treatment Condition	.64	7.46***	.78									
Additional Tic Treatment	-	-	-				-	-	-			
Block 2 (baseline predictors)				.96	.93	.07				.62	.39	.08
YGTSS	-.02	-.14	-.01				-.07	-.92	-.27			
Coprolalia/Lower Limb	.30	1.24	.11				.91	.83	.24			
CBCL Externalizing	.30	.17	.01				-.01	-.64	-.18			
Brief FAM-III	.02	2.11	.2				.01	.12	.03			
Comorbid Disorder	.16	1.15	.11				.27	.47	.14			

-Additional Tic Treatment removed from analysis due to assumptions of normality. YGTSS = Yale Global Tic Severity Score; CBCL = Child Behavior Checklist; Brief FAM-III = Brief Family Assessment Measure;
***p < .001

-Post Treatment Score on Measure: Scores from post treatment on the dependent variable for the given analysis.

Table 9

Primary Hypothesis 3: Effects of Memory on Tic Severity and General Functioning at Follow Up for Subjects Who Received CBIT (n = 12)

	YGTSS Total						SAS-SR Total					
Variable	β	t	sr^2	R	R^2	ΔR^2	β	t	sr^2	R	R^2	ΔR^2
Block 1				.86	.75	.75				.56	.31	.31
Post Treatment Score on Measure	.72	3.59**	.59				.12	.45	.12			
Tic Medication Status	-	-	-				-	-	-			
Additional Tic Treatment	.22	1.11	.18				.54	1.98	.54			
Block 2				.88	.78	.03				.64	.41	.10
Treatment Knowledge	.02	.11	.02				-.15	-.45	-.13			
Time Since Baseline	-.2	-.95	-.17				-.36	-1.09	-.31			

-Post Treatment Score on Measure: Scores from post treatment on the dependent variable for the given analysis
-Tic medication status removed from analysis due to assumptions of normality; **p < .01

Table 10

Primary Hypothesis 4: Effects of Reinforcement History on Tic Severity and General Functioning at Follow Up for Subjects who Received CBIT (n = 12)

	YGTSS Total						SAS-SR Total					
Variable	B	t	sr^2	R	R^2	ΔR^2	β	t	sr^2	R	R^2	ΔR^2
Block 1				.86	.75	.75				.56	.31	.31
Post Treatment Score on Measure	.72	3.59**	.59				.12	.45	.12			
Tic Medication Status	-	-	-				-	-	-			
Additional Tic Treatment	.22	1.11	.18				.54	1.98	.54			
Block 2				.88	.78	.03				.83	.69	.38
How long continue the rewards program?	.13	.59	.11				1.07	2.64*	.59			
How long receive rewards for using CR?	-	-	-				-	-	-			
What types of rewards earn?	-	-	-				-	-	-			
How often praised for using CR?	.15	.68	.13				.47	1.75	.39			
How soon receive rewards when earned?	-	-	-				-	-	-			
How much time practice CR each week?	.04	.22	.04				.09	.3	.06			

-Post Treatment Score on Measure: Scores from post treatment on the dependent variable for the given analysis.
-Tic Medication Status, How long receive rewards for using CR, What types of rewards earn, and How soon receive Rewards when earned all removed from analysis due to assumptions of normality; *p < .05; **p < .01

Table 11

Exploratory Hypothesis 1: CBIT vs. PST Differences in YGTSS scores at Follow Up

Treatment	N		X		SD
CBIT	10		8.40		8.57
PST	5		21.80		2.68
Total	15		12.86		9.59
Source of variation	SS	DF	Mean square	F-cal	Sig level
Model	1126.65	3	375.56	25.34	.000
Intercept	268	1	268	18.08	.001
Post tic severity	9.76	1	9.76	.65	.43
Medication use	.01	0			
Additional treatment	.01	0			
Treatment assignment	635.19	1	635.19	42.85	.000
Error	163.03	11	14.82		
Total	3773	15			

- SD = Standard Deviation; SS = Sum of Squares; DF = Degrees of Freedom

Table 12

Exploratory Hypothesis 2: CBIT vs. PST Differences in SAS-SR scores at Follow Up

Treatment	N		X		SD
CBIT	10		1.91		.72
PST	5		1.83		.13
Total	15		1.88		.58
Source of variation	SS	DF	Mean square	F-cal	Sig level
Model	1.44	3	.48	1.59	.246
Intercept	1.91	1	1.91	6.31	.029
Post SAS Score	.000	1	.000	.000	.996
Medication use	.000	0			
Additional treatment	.000	0			
Treatment assignment	.005	1	.005	.91	.904
Error	3.32	11	.3		
Total	58.31	15			

- SD = Standard Deviation; SS = Sum of Squares; DF = degrees of freedom

Table 13

Course of Tic Phenomenology after Post Treatment

	Mean (SD)		
	CBIT	PST	Total
Overall Course	(n = 10)	(n = 5)	(n = 15)
Tic severity ratings (0-10)			
Middle school	5.4 (2.01)	6.75 (1.25)	5.78 (1.88)
Begin High School	3.6 (1.26)	6.25 (1.50)	4.35 (1.78)
High School	2.7 (1.63)	4.6 (1.51)	3.33 (1.79)
Finish High School	2.28 (.95)	5.33 (2.30)	3.20 (1.98)
Begin College/Work	1.4 (.54)	5 (1.00)	2.75 (1.98)
Age Tics Worst	11 (1.69)	12.2 (3.49)	11.4 (2.38)
Age Tics Best	17.1 (1.19)	19 (2.82)	17.73 (2.01)
New Tics Since Post	1.3 (1.41)	1.6 (2.30)	1.4 (1.68)

Table 14

Treatment Feedback and Recommendations

Interview Question	Frequency	Percent
What did you like most about treatment? (n = 9)		
Talking with the therapist	3	33.33%
Learning more about tics	2	22.22%
Rewards/Compensation	2	22.22%
Learning the competing response	1	11.11%
Computer tasks at screen	1	11.11%
What did you like least about treatment? (n = 11)		
Monitoring tics weekly	5	45.45%
15-min videotaped observation sessions	4	36.36%
Completing questionnaires	2	18.18%
What was most helpful? (n = 16)		
Competing responses	9	56.25%
Diaphragmatic breathing	2	12.50%
Talking to the therapist	2	12.50%
Identifying tic triggers	1	6.25%
Taking breaks	1	6.25%
Learning about tics	1	6.25%
What was least helpful? (n = 4)		
15-min videotaped observation sessions	2	50%
Diaphragmatic breathing	1	25%
Progressive muscle relaxation	1	25%
Anything you would change or add to the treatment? (n = 11)		
Add more rewards	2	18.18%
More breathing practice	1	9.09%
More booster sessions	1	9.09%
Add distraction techniques	1	9.09%
More relapse prevention review	1	9.09%
Offer multiple competing responses for a tic	1	9.09%
Increase treatment accessibility	1	9.09%
Eliminate videotaped observations sessions	1	9.09%
Add diet and exercise suggestions	1	9.09%
Include mindfulness strategies	1	9.09%

Figure 1

Flow of Patients through the Recruitment Process

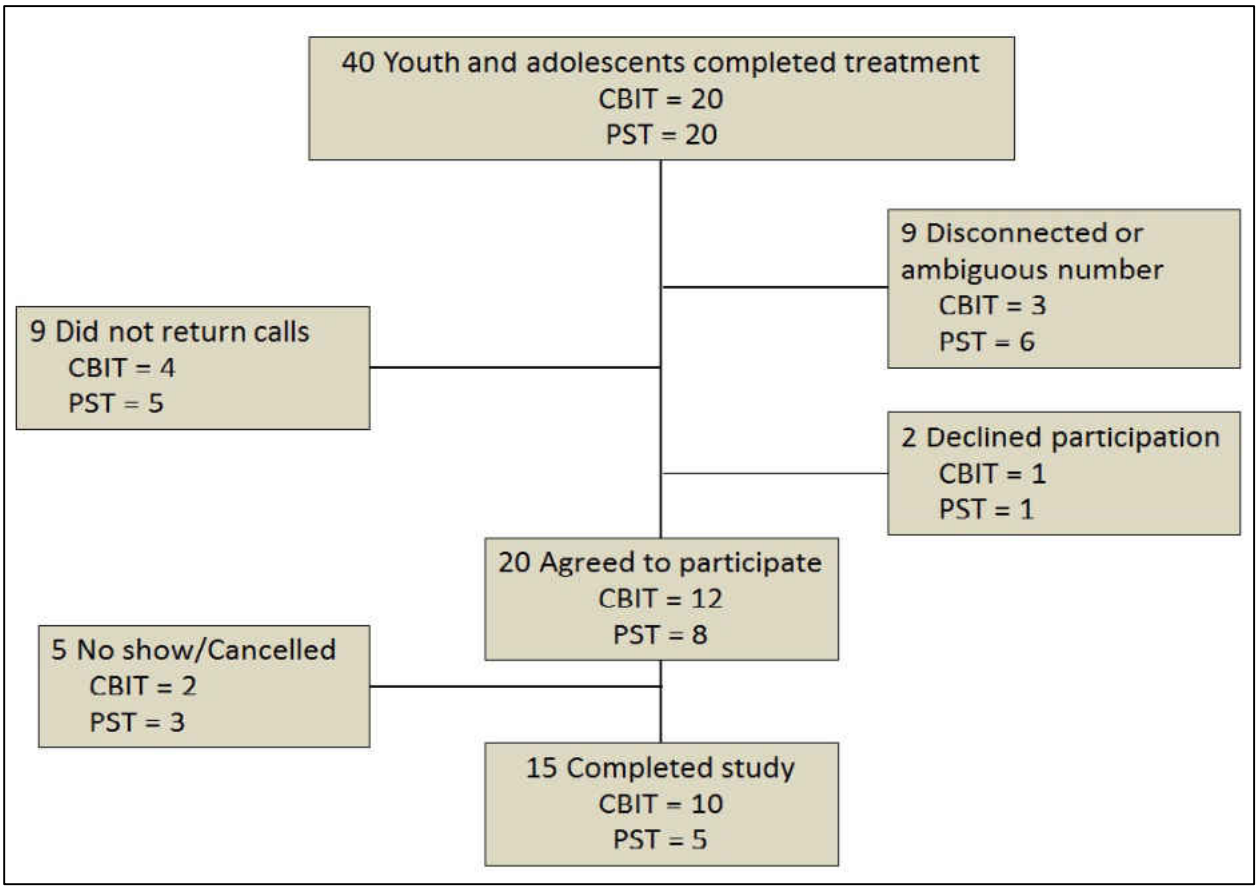


Figure 2

Subject-Reported Tic Antecedents by Developmental Period

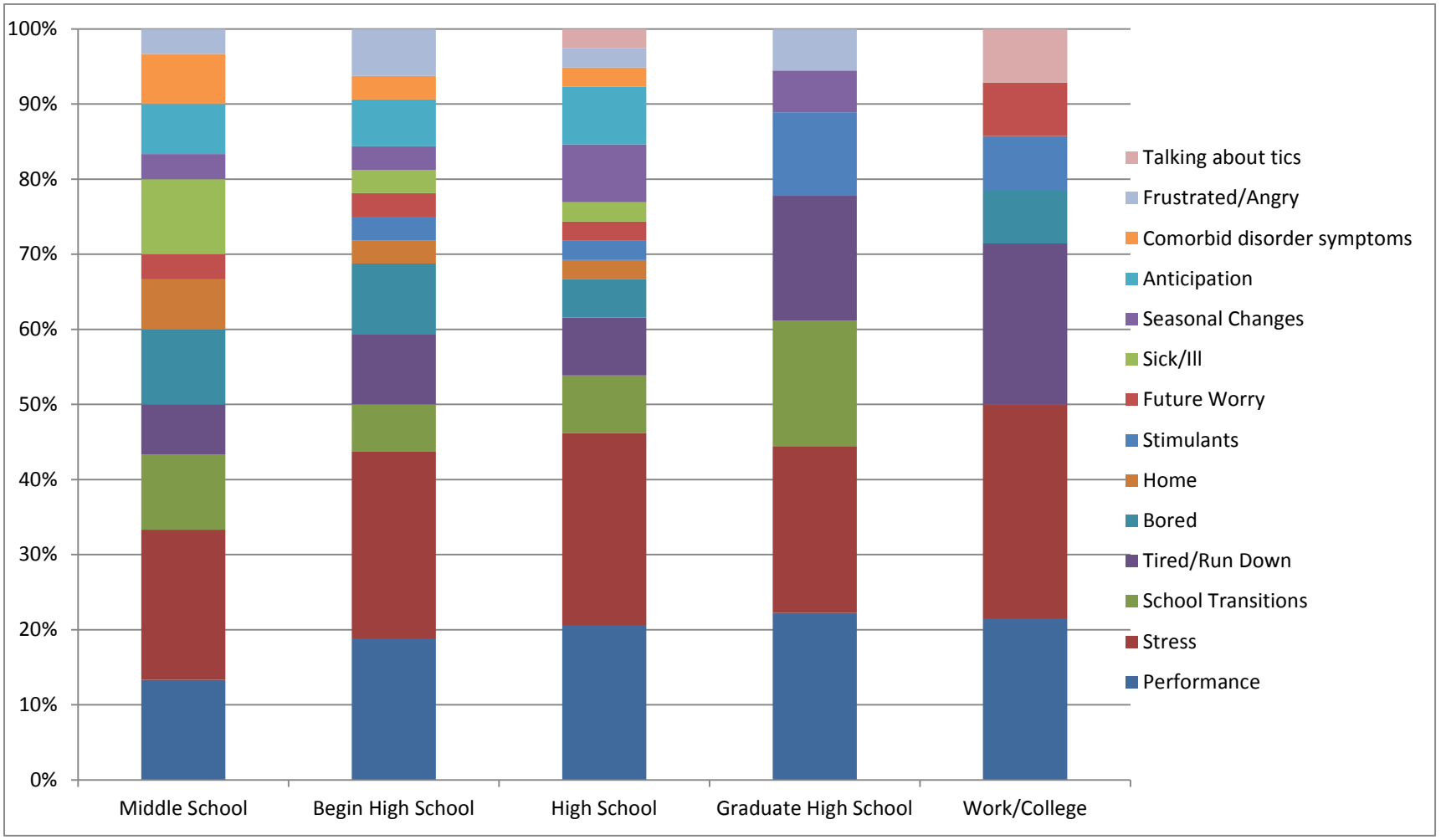


Figure 3

Subject-Reported Tic Consequences by Developmental Period

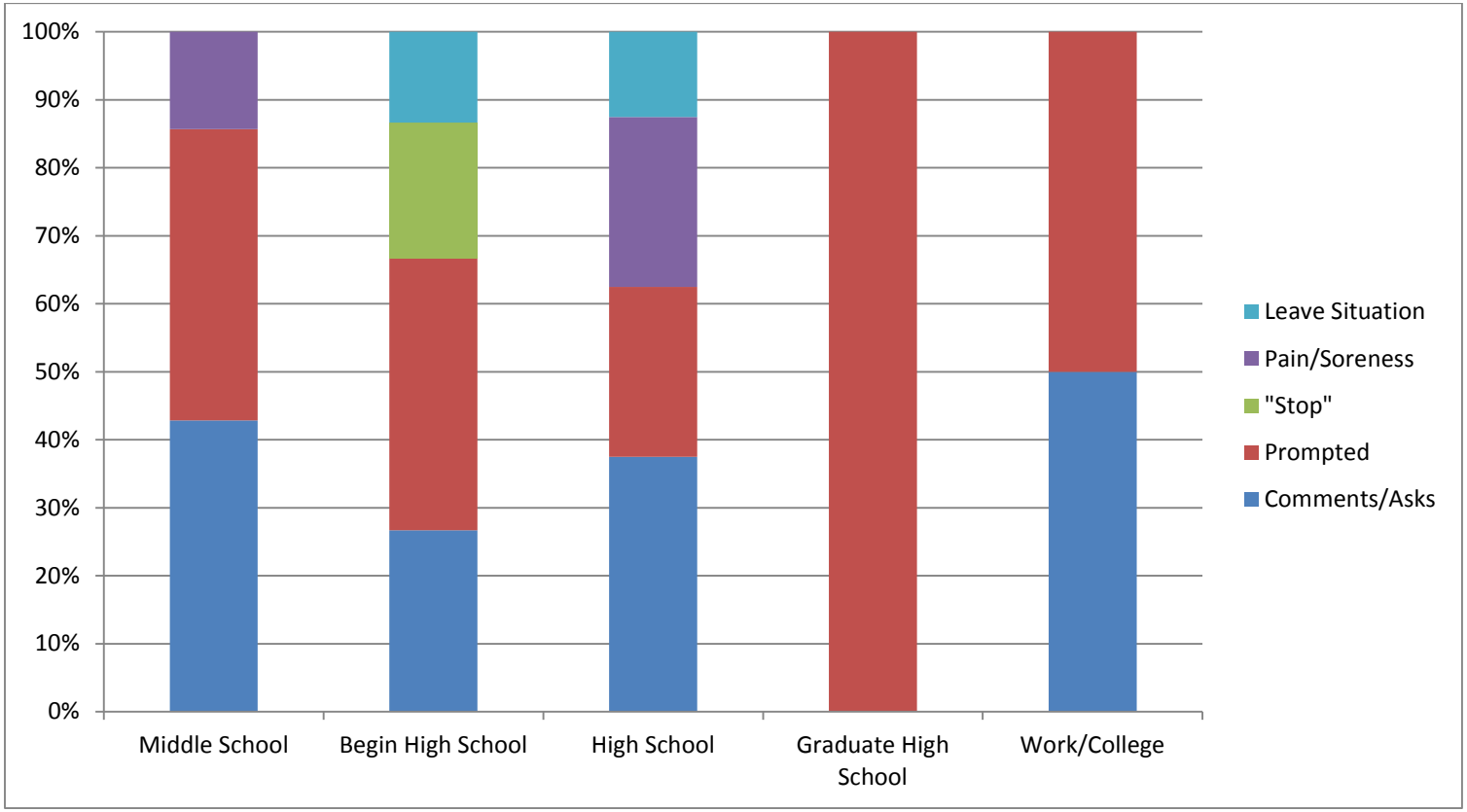


Figure 4

Subject-Reported Tic Management Strategies by Developmental Period

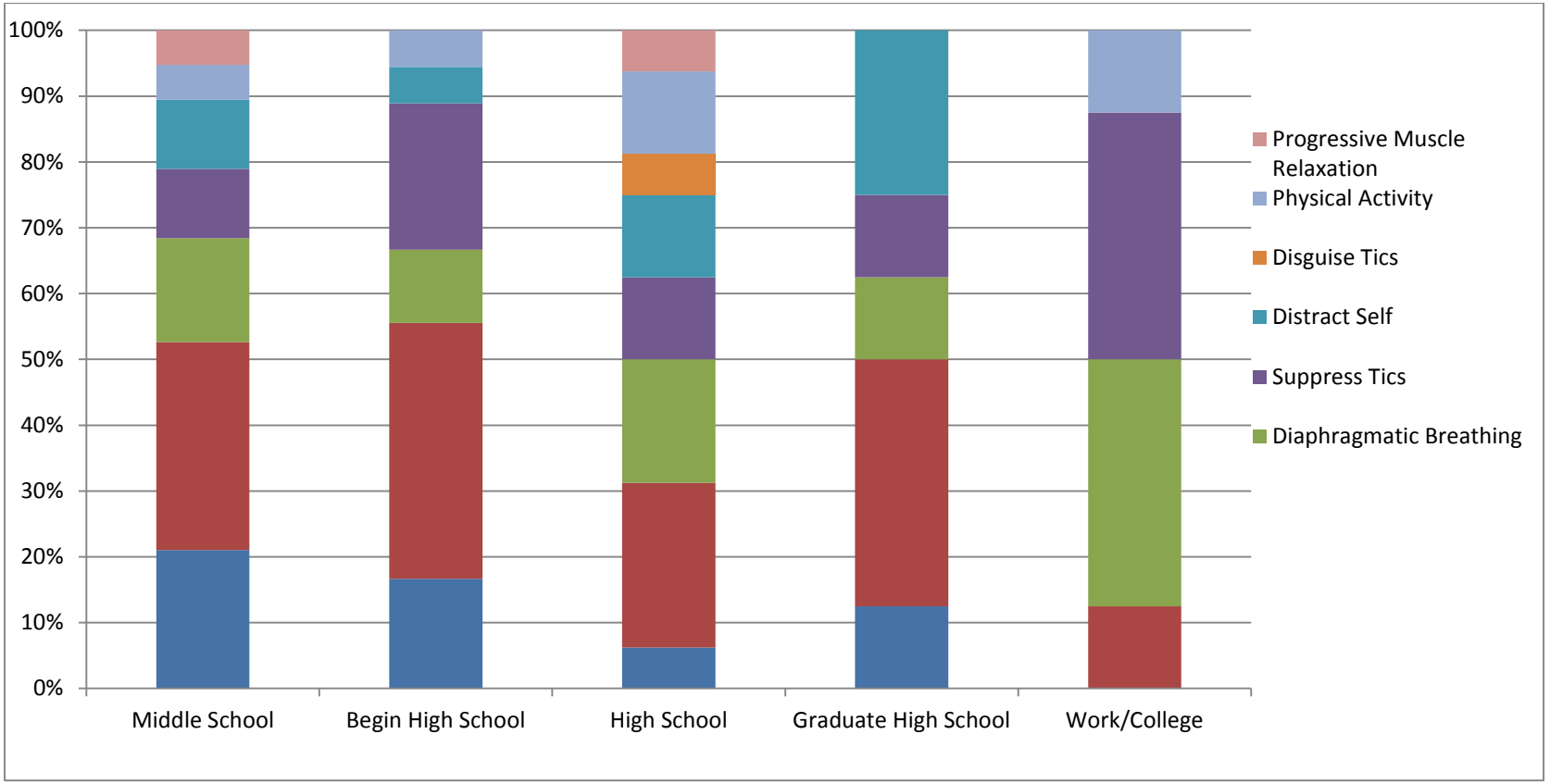
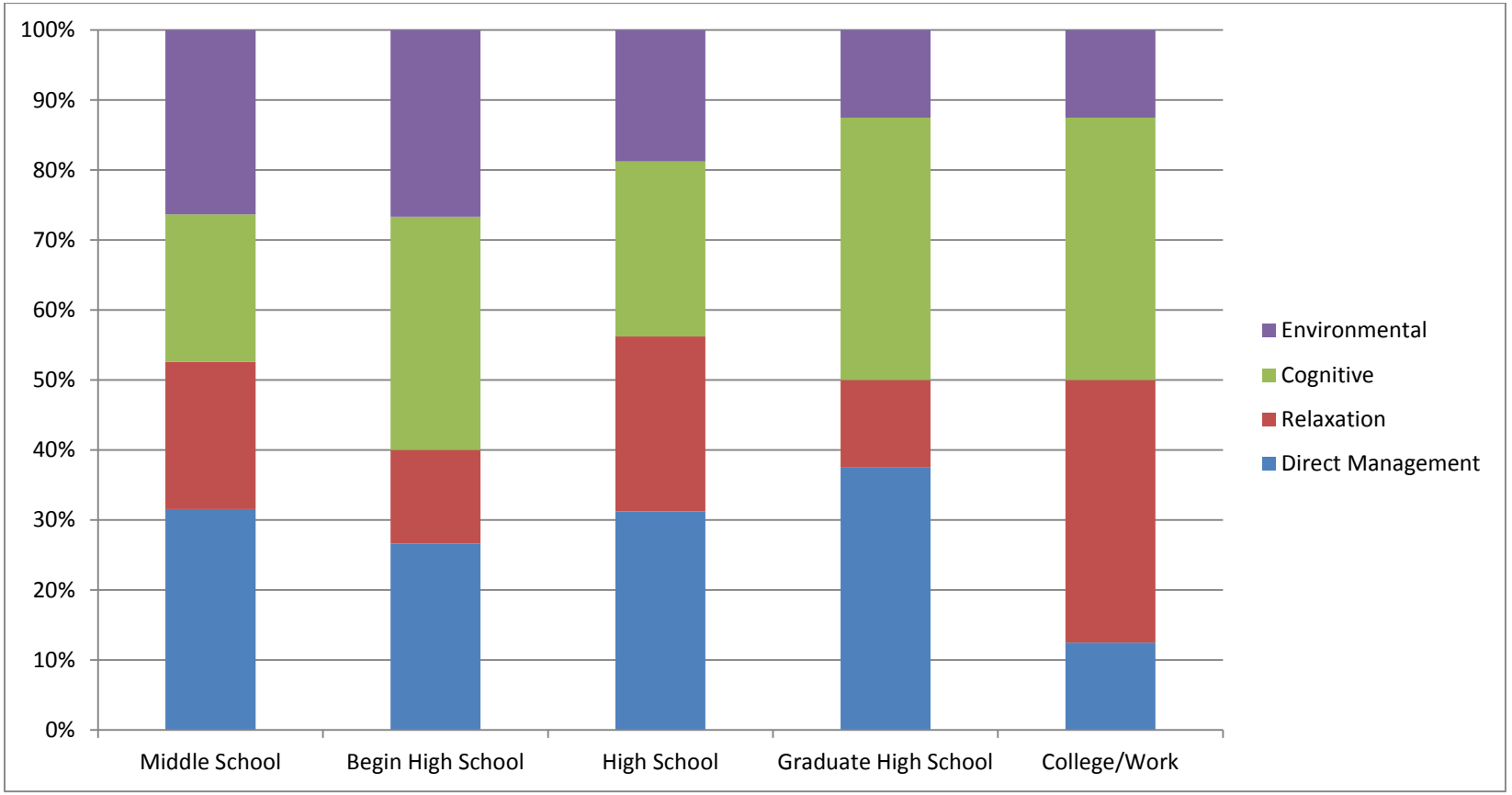


Figure 5

Type of Tic Management Strategy Used by Developmental Period



Appendix A

Clinician-Administered Measures

Yale Global Tic Severity Scale (YGTSS)

NAME:	TODAY'S DATE : / /
RATER:	

MOTOR TIC SYMPTOM CHECKLIST (Check motor tics present during **past week**.)

•**Simple Motor Tics** (Rapid, Darting, "Meaningless"):

⑥ Eye blinking
⑥ Eye movements
⑥ Nose movements
⑥ Mouth movements
⑥ Facial grimace
⑥ Head jerks/movements
⑥ Shoulder shrugs
⑥ Arm movements
⑥ Hand movements
⑥ Abdominal tensing
⑥ Leg, foot, or toe movements
⑥ Other (describe):

_____

⑥ Other (describe):

_____

•**Complex Motor Tics** (Slower, "Purposeful"):

⑥ Eye movements
⑥ Mouth movements
⑥ Facial movements or expressions
⑥ Head gestures or movements
⑥ Shoulder movements
⑥ Arm movements
⑥ Hand movements
⑥ Writing tics
⑥ Dystonic postures
⑥ Bending or gyrating
⑥ Rotating
⑥ Leg or foot or toe movements
⑥ Blocking

⑥ Tic related compulsive behaviors (touching, tapping, grooming, evening-up)
⑥ Copropraxia
⑥ Self-abusive behavior
⑥ Paroxysms of tics (displays), duration ___ seconds
⑥ Disinhibited behavior (describe):*

⑥ Other (describe):

PHONIC TIC SYMPTOM CHECKLIST (Check phonic tics present over the **past week**.)

•**Simple Phonic Symptoms** (Fast, "Meaningless" Sounds):
⑥ Sounds, noises (circle: coughing, throat clearing, sniffing, or animal or bird noises)
⑥ Other (list):

•**Complex Phonic Symptoms** (Language: Words, Phrases, Statements):
⑥ Syllables (list)

⑥ Words (list)

⑥ Coprolalia (list)

⑥ Echolalia
⑥ Palalalia
⑥ Blocking
⑥ Speech atypicalities (describe)

⑥ Disinhibited speech (describe)*

* Do not include disinhibitions in ratings of tic behaviors

NUMBER	**Motor**	**Phonic**	
None	⑥	⑥	**0**
Single tic	⑥	⑥	**1**
Multiple discrete tics (2-5)	⑥	⑥	**2**
Multiple discrete tics (>5)	⑥	⑥	**3**

Multiple discrete tics plus as least one orchestrated pattern of multiple simultaneous or sequential tics where it is difficult to distinguish discrete tics	⑥	⑥	**4**
Multiple discrete tics plus several (>2) orchestrated paroxysms of multiple simultaneous or sequential tics that where it is difficult to distinguish discrete tics	⑥	⑥	**5**

FREQUENCY

	Motor	Phonic	
NONE No evidence of specific tic behaviors	⑥	⑥	**0**
RARELY Specific tic behaviors have been present during previous week. These behaviors occur infrequently, often not on a daily basis. If bouts of tics occur, they are brief and uncommon.	⑥	⑥	**1**
OCCASIONALLY Specific tic behaviors are usually present on a daily basis, but there are long tic-free intervals during the day. Bouts of tics may occur on occasion and are not sustained for more than a few minutes at a time.	⑥	⑥	**2**
FREQUENTLY Specific tic behaviors are present on a daily basis. tic free intervals as long as 3 hours are not uncommon. Bouts of tics occur regularly but may be limited to a single setting.	⑥	⑥	**3**
ALMOST ALWAYS Specific tic behaviors are present virtually every waking hour of every day, and periods of sustained tic behaviors occur regularly. Bouts of tics are common and are not limited to a single setting.	⑥	⑥	**4**
ALWAYS Specific tic behaviors are present virtually all the time. Tic free intervals are difficult to identify and do not last more than 5 to 10 minutes at most.	⑥	⑥	**5**

INTENSITY

	Motor	Phonic	
ABSENT	⑥	⑥	**0**
MINIMAL INTENSITY Tics not visible or audible (based solely on patient's private experience) or tics are less forceful than comparable voluntary actions and are typically not noticed because of their intensity.	⑥	⑥	**1**
MILD INTENSITY Tics are not more forceful than comparable voluntary actions or utterances and are typically not noticed because of their intensity.	⑥	⑥	**2**
MODERATE INTENSITY Tics are more forceful than comparable voluntary actions but are not outside the range of normal expression for comparable voluntary actions or utterances. They may call attention to the individual because of their forceful character.	⑥	⑥	**3**
MARKED INTENSITY Tics are more forceful than comparable voluntary actions or utterances and typically have an "exaggerated" character. Such tics frequently call attention to the individual because of their forceful and exaggerated character.	⑥	⑥	**4**
SEVERE INTENSITY Tics are extremely forceful and exaggerated in expression. These tics call attention to the individual and may result in risk of physical injury (accidental, provoked, or self-inflicted) because of their forceful expression.	⑥	⑥	**5**

COMPLEXITY

	Motor	Phonic	
NONE If present, all tics are clearly "simple" (sudden, brief, purposeless) in character.	⑥	⑥	**0**
BORDERLINE Some tics are not clearly "simple" in character.	⑥	⑥	**1**
MILD Some tics are clearly "complex" (purposive in appearance) and mimic brief "automatic" behaviors, such as grooming, syllables, or brief meaningful utterances such as "ah huh," "hi" that could be readily camouflaged.	⑥	⑥	**2**

MODERATE Some tics are more "complex" (more purposive and sustained in appearance) and may occur in orchestrated bouts that would be difficult to camouflage but could be rationalized or "explained" as normal behavior or speech (picking, tapping, saying "you bet" or "honey", brief echolalia).	⑥	⑥	**3**
MARKED Some tics are very "complex" in character and tend to occur in sustained orchestrated bouts that would be difficult to camouflage and could not be easily rationalized as normal behavior or speech because of their duration and/or their unusual, inappropriate, bizarre or obscene character (a lengthy facial contortion, touching genitals, echolalia, speech atypicalities, longer bouts of saying "what do you mean" repeatedly, or saying "fu" or "sh").	⑥	⑥	**4**
SEVERE Some tics involve lengthy bouts of orchestrated behavior or speech that would be impossible to camouflage or successfully rationalize as normal because of their duration and/or extremely unusual, inappropriate, bizarre or obscene character (lengthy displays or utterances often involving copropraxia, self-abusive behavior, or coprolalia).	⑥	⑥	**5**

INTERFERENCE

	Motor	**Phonic**	
NONE	⑥	⑥	**0**
MINIMAL When tics are present, they do not interrupt the flow of behavior or speech.	⑥	⑥	**1**
MILD When tics are present, they occasionally interrupt the flow of behavior or speech.	⑥	⑥	**2**
MODERATE When tics are present, they frequently interrupt the flow of behavior or speech.	⑥	⑥	**3**
MARKED When tics are present, they frequently interrupt the flow of behavior or speech, and they occasionally disrupt intended action or communication.	⑥	⑥	**4**
SEVERE When tics are present, they frequently disrupt intended action or communication.	⑥	⑥	**5**

IMPAIRMENT

NONE	⑥	**0**
MINIMAL Tics associated with subtle difficulties in self-esteem, family life, social acceptance, or school or job functioning (infrequent upset or concern about tics vis a vis the future, periodic, slight increase in family tensions because of tics, friends or acquaintances may occasionally notice or comment about tics in an upsetting way).	⑥	**10**
MILD Tics associated with minor difficulties in self-esteem, family life, social acceptance, or school or job functioning.	⑥	**20**
MODERATE Tics associated with some clear problems in self-esteem family life, social acceptance, or school or job functioning (episodes of dysphoria, periodic distress and upheaval in the family, frequent teasing by peers or episodic social avoidance, periodic interference in school or job performance because of tics).	⑥	**30**
MARKED Tics associated with major difficulties in self-esteem, family life, social acceptance, or school or job functioning.	⑥	**40**
SEVERE Tics associated with extreme difficulties in self-esteem, family life, social acceptance, or school or job functioning (severe depression with suicidal ideation, disruption of the family (separation/divorce, residential placement), disruption of social tics - severely restricted life because of social stigma and social avoidance, removal from school or loss of job).	⑥	**50**

Clinical Global Impressions Scale

CLINICAL GLOBAL IMPRESSIONS (CGI) SCALE

Subject's Initials_____ Date_____

Rater's initials_____ Informant_____

1. Severity of Illness
Considering your total clinical experience with this particular population, how ill is the subject at this time?

0 = Not assessed
1 = Normal, not at all ill
2 = Borderline ill
3 = Mildly ill
4 = Moderately ill
5 = Markedly ill
6 = Severely ill
7 = Extremely ill

☐ Rating

2. Global Improvement
Rate the total improvement, whether or not, in your judgment, it is due entirely to treatment. Compared to the subject's condition at baseline, how much has the subject changed?

0 = Not assessed
1 = Very much improved
2 = Much improved
3 = Improved
4 = Minimally improved
5 = No Change
6 = Minimally worse
7 = Much worse
8 = Very much worse

☐ Rating

General Interview Questions

TIC HISTORY

1. Any new tics start after treatment? (SEE TIME COURSE - TICS)

Follow Up Questions: Which ones? When did they start? What was happening before they started? What happened after? How manage them? What was the outcome?

2. Were there periods of time where tics got better or worse? (SEE TIME COURSE - TICS)

Follow Up Questions: Which ones? When did they start? What was happening before they started? What happened after? How manage them? What was the outcome?

***For each time period, have subject rate severity of tics using SUDS ratings of 0-10, A rating of 0 indicates that tics either were not occurring or produces absolutely no distress or discomfort. A score of 10 indicates that tics are creating significant amounts of distress or discomfort. Also inquire about age(s) during each period.**

TIME COURSE - TICS

Time Period	Tic	Antecedents	Consequences
Middle/Junior High School SUDS= Ages=			
Begin High School SUDS= Ages=			
High School SUDS= Ages=			
Graduate High School SUDS= Ages=			
Begin College/Work SUDS= Ages=			

3. Have you tried any additional treatments for tics since the study ended?

Type	Start Date	Stop Date	Outcome
Medications			
Therapy			
Other (specify)			

4. Have you tried any additional treatments for psychological or behavioral problems since the study ended?

Type	Start Date	Stop Date	Outcome
Medications			
Therapy			
Other (specify)			

5. Have you ever been diagnosed with Obsessive-Compulsive Disorder (OCD)?

When were you diagnosed?

How were you diagnosed?

6. Have you ever been diagnosed with Attention Deficit Hyperactivity Disorder (ADHD)?

When were you diagnosed?

How were you diagnosed?

7. Since completing the study, have you had any negative life events such as trauma, accidents, loss, serious illnesses, hospitalizations, major life changes? (SEE ADVERSE EVENTS)

ADVERSE EVENTS

Severity*	Causal Relationship	Action Taken	Outcome
1=Mild 2=Moderate 3=Severe 4=Serious	1=Definitely related to TS 2=Probably related to TS 3=Possibly related to TS 4=Not Related to TS *If no or possible* 5=Related to comorbid disorder 6=Related to RX/Substance 7=Unknown	1=None 2=Remedial therapy-pharmacologic 3=Remedial therapy – nonpharmacological 4=Referral for treatment 5=Hospitalization	1=Resolved, No sequelae 2=AE still present – no treatment 3=AE still present – being treated 4=Residual effects present - no treatment 5=Residual effects present – being treated 6=Unknown

Event	Start Date	Stop Date	Severity	Causal Relationship	Action Taken	Outcome

***Mild** = minor complaint causing no interference and not requiring any intervention
Moderate = more than minimal problem, source of some interference and may require intervention
Severe = significant complaint, definite interference requiring some intervention
Serious = life threatening, a potential for long-term disability, and/or requiring hospitalization

REINFORCEMENT/EXTINCTION

1. Did you continue the rewards program learned while in treatment?

1.b. For how long?

No/NA (0)	1 WK (1)	1 WK-1 MO (2)	1-6 MO (3)	6 MO-1 YR (4)	1-5 YR (5)	Current (6)

2. Did you receive rewards for using competing response/exercises after treatment?

2.b. For how long?

No/NA (0)	1 WK (1)	1 WK-1 MO (2)	1-6 MO (3)	6 MO-1 YR (4)	1-5 YR (5)	Current (6)

3. What types of rewards were given?

a. Were rewards typically something could get otherwise, outside of whether or not you used treatment strategies?

No Rewards (0)	Yes (1)	No (2)

b. Were rewards typically something you deemed very valuable or really wanted?

No Rewards (0)	Yes (1)	No (2)

4. How often were you given rewards, including praise, for using competing responses/exercises?

Never (0)	Every time (0)	Every other time (1)	Daily (1)	Weekly (1)	Monthly (1)

5. How soon did you receive receive rewards after using competing responses/exercises?

N/A (0)	Immediately (0)	Within 24 hours (1)	Within the week (1)	Within the month (1)

6. How much time during the week would you typically practice using new competing responses/exercises?

N/A (0)	Once (0)	0-30 min (0)	30-90 min (1)	90 min - 2 hours (2)	2+ hours (3)

TREATMENT DURABILITY

1. How long did you continue using competing responses/exercises after treatment?

No/NA (0)	1 WK (1)	1 WK-1 MO (2)	1-6 MO (3)	6 MO-1 YR (4)	1-5 YR (5)	Current (6)

a. Examples of competing responses you continued to use?

b. Were the competing responses effective?

c. Did you include others to help you continue using competing responses?

2. Did you develop new competing responses/exercises after treatment (Y/N)?

No/NA (0)	1 WK (1)	1 WK-1 MO (2)	1-6 MO (3)	6 MO-1 YR (4)	1-5 YR (5)	Current (6)

a. Examples of new competing responses developed?

b. Effective?

c. Include Others?

3. How often were you prompted to use your competing responses/exercises?

Never/NA (0)	Yearly (1)	Monthly (2)	Weekly (3)	Daily (4)	Constantly (5)

a. Who prompted you?

b. How many people prompted you?

4. Continue monitoring new tics after treatment (Y/N)?

No/NA (0)	1 WK (1)	1 WK-1 MO (2)	1-6 MO (3)	6 MO-1 YR (4)	1-5 YR (5)	Current (6)

a. Examples of new tics that were monitored?

b. Was monitoring effective?

c. Did you include others to help you monitor new tics?

5. Implement functional interventions (e.g., reducing time in situations where you tended to tic more, etc.) after treatment?

No/NA (0)	1 WK (1)	1 WK-1 MO (2)	1-6 MO (3)	6 MO-1 YR (4)	1-5 YR (5)	Current (6)

a. Examples of functional interventions used after treatment?

b. Were they effective?

c. Did you include others to help you implement these interventions?

6. Did parent/support person continue helping you with current and new tics after treatment(Y/N)?

No/NA (0)	1 WK (1)	1 WK-1 MO (2)	1-6 MO (3)	6 MO-1 YR (4)	1-5 YR (5)	Current (6)

a. Examples?

b. Effective?

c. Include Others?

7. Which of the following treatment aspects do you currently use? (circle all that apply)

None (0)	CR/Exercises (1)	Monitoring (1)	Functional Interventions—such as reducing time in situations that make tics worse, etc. (1)	Social Support (1)	Other (specify) (1)

8. Upon completing treatment, how did other react to your ability to manage your tics?

No Difference (0)	Positive Reactions (1)	Negative Reactions (0)	Neutral Reactions (1)

9. Upon completing treatment, how did other react to your change in of tics if there was a change?

No Difference (0)	Positive Reactions (1)	Negative Reactions (0)	Neutral Reactions (1)

10. Upon after completing treatment, how did other react to your use of competing responses/exercises?

No Difference (0)	Positive Reactions (1)	Negative Reactions (0)	Neutral Reactions (1)

TREATMENT ACCEPTABILITY

1. Which treatment, or treatments did you receive?

2. Which parts of the treatment(s) you did you like?

3. Which parts of the treatment(s) did you dislike?

4. Which parts of the treatment(s) were most helpful?

5. Which parts of the treatment(s) were not helpful?

6. Anything you would change or add to the treatment(s)?

Appendix B

Self Report Measures – All Subjects

Demographics Form-Parent Version

Subject's Initials_____ Date_____
Subject's ID#_____ Informant_____

MEDICAL HISTORY/DEMOGRAPHICS – PARENT FORM

DEMOGRAPHICS

1. Date of Birth 1. ☐☐ ☐☐ ☐☐☐☐ (Month / Date / Year)

2. Gender (1 = Female, 2 = Male) 2. ☐

3. Do you consider yourself to be Hispanic or Latino? 3. ☐
   0 = Not Hispanic or Latino
   1 = Hispanic or Latino

3a. What race do you consider yourself to be? Select one 3a ☐
   1 = White
   2 = Black or African American
   3 = American Indian or Alaska Native
   4 = Asian
   5 = Native Hawaiian or Other Pacific Islander

4. Handedness (1 = Right, 2 = Left, 3 = Mixed) 4. ☐

5. Parent's occupation: (5a = Mother, 5b = Father)
   a. Mother's Occupation_____
   b. Father's Occupation_____

5a. Office Use Only	01 = Homemaker	05 = Technical	09 = Other, Mother (specify) _____ ☐☐
	02 = Laborer	06 = Professional	
	03 = Clerical	07 = Farmer	10 = Other, Father (specify) _____ ☐☐
5b.	04 = Craftsman or artist	08 = Self-employed	

6. Parents highest education received (6a = mother, 6b = father):
   1=less than 7 years of schooling
   2=junior high school
   3=partial high school
   5=technical college
   6=partial college
   7=college graduate
   6a. ☐ ☐

4=high school graduate 8=professional degree 6b.

7a. Number of siblings (include adopted and step-siblings). 7a. ☐☐

7b. Number of other children living with participant (include adopted and step siblings). 7b. ☐☐

8. Living arrangements 8. ☐
1 = Lives with both parents (same residence)
2 = Lives with both parents (different residence)
3 = Lives with one parent
4 = Lives with other relative
5 = Lives with adoptive parent(s)
6 = Other (specify) _____

Lifetime Diagnosis for Child (0=No, 1=Yes)

1. Perinatal insult or serious neonatal illness ☐
1. If Yes = 1, describe
_____

2. Pulmonary (including asthma)_____ ☐
2.

3. Cardiovascular (including high blood pressure) _____ ☐
3.

4. Heart Murmur _____ ☐
4.

5. Renal _____ ☐
5.

6. Hepatic _____ ☐
6.

7. Gastrointestinal _____ ☐
7.

8. Endocrine/Metabolic (including diabetes) _____ ☐
8.

☐

9. Ophthalmologic _____ ☐
9.

10. Dermatologic _____ ☐
10.

11. Neurologic (other than ADHD or tics) _____ ☐
11.

12. Head Injury_____ ☐
12.

13. Migraine Headaches (diagnosed)_____ ☐
13.

14. Urologic_____ ☐
14.

15. Gynecologic_____ ☐
15.

16. Psychiatric (other than OCD)_____ ☐
16.

17. Major Surgeries _____ ☐
17.

18. Allergies_____ ☐
18.

19. Musculoskeletal_____ ☐
19.

20. Encephalitis_____ ☐
20.

21. Meningitis_____ ☐
21.

22. COMMENTS:

_____

_____

_____

MEDICATIONS

Please review carefully and complete the following medications chart. Check all medications the child has ever taken and/or is currently taking. (Note: The drug chart includes names from both Europe and North America)

Medication	Ever Taken?	Indication	Start Date MM/YEAR	Stop Date MM/YEAR	Dose	Benefit (0=worsened 1=improved 4=unchanged 9=uncertain)
Neuroleptics:	**YES NO**					
1. Haloperidol (Haldol)	Y N					
2. Fluphenazine (Prolixin)	Y N					
3. Pimozide (Orap)	Y N					
4. Other	Y N					
Atypical Neuroleptics:	Y N					
5. Olanzapine (Zyprexa)						
6. Quetiapine (Seroquel)	**YES NO**					
	Y N					
7. Risperidone (Risperidal)	Y N					
8. Ziprasidone (Geodon)	Y N					

9. Aripiprazole	Y N					
10. Other	Y N					
SRIs: 11. Citalopram (Celexa)	Y N					
12. Clomipramine (Anafranil)	**YES** **NO** Y N					
13. Fluoxetine (Prozac)	Y N					
14. Fluvoxamine (Luvox)	Y N					
15. Paroxetine (Paxil)	Y N					
16. Sertraline (Zoloft)	Y N					
	Y N					

Antidepressants: 17. Bupropion (Welbutrin)	**YES** **NO** Y N					
18. Mirtazapine (Remeron)	Y N					
19. Nefazadone (Serzone)	Y N					
20. Nortriptyline (Pamelor)	Y N					
21. Venlafaxine (Effexor)	Y N					
22. Strattera	Y N					
23. Other	Y N					

Medication	Ever Taken?	Indication	Start Date MM/YEAR	Stop Date MM/YEAR	DOSE	Benefit (0=worsened 1=improved 4=unchanged 9=uncertain)
Psychostimulants:	**YES NO**					
24. Amphetamine (Dexedrine, ADDerall)	Y N					
25. Methylphenidate (Ritalin, Concerta, Metadate)	Y N					
26. Pemoline (Cylert)	Y N					
Alpha agonists:	**YES NO**					
27. Clonidine (Catapres)	Y N					
28. Guanfacine (Tenex)	Y N					
Mood stabilizers:	**YES NO**					
29. Carbamazepine (Tegretol)	Y N					
30. Gabapentin (Neurontin)	Y N					
31. Lamotrigine (Lamictal)	Y N					
32. Lithium carbonate	Y N					
33. Oxcarbazepine (Trileptal)	Y N					
34. Tiagabine (Gabatril)	Y N					
35. Topiramate (Topomax)	Y N					
36. Valproic acid (Depakote, Depakene)	Y N					

37. Other	Y N					
Benzodizepines: 38. Clonazepam (Klonopin)	**YES** **NO** Y N					
39. Lorazepam (Ativan)	Y N					
40. Other	Y N					
Injections: 41.Botulinum toxin (Botox)	**YES** **NO** Y N					
Unclassified: 41. Pergolide (Permax)	**YES** **NO** Y N					
42. Other 1:	Y N					
43. Other 2:	Y N					

Demographics Form – Adult Version

MEDICAL HISTORY/DEMOGRAPHICS – ADULT FORM

Subject ID #_____ Date_____

Rater's Initials: _____ Informant_____

DEMOGRAPHICS

1. Date of Birth 1. ☐☐ ☐☐ ☐☐☐☐ (Month Date Year)

2. Gender (1 = Female, 2 = Male 3 = Transgendered) 2. ☐

3. Do you consider yourself to be Hispanic or Latino? 3. ☐
   0 = Not Hispanic or Latino
   1 = Hispanic or Latino

3a. What race do you consider yourself to be? Select one 3a. ☐
   1 = White
   2 = Black or African American
   3 = American Indian or Alaska Native
   4 = Asian
   5 = Native Hawaiian or Other Pacific Islander

4. Handedness (1 = Right, 2 = Left, 3 = Mixed) 4. ☐

7. Occupation:
   Occupation_____

01 = Homemaker	05 = Technical	09 = Student
02 = Laborer	06 = Professional	10 = Other: Specify _____
03 = Clerical	07 = Farmer	
04 = Craftsman or artist	08 = Self-employed	

☐☐

8. Highest education received
   1=less than 7 years of schooling
   2=junior high school
   3=partial high school
   4=high school graduate
   5=technical college
   6=partial college
   7=college graduate
   8=professional degree

6. ☐

☐☐

7. Number of children (include adopted and step-children). 7.

8. Marital Status
   1 = Never married
   2 = Married
   3 = Separated
   4 = Divorced
   5 = Widowed

9. Living arrangements 8. ☐
   1 = Lives alone
   2 = Lives with partner (same residence)
   3 = Lives with partner and children (same residence)
   4 = Lives with parent(s) or other relative (specify_____)
   5 = Other (specify) _____

Medical History (0=No, 1=Yes)

1. Perinatal insult or serious neonatal illness ☐
   1. If Yes = 1, describe
_____

2. Pulmonary (including asthma)_____ ☐
   2.

3. Cardiovascular (including high blood pressure) _____ ☐
   3.

4. Heart Murmur _____ ☐
   4.

5. Renal _____ ☐
   5.

6. Hepatic _____ ☐
   6.

7. Gastrointestinal _____ ☐
   7.

8. Endocrine/Metabolic (including diabetes) _____ ☐
   8.

9. Ophthalmologic _____ ☐
   9.

10. Dermatologic _____ ☐
10.

11. Neurologic (other than ADHD or tics) _____ ☐
11.

12. Head Injury_____ ☐
12.

13. Migraine Headaches (diagnosed)_____ ☐
13.

14. Urologic_____ ☐
14.

15. Gynecologic_____ ☐
15.

16. Psychiatric (other than OCD)_____ ☐
16.

17. Major Surgeries _____ ☐
17.

18. Allergies_____ ☐
18.

19. Musculoskeletal_____ ☐
19.

20. Encephalitis_____ ☐
20.

21. Meningitis_____ ☐
21.

22. COMMENTS:

_____

_____

_____

MEDICATIONS

Please review carefully and complete the following medications chart. Check all medications that you have ever taken and/or are currently taking. (Note: The drug chart includes names from both Europe and North America)

Medication	Ever Taken?	Indication	Start Date MM/YEAR	Stop Date MM/YEAR	Dose	Benefit (0=worsened 1=improved 4=unchanged 9=uncertain)
Neuroleptics: 1. Haloperidol (Haldol)	**YES NO** Y N					
2. Fluphenazine (Prolixin)	Y N					
3. Pimozide (Orap)	Y N					
4. Other	Y N					
Atypical Neuroleptics: 5. Olanzapine (Zyprexa)	Y N					
6. Quetiapine (Seroquel)	**YES NO** Y N					
7. Risperidone (Risperidal)	Y N					
8. Ziprasidone (Geodon)	Y N					
9. Aripiprazole	Y N					
10. Other	Y N					
SRIs: 11. Citalopram (Celexa)	Y N					
12. Clomipramine (Anafranil)	**YES NO** Y N					

13. Fluoxetine (Prozac)	Y N					
14. Fluvoxamine (Luvox)	Y N					
15. Paroxetine (Paxil)	Y N					
16. Sertraline (Zoloft)	Y N					
17. Other	Y N					

Antidepressants:	**YES NO**					
18. Bupropion (Welbutrin)	Y N					
19. Mirtazapine (Remeron)	Y N					
20. Nefazadone (Serzone)	Y N					
21. Nortriptyline (Pamelor)	Y N					
22. Venlafaxine (Effexor)	Y N					
23. Strattera	Y N					
24. Other	Y N					
Medication	**Ever Taken ?**	**Indication**	**Start Date MM/YEAR**	**Stop Date MM/YEAR**	**DOSE**	**Benefit (0=worsened 1=improved 4=unchanged 9=uncertain)**
Psychostimulants:	**YES NO**					
25. Amphetamine (Dexedrine, ADDerall)	Y N					

26. Methylphenidate (Ritalin, Concerta, Metadate)	Y N					
27. Pemoline (Cylert)	Y N					
Alpha agonists: 28. Clonidine (Catapres)	**YES NO** Y N					
29. Guanfacine (Tenex)	Y N					
Mood stabilizers: 30. Carbamazepine (Tegretol)	**YES NO** Y N					
31. Gabapentin (Neurontin)	Y N					
32. Lamotrigine (Lamictal)	Y N					
33. Lithium carbonate	Y N					
34. Oxcarbazepine (Trileptal)	Y N					
35. Tiagabine (Gabatril)	Y N					
36. Topiramate (Topomax)	Y N					
37. Valproic acid (Depakote, Depakene)	Y N					
38. Other	Y N					
Benzodizepines: 39. Clonazepam (Klonopin)	**YES NO** Y N					

40. Lorazepam (Ativan)	Y N					
41. Other	Y N					
Injections: 42.Botulinum toxin (Botox)	**YES NO** Y N					

Unclassified: 43. Pergolide (Permax)	**YES NO** Y N					
44. Other 1:	Y N					
45. Other 2:	Y N					

CBIT Knowledge of Treatment Test

Please choose the answer that **best** reflects what you learned during the course of your treatment at the University of Wisconsin-Milwaukee Tic Disorders Clinic

1. Which of the following is *not* one of the three rules of a good competing response?
a. It should block the tic.
b. It should be complex.
c. It should not be noticeable.
d. It should be able to be done anywhere.

2. How long should you hold a competing response?
a. Thirty seconds or until the urge goes away, whichever is longer.
b. One minute or until the urge goes away, whichever is longer.
c. As long as you want to hold it.
d. Until someone notices you doing it.

3. If you had a tic where your head jerked to one side, which of the following would be a good competing response?
a. To gently squeeze your hands into fists.
b. To rotate your head in circles counter clockwise.
c. Dip your chin slightly and gently tense the muscles on the sides of your neck.
d. Leave whatever situation you are in immediately.

4. When should you use a competing response?
a. Whenever you think about tics.
b. Whenever you feel an urge to tic.
c. Whenever you feel an urge to tic or after a tic occurs.
d. Whenever you talk about tics.

5. Tics are most commonly diagnosed around which ages?
a. Ages 3-5
b. Ages 5-7
c. Ages 7-9
d. Ages 9-11

6. In addition to competing responses, what are some other effective strategies you might use to reduce frequency of tics?
a. Hold your breath.
b. Deep breathing and muscle relaxation.
c. Try as hard as you can not to think about tics.
d. There are no other strategies.

7. In order to become more aware of how often and where your tics usually occur, which strategy might you use?
a. Ask someone you know to tell you.
b. Try to estimate the number on your own.
c. Select the first number comes to mind.
d. Keep track of the tics when they occur over the course of the day or the week.

8. If you notice your tics occur more in certain situations, what are some strategies you might use?
a. Avoid or change the situation if you can, or set up reminders to use your competing responses as needed.
b. Stay in those situations for as long as possible.
c. Bring someone with you to those situations.
d. There are no strategies in those situations.

9. Which of the following is an effective way for a close friend or family member help you manage your tics?
a. Whenever they see you ticcing they tell you to stop.
b. Whenever they see you ticcing they tell someone else.
c. Whenever they see you ticcing they remind you to use your competing response.
d. Whenever they see you ticcing they call a doctor.

10. Tic disorders are more common in:
a. Boys
b. Girls

11. Which of the following is an *incorrect* way to do diaphragmatic, or relaxed breathing?
a. Expand your stomach while breathing.
b. Breath in through your nose and out through your mouth.
c. Breath in for a longer period of time than you breath out.
d. Keep your chest still while breathing.

12. A common neurological theory used to explain tics is:
a. Deficits in the Cortico-striatal-thalamo-cortical pathway
b. Deficits in the hypothalamic-pituitary pathway
c. Deficits in the posterior-sensorimotor pathway
d. Deficits in the medial temporal-singulate-gyrus pathway

13. Since the study ended, have you searched for information regarding tic disorders on the internet, the Tourette Syndrome Association website, or other sources?
a. Yes
b. No

14. How much time have you spent researching information on tic disorders since the study ended?
a. None
b. A little bit of time spent researching information.
c. Some time spent researching information.
d. A lot of time spent researching information.

SAS-SR
Child/Adolescent Report

Subject's Initials_____ Date_____

Informant_____

Instructions: We are interested in finding out how you have been doing in the **last two (2) weeks.** We would like you to circle the answer that best describes your behavior in school, with friends, and at home for the **last two (2) weeks.**

1. How many days of classes did you miss in the last 2 weeks?
   O No days missed.
   O A few days missed
   O I missed about half the time
   O I missed more than half time but did make at least one day
   O I did not go to classes at all

2. Have you been able to keep up with your classwork in the last 2 weeks?
   O I did my work very well
   O I did my work well but had some problems
   O I needed help with my work and did not do well about half the time
   O I did my work poorly most of the time
   O I did my work poorly all of the time

3. During the last 2 weeks, have you been ashamed of how you do your schoolwork?
   O I never felt ashamed
   O Once or twice I felt ashamed
   O About half the time I felt ashamed
   O I felt ashamed most of the time
   O I felt ashamed all of the time

4. Have you had any arguments with kids at school in the last 2 weeks?
   O I had no arguments and got along very well
   O I usually got along well but had some problems
   O I had more than one argument
   O I had many arguments
   O I did not attend school; can't answer

5. Have you felt unhappy at school during the last 2 weeks?
   O I never felt unhappy
   O Once or twice I felt unhappy
   O Half the time I felt unhappy

O I felt unhappy most of the time
O I felt unhappy all of the time
O I did not attend school; can't answer

6. Have you felt found your schoolwork interesting in these last 2 weeks?
   O My work was almost always interesting
   O Once or twice my work was not interesting
   O Half the time my work was not interesting
   O Most of the time my work was not interesting
   O My work was never interesting

7. How many friends have you seen or spoken to in the last 2 weeks?
   O Nine or more friends
   O Five to Eight friends
   O Two to Four friends
   O One friend
   O No friends

8. Have you been able to talk about your feelings and problems with at least one friend during the last 2 weeks?
   O I can always talk about my feelings
   O I usually talk about my feelings
   O About half the time I felt able to talk about my feelings
   O I usually was not able to talk about my feelings
   O I was never able to talk about my feelings
   O I have no friends; can't answer

9. How many times in the last two weeks have you been with other kids? For example: visited friends, gone to movies, bowling, invited friends to your home?
   O More than three times
   O Three times
   O Twice
   O Once
   O None

10. How much time have you spent on hobbies or other activities during the last 2 weeks? For example: arts and crafts, sports, reading?
    O I spent most of my spare time on hobbies almost every day
    O I spent some spare time on hobbies some of the days
    O I spent a little spare time on hobbies
    O I usually did not spend any time on hobbies but did watch t.v.
    O I did not spend any spare time on hobbies or watching t.v.

11. Have you had arguments with your friends in the last 2 weeks?
    O I had no arguments and got along very well
    O I usually got along well but had some arguments
    O I had more than one argument
    O I had many arguments
    O I was always in arguments
    O I have no friends; can't answer

12. If your feelings were hurt by a friend during the last 2 weeks, how badly did you take it?
    O If did not bother me or it did not happen
    O I got over it in a few hours
    O I got over it an a few days
    O I got over it in a week
    O It will take me a long time to feel better
    O I have no friends; can't answer

13. Have you felt shy or nervous with people in the last 2 weeks?
    O I always felt o.k.
    O Sometimes I felt nervous but could relax after a while
    O About half the time I felt nervous
    O I usually felt nervous
    O I always felt nervous
    O I was never with people; can't answer

14. Have you felt lonely and wished for more friends during the last 2 weeks?
    O I have not felt lonely
    O I have felt lonely a few times
    O About half the time I felt lonely
    O I usually felt lonely
    O I always felt lonely and wished for more friends

15. Have you felt bored in your spare time during the last 2 weeks?
    O I never felt bored
    O I usually did not feel bored
    O About half the time I felt bored
    O Most of the time I felt bored
    O I was constantly bored

Family:

16. Have you had arguments with your parents in the last 2 weeks?
    O We always got along very well
    O We usually got along very well but had some arguments
    O I had more than one argument with at least one parent
    O I had many arguments
    O I was always in arguments

17. Have you been able to talk about your feelings and problems with your parents in the last 2 weeks?
    O I can always talk about my feelings with my parents
    O I usually can talk about my feelings
    O About half the time I felt able to talk about my feelings
    O I usually was not able to talk about my feelings
    O I was never able to talk about my feelings
    O No contact with my parents in the last 2 weeks; can't answer

18. Have you wanted to do THE OPPOSITE of what your parents wanted in order to make them angry during the past 2 weeks?
    O I never wanted to do the opposite of what my parents wanted
    O Once or twice I wanted to do the opposite of what my parents wanted
    O About half the time I wanted to do the opposite
    O Most of the time I wanted to do the opposite
    O I always wanted to do the opposite

19. Have you been worried about things happening to your family without good reason in the last 2 weeks?
    O I have not worried without reason
    O Once or twice I worried
    O About half the time I worried
    O Most of the time I worried
    O I have worried the entire time

20. During the past 2 weeks, have you been thinking that you have let your family down or have been unfair to them at any time?
    O I did not feel that I let them down at all
    O I usually did not feel that I let them down
    O About half the time I felt that I let them down
    O Most of the time I felt that I let them down
    O I always felt that I let them down

21. During the last 2 weeks, have you been thinking that your family let you down or has been unfair to you?
    O I never felt that they let me down
    O I felt that they usually did not let me down
    O About half the time I felt they let me down
    O I usually have felt that they let me down
    O I am very mad that they let me down

ADOLESCENTS ONLY: (12-17 years old)

22. How many times have you been on a date these last two weeks?
    O More than three times
    O Three times
    O Twice
    O Once
    O None
    O Under age 12; can't answer

23. Have you been interested in dating during the last 2 weeks?
    O I was always interested in dating
    O Most of the time I was interested
    O About half the time I was interested
    O Most of the time I was not interested
    O I was completely uninterested
    O Under age 12; can't answer

SAS-SR
Adult Report

Subject's Initials_____ Date_____

Informant_____

Instructions: We are interested in finding out how you have been doing in the **last two (2) weeks.** We would like you to answer some questions about your work, your spare time, and your family life. There are no right or wrong answers to these questions. Before starting, please fill out the information at the top of the answer form. Answer the questions by circling your reponse.

A. Work For Pay
Do you work 15 hours or more per week for pay?
*If **YES**, please answer questions 1-3. If **NO**, skip to section* B. Housework (unpaid)

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1. How many days did you miss from work in the last 2 weeks?
   O I didn't miss any days.
   O I missed one day.
   O I missed about half the time.
   O I missed more than half time but did work at least one day.
   O I did not work any days because of scheduled vacation.

2. Have well you been able to do your work in the last 2 weeks?
   O I did my work very well.
   O I did my work well but had some minor problems.
   O I needed help with my work and did not do well about half the time.
   O I did my work poorly most of the time
   O I did my work poorly all of the time

3. How often have you been ashamed of how you did your work in the last 2 weeks?
   O I never felt ashamed.
   O Once or twice I felt ashamed.
   O About half the time I felt ashamed.
   O I felt ashamed most of the time.
   O I felt ashamed all of the time.

B. Housework (unpaid)
Is unpaid housework a significant activity in your life?
*If **YES**, please answer questions 4-6. If **NO**, skip to section* C. Student

4. How often did you do some unpaid housework (e.g., cooking, cleaning, laundry, grocery shopping, and errands) in the past 2 weeks?
   O I did housework every day.
   O I did housework almost every day.
   O I did housework about half the time.
   O I did not usually do the housework.
   O I was completely unable to do housework.
   O I was away from home all of the last 2 weeks.

5. During the last 2 weeks, how well did you do your housework?
   O I did my work very well.
   O I did my work well but had some minor problems.
   O I needed help with my work and did not do well about half the time.
   O I did my work poorly most of the time
   O I did my work poorly all of the time

6. How often have you been ashamed of how you did your housework in the last 2 weeks?
   O I never felt ashamed.
   O Once or twice I felt ashamed.
   O About half the time I felt ashamed.
   O I felt ashamed most of the time.
   O I felt ashamed all of the time.

C. Student
Do you attend school at least half time?
*If **YES**, please answer questions 7-9. If **NO**, skip to section* D. Social and Leisure

7. How many days of classes did you miss in the past 2 weeks?
   O I didn't miss any days.
   O I missed one day.
   O I missed about half the time.
   O I missed more than half time but did work at least one day.
   O I did not work any days because of scheduled vacation.

8. Have well you been able to keep up with your schoolwork in the last 2 weeks?
   O I did my schoolwork very well.
   O I did my schoolwork well but had some minor problems.

O I needed help with my schoolwork and did not do well about half the time.
O I did my schoolwork poorly most of the time
O I did my schoolwork poorly all of the time

9. During the last 2 weeks, how often have you been ashamed of how you did your schoolwork?
O I never felt ashamed.
O Once or twice I felt ashamed.
O About half the time I felt ashamed.
O I felt ashamed most of the time.
O I felt ashamed all of the time.

D. Social and Leisure
Please answer questions 10-12.

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10. How many friends have you seen or been in contact with in the last 2 weeks?
O Nine or more friends.
O Five to Eight friends.
O Two to Four friends.
O One friend.
O No friends.

11. How often have you felt lonely and wished for more friends during the last 2 weeks?
O I have not felt lonely.
O I have felt lonely a few times.
O I felt lonely about half the time.
O I usually felt lonely.
O I always felt lonely and wished for more friends.

12. How often have you felt bored in your spare time during the last 2 weeks?
O I never felt bored.
O I did not usually feel bored.
O About half the time I felt bored.
O Most of the time I felt bored.
O I was constantly bored.

E. Family Outside the Home

Answer questions 13-15 about your parents, brothers, sisters, in-laws, and children not living at home.

13. How often have you been able to talk about your feelings and problems with one of your relatives in the last 2 weeks?
    O I was always able to talk about my feelings with at least one relative.
    O I was usually talk about my feelings.
    O About half the time I was able to talk about my feelings.
    O I was not usually able to talk about my feelings.
    O I was never able to talk about my feelings.

14. Have you avoided contact with your relatives these last 2 weeks?
    O I have contacted relatives regularly.
    O I have contacted a relative at least once.
    O I have waited for my relatives to contact me.
    O I have avoided my relatives, but they contacted me.
    O My work was never interesting

15. During the last 2 weeks, have you been thinking that any of your relatives have let you down or have been unfair to you at any time?
    O I never felt that they let me down.
    O I felt that they usually did not let me down.
    O About half the time I felt they let me down.
    O I usually felt that they let me down.
    O I feel bitter that they let me down.

F. Primary Relationship

Are you living with your spouse or have you been living with a partner in an intimate relationship?
*If **YES**, please answer questions 16-18. If **NO**, skip to section* G. Parental

16. Have you had any open arguments with your partner in the last 2 weeks?
    O We had no arguments, and got along well.
    O We usually got along well but had minor arguments.
    O We had more than one argument.
    O We had many arguments.
    O We were constantly having arguments.

17. How often have you been able to talk about your feelings and problems with your partner in the last 2 weeks?
    O I could always talk freely about my feelings.
    O I could usually talk about my feelings.
    O About half the time I felt able to talk about my feelings.
    O I was not usually able to talk about my feelings.
    O I was never able to talk about my feelings.

18. How have you felt about your partner during the last 2 weeks?
    O I always felt affection.
    O I usually felt affection.
    O About half the time I felt dislike and half the time affection.
    O I usually felt dislike.
    O I always felt dislike.

G. Parental

Have you had unmarried children, stepchildren, or foster children living at home during the last 2 weeks?
*If **YES**, please answer questions 19-21. If **NO**, skip to section* H. Family Unit

---

19. How often have you been interested in what your children are doing—school, play, or hobbies—during the last 2 weeks?
    O I was always interested and actively involved.
    O I was usually interested and involved.
    O I was interested about half the time and uninterested half the time.
    O I was usually uninterested.
    O I was always uninterested.

20. Have you been able to talk and listen to your children during the last 2 weeks? (Include only children over the age of 2.)
    O I was always able to communicate with them.
    O I was usually able to communicate with them.
    O About half the time I could communicate.
    O I was not usually able to communicate.
    O I was completely able to communicate
    O Not applicable: No children over the age of 2.

21. How have you been getting along with your children during the last 2 weeks?
    O I had no arguments and got along very well.
    O I usually got along well but had minor arguments.
    O I had more than one argument.
    O I had many arguments.
    O I was constantly having arguments.

G. Family Unit

Have you ever been married, lived with a partner in an intimate relationship, or had children?
*If **YES**, please answer questions 22-23. If **NO**, skip to question 24*

22. Have you worried about your partner or any of your children without any reason during the last 2 weeks, even if you are not living together now?
    O I never worried.
    O Once or twice I worried.
    O About half the time I worry.
    O Most of the time I worry.
    O I always worried.
    O Not applicable: Partner and children not living.

23. During the last 2 weeks, have you been thinking that you have let down your partner or any of your children at any time?
    O I did not feel I let them down at all.
    O I did not usually feel that I let them down.
    O About half the time I felt I let them down.
    O Most of the time I felt that I let them down.
    O I let them down completely.

Everyone please answer question 24.

24. Have you had enough money to take care of your own and your immediate family's financial needs during the last two weeks?
    O I had enough money for needs.
    O I usually have enough money with minor problems.
    O About half the time I did not have enough money but did not have to borrow money.
    O I usually did not have enough money and had to borrow from others.
    O I had great financial difficulty.

Premonitory Urge Scale

Subject's Initials _____ Date_____
Rater's Initials _____ Informant_____

Please answer the following questions. Try to be very honest when you answer them. Circle the number that best describes how you feel.

	Not at all true	A little true	Pretty much true	Very much true
1. Right before I do a tic, I feel like my insides are itchy.	**1**	**2**	**3**	**4**
2. Right before I do a tic, I feel pressure inside my brain or body.	**1**	**2**	**3**	**4**
3. Right before I do a tic, I feel "wound up" or tense inside.	**1**	**2**	**3**	**4**
4. Right before I do a tic, I feel like something is not "just right."	**1**	**2**	**3**	**4**
5. Right before I do a tic, I feel like something isn't complete.	**1**	**2**	**3**	**4**
6. Right before I do a tic, I feel like there is energy in my body that needs to get out.	**1**	**2**	**3**	**4**
7. I have these feelings almost all the time before I do a tic.	**1**	**2**	**3**	**4**
8. These feelings happen for every tic I have.	**1**	**2**	**3**	**4**
9. After I do the tic, the itchiness, energy, pressure, tense feelings, or feelings that something isn't "just right" or complete go away, at least for a little while.	**1**	**2**	**3**	**4**
10. I am able to stop my tics, even if only for a short period of time.	**1**	**2**	**3**	**4**

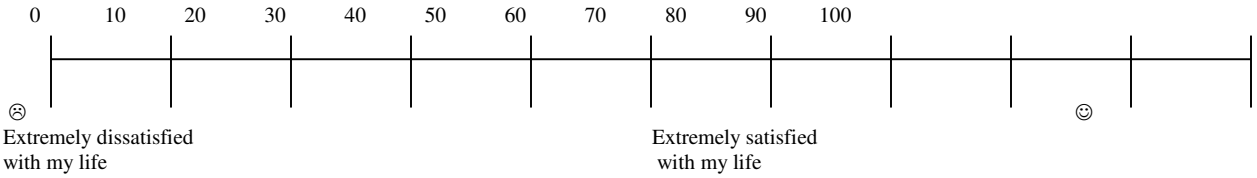
Gilles de la Tourette Syndrome – Quality of Life scale (GTS-QOL)

Having a health problem can affect a person's quality of life in many different ways. This questionnaire addresses the issue of how your illness affects your well-being. Please put one cross in the box corresponding to the answer that fits your feelings best.
Note that this list includes many problems that you may never experience.

In the last 4 weeks have you	No Problem	Slight Problem	Moderate Problem	Marked Problem	Extreme Problem
1. Been unable to control all your movements?	☐	☐	☐	☐	☐
2. Had difficulty with daily life activities or hobbies (e.g. cooking, writing)?	☐	☐	☐	☐	☐
3. Suffered from pain or physical injuries as a result of your tics?	☐	☐	☐	☐	☐
4. Felt troubled by noises you could not stop making?	☐	☐	☐	☐	☐
5. Been worried about using swear words you did not mean to say?	☐	☐	☐	☐	☐
6. Been worried about doing something embarrassing (e.g. rude gestures)?	☐	☐	☐	☐	☐
7. Had to repeat words over and over?	☐	☐	☐	☐	☐
8. Had to repeat things that other people did or said (copying people)?	☐	☐	☐	☐	☐
9. Had to do things over and over again, in a certain way (e.g. checking, touching)?	☐	☐	☐	☐	☐
10. Experienced unpleasant thoughts or pictures going through your mind?	☐	☐	☐	☐	☐
11. Had difficulty concentrating?	☐	☐	☐	☐	☐
12. Had problems with your memory?	☐	☐	☐	☐	☐

13. Lost or misplaced important things (e.g. wallet, keys, mobile phone)?	☐	☐	☐	☐	☐
14. Had difficulty finishing your tasks once you have started them?	☐	☐	☐	☐	☐
15. Felt generally in poor health?	☐	☐	☐	☐	☐
16. Felt sad or depressed?	☐	☐	☐	☐	☐
17. Experienced rapid changes in your mood(s)?	☐	☐	☐	☐	☐
18. Experienced lack of self-confidence?	☐	☐	☐	☐	☐
19. Felt anxious?	☐	☐	☐	☐	☐
20. Felt restless?	☐	☐	☐	☐	☐
21. Had difficulty controlling your temper?	☐	☐	☐	☐	☐
22. Felt you were not in control of your life?	☐	☐	☐	☐	☐
23. Felt frustrated?	☐	☐	☐	☐	☐
24. Felt you needed more help or support from other people?	☐	☐	☐	☐	☐
25. Experienced difficulty seeing your friends?	☐	☐	☐	☐	☐
26. Had difficulty taking part in social activities (e.g. going out for a meal)?	☐	☐	☐	☐	☐
27. Felt on your own or isolated?	☐	☐	☐	☐	☐

Please indicate how satisfied you feel overall with your life at the moment by putting a cross on the line between 0 and 100.



Brief Family Assessment Measure (General Scale)

Subject's Initials_____ Date_____

Informant_____

Directions

On this page you will find 14 statements about your family as a whole. Read each statement carefully and decide how well the statement describes your family **during the past TWO WEEKS**. Make your response by filling in the circle in the appropriate column. **Fill in only ONE circle for each statement**. **Provide an answer for EACH statement**, even if you are not completely sure of your answer.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. We tell each other things that bother us	O	O	O	O
2. We feel loved in our family	O	O	O	O
3. When you do something wrong in our family, you don't know what to expect	O	O	O	O
4. We never let things pile up until they are more than we can handle	O	O	O	O
5. I never know what's going on in our family	O	O	O	O
6. My family tries to run my life	O	O	O	O
7. If we do something wrong, we don't get a chance to explain	O	O	O	O
8. When things aren't going well it takes too long to work them out	O	O	O	O
9. We can't rely on family members to do their part	O	O	O	O
10. We take the time to listen to each other	O	O	O	O
11. Punishments are fair in our family	O	O	O	O
12. We deal with our problems even when they are serious	O	O	O	O
13. We don't really trust each other	O	O	O	O
14. We are free to say what we think in our family	O	O	O	O

Patient Satisfaction Questionnaire

Subject's Initials_____ Date_____

Informant_____

Please help us improve our program by answering some questions about the services you received. We are interested in your honest opinions, whether they are positive or negative. Please answer all of the questions.

1. How would you rate the quality of help you wanted?
O Excellent **O** Good **O** Fair **O** Poor

2. Did you get the kind of help you wanted?
O No, definitely not **O** No, not really **O** Yes, generally **O** Yes, definitely

3. To what extent has the program met your needs?
O Almost all of my needs have been met **O** Only a few of my needs have been met
O Most of my needs have been met **O** None of my needs have been met

4. If a friend were in need of similar help, would you recommend the program to him/her?
O No, definitely not **O** No, not really **O** Yes, generally **O** Yes, definitely

5. How satisfied were you with the amount of help you received?
O Quite dissatisfied **O** Indifferent or mildly dissatisfied **O** Mostly satisfied **O** Very satisfied

6. Has the help you received helped you to deal more effectively with your problems?
O Yes, they helped **O** Yes, they helped somewhat
O No, they really didn't help **O** No, they seemed to make things a great deal worse

7. In an overall, general sense, how satisfied are you with the help you have received?
O Very satisfied **O** Mostly satisfied **O** Indifferent or mildly dissatisfied **O** Quite dissatisfied

8. If you were to seek help again, would you come back to our program?
O No, definitely not **O** No, I don't think so **O** Yes, I think so **O** Yes, definitely

Holmes-Rahe Stress Scale for Students, Teenagers, and Young Adults

Directions: Below is a list of stressful events students, teenagers, and young adults often experience. For each event, please indicate the number of times it has occurred in your life in *the past year*, as well as *during the time period since you completed the study*.

Event	Past Year?	Since Study Ended?
1. Death of parent		
2. Unplanned pregnancy/abortion		
3. Getting married		
4. Divorce of parents		
5. Acquiring a visible deformity		
6. Fathering a child		
7. Jail sentence of parent for over one year		
8. Marital separation of parents		
9. Death of a brother or sister		
10. Change in acceptance by peers		
11. Unplanned pregnancy of sister		
12. Discovery of being an adopted child		
13. Marriage of parent to stepparent		
14. Death of a close friend		
15. Having a visible congenital deformity		
16. Serious illness requiring hospitalization		
17. Failure of a grade in school		
18. Not making an extracurricular activity		
19. Hospitalization of a parent		
20. Jail sentence of parent for over 30 days		
21. Breaking up with boyfriend or girlfriend		
22. Beginning to date		
23. Suspension from school		
24. Becoming involved with drugs or alcohol		
25. Birth of a brother or sister		

26. Increase in arguments between parents		
27. Loss of job by parent		
28. Outstanding personal achievement		
29. Change in parent's financial status		
30. Accepted at college of choice		
31. Being a senior in high school		
32. Hospitalization of a sibling		
33. Increased absence of parent from home		
34. Brother or sister leaving home		
35. Addition of third adult to family		
36. Becoming a full-fledged member of a church		
37. Decrease in arguments between parents		
38. Decrease in arguments with parents		
39. Mother or father beginning work		

Appendix C

Parent Report Measures

Child Behavior Checklist for Ages 6-18

I. **Please list the sports your child most likes the same** **To take part in.** For example: swimming, **he/she do** baseball, skating, skate boarding, bike riding, fishing, etc. □ None	**Compared to others of the same age, about how much time does he/she spend in each?**				**Compared to others of age, how well does each one?**		
	Less Than Average	Average	More Than Average	Don't Know	Above Average	Average	Below Average
a._____	□	□	□	□	□	□	□
b._____	□	□	□	□	□	□	□
c._____	□	□	□	□	□	□	□

II. Please list your child's favorite hobbies, the same activities, and games, other than sports. he/she do For example: stamps, dolls, books, piano, Crafts, cars, computers, singing, etc. (Do ***not*** include listening to radio or TV.) □ None	**Compared to others of the same age, about how much time does he/she spend in each?**				**Compared to others of age, how well does each one?**		
	Less Than Average	Average	More Than Average	Don't Know	Above Average	Average	Below Average
a._____	□	□	□	□	□	□	□
b._____	□	□	□	□	□	□	□
c._____	□	□	□	□	□	□	□

III. Please list any organizations, clubs, teams, **Compared to others of the same**

Or groups your child belongs to.	**age, how active is he/she in each?**			
□ None	Less Active	Average	More Active	Don't Know
a._____	☐	☐	☐	☐
b._____	☐	☐	☐	☐
c._____	☐	☐	☐	☐

IV. Please list any jobs or chores your child has. For example: paper route, babysitting, making bed, working in store, etc. (include both paid and unpaid jobs and chores.)

□ None

	Compared to others of the same age, how well does he/she carry them out?			
	Below Average	Average	Above Average	Don't Know
a._____	☐	☐	☐	☐
b._____	☐	☐	☐	☐
c._____	☐	☐	☐	☐

Be sure you answered all items. Then see other side.

Please print. Be sure to answer all items.

V. 1. About how many close friends does your child have? (Do *not* include brothers & sisters)

☐ None ☐ 1 ☐ 2 or 3 ☐ 4 or more

2. About how many times a week does your child do things with any friends outside of regular school hours? (Do *not* include brothers & sisters) ☐ Less than 1 ☐ 1 or 2 ☐ 3 or more

VI. Compared to others of his/her age, how well does your child:

	Worse	**Average**	**Better**	
a. Get along with his/her brothers & sisters?	☐	☐	☐	☐ Has no brothers or sisters
b. Get along with other kids?	☐	☐	☐	
c. Behave with his/her parents?	☐	☐	☐	
d. Play and work alone?	☐	☐	☐	

VII. 1. Performance in academic subjects. ☐ **Does not attend school because** _____

_____

Check a box for each subject that child takes	Failing	Below Average	Average	Above Average
a. Reading, English, or Language Arts	☐	☐	☐	☐
b. History or Social Studies	☐	☐	☐	☐

c. Arithmetic or Math	☐	☐	☐	☐
d. Science	☐	☐	☐	☐
e. _____	☐	☐	☐	☐
f. _____	☐	☐	☐	☐
g. _____	☐	☐	☐	☐

Other academic subjects-for example: computer courses, foreign language, business. Do ***not*** include, gym, shop, driver's ed., or other nonacademic subjects.

---

2. Does your child receive special education or remedial services or attend a special class or special school?

☐ No ☐ Yes – kind of services, class, or school:

3. Has your child repeated any grades? ☐ No ☐ Yes – grades and reasons:

---

4. Has your child had any academic or other problems in school? ☐ No ☐ Yes – please describe:

When did these problems start? _____

Have these problems ended? ☐ No ☐ Yes – when?

Does your child have any illness or disability (either physical or mental)? ☐ No ☐ Yes – please describe:

What concerns you most about your child?

Please describe the best things about your child.

Please print. Be sure to answer all items.

Below is a list of items that describe children and youths. For each item that describes your child ***now or within the past 6 months***, please circle the **2** if the item is **very true or often true** of your child. Circle the **1** if the item is **somewhat or sometimes true** of your child. If the item is **not true** of your child, circle the **0**. Please answer all times as well as you can, even if some do not seem to apply to your child.

0 = Not True (as far as you know) 1 = Somewhat or Sometimes True 2 = Very True or Often True

---

0 1 2 1. Acts too young for his/her age

0 1 2 2. Drinks alcohol without parents' approval (describe): _____ _____

0 1 2 3. Argues a lot

0 1 2 4. Fails to finish things he/she starts

0 1 2 5. There is very little he/she enjoys

0 1 2 6. Bowel movements outside toilet

0 1 2 7. Bragging, boasting
0 1 2 8. Can't concentrate, can't pay attention for long
0 1 2 9. Can't get his/her mind off certain thoughts; obsessions (describe): _____
_____
0 1 2 10. Can't sit still, restless, or hyperactive

0 1 2 11. Clings to adults or too dependent
0 1 2 12. Complains of loneliness
0 1 2 13. Confused or seems to be in a fog
0 1 2 14. Cries a lot
0 1 2 15. Cruel to animals
0 1 2 16. Cruelty, bullying, or meanness to others

0 1 2 17. Daydreams or gets lost in his/her thoughts
0 1 2 18. Deliberately harms self or attempts suicide

0 1 2 19. Demands a lot of attention
0 1 2 20. Destroys his/her own things
0 1 2 21. Destroys things belonging to his/her family or others
0 1 2 22. Disobedient at home
0 1 2 23. Disobedient at school
0 1 2 24. Doesn't eat well
0 1 2 25. Doesn't get along with other kids
0 1 2 26. Doesn't seem to feel guilty after misbehaving

0 1 2 27. Easily jealous
0 1 2 28. Breaks rules at home, school, or elsewhere

0 1 2 29. Fears certain animals, situations, or places other than school (describe): _____
_____
0 1 2 30. Fears going to school
0 1 2 31. Fears he/she might think or do something bad
0 1 2 32. Feels he/she has to be perfect
0 1 2 33. Feels or complains that no one loves him/her
0 1 2 34. Feels other are out to get him/her
0 1 2 35. Feels worthless or inferior
0 1 2 36. Gets hurt a lot, accident-prone
0 1 2 37. Gets in many fights
0 1 2 38. Gets teased a lot
0 1 2 39. Hangs around with others who get in trouble
0 1 2 40. Hears sounds or voices that aren't there (describe):_____
0 1 2 41. Impulsive or acts without thinking
0 1 2 42. Would rather be alone than with others
0 1 2 43. Lying or cheating
0 1 2 44. Bites fingernails

0 1 2 45. Nervous, highstrung, or tense
0 1 2 46. Nervous movements or twitching (describe):_____
0 1 2 47. Nightmares
0 1 2 48. Not liked by other kids
0 1 2 49. Constipated, doesn't move bowels
0 1 2 50. Too fearful or anxious
0 1 2 51. Feels dizzy or lightheaded
0 1 2 52. Feels too guilty
0 1 2 53. Overeating
0 1 2 54. Overtired without good reason
0 1 2 55. Overweight
0 1 2 56. Physical problems ***without known medical cause:***
0 1 2 a. Aches or pains (***not*** stomach or headaches)
0 1 2 b. Headaches
0 1 2 c. Nausea, feels sick
0 1 2 d. Problems with eyes (not corrected by glasses) (describe):_____
0 1 2 e. Rashes or other skin problems
0 1 2 f. Stomachaches
0 1 2 g. Vomiting, throwing up
0 1 2 h. Other (describe):_____
0 1 2 57. Physically attacks people
0 1 2 58. Picks nose, skin, or other parts of body (describe):_____
0 1 2 59. Plays with own sex parts in public
0 1 2 60. Plays with own sex parts too much
0 1 2 61. Poor school work
0 1 2 62. Poorly coordinated or clumsy
0 1 2 63. Prefers being with older kids
0 1 2 64. Prefers being with younger kids
0 1 2 65. Refuses to talk
0 1 2 66. Repeats certain acts over and over; compulsions (describe):_____
0 1 2 67. Runs away from home
0 1 2 68. Screams a lot
0 1 2 69. Secretive, keeps things to self
0 1 2 70. Sees things that aren't there (describe):_____
0 1 2 71. Self-conscious or easily embarrassed
0 1 2 72. Sets fires
0 1 2 73. Sexual problems (describe):_____
0 1 2 74. Showing off or clowning
0 1 2 75. Too shy or timid
0 1 2 76. Sleeps less than most kids
0 1 2 77. Sleeps more than most kids during day and/or night (describe):_____
0 1 2 78. Inattentive or easily distracted
0 1 2 79. Speech problem (describe):_____
0 1 2 80. Stares blankly
0 1 2 81. Steals at home
0 1 2 82. Steals outside the home
0 1 2 83. Stores up too many things he/she doesn't need (describe):_____
0 1 2 84. Strange behavior (describe):_____

0 1 2 85. Strange ideas (describe):_____
0 1 2 86. Stubborn, sullen, or irritable
0 1 2 87. Sudden changes in mood or feelings
0 1 2 88. Sulks a lot
0 1 2 89. Suspicious
0 1 2 90. Swearing or obscene language
0 1 2 91. Talks about killing self
0 1 2 92. Talks or walks in sleep (describe):_____
0 1 2 93. Talks too much
0 1 2 94. Teases a lot
0 1 2 95. Temper tantrums or hot temper
0 1 2 96. Thinks about sex too much
0 1 2 97. Threatens people
0 1 2 98. Thumb-sucking
0 1 2 99. Smokes, chews, or sniffs tobacco
0 1 2 100. Trouble sleeping (describe):_____
0 1 2 101: Truancy, skips school
0 1 2 102. Underactive, slow moving, or lacks energy
0 1 2 103. Unhappy, sad, or depressed
0 1 2 104. Unusually loud
0 1 2 105. Uses drugs for nonmedical purposes (***don't*** include alcohol or tobacco) (describe):_____
0 1 2 106. Vandalism
0 1 2 107. Wets self during the day
0 1 2 108. Wets the bed
0 1 2 109. Whining
0 1 2 110. Wishes to be of opposite sex
0 1 2 111. Withdrawn, doesn't get involved with others
0 1 2 112. Worries
0 1 2 113. Please write in any problems your child has that were not listed above:_____
0 1 2 _____
0 1 2 _____
0 1 2 _____

Appendix D

Self Report – Subjects Under 18

CY-BOCS

This questionnaire can be completed by the child/adolescent, parents, or both working together. We are interested in getting the most accurate information possible. There are no right or wrong answers. Please just answer the best you can. Thank you.

Please check all COMPULSIVE SYMPTOMS that you have noticed over the past week

COMPULSIONS are things you feel compelled to do even though you may know the behavior does not make sense. Compulsions are typically done to reduce fear or distress associated with obsessive thoughts.

1. Which of the following Washing/Cleaning Compulsions have you noticed over the PAST WEEK? Check all that apply.

_____ Excessive or ritualized handwashing (e.g., takes long time to wash, needs to restart if interrupted, or needs to wash hands in particular order of steps)

_____ Excessive or ritualized showering, bathing, toothbrushing, grooming, toilet routine (see handwashing)

_____ Excessive cleaning of items (e.g., clothes, faucets, floors or important objects)

_____ Other measures to prevent or remove contact with contaminants (e.g., using towel or foot to flush toilet or open door, refusing to shake hands, asking family members to remove insecticides, garbage)

_____ Other Washing/Cleaning Compulsions (Describe)

2. Which of the following Checking Compulsions have you noticed over the PAST WEEK? Check all that apply.

_____ Checking locks, toys, school books/items, etc.

_____ Checking associated with getting washed, dressed, or undressed

_____ Checking that did not/will not harm others (e.g., checking that nobody's been hurt, asking for reassurance, or telephoning to make sure that everything is alright)

_____ Checking that did not/will not harm self (e.g., looking for injuries or bleeding after handling sharp or breakable objects, asking for reassurance that everything is alright)

_____ Checking that nothing terrible did/will happen (e.g., searching the newspaper or television for news about catastrophe)

_____ Checking that did not make mistake (e.g., while reading, writing, doing simple calculations, homework)

_____ Checking tied to health worries (e.g., seeking reassurance about having an illness, repeatedly measuring pulse, checking for body odors or ugly features)

_____ Other Checking Compulsions (Describe)

3. Which of the following Repeating Compulsions have you noticed over the PAST WEEK? Check all that apply.

_____ Rereading, erasing, or rewriting (e.g., taking hours to read few pages or write few sentences due to concern over not understanding or needing letters to be perfect)

_____ Need to repeat routine activities (e.g., getting up and down from chair, in and out of doorway, turning light switch or TV on and off a specific number of times.

_____ Other Repeating Compulsions (Describe)

4. Have you noticed any Counting Compulsions (counts objects) over the PAST WEEK?

_____ Yes
_____ No
if yes Please Describe:

5. Which of the following Arranging/Symmetry Compulsions have you noticed over the PAST WEEK? Check all that apply.

_____ Arranging/Ordering (e.g., spend hours straightening paper and pens on a desktop or books in a bookcase; become very upset if order is disturbed)

_____ Symmetry/Evening up (e.g. arranges things or own self so that two or more sides are "even" or symmetrical)

_____ Other Arranging Compulsions (Describe)

6. Which of the following <u>Hoarding/Saving Compulsions</u> (do not count saving sentimental or needed objects) **have you noticed over the <u>PAST WEEK?</u> Check all that apply.**

_____ Difficulty throwing things away, saving bits of paper, string, old newspapers, notes, cans, paper towels, wrappers and empty bottles; may pick up useless objects from street or garbage.

_____ Other Hoarding/Saving Compulsions (Describe)

7. Have you noticed any <u>Excessive Games/Superstitious Behaviors</u> (Must be associated with anxiety – not just a game) **over the <u>PAST WEEK?</u>** (e.g., not stepping on cracks, touching objects a certain number of times, etc.)

_____ Yes
_____ No
if yes Please Describe:

8. Have you noticed any <u>Rituals Involving Other Persons</u> over the <u>PAST WEEK?</u> (e.g., excessive asking for reassurance, asking parent to repeatedly answer the same question, etc.)

_____ Yes
_____ No
if yes Please Describe:

9. Which of the following <u>Miscellaneous Compulsions</u> have you noticed over the <u>PAST WEEK?</u> Check all that apply.

_____ Excessive telling, asking, or confessing (e.g., confess repeatedly for minor or imagined transgressions, ask for reassurance)

_____ Measures (not checking) to prevent harm to self or others or some other terrible consequences (e.g. avoids sharp or breakable objects, knives or scissors)

_____ Ritualized eating behaviors (e.g., arrange food, knife, and fork in a particular order before eating, eat according to a strict ritual)

_____ Excessive touching, tapping, rubbing (e.g., repeatedly touch particular surfaces, objects, or other people; perhaps to prevent a bad occurrence)

_____ Excessive list making

_____ Need to do things (e.g., touch or arrange) until it feels "just right"

_____ Avoid saying certain words (e.g., goodnight or goodbye, person's name, bad event)

_____ Other (Describe)

Please check all <u>OBSESSIVE</u> SYMPTOMS that you have noticed over the past week

<u>OBSESSIONS</u> are intrusive, recurrent and distressing thoughts, sensations, urges, or images that you may experience. They are typically frightening and may be either realistic or unrealistic in nature

1. Which of the following Contamination Obsessions have you noticed in the <u>PAST WEEK?</u> Check all that apply.

_____ Excessive concern with dirt, germs, certain illnesses (e.g., from door handles, other people)

_____ Excessive concern/disgust with bodily waste or secretions (e.g., urine, feces, semen, sweat)

_____ Excessive concern with environmental contaminants (e.g., asbestos or radioactive substances)

_____ Excessive concern with contamination from household items (e.g., cleaners, solvents)

_____ Excessive concern about contamination from touching animals/insects

_____ Excessively bothered by sticky substances or residues (e.g., adhesive tape, syrup)

_____ Concerned will get ill due to being contaminated by something (e.g., like germs, animals, cleaners, etc.)

_____ Concerned will get others ill by spreading contaminant

_____ Other Washing/Cleaning Obsessions (Describe)

2. Which of the following <u>Aggressive Obsessions</u> have you noticed in the <u>PAST WEEK?</u> Check all that apply.

_____ Fear might harm self (e.g., using knives or other sharp objects)

_____ Fear might harm others (e.g., fear of pushing someone in front of a train, hurting someone's feelings, causing harm by giving wrong advice)

_____ Fear something bad will happen to self

_____ Fear something bad will happen to others

_____ Violent or horrific images (e.g., images of murders, dismembered bodies, or other disgusting images)

_____ Fear of blurting out obscenities or insults (e.g., in public situations like church, school)

_____ Fear will act on unwanted impulses (e.g., punch or stab a friend, drive a car into a tree)

_____ Fear will steal things against his/her will (e.g.,accidently "cheating" cashier or shoplifing something)

_____ Fear will be responsible for terrible event (e.g., fire or burglary because didn't check locks)

_____ Other Aggressive Obsessions(Describe)

3. Have you noticed any Hoarding/Saving Obsessions over the <u>PAST WEEK?</u> (e.g., Worries about throwing unimportant things away because he/she might need them in the future, urges to pick up and collect useless things)

_____ Yes
_____ No
If yes Please Describe:

4. Which of the following Health-related Obsessions **have you noticed in the PAST WEEK? Check all that apply.**

_____ Excessive concern with illness or disease (e.g., worries that he/she might have an illness like cancer, heart disease, AIDS, despite reassurance from doctors; concerns about vomiting)

_____ Excessive concern with body part or aspect of appearance (e.g., worries that his/her face, ears, nose, arms, legs, or other body part is disgusting or ugly)

_____ Other Health-related Obsessions (Describe)

5. Which of the following Religious/Moral Obsessions **have you noticed in the PAST WEEK? Check all that apply.**

_____ Overly concerned with offending God or other religious objects (e.g., having blasphemous thoughts, saying blasphemous things, or being punished for these things)

_____ Excessive concern with right/wrong, morality (e.g., worries about always doing "the right thing", worries about having told a lie or having cheated someone)

_____ Other Religious Obsessions (Describe)

6. Have you noticed any Magical Obsessions over the PAST WEEK? (e.g., lucky/unlucky numbers, colors, words, or gives special meaning to certain numbers, colors or words, etc.)

_____ Yes
_____ No
If yes Please Describe:

7. Which of the following Sexual Obsessions have you noticed in the PAST WEEK? Check all that apply.

_____ Forbidden or upsetting sexual thoughts, images, or impulses (e.g., unwanted images of violent sexual behavior toward others, or unwanted sexual urges towards family members or friends)

_____ Obsessions about sexual orientation (e.g., that he/she may be gay or may become gay when there is no basis for these thoughts

_____ Other Sexual Obsessions (Describe)

8. Which of the following <u>Miscellaneous Obsessions</u> have you noticed in the <u>PAST WEEK?</u> Check all that apply.

_____ Fear of doing something embarrassing (e.g., appearing foolish, burping, having "bathroom accident")

_____ The need to know or remember things (e.g., insignificant things like license plate numbers, bumper stickers or T-shirt slogans)

_____ Fear of saying certain things (e.g., because of superstitious fears, fear of saying "thirteen")

_____ Fear of not saying the right thing (e.g., fear of having said something wrong or not using "perfect" word)

_____ Intrusive (non-violent) images (e.g., random, unwanted images that come into his/her mind)

_____ Intrusive sounds, words, music, or numbers (e.g., hearing words, songs or music in his/her mind that can't stop; bothered by low sounds like clock ticking or people talking)

_____ Uncomfortable sense of incompleteness or emptiness unless things done "just right"

_____ Other Obsessions (Describe)

The following questions assess how strong your OCD symptoms currently are and how much they have bothered you or gotten in the way over the past week. The first five questions refer to compulsions or rituals (the things you typically do to make the obsessive thoughts go away). Please think about all of the compusions you checked as positive on pages 1 & 2 of this questionnaire. Rate each of the five questions (time occupied, interference, distress, resistance, and control) based on your total experience with all of your compusions over the past week.

IF YOU DID NOT ENDORSE ANY OBESSIONS OR COMPULSIONS ON THE CHECKLIST, YOU DO NOT NEED TO COMPLETE THIS FORM. Some of the questions may sound confusing or seem difficult to answer but do the best you can. There are no right or wrong answers. If you are not sure about something, it's okay to make a best guess. The purpose of these questions is just to provide your doctor with some information to help him or her better understand how strong your OCD is and how much it interferes with your ability to do things that you need to or like to do.

COMPULSIONS

---

1. How much time do you spend performing compulsions?

None	*Mild*	*Moderate*	*Severe*	*Extreme*
	Less than 1 hr/day or a few times per day	1-3 hrs/day or 1-3 times per hour	Between 3+ and 8 hrs/day or several time per hour	More than 8 hrs/day or nearly constantly
0	**1**	**2**	**3**	**4**

---

2. How much do compulsions interfere with school, family, and/or friends?

None	*Mild*	*Moderate*	*Severe*	*Extreme*
	Slight interference but no impairment	Definite interference but things still manageable	Causes substantial impairment in school, social, or family function	Incapacitating
0	**1**	**2**	**3**	**4**

---

3. How upset would you get if not allowed to do your compulsions?

None	*Mild*	*Moderate*	*Severe*	*Extreme*
	Only slightly anxious If compulsions prevented	Anxiety would increase but remain manageable	Significant and troubling increase in anxiety	Incapacitating anxiety "meltdown"
0	**1**	**2**	**3**	**4**

---

4. How hard do you try to fight or resist your compulsions?

Always	*Mild*	*Moderate*	*Severe*	*Extreme*
Always tries to resist	Tries to resist most of the time	Some effort to resist (about half the time)	Gives in to most/all urges but with reluctance	Gives in to all urges without thinking
0	**1**	**2**	**3**	**4**

---

5. When you try to resist doing your rituals, how well does it work?

Complete Control	*Much Control*	*Moderate Control*	*Little Control*	*No Control*
	Usually can resist urge and not do rituals	Can resist ritual but only with great difficulty	Needs to do ritual but can delay giving in with difficulty	Must do ritual right away Unable to resist at all
0	**1**	**2**	**3**	**4**

IF YOU DID NOT ENDORSE ANY OBESSIONS OR COMPULSIONS ON THE CHECKLIST, YOU DO NOT NEED TO COMPLETE THIS FORM. The next five questions refer to obsessive thoughts (thoughts, images, or feelings that bother you and that you can't get out of your mind).

Again please think about all of the compulsions you checked as positive on pages 3 & 4 and rate the questions based on your total experience with all of these symptoms over the past week.

Again some of the questions may sound confusing or seem difficult to answer but do the best you can. There are no right or wrong answers. If you are not sure about something, it's okay to make a best guess.

OBSESSIONS

---

1. How much time is occupied by obsessive thoughts?

None	*Mild*	*Moderate*	*Severe*	*Extreme*
	Less than 1 hr/day or occasional intrusion	1-3 hrs/day or or frequent intrusion	Between 3+ and 8 hrs/day or very frequent intrusion	More than 8 hrs/day or near constant intrusion
0	**1**	**2**	**3**	**4**

---

2. How much do these thoughts interfere with school, family, and/or friends?

None	*Mild*	*Moderate*	*Severe*	*Extreme*
	Slight interference but no impairment	Definite interference but things still manageable	Causes substantial impairment in school, social,or family function	Incapacitating
0	**1**	**2**	**3**	**4**

---

3. How much distress is associated with obsessive thoughts?

None	*Mild*	*Moderate*	*Severe*	*Extreme*
	Infrequent distress	Distress frequent and disturbing but still manageable	Distress very frequent and very disturbing	Near constant and disabling distress and frustration
0	**1**	**2**	**3**	**4**

---

4. How hard do you try to stop the thoughts?

None	*Mild*	*Moderate*	*Severe*	*Extreme*
	Tries to resist most of the time	Some effort to resist (about half the time)	Gives in to most or all obsessions with reluctance	Gives in completely to all obsessions without thinking
0	**1**	**2**	**3**	**4**

---

5. When you try to resist your obsessions, how well does it work?

Complete Control	*Much Control*	*Moderate Control*	*Little Control*	*No Control*
	Usually can stop or put off obsession with some effort	Sometimes able to stop or divert obsession	Rarely can stop obsession but can put off with effort	Unable to control or put off obsession at all
0	**1**	**2**	**3**	**4**

Self-Report for Childhood Anxiety Related Disorders (SCARED)

Subject's Initials_____ Date_____

Informant_____

Below is a list of items that describe how people feel. For each item that describes you, please circle the **2** if the item is **very true or often true** of you. Circle the **1** if the item is **somewhat or sometimes true** of you. If the item is **not true** of you, please circle the **0**. Please answer all items as well as you can, even if some do not seem to concern you.

0=Not true or hardly ever true
1=Somewhat true or sometimes true
2=Very true or often true

	0 Not True or Hardly Ever True	**1 Somewhat True or Sometimes True**	**2 Very True or Often True**
1. When I feel frightened, it is hard to breathe	○	○	○
2. I get headaches when I am at school	○	○	○
3. I don't like to be with people I don't know well	○	○	○
4. I get scared if I sleep away from home	○	○	○
5. I worry about other people liking me	○	○	○
6. When I get frightened, I feel like passing out	○	○	○
7. I am nervous	○	○	○
8. I follow my mother or father wherever they go	○	○	○
9. People tell me that I look nervous	○	○	○
10. I feel nervous with people I don't know well	○	○	○
11. I get stomachaches at school	○	○	○
12. When I get frightened, I feel like I am going crazy	○	○	○
13. I worry about sleeping alone	○	○	○
14. I worry about being as good as other kids	○	○	○
15. When I get frightened, I feel like things are not real	○	○	○
16. I have nightmares about something bad happening to my parents	○	○	○
17. I worry about going to school	○	○	○

18. When I get frightened, my heart beats fast	○	○	○
19. I get shaky	○	○	○
20. I have nightmares about something bad happening to me	○	○	○

	0 **Not True or Hardly Ever True**	**1** **Somewhat True or Sometimes True**	**2** **Very True or Often True**
21. I worry about things working out for me	○	○	○
22. When I get frightened, I sweat a lot	○	○	○
23. I am a worrier	○	○	○
24. I get really frightened for no reason at all.	○	○	○
25. I am afraid to be alone in the house	○	○	○
26. It is hard for me to talk with people I don't know well.	○	○	○
27. When I get frightened, I feel like I am choking	○	○	○
28. People tell me that I worry too much	○	○	○
29. I do not like to be away from my family	○	○	○
30. I am afraid of having anxiety (or panic) attacks	○	○	○
31. I worry that something bad might happen to my parents	○	○	○
32. I feel shy with people I don't know well	○	○	○
33. I worry about what is going to happen in the future	○	○	○
34. When I get frightened, I feel like throwing up	○	○	○
35. I worry about how well I do things	○	○	○
36. I am scared to go to school	○	○	○
37. I worry about things that have already happened	○	○	○
38. When I get frightened, I feel dizzy	○	○	○
39. I feel nervous when I am with other children or adults and I have to do something while they watch me (for example: read aloud, speak, play a game, play a sport)	○	○	○
40. I feel nervous about going to parties, dances, or any place where there will be people that I don't know well	○	○	○
41. I am shy	○	○	○

Client ID: _____

Age: _____ Birthdate: _____
mm/dd/yyyy

Grade: _____ Gender: Male Female

Today's date: _____
mm/dd/yyyy

CDI

by Maria Kovacs, Ph.D.

Kids sometimes have different feelings and ideas.

This form lists the feelings and ideas in groups. From each group of three sentences, pick one sentence that describes you ***best*** for the past two weeks. After you pick a sentence from the first group, go on to the next group.

There is no right or wrong answer. Just pick the sentence that best describes the way you have been recently. Put a mark like this ☒ next to your answer. Put the mark in the box next to the sentence that you pick.

Here is an example of how this form works. Try it. Put a mark next to the sentence that describes you ***best***.

Example:

- ☐ I read books all the time.
- ☐ I read books once in a while.
- ☐ I never read books.

Remember, pick out the sentences that describe you best in the PAST TWO WEEKS.

Item 1
- ☐ I am sad once in a while.
- ☐ I am sad many times.
- ☐ I am sad all the time.

Item 2
- ☐ Nothing will ever work out for me.
- ☐ I am not sure if things will work out for me.
- ☐ Things will work out for me O.K.

Item 3
- ☐ I do most things O.K.
- ☐ I do many things wrong.
- ☐ I do everything wrong.

Item 4
- ☐ I have fun in many things.
- ☐ I have fun in some things.
- ☐ Nothing is fun at all.

Item 5
- ☐ I am bad all the time.
- ☐ I am bad many times.
- ☐ I am bad once in a while.

Item 6
- ☐ I think about bad things happening to me once in a while.
- ☐ I worry that bad things will happen to me.
- ☐ I am sure that terrible things will happen to me.

Item 7
- ☐ I hate myself.
- ☐ I do not like myself.
- ☐ I like myself.

Item 8
- ☐ All bad things are my fault.
- ☐ Many bad things are my fault.
- ☐ Bad things are not usually my fault.

Item 9
- ☐ I do not think about killing myself.
- ☐ I think about killing myself but I would not do it.
- ☐ I want to kill myself.

Turn over and fill out the other side.

Remember, pick out the sentences that describe you best in the past two weeks.

Item 10
- ☐ I feel like crying every day.
- ☐ I feel like crying many days.
- ☐ I feel like crying once in a while.

Item 11
- ☐ Things bother me all the time.
- ☐ Things bother me many times.
- ☐ Things bother me once in a while.

Item 12
- ☐ I like being with people.
- ☐ I do not like being with people many times.
- ☐ I do not want to be with people at all.

Item 13
- ☐ I cannot make up my mind about things.
- ☐ It is hard to make up my mind about things.
- ☐ I make up my mind about things easily.

Item 14
- ☐ I look O.K.
- ☐ There are some bad things about my looks.
- ☐ I look ugly.

Item 15
- ☐ I have to push myself all the time to do my schoolwork.
- ☐ I have to push myself many times to do my schoolwork.
- ☐ Doing schoolwork is not a big problem.

Item 16
- ☐ I have trouble sleeping every night.
- ☐ I have trouble sleeping many nights.
- ☐ I sleep pretty well.

Item 17
- ☐ I am tired once in a while.
- ☐ I am tired many days.
- ☐ I am tired all the time.

Item 18
- ☐ Most days I do not feel like eating.
- ☐ Many days I do not feel like eating.
- ☐ I eat pretty well.

Item 19
- ☐ I do not worry about aches and pains.
- ☐ I worry about aches and pains many times.
- ☐ I worry about aches and pains all the time.

Item 20
- ☐ I do not feel alone.
- ☐ I feel alone many times.
- ☐ I feel alone all the time.

Item 21
- ☐ I never have fun at school.
- ☐ I have fun at school only once in a while.
- ☐ I have fun at school many times.

Item 22
- ☐ I have plenty of friends.
- ☐ I have some friends but I wish I had more.
- ☐ I do not have any friends.

Item 23
- ☐ My schoolwork is alright.
- ☐ My schoolwork is not as good as before.
- ☐ I do very badly in subjects I used to be good in.

Item 24
- ☐ I can never be as good as other kids.
- ☐ I can be as good as other kids if I want to.
- ☐ I am just as good as other kids.

Item 25
- ☐ Nobody really loves me.
- ☐ I am not sure if anybody loves me.
- ☐ I am sure that somebody loves me.

Item 26
- ☐ I usually do what I am told.
- ☐ I do not do what I am told most times.
- ☐ I never do what I am told.

Item 27
- ☐ I get along with people.
- ☐ I get into fights many times.
- ☐ I get into fights all the time.

Appendix E

Self Report – Subjects 18 and Older

Yale Brown Obsessive Compulsive Scale (YBOCS)

SYMPTOM CHECKLIST: OBSESSIVE THOUGHTS

OBSESSIONS are unwelcome and distressing ideas, thoughts, images or impulses that repeatedly enter your mind. They may seem to occur against your will. They may be offensive to you, you may recognize them as senseless, and they may not fit your personality. They are excessive when compared to others you know. Please check all items below that have occurred for you currently or in the past.

Aggressive	Current	Past
Fear might harm self	☐	☐
Fear might harm others	☐	☐
Violent or horrific images	☐	☐
Fear of blurting obscenities or insults	☐	☐
Fear of doing something embarrassing	☐	☐
Fear will act on unwanted impulse	☐	☐
Fear will steal things	☐	☐
Fear will harm others because not careful enough	☐	☐
Fear will be responsible for something terrible happening	☐	☐
Other : _____	☐	☐

Contamination	Current	Past
Concerns about disgust with bodily waste or secretions	☐	☐
Concern about dirt or germs	☐	☐
Concern about environmental contaminants	☐	☐
Concern with household cleaners	☐	☐
Concern around animals	☐	☐
Bothered by sticky substances or residues	☐	☐
Concerned I will get ill due to contamination	☐	☐
Concern I will get others ill due to contamination	☐	☐
Other : _____	☐	☐

Sexual or Moral	Current	Past
Forbidden or perverse sexual thoughts, images or impulses	☐	☐
Concern about blasphemy or having sinful thoughts	☐	☐
Concerned about right and wrong, morality or whether I have done the right thing	☐	☐

Other	Current	Past
Must save even useless things	☐	☐
Need to know or remember certain things	☐	☐
Fear of saying certain things, or not saying the right thing	☐	☐
Fear of losing things	☐	☐

Symmetry/Exactness	Current	Past
Concern about things being properly aligned	☐	☐
Worried about handwriting being perfect	☐	☐
Other: _____	☐	☐

Superstitious fears (black cats, stepping on cracks)	☐	☐
Concern about significance of numbers	☐	☐
Worried other will have an accident unless things are just right	☐	☐
Concern about Lucky or Unlucky numbers	☐	☐

IF YOU DID NOT ENDORSE ANY OBESSIONS ON THE CHECKLIST, YOU DO NOT NEED TO COMPLETE THIS FORM. When answering these questions, think specifically about the obsessive thoughts you just checked as "Current". Circle the number that best answers the questions for you at present.

1. TIME OCCUPED BY OBSESSIVE THOUGHTS: How much of your time is occupied by obsessive thoughts?

When obsessions occur as brief, intermittent intrusions, it may be difficult to assess time occupied by them in terms of total hours. In such cases, estimate time by determining how frequently they occur.

0	1	2	3	4
None	Mild, less than 1 hr/day or occasional intrusion.	Moderate, 1 to 3 hrs/day or frequent intrusion	Severe, greater than 3 and up to 8 hrs/day or very frequent intrusion.	Extreme, greater than 8 hrs/day or near constant intrusion.

2. INTERFERENCE DUE TO OBSESSIVE THOUGHTS: How much do your obsessive thoughts interfere with your social or work (or role) functioning? Is there anything that you don't do because of them?

0	1	2	3	4
None	Mild, slight interference with social or occupational activities.	Moderate, definite interference with social or occupational performance, but still manageable.	Severe, causes substantial impairment in social or occupational performance.	Extreme, incapacitating.

3. DISTRESS ASSOCIATED WITH OBSESSIVE THOUGHTS: How much distress do your obsessive thoughts cause you? (do not rate distress associated with other conditions or situations)

0	1	2	3	4
None	Mild, not too disturbing	Moderate, disturbing but still manageable	Severe, very disturbing	Extreme, near constant and disabling disress

4. RESISTANCE AGAINST OBSESIVE THOUGHTS: How much of an effort do you make to resist or to disregard obsessive thoughts?

0	1	2	3	4
Always try to resist	Try to resist most of the time	Some effort to resist	No effort to resist, but would like to resist	No effort to resist and don't wish to resist

5. CONTROL OVER OBSESIVE THOUGHTS: How much control do you have over your obsessive thoughts?

0	1	2	3	4
Complete control	Much control, usually able to stop with effort and concentration	Moderate control, sometimes able to stop	Little control, rarely successful at stopping obsessions	No control, obsessions are completely involuntary

SYMPTOM CHECKLIST: COMPULSIONS

COMPULSIONS are actions or behaviors that you feel driven to perform although you may recognize them as senseless or excessive compared to others you know. At times, you may try to resist doing them but this may prove difficult. You may experience anxiety that does not diminish until the behavior is completed. A **ritual** is a behavioral routine that you do the same way each time.

Please check all items below that have occurred for you currently or in the past.

Cleaning/Washing	Current	Past
Excessive or ritualized hand washing	☐	☐
Excessive/ritualized bathing, tooth brushing, grooming or toilet routine.	☐	☐
Excessive/ritualized cleaning of household items or other objects	☐	☐
Other measures to prevent or remove contact with contaminants: _____	☐	☐
Other: _____	☐	☐

Checking	Current	Past
Checking locks, stove, appliances, etc.	☐	☐
Checking you did not or will not harm others	☐	☐
Checking you did not or will not harm yourself	☐	☐
Checking that nothing terrible did or will happen	☐	☐
Checking you did not make a mistake	☐	☐
Checking bodily symptoms (pulse, heart rate, for nausea, etc.)	☐	☐
Other : _____	☐	☐

Counting/Ordering	Current	Past
Need to count and re-count	☐	☐
Need to order and r-order, arrange and re-arrange items	☐	☐
Concerned about right and wrong, morality or whether I have done the right thing	☐	☐
Worried about handwriting being perfect	☐	☐

Hoarding	Current	Past
Saving or collecting useless things (other than food)	☐	☐

Other	Current	Past
Mental rituals such as praying, thinking a "good thought" to undo a "bad thought" or action	☐	☐
Need to touch, tap or rub	☐	☐
Performing rituals to prevent harm or terrible consequences to myself or others	☐	☐
Ritualized eating behaviors	☐	☐
Hair pulling	☐	☐

IF YOU DID NOT ENDORSE ANY COMPULSIONS ON THE CHECKLIST, YOU DO NOT NEED TO COMPLETE THIS FORM. **When answering these questions, think specifically about the compulsive behaviors you just checked as "Current". Circle the number that best answers the questions for you at present.**

1. TIME OCCUPED PERFORMING COMPULSIONS: How much of your time is occupied by compulsive behaviors?

0	1	2	3	4
None	Mild, less than 1 hr/day.	Moderate, 1 to 3 hrs/day or frequent intrusion	Severe, greater than 3 and up to 8 hrs/day	Extreme, greater than 8 hrs/day

2. INTERFERENCE DUE TO COMPUSIVE BEHAVIORS: How much do your compulsive behaviors interfere with your social or work (or role) functioning?

0	1	2	3	4
None	Mild, slight interference with social or occupational activities.	Moderate, definite interference, but still manageable.	Severe, causes substantial impairment.	Extreme, incapacitating.

3. DISTRESS ASSOCIATED WITH COMPULSIVE BEHAIVORS: How much distress do your compulsive behaviors cause you? (do not rate distress associated with other conditions or situations)

0	1	2	3	4

None	Mild, not too disturbing	Moderate, disturbing but still manageable	Severe, very disturbing	Extreme, near constant and disabling distress

4. RESISTANCE AGAINST COMPULSIVE BEHAVIORS: How much of an effort do you make to resist or to disregard compulsive behaviors?

0	1	2	3	4
Always try to resist	Try to resist most of the time	Some effort to resist	No effort to resist, but would like to resist	No effort to resist and don't wish to resist

5. CONTROL OVER COMPULSIVE BEHAVIORS: How much control do you have over your compulsive behaviors?

0	1	2	3	4
Complete control	Much control, usually able to stop with effort and concentration	Moderate control, sometimes able to stop	Little control, rarely successful at stopping compulsions	No control, compulsions are completely involuntary

Beck Depression Inventory

Subject ID# _____ Date_____ Informant_____

Choose one statement from among the group of four statements in each question that best describes how you have been feeling during the **past few days**. Circle the number beside your choice.

1
0 I do not feel sad.
1 I feel sad.
2 I am sad all the time and I can't snap out of it.
3 I am so sad or unhappy that I can't stand it.

2
0 I am not particularly discouraged about the future.
1 I feel discouraged about the future.
2 I feel I have nothing to look forward to.
3 I feel that the future is hopeless and that things cannot improve.

3
0 I do not feel like a failure.
1 I feel I have failed more than the average person.
2 As I look back on my life, all I can see is a lot of failure.
3 I feel I am a complete failure as a person.

4
0 I get as much satisfaction out of things as I used to.
1 I don't enjoy things the way I used to.
2 I don't get any real satisfaction out of anything anymore.
3 I am dissatisfied or bored with everything.

5
0 I don't feel particularly guilty.
1 I feel guilty a good part of the time.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6
0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7
0 I don't feel disappointed in myself.
1 I am disappointed in myself.
2 I am disgusted with myself.
3 I hate myself.

8 **0** I don't feel I am any worse than anybody else.
1 I am critical of myself for my weaknesses or mistakes.
2 I blame myself all the time for my faults.
3 I blame myself for everything bad that happens.

9 **0** I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10 **0** I don't cry any more than usual.
1 I cry more now than I used to.
2 I cry all the time now.
3 I used to be able to cry, but now I can't cry even though I want to.

11 **0** I am no more irritated by things than I ever am.
1 I am slightly more irritated now than usual.
2 I am quite annoyed or irritated a good deal of the time.
3 I feel irritated all the time now.

12 **0** I have not lost interest in other people.
1 I am less interested in other people than I used to be.
2 I have lost most of my interest in other people.
3 I have lost all of my interest in other people.

13 **0** I make decisions about as well as I ever could.
1 I put off making decisions more than I used to.
2 I have greater difficulty in making decisions than before.
3 I can't make decisions at all anymore.

14 **0** I don't feel that I look any worse than I used to.
1 I am worried that I am looking old or unattractive.
2 I feel that there are permanent changes in my appearance that make me look unattractive.
3 I believe that I look ugly.

15 **0** I can work about as well as before.
1 It takes an extra effort to get started at doing something.
2 I have to push myself very hard to do anything.
3 I can't do any work at all.

16 **0** I can sleep as well as usual.
1 I don't sleep as well as I used to.
2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
3 I wake up several hours earlier than I used to and cannot get back to sleep.

17 **0** I don't get more tired than usual.
1 I get tired more easily than I used to.
2 I get tired from doing almost anything.
3 I am too tired to do anything.

18 **0** My appetite is no worse than usual.
1 My appetite is not as good as it used to be.
2 My appetite is much worse now.
3 I have no appetite at all anymore.

19 **0** I haven't lost much weight, if any, lately.
1 I have lost more than five pounds.
2 I have lost more than ten pounds.
3 I have lost more than fifteen pounds.
(Score 0 if you have been purposely trying to lose weight.)

20 **0** I am no more worried about my health than usual.
1 I am worried about physical problems such as aches and pains, or upset stomach, or
constipation.
2 I am very worried about physical problems, and it's hard to think of much else.
3 I am so worried about my physical problems that I cannot think about anything else.

21 **0** I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interested in sex completely.

SCORING	**OFFICE USE ONLY**
1 – 10: These ups and downs are considered normal.	
11 – 16: Mild mood disturbance	
17 – 20: Borderline clinical depression	
21 – 30: Moderate depression	
31 – 40: Severe depression	
Over 40: Extreme depression	

Beck Anxiety Inventory

Subject ID# _____ Date_____

Rater's Initials: _____ Informant_____

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - Sum each column. Then sum the column totals to achieve a grand score. Write that score here _____ .

Office Use Only

Please print your answers.

ADULT SELF-REPORT FOR AGES 18-59

For office use only
ID#

YOUR FULL NAME First Middle Last

YOUR GENDER ☐ Male ☐ Female

YOUR AGE

ETHNIC GROUP OR RACE

TODAY'S DATE Mo. ____ Date ____ Yr. ____

YOUR BIRTHDATE Mo. ____ Date ____ Yr. ____

Please fill out this form to reflect ***your*** views, even if other people might not agree. You need not spend a lot of time on any item. Feel free to print additional comments. ***Be sure to answer all items.***

YOUR USUAL TYPE OF WORK, even if not working now. Please be specific—for example, auto mechanic; high school teacher; homemaker; laborer; lathe operator; shoe salesman; army sergeant; student (indicate what you are studying & what degree you expect).

Your work _____ Spouse or partner's work _____

PLEASE CHECK YOUR HIGHEST EDUCATION

- ☐ 1. No high school diploma and no GED
- ☐ 2. General Equivalency Diploma (GED)
- ☐ 3. High school graduate
- ☐ 4. Some college but no college degree
- ☐ 5. Associate's Degree
- ☐ 6. Bachelor's or RN Degree
- ☐ 7. Some graduate school but no graduate degree
- ☐ 8. Master's Degree
- ☐ 9. Doctoral or Law Degree
- ☐ Other education (specify): _____

I. FRIENDS:

A. About how many close friends do you have? (Do not include family members.)

☐ None ☐ 1 ☐ 2 or 3 ☐ 4 or more

B. About how many times a month do you have contact with any of your close friends? (Include in-person contacts, phone, letters, e-mail.)

☐ Less than 1 ☐ 1 or 2 ☐ 3 or 4 ☐ 5 or more

C. How well do you get along with your close friends?

☐ Not as well as I'd like ☐ Average ☐ Above average ☐ Far above average

D. About how many times a month do any friends or family visit you?

☐ Less than 1 ☐ 1 or 2 ☐ 3 or 4 ☐ 5 or more

II. SPOUSE OR PARTNER:

What is your marital status?

- ☐ Never been married
- ☐ Married, living with spouse
- ☐ Widowed
- ☐ Married but separated from spouse
- ☐ Divorced
- ☐ Other—please describe: _____

At any time in the past 6 months, did you live with your spouse or with a partner?

☐ **No—please skip to page 2.**

☐ **Yes**—Circle ***0, 1,*** or ***2*** beside items A-H to describe your relationship ***during the past 6 months:***

0 = Not True 1 = Somewhat or Sometimes True 2 = Very True or Often True

0	1	2	A. I get along well with my spouse or partner		
0	1	2	B. My spouse or partner and I have trouble sharing responsibilities		
0	1	2	C. I feel satisfied with my spouse or partner		
0	1	2	D. My spouse or partner and I enjoy similar activities		
0	1	2	E. My spouse or partner and I *disagree* about living arrangements, such as where we live		
0	1	2	F. I have trouble with my spouse or partner's family		
0	1	2	G. I like my spouse or partner's friends		
0	1	2	H. My spouse or partner's behavior annoys me		

Please be sure you have answered all items. Then see other side.

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Please print. Be sure to answer all items.

III. FAMILY:

Compared with others, how well do you:		Worse than Average	Variable or Average	Better than Average	No Contact
A. Get along with your brothers?	☐ I have no brothers	☐	☐	☐	☐
B. Get along with your sisters?	☐ I have no sisters	☐	☐	☐	☐
C. Get along with your mother?	☐ Mother is deceased	☐	☐	☐	☐
D. Get along with your father?	☐ Father is deceased	☐	☐	☐	☐
E. Get along with your biological or adopted children?	☐ I have no children				
1. Oldest child	☐ Not applicable	☐	☐	☐	☐
2. 2nd oldest child	☐ Not applicable	☐	☐	☐	☐
3. 3rd oldest child	☐ Not applicable	☐	☐	☐	☐
4. Other children	☐ Not applicable	☐	☐	☐	☐
F. Get along with your stepchildren?	☐ I have no stepchildren	☐	☐	☐	☐

IV. JOB: ***At any time in the past 6 months,*** did you have any paid jobs (including self-employment and military service)?

☐ **No—please skip to Section V.**

☐ **Yes—please describe your job(s):** _____

Circle ***0, 1,*** or ***2*** beside items A-I to describe your work experience ***during the past 6 months:***

0 = Not True **1 = Somewhat or Sometimes True** **2 = Very True or Often True**

0 1 2	A. I work well with others	0 1 2	F. I do things that may cause me to lose my job
0 1 2	B. I have trouble getting along with bosses	0 1 2	G. I stay away from my job even when I'm not sick or not on vacation
0 1 2	C. I do my work well	0 1 2	H. My job is too stressful for me
0 1 2	D. I have trouble finishing my work	0 1 2	I. I worry too much about work
0 1 2	E. I am satisfied with my work situation		

V. EDUCATION: ***At any time in the past 6 months,*** did you attend school, college, or any other educational or training program?

☐ **No—please skip to Section VI.**

☐ **Yes—what kind of school or program?** _____

What degree or diploma are you seeking? _____ Major? _____

When do you expect to receive your degree or diploma? _____

Circle ***0, 1,*** or ***2*** beside items A-E to describe your educational experience ***during the past 6 months:***

0 = Not True **1 = Somewhat or Sometimes True** **2 = Very True or Often True**

0 1 2	A. I get along well with other students	0 1 2	D. I am satisfied with my educational situation
0 1 2	B. I achieve what I am capable of	0 1 2	E. I do things that may cause me to fail
0 1 2	C. I have trouble finishing assignments		

VI. Do you have any illness, disability, or handicap? ☐ **No** ☐ **Yes—please describe:**

VII. Please describe your concerns or worries about family, work, education, or other things: ☐ **No concerns**

VIII. Please describe the best things about yourself:

Please be sure you have answered all items.

Please print your answers. Be sure to answer all items.

IX. Below is a list of items that describe people. For each item, please circle *0, 1,* or *2* to describe yourself *over the past 6 months.* Please answer all items as well as you can, even if some do not seem to apply to you.

0 = Not True **1 = Somewhat or Sometimes True** **2 = Very True or Often True**

0 1 2 1. I am too forgetful
0 1 2 2. I make good use of my opportunities
0 1 2 3. I argue a lot
0 1 2 4. I work up to my ability
0 1 2 5. I blame others for my problems
0 1 2 6. I use drugs (other than alcohol and nicotine) for nonmedical purposes (describe): _____
0 1 2 7. I brag
0 1 2 8. I have trouble concentrating or paying attention for long
0 1 2 9. I can't get my mind off certain thoughts (describe): _____
0 1 2 10. I have trouble sitting still
0 1 2 11. I am too dependent on others
0 1 2 12. I feel lonely
0 1 2 13. I feel confused or in a fog
0 1 2 14. I cry a lot
0 1 2 15. I am pretty honest
0 1 2 16. I am mean to others
0 1 2 17. I daydream a lot
0 1 2 18. I deliberately try to hurt or kill myself
0 1 2 19. I try to get a lot of attention
0 1 2 20. I damage or destroy my things
0 1 2 21. I damage or destroy things belonging to others
0 1 2 22. I worry about my future
0 1 2 23. I break rules at work or elsewhere
0 1 2 24. I don't eat as well as I should
0 1 2 25. I don't get along with other people
0 1 2 26. I don't feel guilty after doing something I shouldn't
0 1 2 27. I am jealous of others
0 1 2 28. I get along badly with my family
0 1 2 29. I am afraid of certain animals, situations, or places (describe): _____
0 1 2 30. My relations with the opposite sex are poor
0 1 2 31. I am afraid I might think or do something bad
0 1 2 32. I feel that I have to be perfect
0 1 2 33. I feel that no one loves me
0 1 2 34. I feel that others are out to get me
0 1 2 35. I feel worthless or inferior
0 1 2 36. I accidentally get hurt a lot, accident-prone
0 1 2 37. I get in many fights
0 1 2 38. My relations with neighbors are poor
0 1 2 39. I hang around people who get in trouble
0 1 2 40. I hear sounds or voices that other people think aren't there (describe): _____
0 1 2 41. I am impulsive or act without thinking
0 1 2 42. I would rather be alone than with others
0 1 2 43. I lie or cheat
0 1 2 44. I feel overwhelmed by my responsibilities
0 1 2 45. I am nervous or tense
0 1 2 46. Parts of my body twitch or make nervous movements (describe): _____
0 1 2 47. I lack self-confidence
0 1 2 48. I am not liked by others
0 1 2 49. I can do certain things better than other people
0 1 2 50. I am too fearful or anxious
0 1 2 51. I feel dizzy or lightheaded
0 1 2 52. I feel too guilty
0 1 2 53. I have trouble planning for the future
0 1 2 54. I feel tired without good reason
0 1 2 55. My moods swing between elation and depression
56. Physical problems ***without known medical cause:***
0 1 2 a. Aches or pains (***not*** stomach or headaches)
0 1 2 b. Headaches
0 1 2 c. Nausea, feel sick
0 1 2 d. Problems with eyes (***not*** if corrected by glasses) (describe): _____
0 1 2 e. Rashes or other skin problems
0 1 2 f. Stomachaches
0 1 2 g. Vomiting, throwing up
0 1 2 h. Heart pounding or racing
0 1 2 i. Numbness or tingling in body parts
0 1 2 57. I physically attack people
0 1 2 58. I pick my skin or other parts of my body (describe): _____
0 1 2 59. I fail to finish things I should do
0 1 2 60. There is very little that I enjoy
0 1 2 61. My work performance is poor
0 1 2 62. I am poorly coordinated or clumsy

Please be sure you have answered all items. Then see other side.

Please print your answers. Be sure to answer all items.

0 = Not True **1 = Somewhat or Sometimes True** **2 = Very True or Often True**

0 1 2 63. I would rather be with older people than with people of my own age
0 1 2 64. I have trouble setting priorities
0 1 2 65. I refuse to talk
0 1 2 66. I repeat certain acts over and over (describe): _____
_____
0 1 2 67. I have trouble making or keeping friends
0 1 2 68. I scream or yell a lot
0 1 2 69. I am secretive or keep things to myself
0 1 2 70. I see things that other people think aren't there (describe): _____
_____
0 1 2 71. I am self-conscious or easily embarrassed
0 1 2 72. I worry about my family
0 1 2 73. I meet my responsibilities to my family
0 1 2 74. I show off or clown
0 1 2 75. I am too shy or timid
0 1 2 76. My behavior is irresponsible
0 1 2 77. I sleep more than most other people during day and/or night (describe):
_____
0 1 2 78. I have trouble making decisions
0 1 2 79. I have a speech problem (describe):
_____
0 1 2 80. I stand up for my rights
0 1 2 81. My behavior is very changeable
0 1 2 82. I steal
0 1 2 83. I am easily bored
0 1 2 84. I do things that other people think are strange (describe): _____
_____
0 1 2 85. I have thoughts that other people would think are strange (describe): _____
_____
0 1 2 86. I am stubborn, sullen, or irritable
0 1 2 87. My moods or feelings change suddenly
0 1 2 88. I enjoy being with people
0 1 2 89. I rush into things without considering the risks
0 1 2 90. I drink too much alcohol or get drunk
0 1 2 91. I think about killing myself
0 1 2 92. I do things that may cause me trouble with the law (describe): _____
_____
0 1 2 93. I talk too much
0 1 2 94. I tease others a lot
0 1 2 95. I have a hot temper
0 1 2 96. I think about sex too much
0 1 2 97. I threaten to hurt people
0 1 2 98. I like to help others
0 1 2 99. I dislike staying in one place for very long
0 1 2 100. I have trouble sleeping (describe): _____
_____
0 1 2 101. I stay away from my job even when I'm not sick or not on vacation
0 1 2 102. I don't have much energy
0 1 2 103. I am unhappy, sad, or depressed
0 1 2 104. I am louder than others
0 1 2 105. People think I am disorganized
0 1 2 106. I try to be fair to others
0 1 2 107. I feel that I can't succeed
0 1 2 108. I tend to lose things
0 1 2 109. I like to try new things
0 1 2 110. I wish I were of the opposite sex
0 1 2 111. I keep from getting involved with others
0 1 2 112. I worry a lot
0 1 2 113. I worry about my relations with the opposite sex
0 1 2 114. I fail to pay my debts or meet other financial responsibilities
0 1 2 115. I feel restless or fidgety
0 1 2 116. I get upset too easily
0 1 2 117. I have trouble managing money or credit cards
0 1 2 118. I am too impatient
0 1 2 119. I am not good at details
0 1 2 120. I drive too fast
0 1 2 121. I tend to be late for appointments
0 1 2 122. I have trouble keeping a job
0 1 2 123. I am a happy person

124. ***In the past 6 months,*** about how many times per day did you use tobacco (including smokeless tobacco)? _____ times per day.

125. ***In the past 6 months,*** on how many days were you drunk? _____ days.

126. ***In the past 6 months,*** on how many days did you use drugs for nonmedical purposes (including marijuana, cocaine, and other drugs, except alcohol and nicotine)? _____ days.

Please be sure you have answered all items.

Curriculum Vitae
Flint M. Espil

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EDUCATION

University of Wisconsin-Milwaukee (Milwaukee, WI)
Major: Clinical Psychology (Ph.D.) (2015, anticipated)
Dissertation: *A long-term follow up to a randomized controlled trial of comprehensive behavioral intervention for tics.*
Co-Chairs**:** Douglas W. Woods, Ph.D. and Han J. Lee, Ph.D.

University of Mississippi Medical Center (Jackson, MS)
Pre-doctoral Psychology Residency, 2014-2015 (anticipated)
Concentration: Child Clinical Psychology

University of Colorado at Denver (Denver, CO)
Major: Psychology (M.A.), May 2008
Terminal Master's program with emphasis in clinical psychology
Thesis: *The gift of culture: The roles of time, diagnosis, and culture in accepting gifts in therapy*
Chair: Mitchell M. Handelsman, Ph.D.

University of Idaho, (Moscow, ID)
Major: Psychology (B.S.), May 2006, *summa cum laude*

PEER-REVIEWED PUBLICATIONS

1. Capriotti, M. R., Piacentini, J. C., Himle, M. B., Ricketts, E. J., **Espil, F. M.**, Lee, H. J., Turkel, J. E., & Woods, D. W. (in press). Assessing environmental consequences of ticcing in youth with chronic tic disorders: The tic accommodation and reactions scale. *Children's Health Care.*

2. **Espil, F. M.**, Capriotti, M. R., Conelea, C. A., & Woods, D. W. (2014). The role of parental perceptions of tic frequency and tic intensity in predicting tic-related functional impairment in youth with chronic tic disorders. *Child Psychiatry and Human Development*, *45* (6), 657-655.

3. Ricketts, E. J., Bauer, C. C., Van der Fluit, F., Capriotti, M. R., **Espil, F. M.**, Snorrason, I., Ely, L. J., Walther, M. R., & Woods, D. W. (2013). Behavior therapy for stereotypic movement disorder in typically developing children: A clinical case series. *Cognitive and Behavioral Practice, 20 (4),* 544-555.

4. Capriotti, M. R., **Espil, F. M.**, & Woods, D. W. (2013). Environmental factors as potential determinants of premonitory urge severity in youth with Tourette Syndrome. *Journal of Obsessive-Compulsive and Related Disorders, 2,* 37-42.

5. Capriotti, M., Brandt B., Ricketts, E., **Espil, F. M**., Woods, D. W. (2012). Comparing the effects of reinforcement and response-cost contingencies on tic suppression and expression in youth with Tourette Syndrome. *Journal of Applied Behavior Analysis*, *45*, 251-263.

6. Benotsch, E. G., Martin, A. M., **Espil, F. M**., Nettles, C. D., Seal, D. W., & Pinkerton, S.D. (2011). Internet use, recreational travel, and HIV risk behaviors in men who have sex with men. *Journal of Community Health, 36 (3),* 398-405.

BOOK CHAPTERS

1. Capriotti, M. R., **Espil, F. M**., & Woods, D. W. (2013). Tourette Syndrome and Tic Disorders. In S. G. Hofmann (Ed.), *The Wiley Handbook of Cognitive Behavioral Therapy.* Hoboken, NJ: John Wiley & Sons.

2. Capriotti, M. R., **Espil, F. M**., & Woods, D. W. (2012). Behavior Therapy. In J. T. Walkup, J. W. Mink, & K. S. McNaught (Eds.), *A Family Guide to Tourette Syndrome.* Bayside, NY: Tourette Syndrome Association.

3. Woods, D. W., Snorrason, I., & **Espil, F. M**. (2011). Cognitive-Behavioral Therapy in Adults. In J. E. Grant, D. J. Stein, D. W. Woods, & N. J. Keuthen (Eds.), *Trichotillomania, Skin-Picking, and other Stereotypic Disorders.* Arlington, VA: American Psychiatric Publishing.

TALKS AND SYMPOSIA

1. Capriotti, M. R., Ricketts, E. J., **Espil, F. M.**, Lee, H.J., Piacentini, J. C., & Woods, D. W. (2013). *Assessing environmental consequences of ticcing in youth with Tourette syndrome*. In J. A. Richey (Chair). Repetitive behaviors across the disorders: A transdiagnostic framework. Symposium presented at the 47th annual convention of the Association for Behavioral and Cognitive Therapies, Nashville, TN.

2. Woods, D. W., Ely, L. J., Bauer, C. C., Twohig, M. P., Saunders, S., Compton, S. N., Deckersbach, T., **Espil, F. M**., …& Franklin, M. E. (2013). *Acceptance enhanced behavior therapy vs. psychoeducation + supportive therapy for trichotillomania: Results from a randomized controlled trial.* In M. Falkenstein & D. Haaga (Chairs). Developments in trichotillomania treatment research. Symposium presented at the 47th annual convention of the Association for Behavioral and Cognitive Therapies, Nashville, TN.

3. **Espil, F. M**., Capriotti, M. R., & Woods, D. W. (2012). *Assessing the relative contributions of tic frequency and tic intensity to predict functional impairment in youth with chronic tic disorders*. In S. Wilhelm (Chair). Cutting edge assessment of tic disorders. Symposium presented at the 46th annual convention of the Association for Behavioral and Cognitive Therapies, Baltimore, MD.

POSTER PRESENTATIONS

1. **Espil, F. M**., Snorrason, I., Capriotti, M. R., Goetz, A. R., & Woods, D. W. (2014). *CBIT 8 years later: General course of tic severity and the most common tic antecedents, consequences, and management strategies by developmental period*. Poster presented at the 48thAnnual ABCT Convention, Philadelphia, November, 2014.

2. Ricketts, E. J., Goetz, A., Capriotti, M. R., Bauer, C., Brei, N., **Espil, F. M**., Ran, D., & Woods, D. W. (2014). *A randomized wait-list-controlled trial of voice over internet*

protocol-delivered behavior therapy for chronic tic disorders. Poster presented at the 48thAnnual ABCT Convention, Philadelphia, November, 2014.

3. Siwiec, S., Zupek, S., Park, M.Y., Bilkey, S., **Espil, F.M.**, Goetz, A., & Lee, H.J. (2014). *Automatic versus focused hair pulling and their differential association with severity of trichotillomania.* Poster presented at the 48thAnnual ABCT Convention, Philadelphia, November, 2014.

4. Siwiec, S.G., Park, M.Y., Zupek, S., Bilkey, S., **Espil, F.M.**, Goetz, A., Lee, H.J. (2014). *Psychometric properties of the NIMH trichotillomania severity rating scale for youths with trichotillomania*. Poster presented at the 48th Annual ABCT Convention, Philadelphia, November, 2014.

5. Houghton, D. C., Compton, S., Twohig, M. P., Franklin, M. E., Saunders, S., **Espil, F. M.**, Capriotti, M. R., & Woods, D. W. (2013*). Development of a trichotillomania-specific version of the acceptance and action questionnaire: The acceptance and action questionnaire-trichotillomania*. Poster presented at the 47th annual convention of the Association for Behavioral and Cognitive Therapies, Nashville, TN.

6. Lee. H. J., **Espil, F. M.**, Bauer, C. C., Bilkey, S., Zupek, S., Koester, R., & Woods, D. W. (2013). *Response inhibition training for children with trichotillomania.* Poster presented at the 20th annual Trichotillomania Learning Center conference, Newark, NJ.

5. **Espil, F. M**., Capriotti, M. R., Ricketts, E. J., Bauer, C. C., Neal-Barnett, A., & Woods, D. W. (2012). *Minority recruitment of individuals with trichotillomania: Preliminary findings from a large, randomized controlled trial*. Special Interest Group poster presented at the 46th annual Association for Behavioral and Cognitive Therapies conference, Baltimore, MD.

6. Capriotti, M. R., **Espil, F. M**., Bauer, C. C., Ely, L. J., & Woods, D. W. (2012). *Evaluating sources of potential sampling bias in a trial of behavior therapy for trichotillomania in adults*. Special Interest Group poster presented at the 46th annual Association for Behavioral and Cognitive Therapies conference, Baltimore, MD.

7. **Espil, F. M**., Capriotti, M. R., Conelea, C. A., & Woods, D. W. (2012). *Treatment delay as a predictor of functional impairment in youth with chronic tic disorders*. Poster presented at the 46th annual Association for Behavioral and Cognitive Therapies conference, Baltimore, MD.

8. Jacobi, D. M., Riemann, B. C., & **Espil, F. M**. (2012). *Exposure based cognitive behavior therapy for pediatric OCD with comorbid ADHD in a residential setting: Treatment outcome in an intent-to-treat sample of 13-17 year olds*. Poster presented at the 46th annual Association for Behavioral and Cognitive Therapies conference, Baltimore, MD.

9. Jacobi, D. M., Riemann, B. C., & **Espil, F. M**. (2012). *Obsessive-compulsive disorder and comorbid Asperger's disorder: Treatment outcome in an intent-to-treat sample of adolescents in a residential treatment program.* Poster presented at the 46th annual Association for Behavioral and Cognitive Therapies conference, Baltimore, MD.

10. Ricketts, E. J., Bauer, C. C., Van der Fluit, F., Capriotti, M. R., **Espil, F. M**., Snorrason, I., Ely, L. J., Walther, M. R., & Woods, D. W. (2012). *Behavior therapy for stereotypic movement disorder in typically developing children: A clinical case series*. Poster presented at the 46th annual Association for Behavioral and Cognitive Therapies conference, Baltimore, MD.

11. **Espil, F. M**., Bauer, C. C., & Woods, D. W. (2012*). Enhanced comprehensive behavioral intervention for tics.* Poster presented at the 38th annual Association for Behavior Analysis International conference, Seattle, WA.

12. **Espil, F. M**., Capriotti, M. R., Johnson, J. A., Conelea, C. A., & Woods, D. W. (2011). *Assessing the relative contributions of tic frequency and tic intensity functional impairment in youth with chronic tic disorders.* Poster presented at the 45th annual Association for Behavioral and Cognitive Therapies conference, Toronto, Canada.

13. **Espil, F. M**., Capriotti, M. R., Ricketts, E. M., Conelea, C. A., & Woods, D. W. (2011*). Self-reported medication use and outcome in a community sample of children with chronic tic disorders.* Special Interest Group poster presented at the 45th annual Association for Behavioral and Cognitive Therapies conference, Toronto, Canada.

14. Capriotti, M. R., **Espil, F. M**., Wissing, A. A., Conelea, C. A., & Woods, D. W. (2011). *Comparing the effects of response cost and DRO contingencies on tic suppression*. Poster presented at the 45th annual Association for Behavioral and Cognitive Therapies conference, Toronto, Canada.

15. **Espil, F. M**., Moore, E. M., & Mosack, K. E. (2010). *Sexual behavior and perceptions of risk in college students.* Poster presented at the 31st annual Society of Behavioral Medicine meeting in Seattle, WA.

16. Brouwer, A. M., Wendorf, A. R., **Espil, F. M**., Sokolava, L., & Kucheras, S. (2010*). Exploring cultural themes in missing data: A survey project examining correlates of hypertension among Russian-speaking immigrant women.* Poster presented at the 31st annual Society of Behavioral Medicine meeting in Seattle, WA.

17. Brouwer, A. M., Wendorf, A. R., **Espil, F. M**., & Mosack, K. E. (2009*). Hypertension in older Russian immigrant women: Cultural identity and illness beliefs.* Poster presented at the Association for Psychological Science 22nd annual convention, San Francisco, CA.

18. Wendorf, A. R., Brouwer, A. M., **Espil, F. M**., & Mosack, K. E. (2009*). Depression and adherence: Hypertension in older Russian immigrant Women*. Poster presented at the Association for Psychological Science 22nd annual convention, San Francisco, CA.

19. Cabral, O., McCardle, M. **Espil, F. M**., Nettles, C. D., Richardson, D., Allen, B., Benotsch, E. G., & Rietmeijer, C. (2007). *Methamphetamine use and HIV risk behaviors in patients seeking STD clinic services.* Poster presentation at the 115th annual American Psychology Association conference, San Francisco, CA.

18. **Espil, F. M**., Cabral, O., McCardle, M., Nettles, C. D., & Benotsch, E. G. (2007*). Substance use and HIV risk behaviors during recreational travel.* Poster presentation at the 28th annual Society of Behavioral Medicine meeting, Washington D.C.

19. McCardle, M., **Espil, F. M**., Cabral, O., Nettles, C. D., Richardson, D., Allen, B., Benotsch, E. G., & Rietmeijer, C. (2007). *Perceived power, self-efficacy, condom use, and sexual risk behaviors in women receiving STD clinic services*. Poster presentation at the 28th annual Society of Behavioral Medicine meeting, Washington D.C.

20. **Espil, F. M**., Erickson, N., Yamamoto, A., McAllister, J., & Craig, T. (2005). *Perceptions of jury deliberations and defendant race.* Poster presentation at the Association for Psychological Science 17th annual convention, Los Angeles, CA.

21. Bradshaw, K., **Espil, F. M**., & Danielson, T. (2005). *The dangers of peer influence: An examination of Idaho students' alcohol and cigarette use*. Poster presentation at the 21st annual Idaho Conference on Alcohol and Drug Dependency, Boise, Idaho.

22. **Espil, F. M**. & Hill, M. (2004). *Perspectives on physician apparel*. Department poster presentation at the University of Idaho psychology research colloquium, Moscow, ID.

CLINICAL POSITIONS

October 2014- Present	**Consultant**, Child Inpatient Unit *Batson Children's Hospital*, University of Mississippi Medical Center
July 2014- Present	**Therapist**, Child Anxiety Clinic *Department of Psychiatry*, University of Mississippi Medical Center
July 2014- Present	**Evaluator and Consultant**, Residential Treatment Facility *Mississippi Children's Services*, University of Mississippi Medical Center
July 2014- Present	**Therapist**, General Psychology Clinic *Department of Psychiatry,* University of Mississippi Medical Center
July 2014- Present	**Instructor**, Prolonged Exposure for PTSD Dissemination *Department of Psychiatry,* University of Mississippi Medical Center
August 2013- June 2014	**Therapist**, Adult Inpatient Unit Rogers Memorial Hospital, Oconomowoc, WI
August 2011- June 2014	**Therapist**, Child and Adolescent Anxiety and OC Spectrum Residential Rogers Memorial Hospital, Oconomowoc, WI
August 2011- June 2014	**Therapist**, Eating Disorder and Anxiety Residential Rogers Memorial Hospital, Oconomowoc, WI
August 2010-	**Therapist**, Anxiety and OC Spectrum Disorders Clinic

June 2014	*Department of Psychology*, University of Wisconsin-Milwaukee
August 2009- June 2014	**Therapist**, Tic Disorder and Trichotillomania Specialty Clinic *Department of Psychology*, University of Wisconsin-Milwaukee
August 2007- June 2008	**Therapist,** Child and Adolescent Outpatient Community Services *West Denver Child and Family Center*, Mental Health Centers of Denver

RESEARCH POSITIONS

September 2012- August 2013	Behavior Therapy Supervisor for Pilot Open Case Series of Voice Over Internet Protocol-Delivered Behavior Therapy for Chronic Tic Disorders, 5F31 MH096375-02 University of Wisconsin-Milwaukee Supervisor: Douglas W. Woods, Ph.D.
September 2011- June 2014	Study Coordinator for Acceptance Enhanced Behavior Therapy (AEBT) for Adults with Trichotillomania, NIH #5R01 MH080966-02 University of Wisconsin-Milwaukee Supervisor: Douglas W. Woods, Ph.D.
May 2010- June 2014	Graduate Research Assistant in the Behavior Therapy and Research Lab, University of Wisconsin-Milwaukee Supervisor: Douglas W. Woods, Ph.D.
August 2011- June 2014	Independent Evaluator for Trichotillomania Treatment Research Grant Trichotillomania Learning Center University of Wisconsin-Milwaukee Supervisor: Han Joo Lee, Ph.D.
August 2008- May 2010	Graduate Research Assistant in the Patient Advocacy and Research Lab, University of Wisconsin-Milwaukee Supervisor: Katie Mosack, Ph.D.
August 2006- May 2008	Project Assistant for Interventions to Reduce Sexual Risk Behaviors and Substance Use, NIH R21-MH078790 University of Colorado Denver Supervisor: Eric G. Benotsch, Ph.D.
September 2004- May 2006	Lab Manager in the Human Factors Laboratory University of Idaho Supervisor: Traci Y. Craig, Ph.D.

TEACHING POSITIONS

Training Graduate Students

Psychological Assessment Supervisor (2013-2014)

8 Students, *Department of Psychology*, University of Wisconsin-Milwaukee

Tic Disorder and Trichotillomania Specialty Clinic Supervisor (2011-2014)
4 Students, *Department of Psychology*, University of Wisconsin-Milwaukee

Training Undergraduate Students
Mentoring of Psychology Undergraduate Students (2007-2014)
8 Students, *Department of Psychology*, University of Wisconsin-Milwaukee
1 Student, *Department of Psychology*, University of Colorado Denver

Lectures
Course Instructor and Lecturer (Spring 2012)
Personality Psychology
Department of Psychology, University of Wisconsin-Milwaukee

Graduate Teaching Assistantship (2008- 2011)
Psychology Research Methods (4 courses)
Psychological Statistics (3 courses)
Introduction to Psychology (2 courses)
Department of Psychology, University of Wisconsin-Milwaukee

Graduate Teaching Assistantship (2006- 2008)
Introduction to Psychology (2 courses)
Psychological Statistics (2 courses)
History of Psychology
Department of Psychology, University of Colorado Denver

PEER-REVIEW EXPERIENCE

- Child Psychiatry and Human Development
- Child and Family Psychology Review (mentored review)
- Journal of Cognitive Psychotherapy (mentored review)
- Cognitive and Behavioral Practice (mentored review)
- Emotion (mentored review)

PROFESSIONAL MEMBERSHIPS

- Student Member, American Psychology Association, 2006-Present
- Student Member, Association for Behavioral and Cognitive Therapies, 2009- Present

AWARDS & HONORS

2009-2011	**Graduate Student Travel Award**, University of Wisconsin-Milwaukee
2008-2010	**Chancellor's Graduate Student Award**, University of Wisconsin-Milwaukee
2010	**Student Meritorious Abstract Award**, Society of Behavioral Medicine
2007	**Chancellor's Award of Excellence in Research**, University of Colorado Denver

REFERENCES

Available upon request