Behavioral and Cognitive-Behavioral Interventions with Pediatric Populations

SCOTT W. POWERS
Cincinnati Children's Hospital Medical Center and University of Cincinnati College of Medicine, USA

JULIE S. JONES AND BENJAMIN A. JONES
Greenville Hospital System, USA

ABSTRACT

Clinical outcome studies have established cognitive-behavioral therapy (CBT) as an efficacious treatment for children and adolescents presenting with a variety of problems, such as anxiety and maladaptive behaviors. Findings to date are also very promising for the use of CBT techniques with children and adolescents who have chronic medical illnesses, including obesity, encopresis, severe and persistent feeding problems, recurrent headache, recurrent abdominal pain and acute procedural pain. This article provides an overview of behavioral/cognitive-behavioral theory, intervention and the important role outcome-based research plays in the development of this treatment modality. CBT interventions utilized with various pediatric populations are described, and the results of outcome-based research employing these techniques are examined. The Chambless criteria are used to determine the efficacy of specific interventions based upon the number, size and outcomes of studies utilizing CBT treatments with pediatric populations. Case examples are included to further illustrate the effectiveness of these interventions for children and adolescents with chronic medical conditions.

KEYWORDS

empirically supported treatment, feeding, obesity, pain, pediatric psychology

BEHAVIORAL AND COGNITIVE-BEHAVIORAL therapies have permanently altered the landscape of non-pharmacological treatment for emotional and behavioral disorders. The evidence-based techniques derived from these treatment models have been proven efficacious through research on their application to a wide range of patient populations and conditions, such as anxiety and depression. These models have also given rise to therapeutic techniques that have applicability beyond the scope of mood and behavioral disturbances. This is particularly true within the specialized field of pediatric psychology, where behavioral/cognitive-behavioral therapies, have demonstrated efficacy in the treatment of recurrent pediatric headache (Holden, Deichmann, & Levy, 1999), recurrent abdominal pain (Janicke & Finney, 1999), medical procedure-related pain

Clinical Child Psychology and Psychiatry Copyright © 2005 SAGE Publications (London, Thousand Oaks and New Delhi) Vol 10(1): 65–77. DOI: 10.1177/1359104505048792 www.sagepublications.com

(Powers, 1999), disease-related pain (Walco, Sterling, Conte, & Engel, 1999), severe feeding problems (Kerwin, 1999), pediatric obesity (Jelalian & Saelens, 1999) and encopresis (M.L. McGrath, Mellon, & Murphy, 2000).

This article begins with a brief overview of the theoretical underpinnings of behavioral and cognitive-behavioral therapies (referred to as CBT here). Although by no means an exhaustive history of this relatively young branch of psychotherapy, this article will help clarify the relationship among theory, application and empirically based clinical outcome research. Later, a number of the behavioral/cognitive-behavioral interventions that have been proven to be efficacious in treating children with chronic illnesses are discussed. Case examples are used to illustrate the use of CBT with some of the more prevalent pediatric disorders. It is our hope that this article will allow for the clinical application of empirically supported treatment by those who serve children, adolescents and their families in a variety of clinical care settings.

Overview of behavioral and cognitive-behavioral therapies

Behavior therapy can no longer be referred to as merely the clinical application of operant and classical conditioning theories. Behavior therapy may be considered a multifaceted theoretical model, an experimental methodology and a set of techniques (Phillips, 1998). The foundation underlying behavior therapy is the belief that the acquisition and extinction of behaviors occur through a specific set of principles, whether the

SCOTT W. POWERS, PHD, ABPP is Professor of Pediatrics at the University of Cincinnati College of Medicine and Cincinnati Children's Hospital Medical Center, an Adjunct Professor of Psychology at the University of Cincinnati, and a staff pediatric psychologist at Cincinnati Children's Hospital in the Division of Psychology and Department of Pediatrics. He is the Director of the Center for Child Behavior and Nutrition Research, Co-Director of the Headache Center, and Director of the Postdoctoral Training Program in Psychology. He is the Principal Investigator for grants from the National Institutes of Health, United States Department of Agriculture, and national foundations such as the Cystic Fibrosis Foundation and American Headache Society. He is a Fellow of the Society of Pediatric Psychology of the American Psychological Association and holds a diplomate in clinical child and adolescent psychology. Dr Powers has provided cognitive-behavioral care to children and families for over 19 years.

CONTACT: Scott W. Powers, PhD, ABPP, Professor of Pediatrics, Cincinnati Children's Hospital Medical Center, Division of Psychology, Sabin Education Center 4th Floor, ML: D-3015, 3333 Burnet Avenue, Cincinnati, OH 45229–3039, USA. E-mail: Scott.Powers@cchmc.org

JULIE STOLLGER JONES, PSYD is a Pediatric Psychologist in the Division of Developmental-Behavioral Pediatrics, Children's Hospital of the Greenville Hospital System. Dr Jones provides cognitive-behavioral therapy to children and their families for the Division of Developmental-Behavioral Pediatrics and the Division of Pediatric Gastroenterology and Nutrition. She specializes in behavioral feeding intervention.

BENJAMIN A. JONES, PSYD is a Pediatric Psychologist at the Children's Hospital of the Greenville Hospital System. He works with the Division of Developmental-Behavioral Pediatrics, the Pediatric Hematology/Oncology Center, Division of Pediatric Gastroenterology and Nutrition, and Pediatric Neurology. He is the lead psychologist at Children's Hospital, and specializes in behavioral pain management. He has co-authored articles in pediatric pain and in behavior management.

behavior in question is adaptive or maladaptive. Treatment interventions focused on changing maladaptive behaviors are specifically tailored to fit the patient's needs, and are detailed in the description of procedures and methods used to assess treatment gains. This level of detail is crucial to behavior therapy, for it also allows the replication of findings necessary to the establishment of an empirically based intervention. Studies utilizing behavior therapy are designed in such a way as to explicate and deliver interventions and permit collection, analysis and interpretation of data (Powers, 1999). It is for these reasons that behavior therapy has a strong methodological foundation.

From a theoretical perspective, principles of learning, including classical conditioning, operant conditioning and social/observational learning, have played major roles in the development of behavior therapy. Cognitive and social theories have also increasingly been incorporated into the application of behavior therapy, thereby increasing its utility. The impact of these methodologies and schools of thought upon behavioral therapy is examined later.

The principles of operant conditioning have heavily influenced the development of behavior therapy. An operant approach would first operationally define the target behavior to be changed (e.g. a child biting his younger sister). A functional analysis would be completed by observing and recording the events preceding the behavior (e.g. mother begins talking on the phone), the occurrence of the behavior itself (i.e. biting of his younger sister five minutes after his mother begins talking on the phone) and the consequences following the behavior (e.g. mother gets off the phone and attends to the child who bit his sister). Following the functional analysis, interventions based upon operant conditioning theory are utilized, including positive and negative reinforcement, punishment and shaping. As can be surmised, involving the child's caregivers may significantly increase the potential for a particular behavioral intervention to meet with success. The emphasis on parent involvement in behavioral treatment has been greatly influenced by the work of Forehand and colleagues (e.g. McMahon & Forehand, 2003). In this treatment model, the focus on incorporating caregivers into behavioral interventions centered on the use of parent training to help parents modify child noncompliance. When working with medically ill children, parent training is often utilized in educating parents to not unintentionally reinforce a non-desirable behavior by attending to it. For example, if a child with a feeding disorder receives more attention for refusing to take a bite of food than for accepting it, the refusal behavior will likely increase, exacerbating the problem.

Behavior theory has also incorporated aspects of social learning theory and cognitive theories (Mash et al., 1992). Regarding the former, Bandura (1969) has been the social learning theorist most influential upon behavior therapy. His theory emphasized vicarious learning or modeling, symbolic processes, and self-regulation techniques. The inclusion of modeling as a therapeutic tool broadens the repertoire of techniques the therapist brings to treatment by removing the restraint imposed by using in vivo techniques alone.

Modeling procedures have been used frequently to modify problem behaviors in children, particularly fears and anxieties (Ollendick & King, 1998). Modeling is typically used as part of a treatment package to learn or imitate a new behavior and evoke an adaptive response. For example, filmed modeling has been used successfully to help patients learn/imitate behaviors that help decrease behavioral distress during invasive medical procedures (Powers, 1999), fear of dental procedures (Siegel, 1988) and hospitalization (Peterson, Schulthesis, Ridley-Johnson, Miller, & Tracy, 1984).

Bandura and others also emphasized the importance of cognitive processes in how environmental influences are perceived and interpreted, which in turn influences the individual's behavior. Treatment involves working with the patient to identify and modify maladaptive cognitions and, subsequently, maladaptive behaviors. Kendall et al. (1997) demonstrated the efficacy of a CBT package for children with anxiety disorders. The treatment package included behavioral procedures such as modeling, in vivo exposure, role-play, relaxation training and reinforced practice. From pain related to acute medical procedures to anxiety disorders secondary to other conditions, CBT has been shown to be efficacious with children.

Some of the specific techniques and tools used in CBT in children include relaxation training, biofeedback, differential attention, response cost and positive practice. Powers and Spirito (1998a, 1998b), describe the use of biofeedback and relaxation training techniques such as diaphragmatic breathing, progressive muscle relaxation, autogenic training and imagery. Because anxiety and pain are associated with increased sympathetic activity and arousal, the use of relaxation techniques that induce parasympathetic activity and subsequent reduction in sympathetic activity represents a logical choice for intervention. Indeed, empirical evidence exists supporting the use of such treatment, reporting treatment gains in physiological parameters and control of client-presented problems (Holden et al., 1999; Powers, 1999; Powers et al., 2001). Within the treatment session, patients are taught relaxation through the use of one of a variety of scripts or manuals, many of which are designed especially for use with children. Cue-controlled and differential relaxation (i.e. relaxing muscles not involved in activity performance) are useful in the generalization of the relaxation response to settings outside the treatment session. These techniques are often combined with other interventions, such as distraction, comforting self-talk and systematic desensitization.

Adult attention has been identified as a reinforcer for children's behaviors. Differential attention involves providing positive attention for desirable behaviors (e.g. eating food, picking up toys), and ignoring undesirable behaviors (e.g. refusing food, tantrums). Because attention, both positive and negative, serves to increase the occurrence of behavior, behaviors that are attended to will increase, whereas those that are ignored, will decrease over time. Differential attention is one of the key, and typically, first techniques taught to parents during parent training, because all other skills and techniques build upon these basic ones.

Response cost occurs when a positive reinforcer is taken away. The intention is to decrease the probability of a behavior occurring in the future, and is hence called a punishment in operant conditioning terms. An example of a response cost would be the loss of TV viewing because the child refuses to eat. Positive practice involves repeated practice of the appropriate behavior following inappropriate behavior. For example, having a child who has defecated in an inappropriate place practice walking to the bathroom, pulling his/her pants down, sitting on the toilet and dressing again several times in a row would be considered positive practice. This technique serves as both a punishment (e.g. child must engage in a behavior likely to be unpleasant contingent upon the occurrence of an undesirable behavior) and a shaping of an adaptive behavior (e.g. practice of the steps involved in successful toileting).

Empirically supported CBT in pediatric psychology

Efficacy criteria

In 1999, the Society of Pediatric Psychology and the *Journal of Pediatric Psychology* began publishing a special series focusing on the review of empirically supported treatments in pediatric psychology. The Chambless criteria (Chambless, 1998; Chambless et al., 1996), were utilized by experts in the field of pediatric psychology to evaluate the treatment efficacy of psychological and behavioral treatments with various patient populations. These criteria were utilized to assign specific descriptors to a variety of treatment interventions. These interventions could be classified as 'well-established,' 'probably efficacious,' or 'promising intervention'. A detailed description of the Chambless criteria, with the modifications used for the pediatric articles reviewed for the special series, can be found in Spirito (1999).

This article focuses primarily upon the efficacy of the CBT interventions that were found to be 'well-established' or 'probably efficacious' treatments. CBT interventions used with various pediatric populations are identified and relevant case examples, representing some of the pediatric populations most likely to be seen by the general practitioner, are illustrated throughout. The disorders discussed later include: obesity, feeding problems, recurrent pain conditions such as headache and abdominal pain, and acute pain related to medical procedures. Definitions vary slightly according to the taxonomy. For this review, American Psychiatric Association (APA) definitions are used.

Obesity

The National Health and Nutrition Examination Survey (NHANES III) documented that, when utilizing the 95% cut-off for body mass index (BMI), approximately 14% of children and 12% of adolescents in the US are considered overweight. Rates increase to 22% when the BMI threshold is lowered to the 85th percentile (Troiano, Flegal, Kuczmarski, Campbell, & Johnson, 1995). Genetic, physiological and family environmental factors all play a role in the development and maintenance of obesity. Studies investigating monozygotic twins indicate that approximately 70% of the variation in weight is due to genetic factors (Stunkard, Harris, Pedersen, & McClearn, 1990), noting that twins reared apart display similar weight and BMI correlations. Family environmental factors (i.e. parental behaviors and parental obesity), have also been associated with the development of pediatric obesity (Klesges, Malott, Boschee, & Weber, 1986). The condition has also been associated with negative health consequences such as elevated blood pressure and cholesterol levels, orthopedic problems and hyper-insulinemia. In addition, 80% of obese children become obese adults.

Jelalian and Saelens (1999) completed a review of empirically supported psychological treatments in the area of pediatric obesity. Well-established treatments were noted for children between the ages of 8 and 12 years who were medically and psychologically healthy. For example, behavioral intervention (including techniques such as behavioral contracting, self-monitoring, stimulus control, token economy, response cost and reinforcement, parent training, homework exercises and parent weight loss), that focused upon the modification of eating and increasing physical activity have been demonstrated to be superior to education alone (Epstein, Wing, Steranchak, Dickson, & Michelson, 1980), and wait-list control (Aragona, Cassady, & Drabman, 1975; Epstein, Wing, Koeske, & Valoski, 1984; Israel, Stolmaker, & Andrian, 1985; Israel, Stolmaker, Sharp, Silverman, & Simon, 1984), in children under the age of 12 years. Long-term results of such treatments were demonstrated for children who were treated before the age of 12 (Epstein, Valoski, Wing, & McCurley, 1994). There were some 'promising interventions' noted for the treatment of obese adolescents, but no rigorously controlled experiments comparing treatment to wait-list control have been completed.

Feeding problems

Although feeding problems are relatively common, ranging from 25 to 35% in infants and young children (Linscheid, 1992), pediatric psychologists and pediatricians can typically prevent these difficulties from becoming severe feeding disorders with the utilization of parent training and nutrition education. Feeding difficulties in children are typically due to multiple causes, such as medical conditions, oral-motor delay or dysfunction and behavioral mismanagement. The causes are frequently interactive in nature, encompassing a combination of medical and/or oral-motor dysfunction with a behavioral component (Burklow, Phelps, Schultz, McConnell, & Rudolph, 1998). Severe feeding problems are likely to impact a child's health and/or interfere with normal development (Skuse, 1993). Approximately 3–10% of children experience severe feeding problems (Reau, Senturia, Lebailly, & Christoffel, 1996), with the severe feeding issues being more common in children with disabilities and/or medical illness. Treatment packages including behavioral and cognitive-behavioral interventions are often used and found efficacious with severe feeding problems. According to one review (Kerwin, 1999), differential attention (attending to appropriate behavior and ignoring inappropriate behaviors) was demonstrated across 14 studies as a 'well-established treatment'. These studies used various combinations of techniques, such as token economies and time-out for not eating or leaving the table, with differential attention being the only technique common to all. Positive reinforcement of independent and desired feeding behaviors, used in combination with manual guidance, was also demonstrated as a 'well-established' treatment for self-feeding and food refusal.

Case example

'Katie' is a 3-year-old female with a diagnosis of cystic fibrosis (CF) and a history of esophageal reflux and poor growth. Katie continued to demonstrate poor calorie intake and growth following the resolution of her reflux symptoms secondary to medication treatment. She would drink supplements such as Scandishake and Pediasure, but eat only a few, low-calorie foods. Treatment was conducted utilizing a standardized manual, modified for use with toddlers and preschoolers (Powers et al., 2003). The intervention consisted of six treatment sessions conducted over 8 weeks. The initial meeting (pre-treatment session) included teaching Katie's parents to keep weighed, detailed diet diaries. Fourteen days of diet diaries were collected and analysed prior to the second session. During the second session, Katie's parents were given information intended to increase the caloric density of the foods she was eating and began to focus upon how to get her to be more compliant with eating. Treatment focused upon teaching Katie's parents to praise her for taking bites and ignoring her refusals to eat (i.e. differential attention). Subsequent sessions focused upon giving specific suggestions to increase the caloric density of her food (one meal at a time), and how to continue to increase her compliance with eating. Additional behavioral techniques were taught and utilized to increase her compliance with eating, including the use of tangible rewards (earning prizes for eating), and shaping (rewarding her for successive approximations to desired behavior, such as praising her for coming to the table when called and picking up the fork in preparation to eat). As the treatment progressed, Katie began demonstrating some renewed refusal to eat. Contingency management techniques were introduced to increase her compliance with eating (i.e. '*If* you eat your sandwich, *then* you can have more Pediasure.' or '*If* you eat your sandwich, *then* you can play outside'). By the end of the 8-week treatment, Katie increased her daily caloric intake by 800 calories. Her increased caloric intake was maintained at the 3-month follow-up visit (Powers, 2003).

Recurrent pain

Within the pediatric population, CBT strategies frequently employed in pain management include familiar techniques such as guided imagery, changing maladaptive thinking, distraction, meditation, hypnosis, progressive muscle relaxation, breathing exercises and biofeedback. Varni, Blount, Waldron, and Smith (1995), described techniques such as these as 'pain perception regulation modalities' that function as mediating factors and reduce pain by altering pain perception. These techniques are capable of influencing pain perception because pain is a subjective, multidimensional experience, and not able to be described as a purely physiological event.

Although the format and context of treatment may differ somewhat across patient populations and treatment packages, most interventions include a combination of techniques presented in a structured manner over the course of several sessions. As with all cognitive-behavioral interventions, regular practice of skills outside the treatment session is critical. Clinicians often spend a significant amount of time working with patients to help them establish, adhere to and evaluate out-of-session practice.

Headache

Recurrent headaches, both migraine and tension type, are estimated to affect up to 10% of children and adolescents (Abu-Arefeh & Russell, 1994). Adolescent females in particular appear to be at greater risk for migraine headache, with prevalence rates as high as 28% (Split & Neuman, 1999).

CBT frequently utilized with these patients includes biofeedback, guided imagery, self-hypnosis, distraction or some combination thereof. Because this pediatric population has received a fair amount of attention in the literature, some conclusions can be drawn about the effectiveness of the techniques. Studies examining the efficacy of thermal and electromyographic biofeedback for pediatric headache pain generally conclude that biofeedback is effective in reducing headache frequency, duration and intensity (Allen & McKeen, 1991; Burke & Andrasik, 1989; Fentress, Masek, Mehegan, & Benson, 1986; Grazzi, Leone, Frediani, & Bussone, 1990; Guarnieri & Blanchard, 1990; E.E. Labbe & Williamson, 1983; E.L. Labbe & Williamson, 1984; Werder & Sargent, 1984; Womack, Smith, & Chen, 1988). The authors noted reduced headache activity as assessed by subject-report pain diaries and reported that statistically significant changes in subject-report of pain reflect the effectiveness of biofeedback. However, most of the studies reviewed do not examine the specific contribution of biofeedback to treatment gains. Rather, biofeedback was incorporated into a larger multi-modal behavioral intervention and not isolated as a separate treatment element. Studies utilizing biofeedback as the sole behavioral intervention for treatment of pediatric headache avoid the confounding factors inherent to previous studies, and report statistically significant reductions in headache activity (Burke & Andrasik, 1989; Guarnieri & Blanchard, 1990). The absence of progressive muscle relaxation, imagery and autogenic techniques in these studies lends weight to claims of the effectiveness of biofeedback techniques.

Self-hypnosis, guided imagery, autogenic phrases and distraction have also been frequently employed to address pediatric headaches. These techniques help the patient shift attention away from headache pain toward more pleasant thoughts or images, thus decreasing attention to pain and subsequently, pain perception. Relaxation helps to decrease autonomic arousal, which may be beneficial because of the links between heightened sympathetic activity and increased pain perception. Many studies have indicated that these techniques result in greater pain reduction than self-monitoring (Larsson, Daleflod, Hakansson, & Melin, 1987; Larsson, Melin, Lamminen, & Ullstedt, 1987) and placebo control (Larsson & Melin, 1986; P.J. McGrath et al., 1992). Others found that these interventions compare favorably with medication for headache (Larsson, Melin, & Doberl, 1990; Olness, MacDonald, & Uden, 1987). As with studies examining biofeedback, many of these studies utilized multi-modal intervention packages, making it difficult to ascertain the impact of specific techniques. In general, however, these CBT techniques appear to offer benefits in pain management for pediatric headache.

According to the Chambless criteria, self-hypnosis, guided imagery and other relaxation techniques meet the criteria for an 'efficacious' and 'well-established' treatment. Biofeedback is a 'probably efficacious' treatment in the treatment of pediatric recurrent headache (Holden et al., 1999).

Case example

'Cindy' is a 14-year-old ninth grader attending a demanding private school. She presented with an 18-month history of chronic daily headache, describing constant pain with some variation in pain intensity but never experiencing total relief from pain. Cindy had tried a number of medications as prescribed by her neurologist, and had rigorously followed recommendations for proper hydration and sleep. However, she reported minimal improvement from past treatment. Cindy's life was greatly impacted by pain. She became isolated from friends because she did not feel well enough to engage in social activities, her grades began to suffer because she could not concentrate when the pain intensified, and she stopped participating in sports to avoid exacerbating the pain. At her initial session, she described experiencing fatigue, frustration and the belief that she would never be rid of her headache. Subsequent sessions consisted of biofeedback-assisted relaxation training that incorporated guided imagery, breathing exercises and progressive muscle relaxation. Within three sessions, biofeedback data indicated that Cindy was able to produce dramatic increases in skin temperature and decreases in muscle tension during training sessions, data that supported her report of decreased pain levels and anxiety while practicing the cognitive-behavioral techniques. Because much of her headache intensification occurred in response to academic stressors, Cindy was encouraged to utilize these skills at school. After six sessions, Cindy reported markedly decreased headache intensity and increased feelings of efficacy in coping with pain. While her headache rarely decreased so much as to be undetectable, Cindy's pain levels dropped to the point where she was able to resume participation in social activities and sports. Her grades also improved, as she was able to take exams and complete homework uninterrupted by severe headache pain.

Recurrent abdominal pain

Recurrent abdominal pain (RAP) is estimated to affect 10–15% of school-age children (Apley, 1975). It is defined by repeated episodes of abdominal pain with no identifiable organic etiology. RAP patients may present with a variety of additional complaints, such as headache, nausea and vomiting (Walker, Garber, & Greene, 1991). There are comparatively few studies examining the effectiveness of CBT with RAP. Treatment packages consisting of relaxation, imagery, cognitive self-control and behavioral distraction (Sanders et al., 1989; Sanders, Shepherd, Cleghorn, & Woolford, 1994), have been shown to result in greater decreases in pain (as measured by visual analog scaling), than those associated with a wait-list control group. Finney, Lemanek, Cataldo, Katz, and Fuqua (1989), employed a multi-modal package consisting of relaxation training, self-monitoring, encouraging well behavior, school attendance and high fibre diet with children and adolescents with RAP. Post-treatment parent ratings of subject pain suggested a large decrease in pain. However, because each subject received a different combination of treatments it is difficult to ascertain the contribution of the CBT strategies employed, although overall, it would appear that these techniques are 'probably efficacious' (Janicke & Finney, 1999).

Acute pain – Medical procedure-related pain

Like other forms of acute pain, procedure-related pain is often of severe intensity, occurs in close temporal proximity with noxious stimuli, is generally limited to three months duration, and is often associated with a marked anxious reaction. Into this category fall medical procedures such as bone marrow aspirations, venipuncture, surgeries, lumbar punctures and tooth extractions. A number of studies address the efficacy of CBT techniques with children undergoing painful procedures. Samples in these studies are typically drawn from populations of children with chronic medical conditions, particularly those with cancer, who must undergo numerous painful procedures (e.g. lumbar punctures and bone marrow aspirations).

Jay, Elliott, Ozolins, Olson, and Pruitt (1985), published a series of studies examining the efficacy of a CBT package for children undergoing lumbar punctures and bone marrow aspirations. The treatment package consisted of imagery, breathing exercises, modeling, behavioral rehearsal and reinforcement. Results showed these techniques to be as effective as, or superior to, oral Valium (Jay, Elliott, Katz, & Siegel, 1987; Jay, Elliott, Woody, & Siegel, 1991), and general anesthesia (Jay, Elliott, Fitzgibbons, Woody, & Siegel, 1995). Jay et al. (1987), also demonstrated that subjects receiving the treatment package produced lower pain ratings and pulse rates than subjects in an attention-control condition. The efficacy of these techniques for lumbar punctures and bone marrow aspirations has been repeated in other studies (e.g. Blount, Powers, Cotter, Swan, & Free, 1994; Kazak et al., 1996) and has been examined with children undergoing treatment for burns (Elliott & Olson, 1983), injection and venipuncture (Dahlquist, Gil, Armstrong, Ginsberg, & Jones, 1985; Manne et al., 1990; Powers, Blount, Bachanas, Cotter, & Swan, 1993), and routine immunizations (Blount et al., 1992; Gonzalez, Routh, & Armstrong, 1993). In all cases, the use of CBT resulted in less pain and distress for patients. According to the Chambless criteria, CBT can be classified as a 'well-established' treatment for pediatric procedure-related pain (Powers, 1999).

Conclusions

CBT has come to be the non-pharmacological treatment of choice for mood and anxiety disorders. There is a great deal of empirically based literature supporting its efficacy with a variety of disorders and populations. This is primarily because, from a treatment perspective, CBT incorporates effective techniques and latitude in developing individualized interventions to achieve the greatest treatment gain. Because CBT targets specific quantifiable variables, it lends itself to measurement of treatment-induced change. As a result, clinical outcome studies have established CBT as an efficacious treatment for many patient populations.

Among those for whom CBT has been shown to be an effective treatment model are children and adolescents. Research involving the child clinical population clearly supports the use of CBT interventions for treatment of fears and anxiety. Although there is less research in the use of CBT with chronically medically ill children and adolescents, the findings to date are very promising. According to the Chambless criteria, CBT intervention has been shown to be a 'well-established' treatment for obesity (for 8–12-year-olds), severe and persistent feeding problems, recurrent headache, and acute procedural pain. CBT has also been shown to be 'probably efficacious' in the treatment of recurrent abdominal pain, and 'promising' in the treatment of obese teenagers.

For many children and adolescents with medical conditions, CBT offers a variety of empirically supported techniques that can be individualized for specific patient populations, developmental ages, and treatment objectives. It is hoped that this article will encourage the use and study of these interventions with pediatric populations. Through such study, it will be possible to acquire greater knowledge about efficacious treatments for chronically medically ill children.

References

Abu-Arefeh, I., & Russell, G. (1994). Prevalence of headache and migraine in schoolchildren. *British Medical Journal, 309*, 765–776.

Allen, K.D., & McKeen, L.R. (1991). Home-based multicomponent treatment of pediatric migraine. *Headache, 31*, 467–472.

Apley, J. (1975). *The child with abdominal pains* (2nd ed.). Oxford: Blackwell.

Aragona, J., Cassady, J., & Drabman, R.S. (1975). Treating overweight children through parental training and contingency contracting. *Journal of Applied Behavioral Analysis, 8*, 269–278.

Bandura, A. (1969). *Principles of behavior modification*. New York: Holt, Rinehart, and Winston.

Blount, R.L., Bachanas, P.J., Powers, S.W., Cotter, M.W., Franklin, A., Chaplin, W., Mayfield, J., Henderson, M., & Bount, S.D. (1992). Training children to cope and parents to coach them during routine immunizations: Effects on child, parent, and staff behaviors. *Behavior Therapy, 23*, 689–705.

Blount, R.L., Powers, S.W., Cotter, M.W., Swan, S., & Free, K. (1994). Making the system work. Training pediatric oncology patients to cope and their parents to coach them during BMA/LP procedures. *Behavior Modification, 18*, 6–31.

Burke, E.J., & Andrasik, F. (1989). Home- vs. clinic-based biofeedback treatment for pediatric migraine: Results of treatment through one-year follow-up. *Headache, 29*, 434–440.

Burklow, K.A., Phelps, A.N., Schultz, J.R., McConnell, K., & Rudolph, C. (1998). Classifying complex pediatric feeding disorders. *Journal of Pediatric Gastroenterology and Nutrition, 27*, 143–147.

Chambless, D. (1998). Update on empirically validated therapies II. *Clinical Psychologist, 51*, 3–16.

Chambless, D., Sanderson, W.C., Shoham, V., Johnson, S.B., Pope, K.S., Crits-Christoph, P., Baker, M., Johnson, B., Woody, S.R., Sue, S., Beutler, L., Williams, D.A. & McCurry, S. (1996). An update on empirically validated therapies. *Clinical Psychologist, 49*, 5–18.

Dahlquist, L.M., Gil, K.M., Armstrong, F.D., Ginsberg, A., & Jones, B. (1985). Behavioral management of children's distress during chemotherapy. *Journal of Behavioral Therapy and Experimental Psychiatry, 16*, 325–329.

Elliott, C.H., & Olson, R.A. (1983). The management of children's distress in response to painful medical treatment for burn injuries. *Behavioral Research and Therapy, 21*, 675–683.

Epstein, L.H., Valoski, A., Wing, R.R., & McCurley, J. (1994). Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology, 13*, 373–383.

Epstein, L.H., Wing, R.R., Koeske, R., & Valoski, A. (1984). Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology, 52*, 429–437.

Epstein, L.H., Wing, R.R., Steranchak, L., Dickson, B., & Michelson, J. (1980). Comparison of family-based behavior modification and nutrition education for childhood obesity. *Journal of Pediatric Psychology, 5*, 25–36.

Fentress, D.W., Masek, B.J., Mehegan, J.E., & Benson, H. (1986). Biofeedback and relaxation-response training in the treatment of pediatric migraine. *Developmental Medicine and Child Neurology, 28*, 139–146.

Finney, J.W., Lemanek, K.L., Cataldo, M.F., Katz, H.P., & Fuqua, R.W. (1989). Pediatric psychology in primary health care: Brief targeted therapy for recurrent abdominal pain. *Behavior Therapy, 20*, 283–291.

Gonzalez, J.C., Routh, D.K., & Armstrong, F.D. (1993). Effects of maternal distraction versus reassurance on children's reactions to injections. *Journal of Pediatric Psychology, 18*, 593–604.

Grazzi, L., Leone, M., Frediani, F., & Bussone, G. (1990). A therapeutic alternative for tension headache in children: Treatment and 1-year follow-up results. *Biofeedback and Self-Regulation, 15*, 1–6.

Guarnieri, P., & Blanchard, E.P. (1990). Evaluation of home-based thermal biofeedback treatment of pediatric migraine headache. *Biofeedback and Self-Regulation, 15*, 179–184.

Holden, E.W., Deichmann, M.M., & Levy, J.D. (1999). Empirically supported treatments in pediatric psychology: Recurrent pediatric headache. *Journal of Pediatric Psychology, 24*, 91–109.

Israel, A.C., Stolmaker, L., & Andrian, C.A.G. (1985). The effects of training parents in general child management skills on a behavioral weight loss program for children. *Behavior Therapy, 16*, 169–180.

Israel, A.C., Stolmaker, L., Sharp, J.P., Silverman, W.K., & Simon, L.G. (1984). An evaluation of two methods of parental involvement in treating obese children. *Behavior Therapy, 15*, 266–272.

Janicke, D.M., & Finney, J.W. (1999). Empirically supported treatments in pediatric psychology: Recurrent abdominal pain. *Journal of Pediatric Psychology, 24*, 115–127.

Jay, S., Elliott, C.H., Fitzgibbons, I., Woody, P., & Siegel, S. (1995). A comparative study of cognitive behavior therapy versus general anesthesia for painful medical procedures in children. *Pain, 62*(1), 3–9.

Jay, S.M., Elliott, C.H., Katz, E., & Siegel, S.E. (1987). Cognitive-behavioral and pharmacologic interventions for children's distress during painful medical procedures. *Journal of Consulting and Clinical Psychology, 55*, 860–865.

Jay, S.M., Elliott, C.H., Ozolins, M., Olson, R.A., & Pruitt, S.D. (1985). Behavioral management of children's distress during painful medical procedures. *Behavioral Research and Theory, 23*, 513–520.

Jay, S.M., Elliott, C.H., Woody, P.D., & Siegel, S. (1991). An investigation of cognitive-behavior therapy combined with oral valium for children undergoing painful medical procedures. *Health Psychology, 10*, 317–322.

Jelalian, E., & Saelens, B.E. (1999). Empirically supported treatments in pediatric psychology: Pediatric obesity. *Journal of Pediatric Psychology, 24*, 223–248.

Kazak, A.E., Penati, B., Boyer, B.A., Himelstein, B., Brophy, P., Waibel, M.K., Blackall, G.F., Daller, R., & Johnson, K. (1996). A randomized controlled prospective outcome study of a psychological and pharmacological intervention protocol for procedural distress in pediatric leukemia. *Journal of Pediatric Psychology, 21*, 615–631.

Kendall, P.C., Flannery-Schroeder, E., Panichelli-Mindel, S.M., Southam-Gerow, M., Henin, A., & Warman, M. (1997). Therapy for youths with anxiety disorders: A second randomized clinical trial. *Journal of Consulting and Clinical Psychology, 65*, 366–380.

Kerwin, M.E. (1999). Empirically supported treatments in pediatric psychology: Severe feeding problems. *Journal of Pediatric Psychology, 24*, 193–214.

Klesges, R.C., Malott, J.M., Boschee, P.F., & Weber, J.M. (1986). The effects of parental influences on children's food intake, physical activity, and relative weight. *International Journal of Eating Disorders, 5*, 335–346.

Labbe, E.E., & Williamson, D.A. (1983). Temperature biofeedback in the treatment of children with migraine headaches. *Journal of Pediatric Psychology, 8*, 317–326.

Labbe, E.L., & Williamson, D.A. (1984). Treatment of childhood migraine using autogenic feedback training. *Journal of Consulting and Clinical Psychology, 52*, 968–976.

Larsson, B., Daleflod, B., Hakansson, L., & Melin, L. (1987). Therapist-assisted versus self-help relaxation treatment of chronic headaches in adolescents: A school-based intervention. *Journal of Child Psychology and Psychiatry, 28*, 127–136.

Larsson, B., & Melin, L. (1986). Chronic headaches in adolescents: Treatment in a school setting with relaxation training as compared with information-contact and self-registration. *Pain, 25*, 325–336.

Larsson, B., Melin, L., & Doberl, A. (1990). Recurrent tension headache in adolescents treated with self-help relaxation training and a muscle relaxant drug. *Headache, 30*, 665–671.

Larsson, B., Melin, L., Lamminen, M., & Ullstedt, F. (1987). A school-based treatment of chronic headaches in adolescents. *Journal of Pediatric Psychology, 12*, 553–566.

Linscheid, T.R. (1992). Eating problems in children. In C.E. Walker & M.C. Roberts (Eds.), *Handbook of clinical child psychology* (2nd ed., pp. 451–473). New York: Wiley.

Manne, S.L., Redd, W.H., Jacobsen, P.B., Gorfinkle, K., Schorr, O., & Rapkin, B. (1990). Behavioral intervention to reduce child and parent distress during venipuncture. *Journal of Consulting and Clinical Psychology, 58*, 565–572.

Mash, E.J., Humphreys, P., Keene, D., Goodman, J.T., Lascelles, M.A., Cunningham, S.J., et al. (1992). Assessment of child and family disturbance: A behavioral-systems approach. In E.J. Mash & L. Terdal (Eds.), *Assessment of childhood disorders* (pp. 3–68). New York: Guilford Press.

McGrath, M.L., Mellon, M.W., & Murphy, L. (2000). Empirically supported treatments in pediatric psychology: Constipation and encopresis. *Journal of Pediatric Psychology, 25*, 225–254.

McGrath, P.J., Humphreys, P., Keene, D., Goodman, J.T., Lascelles, M.A., Cunningham, S.J., & Firestone, P. (1992). The efficacy and efficiency of a self-administered treatment for adolescent migraine. *Pain, 49*, 321–324.

McMahon, R.J., & Forehand, R. (2003). *Helping the noncompliant child: Family-based treatment for oppositional behavior* (2nd ed.). New York: Guilford Press.

Ollendick, T.H., & King, N.J. (1998). Empirically supported treatments for children with phobic and anxiety disorders: Current status. *Journal of Clinical and Child Psychology, 27*, 156–167.

Olness, K., MacDonald, J.T., & Uden, D.L. (1987). Comparison of self-hypnosis and propranolol in the treatment of juvenile classic migraine. *Pediatrics, 79*, 593–597.

Peterson, L., Schulthesis, K., Ridley-Johnson, R., Miller, D.J., & Tracy, K. (1984). Comparison of three medical procedures on the presurgical and postsurgical reactions of children. *Behavior Therapy, 15*, 197–203.

Phillips, S. (1998). Behavior therapy with children and adolescents. In H.S. Ghuman & R.M. Sarles (Eds.), *Handbook of child and adolescent outpatient treatment and community psychiatry* (pp. 265–281). Philadelphia: Brunner/Mazel.

Powers, S.W. (1999). Empirically supported treatments in pediatric psychology: Procedure-related pain. *Journal of Pediatric Psychology, 24*, 131–145.

Powers, S.W. (2003). Nutrition in early childhood: Focus on parent interaction. *Pediatric Pulmonology, S25,* 138–139.

Powers, S.W., Blount, R.L., Bachanas, P.J., Cotter, M.W., & Swan, S.C. (1993). Helping preschool leukemia patients and their parents cope during injections. *Journal of Pediatric Psychology, 18*, 681–695.

Powers, S.W., Byars, K.C., Mitchell, M.J., Patton, S.R., Schindler, T., & Zeller, M.H. (2003). A randomized pilot study of behavioral treatment to increase caloric intake in toddlers with cystic fibrosis. *Children's Health Care, 32*, 297–311.

Powers, S.W., Mitchell, M.J., Byars, K.C., Bentti, A.L., LeCates, S.L., & Hershey, A.D. (2001). A pilot study of one-session biofeedback training in pediatric headache. *Neurology, 56*, 133.

Powers, S.W., & Spirito, A. (1998a). Relaxation. In N. Noshpitz, J. Coyle, S. Harrison &

S. Eth (Eds.), *Handbook of child and adolescent psychiatry* (Vol. 6, pp. 411–417). New York: Wiley.

Powers, S.W., & Spirito, A. (1998b). Biofeedback. In J. Noshpitz, J. Coyle, S. Harrison & S. Eth (Eds.), *Handbook of child and adolescent psychiatry* (Vol. 6, pp. 417–422). New York: Wiley.

Reau, N.R., Senturia, Y.D., Lebailly, S.A., & Christoffel, K.K. (1996). Infant and toddler feeding patterns and problems: Normative data and a new direction. Pediatric Practice Research Group. *Journal of Developmental and Behavioral Pediatrics, 17*, 149–153.

Sanders, M.R., Rebgetz, M., Morrison, M., Bor, W., Gordon, A., Dadds, M., & Shepherd, R. (1989). Cognitive-behavioral treatment of recurrent nonspecific abdominal pain in children: An analysis of generalization, maintenance, and side effects. *Journal of Consulting and Clinical Psychology, 57*, 294–300.

Sanders, M.R., Shepherd, R.W., Cleghorn, G., & Woolford, H. (1994). The treatment of recurrent abdominal pain in children: A controlled comparison of cognitive-behavioral family intervention and standard pediatric care. *Journal of Consulting and Clinical Psychology, 62*, 306–314.

Siegel, L.J. (1988). Dental treatment. In D.K. Routh (Ed.), *Handbook of pediatric psychology* (pp. 448–459). New York: Guilford Press.

Skuse, D. (1993). Epidemiological and definitional issues in failure to thrive. *Child and Adolescent Psychiatric Clinics of North America: Eating and Growth Disorders, 2*, 37–59.

Spirito, A. (1999). Introduction: Special series on empirically supported treatments in pediatric psychology. *Journal of Pediatric Psychology, 24,* 87–90.

Split, W., & Neuman, W. (1999). Epidemiology of migraine among students from randomly selected secondary schools in Lodz. *Headache, 39*, 494–501.

Stunkard, A.J., Harris, J.R., Pedersen, N.L., & McClearn, G.E. (1990). The body-mass index of twins who have been reared apart. *New England Journal of Medicine, 322*, 1483–1487.

Troiano, R.P., Flegal, K.M., Kuczmarski, R.J., Campbell, S.M., & Johnson, C.L. (1995). Overweight prevalence and trends for children and adolescents. The National Health and Nutrition Examination Surveys, 1963 to 1991. *Archives of Pediatric and Adolescent Medicine, 149*, 1085–1091.

Varni, J.W., Blount, R.L., Waldron, S.A., & Smith, A.J. (1995). Management of pain and distress. In M.C. Roberts (Ed.), *Handbook of pediatric psychology* (pp. 105–123). New York: Guilford Press.

Walco, G.A., Sterling, C.M., Conte, P.M., & Engel, R.G. (1999). Empirically supported treatments in pediatric psychology: Disease-related pain. *Journal of Pediatric Psychology, 24*, 155–167.

Walker, L.S., Garber, J., & Greene, J.W. (1991). Somatization symptoms in pediatric abdominal pain patients: Relation to chronicity of abdominal pain and parent somatization. *Journal of Abnormal Child Psychology, 19*, 379–394.

Werder, D.S., & Sargent, J.D. (1984). A study of childhood headache using biofeedback as a treatment alternative. *Headache, 24*, 122–126.

Womack, W.M., Smith, M.S., & Chen, A.C. (1988). Behavioral management of childhood headache: A pilot study and case history report. *Pain, 32*, 279–283.