A Modularized Cognitive-Behavioral Intervention for Water Phobia in an Adolescent with Childhood-Onset Schizophrenia

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ABSTRACT. The current study evaluated the effectiveness of a modularized treatment of a specific fear of water for a 14-year-old youth with childhood onset schizophrenia using a multiple-baseline across behaviors design. Treatment included gradual exposure to a hierarchy of feared water-related situations with rewards for successful approximations ranging from looking at water to swimming in a pool. Both parent and youth fear rat-

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ings, as well as behavioral observation, were used to monitor treatment progress over the course of 22 weeks. Consistent and repeated exposure successfully reduced fear and avoidance of the swimming pool over time.

KEYWORDS. Modular cognitive-behavior therapy, childhood-onset schizophrenia, specific phobia, multiple baseline

Childhood-onset schizophrenia (COS) is a particularly severe, yet poorly understood, condition. Prevalence rates for the disorder are low, with estimates at 1 in 10,000 (Dulmus & Smyth, 2000). Although there is currently no evidence-based treatment for COS, treatment strategies for this disorder generally consist of an array of interventions including pharmacological therapy, cognitive restructuring, educational interventions, environmental manipulations, and family therapy (McClellan et al., 2001; Gonthier & Lyon, 2004).

Many children with schizophrenia have comorbid conditions, such as anxiety, depression, and conduct difficulties (Russell, Bott, & Sammons, 1989; Schiffman & Daleiden, in press). Given the complexity of symptom presentation and the often recalcitrant nature of actual psychotic symptoms, a focal symptom-based approach (cf. Rogers, 1998) for addressing comorbid conditions among these youth seems consistent with established practice guidelines (e.g., McClellan et al., 2001), and may provide relief from problems more amenable to treatment than psychosis itself. Despite guidelines for psychosocial treatment, little is known regarding the efficacy or effectiveness of such interventions.

Although the effects of behavior therapy on specific phobias are well established and robust (Davis & Ollendick, 2005), the potential of this treatment among youth with schizophrenia is unknown. A recent report by Rapp and colleagues (2005) demonstrated the effectiveness of an exposure-based program for a girl with autism with a specific avoidance of swimming pools. Given the known strength of exposure for phobias among children and adults in general, and the demonstrated effects on a particular child with a developmental disability, targeting specific symptoms among youth with schizophrenia that are potentially amenable to exposure may be an effective means of obtaining clinical progress.

In an effort towards providing preliminary support for a focal symptom-based approach for treating comorbid youth with COS (cf. Rogers, 1998; Schiffman, in press), the present study examined the efficacy of a cognitive-behavioral intervention for treating one youth with COS who exhibited a specific and excessive fear of water (e.g., showers, swimming in pools, at the beach). Specifically, utilizing a single-subject multiple-baseline across behaviors design, we hypothesized that decreases in self- and parent-reported levels of anxiety (across three different clusters of feared water-related activities) would selectively occur in direct response to engaging in exposure-based exercises for those feared activities.

METHOD

Participant

The participant was a 14-year-old male ("Dan") who resided with his mother. Dan was first diagnosed with schizophrenia at the age of 13 years, 2 months, and had undergone several acute hospitalizations prior to receiving ongoing intensive individual, parent, and family therapies at the Child and Adolescent Thought Disorders Program (CATDP) at the University of Hawai'i at Mānoa. At the time of intake into our program, Dan presented with diagnoses of Schizophrenia, Disorganized Type, and Obsessive Compulsive Disorder (OCD) for his tendencies towards checking, repeating, and hoarding. Dan's most recent intelligence testing at the time of intake indicated a full-scale IQ in the Borderline range. Although Dan was able to communicate basic needs and preferences, he demonstrated significantly impaired verbal communication skills.

Dan's specific fear of the water developed after the onset of his psychotic symptoms. Premorbidly, he reportedly enjoyed swimming and water-related activities, and, according to his mother, was a strong swimmer. Following the onset of psychotic symptoms, and prior to beginning treatment, Dan resisted putting water on his ears for fear of his "ears falling off," and he could not place his head underwater for fear of "seeing bad guys" and "monsters."

Throughout the course of treatment, Dan received several pharmacotherapeutic medications. These included atenolol (25mg/day), atomoxetine (18mg/day), and aripiprazole (10mg/day). Dan also received clozapine (ranging from 100mg to 150mg/day) and risperidone (ranging from 0.5mg to 2mg/day) at slightly varying doses.

Treatment Procedure

We employed the Modular CBT manual for anxiety disorders (Chorpita, 1998), a manual derived from the work of Barlow (1988) and Beck and colleagues (Beck, Rush, Shaw, & Emery, 1979) with adults, manualized CBT for children (e.g., Kendall et al., 1997; Silverman et al., 1999), behavior therapy for phobic youth developed in the early part of the twentieth century (Jones, 1924), and its extensions and elaborations over the past 30 years (e.g., Ollendick & Francis 1988). The protocol aims to correct the child's misperception of threat so that the anxiety response is reduced. Such changes are fostered through education and exposure practice exercises designed to teach the child through reasoning and experience that his or her anxiety is not necessary or is out of proportion to the perceived danger. All sessions take an active approach, require a session agenda, and employ rapport building and Socratic strategies.

Measures

Fear Ladder. The fear hierarchy ("Fear Ladder") is jointly created by the child, parent, and therapist to reflect gradations of 10-12 feared situations or stimuli (Barlow & Seidner, 1983; Chorpita, 1998; Wolpe, 1958). Using a visual analog 0-10 point scale (i.e., Fear Thermometer (cf. Melamed, Hawes, Heiby, & Glick, 1975)), children and parents separately (i.e., Child Fear Ladder and Parent Fear Ladder) provide a rating of the child's emotional distress associated with each of the listed situations or stimuli. Zero indicates no/minimal feelings of anxiety or distress and 10 indicates maximum feelings of anxiety or distress. Parent and child Fear Ladder averages taken over the course of treatment served as indices of between-session habituation (i.e., reductions in anxiety or distress across treatment sessions) towards anxiety-provoking or feared situations. A list of Dan's anxiety-provoking situations, together with their clustering into differing series, can be seen in Table 1. Dan and his mother's fear hierarchy data were averaged (i.e., combined-fear hierarchy data) within each series in order to provide the dependent variables for this investigation. Visual inspection suggested no significant differences between child- and parent-fear hierarchy data for any series.

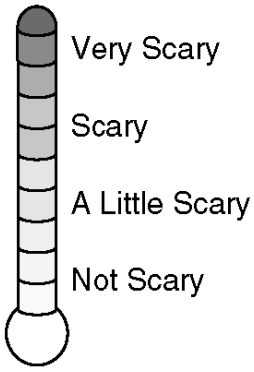
Treatment therapists implemented two modifications to Dan's Fear Ladder in hopes of increasing the validity and/or reliability of Dan's responses towards his specific hierarchy items. First, instead of utilizing a

TABLE 1. Clustering of Child's Fear Hierarchy Items

Series 1 Items: anxiety-provoking situations removed from a swimming pool
Playing with water balloons
Putting head under showerhead with water turned on
Splashing face with water
Sitting by the water (beach or swimming pool)
Looking at the water
Wearing goggles
Putting water on my ears
Series 2 Items: moderately anxiety-provoking situations while in or at a swimming pool
Standing neck-high in water
Standing chest-high in water
Putting my whole leg in water
Standing waist-high in water
Putting my foot in water
Sticking arm underwater
Series 3 Items: difficult anxiety-provoking situations while in a swimming pool
Putting head underwater
Swimming

0-10 point scale (used with Dan's mother) to indicate levels of emotional distress for each of his fear hierarchy items, Dan used a visual analog scale allowing only four discrete responses: (1) Very Scary, (2) Scary, (3) A Little Scary, and (4) Not Scary (see Figure 1). This modification facilitated Dan's understanding of the rating scale. For analytical purposes, these discrete responses were assigned values of 10, 6.66, 3.33, and 0, respectively. Second, given Dan's significant difficulties sustaining attention on tasks, three non-anxiety provoking tasks were inserted into Dan's fear hierarchy to assess for his sustained attention while giving his responses to hierarchy items. These additional items represented enjoyable activities for Dan (i.e., "drinking soda," "eating chips," and "eating candy"), and whenever Dan indicated these items as anything other than "Not Scary," Dan's responses up until that item were disregarded, and Dan was asked to start over. Also, consistent with these efforts towards helping Dan sustain his attention on the task of filling out his fear hierarchy, Dan read aloud every fear hierarchy item before providing a response.

FIGURE 1. Modified Fear Thermometer



Note. Traditional numeric values changed to ordinal categories to facilitate client's comprehension.

Procedure

Therapists in the current investigation were three doctoral-level graduate students and one PhD-level therapist. Therapists worked together in pairs alongside Dan during each treatment session. Treatment sessions typically lasted 60 minutes, and occurred two to three times per week during the exposure phases of treatment. Treatment settings varied slightly, but generally progressed from clinic to community-based settings (e.g., local swimming pools) as Dan mastered more and more of the items on his fear hierarchy. Both child and parent were blind to the present study's analytical design (see below) as well as one another's ratings.

The effects of treatment were evaluated using a multiple-baseline across feared behaviors design, as indicated through combined-fear ladder data (i.e., child- and mother-fear ladders were averaged within each cluster of behavior) (Hayes, Barlow, & Nelson, 1999). As seen in Table 1, three clusters of behaviors were used to represent (1) anxiety-provoking situations involving water, but not directly related to swimming (series 1), (2) moderately easy anxiety-provoking situations while in or at a swimming pool (series 2), and (3) difficult anxiety-provoking situations while in a swimming pool (series 3). To create these clusters, three treatment therapists independently categorized each fear hierarchy item into one of the three categories listed above. This process resulted in 100% agreement between all therapists for all fear hierarchy items. As previously stated, we hypothesized that reported levels of anxiety would decrease when, and only when, intensive exposure-based activities targeting those specific clusters of behaviors occurred.

Treatment therapists in the current investigation used three modules (self-monitoring, psychoeducation, and exposure) from the Modular CBT (MCBT) Manual (Chorpita, 1998) and received weekly supervision from the second author. The concept of modularity has seen growing application in the field of child and adolescent psychotherapy (e.g., Chorpita, Daleiden, & Weisz, 2005). In this context, a module is defined as a self-contained unit of instructions that describes an individual treatment technique (e.g., self-monitoring, psychoeducation, exposure, etc.). The MCBT Manual (Chorpita, 1998) consists of 13 individual treatment techniques (modules) that include self-monitoring, psychoeducation, exposure, cognitive restructuring, social skills training, rewards, differential reinforcement strategies, time out, and maintenance and relapse prevention. Within the modular CBT paradigm, the assembly of these codified techniques is determined by a guiding algorithm and the individual needs of the child and family. One benefit of the modular approach for this study was the ability to add and remove discrete components of the intervention at points of phase change. Consistent with the logic underlying the MCBT manual, treatment progressed through three modules throughout the duration of the present study: (1) Constructing a Fear Hierarchy (1 session), (2) Psychoeducation about the Nature of Anxiety (4 sessions), and (3) Exposure (55 sessions).

The initial baseline period for the present multiple-baseline across behaviors design consisted of the administration of the first two modules, Constructing a Fear Hierarchy (1 session) and Psychoeducation about the Nature of Anxiety (4 sessions). Subsequent to completing the first and second modules during the initial baseline period, Dan engaged in exposure exercises (i.e., Exposure module) designed to selectively target differing clusters of fear hierarchy items. Specifically, exposure-based activities progressed through three phases, targeting series 1, 2 and 3 items sequentially. Exposure in all phases was facilitated by verbal/physical (e.g., "High five!") and edible (e.g., gummy frogs and bears) reinforcement to encourage his approach towards feared stimuli.

The current investigation capitalized on the guided flexibility afforded by a modular approach for anxiety reduction (Chorpita, 1998). For example, treatment techniques (e.g., psychoeducation about the nature of anxiety and exposure) that are traditionally constrained by a prespecified number of treatment sessions (e.g., Barrett, 1998; Barrett, Dadds, & Rapee, 1996; Cobham, Dadds, & Spence, 1998; Kendall 1994, Kendall et al., 1997, Mendlowitz et al., 1999), were delivered repeatedly to Dan across numerous treatment sessions over the course of many

months to address Dan's difficulty with acquiring and retaining new information. Additionally, unlike other treatment strategies for anxiety reduction that typically specify approximately one treatment session per week, the current treatment strategy was much more intensive, as we met with Dan and/or his mother two to three times per week throughout the active phases of intervention.

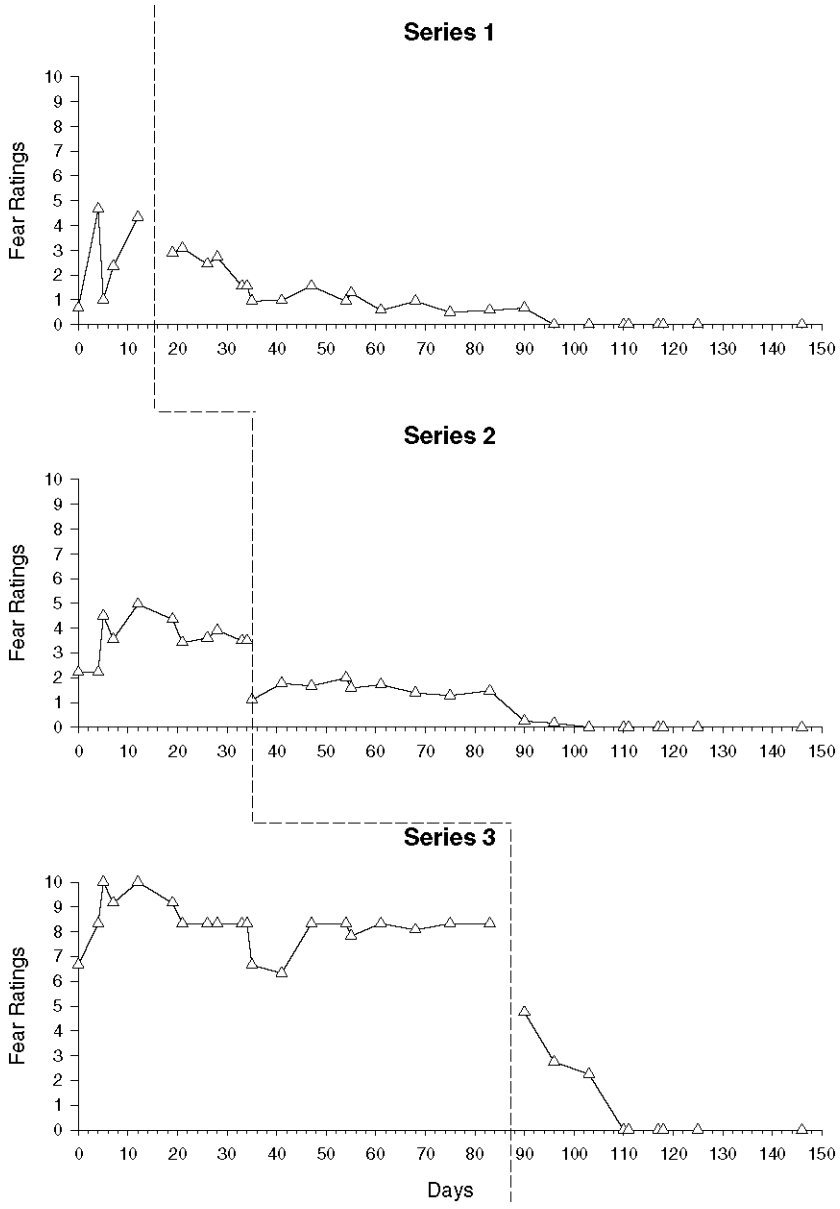
RESULTS

Figure 2 graphically displays combined fear ladder data across all series of behaviors for the duration of treatment. As seen in Figure 2, baseline data for all three series were flat or rising, suggesting unchanging or increasing levels of anxiety for each cluster of behavior prior to engaging in focused exposure-based interventions. As expected, activities conducted during baseline (i.e., self-monitoring, psychoeducation about the nature of anxiety, exposure-based activities for behaviors characteristic of non-targeted series) were found to be ineffective in reducing reported levels of anxiety, and thus did not violate the logic of this SSE design (Hayes et al., 1999).

As seen in Figure 2, engaging in focused exposure-based activities two to three times per week targeting specific series resulted in selective decreases in reported levels of anxiety. In other words, visual inspection of Figure 2 strongly suggests that changes in reported levels of anxiety decreased when, and only when, exposure-based activities targeting those behaviors occurred two to three times per week. Behavioral observations of Dan strongly converged with combined fear hierarchy data, as Dan's and his mother's reports of decreases in anxiety coincided with Dan's engagement in feared activities with increased ease. Additionally, as soon as Dan was able to put his head underwater and engage freely in swimming and diving exercises, he exhibited greater interest in swimming activities and frequently asked for extended exposure sessions to allow for more swimming.

In sum, the results from our multiple-baseline across behaviors design indicate selective decreases (i.e., per child- and parent-reports averaged into a combined-report for each series) in reported levels of anxiety across three different series of behavior during intensive engagement in exposure exercises. Consistent with these self-reports, Dan exhibited progressive levels of mastery over increasingly difficult behavioral tasks (e.g., dripping water on his ears, wading knee high in water, wading chest high in water, placing head under water, swimming,

FIGURE 2. Combined-Fear Hierarchy Data Across Three Series of Behavior for Sessions 1 through 55.



diving). Dan's improvement was further evidenced by his increased interest in swimming activities and frequent requests for extended exposure sessions to allow for more swimming after successfully overcoming his fear of the water.

DISCUSSION

The present investigation provides preliminary support for using a symptom-based approach to address a comorbid anxiety condition in one youth with COS. After graduated, intensive (i.e., two to three exposure sessions per week), and consistent exposure, Dan was able to overcome a specific fear of water that was likely caused by delusions regarding evil creatures. Dan went from extreme avoidance of water (e.g., screaming in fear when a wet cloth was placed on his ears) to having full engagement in and a strong desire for swimming activities. While Dan still experiences delusions and hallucinations, as well as behavioral disorganization, his specific fears of water remitted completely during our intensive intervention. The exposure treatment focused almost exclusively on one specific symptom of concern, with treatment gains not directly generalizing to other domains (e.g., hallucinations, delusions, socialization).

Despite promising results, this study has notable limitations. First, although initial inspection of Figure 2 is highly suggestive of an efficacious intervention for anxiety reduction in a youth with COS, measurement error and extraneous sources of variability may have contributed to Dan's improvement (Hayes et al., 1999). To address measurement error, several safeguards were proactively taken, including keeping measurement procedures as standard as possible on the dimensions of time of assessment (i.e., always prior to beginning treatment session), the assessor (i.e., one of three treatment therapists), and implicit demands on the client (i.e., Dan and his mother were always praised for filling out their fear ladders regardless of their specific answers).

With respect to sources of extraneous variability that may have contributed to reducing Dan's specific fear of the water, the effects of medication and time were considered. Although Dan's antipsychotic medication profile varied slightly throughout the course of this investigation, it is highly unlikely that his slight changes in medicine repeatedly and systematically occurred during all phase-changes into and out of active treatment phases. Unfortunately, data regarding the exact dates of Dan's slight changes to his medication are unavailable. Second,

while the passage of time could be responsible for improvement in symptoms (Rosenthal & Rosnow, 1991), the impact of time seems very unlikely as a potential contributor to change in this case given the multiple-baseline design. All baseline phases (see Figure 2) indicated increase in levels of anxiety, suggesting that time without active exposure led to increased anxiety. The effects of the passage of time for this investigation seem to strengthen, not weaken, causal inference for our intervention.

A second limitation for the present investigation surrounds our use of a single assessment instrument. Despite our use of multiple-informants, fear ladder data were the only source of outcome information gathered in a systematic and structured way that allowed assessment for Dan's fear of the water. Although informal behavioral observations (e.g., Dan swimming, diving, and requesting more time for swimming activities) converged with fear ladder reports, such information was not collected in a way to allow for inferential analyses.

Finally, at the time this paper was written, the long-term efficacy of our intervention was unknown, and complete follow-up data for this study thus far is unavailable. As such, the durability of our intervention remains questionable.

Despite these limitations, this study may represent a successful focal symptom-based approach for treating youth with COS with specific fears. Guided by a modular CBT manual (Chorpita, 1998), repeated and intensive exposure exercises systematically reduced reported levels of anxiety and fear surrounding numerous water-related activities.

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