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FUTURE DIRECTIONS IN THE TREATMENT OF CHILDHOOD ANXIETY DISORDERS

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Abstract

Recent literature reviews reveal a significant growth in the number of clinical trials of psychosocial treatments for ameliorating anxiety disorders in children and adolescents. This paper presents a look ahead toward critical next steps in extending our knowledge and improving the clinical care for the millions of children and families whose lives are impaired by excessive anxiety and fear. Toward this end, we discuss three areas for future research. The first area involves the systematic evaluation of predictors, moderators, and mediators of treatment outcome in order to personalize and augment the effectiveness of current evidence-based treatments. The second area involves examining ways in which current treatments can be extended to new populations (i.e., to those that have been excluded from previous clinical trials), new formats, and to new settings. The third area for future research discusses the need to develop novel interventions (both treatment and prevention) based on emerging evidence from the scientific literature in the fields of developmental psychopathology and neuroscience. Research on the treatment of child anxiety is at an exciting stage and the next generation of studies will likely lead to many innovative and clinically beneficial outcomes.

KEY WORDS: *anxiety disorders, children, treatment, cognitive behavioral therapy.*

Resumen

Las revisiones recientes de la literatura revelan un crecimiento significativo en el número de ensayos clínicos de los tratamientos psicosociales para tratar los trastornos de ansiedad en niños y adolescentes. Este artículo presenta una mirada al futuro sobre los pasos siguientes críticos para ampliar nuestro conocimiento y mejorar el cuidado clínico para millones de niños y de las familias cuyas vidas están deterioradas por la ansiedad y el miedo excesivo. Con este propósito discutimos sobre tres áreas para la investigación futura. La primera

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área implica la evaluación sistemática de predictores, moderadores y mediadores de los resultados del tratamiento con el fin de personalizar y aumentar la eficacia de tratamientos actuales basados en la evidencia. La segunda área implica examinar las formas en las cuales los tratamientos actuales se pueden ampliar a nuevas poblaciones (p. ej., a los que se han sido excluidos de ensayos clínicos anteriores), a nuevos formatos y nuevos contextos. En la tercera área para la investigación futura se discute sobre la necesidad de desarrollar intervenciones novedosas (de tratamiento y prevención) basadas en la evidencia que hay en la literatura científica de psicopatología y neurociencia. La investigación sobre el tratamiento de la ansiedad en niños está en una etapa emocionante y la siguiente generación de estudios conducirá probablemente a muchos resultados innovadores y clínicamente beneficiosos.
PALABRAS CLAVE: *trastornos de ansiedad, niños, tratamiento, terapia cognitivo conductual.*

Recent literature reviews reveal a significant growth in understanding of the phenomenology, epidemiology, etiology, and treatment of anxiety disorders in children and adolescents (hereafter referred to as children; see text by Ollendick & March, 2004). Indeed, the articles in this special issue highlight many of these advances. This paper focuses on the psychosocial treatment of anxiety disorders and presents a look ahead toward critical next steps in extending our knowledge and improving the clinical efficacy and care for the millions of children and families whose lives are impaired by excessive anxiety and fear. Toward this end, we discuss avenues for future research in three areas that focus on ways in which current evidence-based treatments might be 1) augmented or personalized to increase the number of children who experience significant clinical benefits and to address factors that often reduce treatment success, 2) extended into new populations, new settings, and new and novel formats, and 3) ways in which new evidence from developmental psychopathology and neuroscience can lead to innovations in treatment and/or prevention.

Augmenting current treatments for anxiety disorders in youth

As noted by Ollendick and King, in this issue, cognitive behavioral therapy (CBT) is considered an efficacious treatment for the most commonly occurring anxiety disorders in children. Indeed, the odds of recovery are more than three times greater for youth treated by CBT than youth receiving no treatment (Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004). At the same time, response rates in randomized clinical trials of CBT for anxiety disorders average around 60%. Moreover, there is wide individual variability in children's response to treatment, and remission rates are generally lower, suggesting that many children remain symptomatic despite their improvement. These data highlight that while the majority of youth improve with CBT, a considerable number either do not respond or are not "well" after a short-term course (i.e., 10-16 sessions) of treatment. Consequently, a critical area of future research needs to focus on augmenting current

treatments, both to increase the number of children who benefit and to maximize the impact of treatment so that children return to "normal" levels of functioning at post-treatment and beyond. There are numerous approaches to enhancing current CBT treatments and several such efforts have already been attempted, including evaluating the combination of medication and psychotherapy (e.g., POTS, 2004) as well as supplementing individual child treatments with family interventions (Barrett, Dadds, & Rapee, 1996; Bogels & Siqueland, 2006; Cobham, Dadds, & Spence, 1998; Wood, Piacentini, Southam-Gerow, Chu, & Sigman, 2006). Both approaches appear promising, though as discussed below, more research needs to be done.

One previously-neglected method for determining how best to augment current CBT treatments for anxiety disorders is to systematically identify predictors/moderators and mediators of treatment response. The existing treatment literature for pediatric anxiety disorders has focused largely on primary outcomes (i.e., whether the treatment was effective in reducing anxiety symptoms or whether the child meets criteria for an anxiety disorder at post-treatment or follow-up). However, in order to enhance current interventions attention to the factors that interfere with treatment response are needed. In doing so, existing treatments may be tailored to match individual child and family characteristics and ultimately enhance treatment response and prevent relapse.

To date, the identification of predictors of positive treatment response to CBT for child anxiety has been inconclusive and only a few variables have been systematically examined. For instance, treatment outcome (usually defined as presence of diagnosis and/or severity of anxiety/fears) does not appear to differ as a function of ethnicity or comorbidity (Treadwell, Flannery-Schroeder, & Kendall, 1995; Silverman, Kurtines, Ginsburg, Weems, Lumpkin, & Carmichael, 1999a; Silverman, Kurtines, Ginsburg, Weems, Rabian, & Serafini, 1999b). The findings for gender and age are inconsistent: some studies find no moderating effect (Beidel, Turner, & Morris, 2000; Silverman et al., 1999a; 1999b; Treadwell et al., 1995); and others report that children under 13 and girls respond better than older children and boys (Barrett et al., 1996; Berman, Weems, Silverman, & Kurtines, 2000; Cobham et al., 1998; Last, Hansen, & Franco, 1998; Mendlowitz, Manassis, Bradley, Scapillato, Miezitis, & Shaw, 1999; Southam-Gerow, Kendall, & Weersing, 2001). Among the variables examined to date, parental psychopathology (e.g., anxiety, depression, hostility, paranoia) is the most consistent predictor of poor treatment response (Berman et al., 2000; Cobham et al., 1998). These findings provide a strong rationale for assessing parental psychopathology and including intervention strategies to minimize the impact of parental symptoms on child outcomes, although additional research is needed as parental psychopathology may also interact with child age and gender.

Apparent from the literature is that few studies have systematically examined predictors/moderators of treatment response and the range of variables examined has been limited. Future studies are needed to explore other variables that may predict poor response, such as family conflict, cognitive ability, low levels of client motivation or readiness for change, and absence of early treatment response, to name a few.

As is true of predictors/moderators, identification of mediators of treatment response has the potential to refine treatment packages and enhance treatment

outcomes. Unfortunately, as with predictors/moderators, systematic evaluation of theory-based intervention mediators for child anxiety disorders is rare, yet data from correlational and treatment studies suggest several potential mediators including maladaptive cognitions, coping and problem-solving skills, anxiety-enhancing parenting behaviors, and the therapeutic relationship.

With respect to cognitions, several cognitive theories have been proposed to explain the development and/or maintenance of anxiety disorders (Barlow, 2002; Beck & Emery, 1985; Clark, 1986; Daleiden & Vasey, 1997; Ingram & Kendall, 1987). Correlational research has found that maladaptive cognitions are positively associated with anxiety symptoms and disorders in both community and clinic samples. These include anxiety sensitivity (i.e., catastrophic misinterpretations of bodily sensations of anxiety; Ginsburg & Drake, 2002a; Kearney, Albano, Eisen, Allan, & Barlow, 1997); cognitive distortions (e.g., catastrophizing and personalization; Weems, Berman, Silverman, & Saavedra, 2001), general attributions of control (Bell-Dolan & Wessler, 1994; Mattis & Ollendick, 1997), an external locus of control (Chorpita, Brown, & Barlow, 1998), attributions of control for anxiety-relevant events (Ginsburg, Lambert, & Drake, 2004; Weems, Silverman, Rapee, & Pina, 2003) and negative self-statements (Treadwell & Kendall, 1996). However, to test cognitive processes as mediating variables, future studies will need to be designed to examine whether changes in one or more of these types of cognitions facilitate therapeutic change in anxiety severity or functional impairment.

Only two studies have examined cognitions as a mediator of treatment response. Kendall and Treadwell (2007), replicating earlier findings (Treadwell & Kendall, 1996), found that anxious self-statements mediated change in anxiety severity at post-treatment among children (ages 9-13), although depressive self-statements and positive self-statements did not, suggesting content specificity in the types of cognitions that interventions should focus on reducing in order to effect a more positive change.

In addition to cognitions, maladaptive coping styles and deficits in problem-solving skills also appear related to a range of negative emotional health outcomes (see Wolchik & Sandler, 1997 for a review). Avoidant and emotion-focused coping strategies are associated with higher levels of anxiety (Carver, Scheier, & Weintraub, 1989; Ebata & Moos; 1991; Edwards & Trimble, 1992) whereas problem-focused coping is associated with more positive mental health outcomes including lower levels of anxiety (Compas, Malcarne, & Fondacaro, 1988; Jeavons, Horne, & Greenwood, 2000; Whatley, Foreman, & Richards, 1998). CBT interventions that incorporate problem-solving skills have been shown to be positively associated with children's coping ability (Barrett et al., 1996; Lock & Barrett, 2003) and negatively associated with levels of child anxiety symptoms (Kendall, Flannery-Schroeder, Panichelli-Mindel, Southam-Gerow, Henin, & Warman, 1997). However, it is not known whether changes in these skills are needed to induce change or whether these skills change as a function of other CBT strategies.

Developmental models of child anxiety and evidence from correlational studies have also identified several parenting behaviors that are associated with higher levels of child anxiety, including parental overprotection and modeling or reinforcement of avoidance (see Ginsburg, Siqueland, Masia-Warner, & Hedtke, 2004 and Wood et al., 2006 for reviews). In an effort to ameliorate the negative effects of these

parental factors, CBT treatments for child anxiety have incorporated parenting components (e.g., Barrett, 1998; Barrett et al., 1996; Mendlowitz et al. 1999; Silverman et al., 1999a, b). These treatments have been found to be effective in reducing child anxiety and suggest that treatment may impact parenting behaviors that may mediate changes in child anxiety. However, only a few studies have measured changes in parenting skills from pre- to post-treatment and none have examined the mediational effects of parenting on child anxiety. Moreover, because anxious children often have anxious parents, future studies should also include CBT skills directly targeting parental anxiety to examine whether reduction in parental anxiety (rather than parenting behaviors) mediates child outcomes.

The quality of the therapeutic relationship is another neglected area of research that may lead to new knowledge that can be used to augment CBT. The therapeutic relationship with children can be challenging due to children's increasing desire for autonomy and their tendency to deny or minimize problems. However, studies of therapeutic alliance involving youth with psychopathology suggest that relationship-building variables (e.g., therapist warmth, genuineness) are modestly associated with child outcomes (Shirk & Karver, 2003), although the findings from the few studies involving children with anxiety disorders have been mixed (Kendall, 1994; Kendall et al., 1997; Truax, Altman, Wright, & Mitchell, 1973). Importantly, within one sample, therapist report of the therapeutic relationship was positively related to treatment outcome and observer ratings of therapist behaviors indicated that "collaboration" was positively related to therapeutic alliance whereas "pushing the child to talk" and "emphasizing common ground" were related to lower alliance (Creed & Kendall, 2005). The latter finding regarding common ground was unexpected, but upon further review, behaviors coded as such may have been interpreted by children as the therapist using insincere attempts to try to engage the child. These findings suggest that future directions to maximize the contribution of therapeutic alliance to current treatments include exploration of therapist strategies to effectively improve a weak alliance (Creed & Kendall, 2005). Related, because greater child participation in treatment is associated with greater improvement (Chu, Choudhury, Shortt, Pincus, Creed, & Kendall, 2004), it would be of interest to identify therapist behaviors that increase the child's participation in treatment.

In sum, several strategies hold promise for augmenting the efficacy of current CBT treatments. These include examining predictors, moderators, and theory-based mediators of treatment to individualize treatments as well as refine current treatment models and therapeutic skills. The next steps in examining these factors include revisiting the literature to identify key factors, utilizing research designs that include data collection (at multiple time points) of the factors of interest, and conducting appropriate analyses to test moderating and mediating effects.

Extending current treatments for anxiety disorders in childhood

A second area for future research involves extending CBT treatments to new populations, new formats, and into new settings. As noted above, there has been

an increase in the number of efficacy trials evaluating CBT for anxiety disorders in youth in the past decade. However, these studies and their applications have several limitations. First, the majority of efficacy trials have stringent entry criteria, resulting in low rates of comorbidity in comparison to the amount of comorbidity that is typically encountered in "real world" community settings (e.g., schools, community mental health centers). Second, these studies were often conducted in university-based child anxiety specialty clinics, usually on a once weekly treatment visit schedule, with treatment administered by expert CBT clinicians (i.e., doctoral level psychologists or doctoral candidates in psychology with extensive training and supervision). Third, these studies were based on samples of children ages 7-17 from primarily middle and upper-middle class Caucasian families with small percentages of families from diverse racial/ethnic and socioeconomic backgrounds. The next generation of anxiety treatment studies needs to address these and other limitations by extending the evaluation of CBT (Ollendick & King, this issue). Below we discuss specific ways in which CBT can be extended.

New populations

With respect to new populations, there is a need to extend treatments to youth with comorbid disorders, children with cognitive or social deficits, and preschool age children. Extending CBT to youth with comorbid disorders is particularly important given that approximately 80% of children with a principal diagnosis of an anxiety disorder have at least one additional Axis I disorder (Kendall, Brady, & Verduin, 2001; Last, Strauss, & Francis, 1987). In addition, a significant number of youth who meet criteria for a non-anxiety disorder, also present with a co-morbid anxiety disorder. For instance, approximately 35% of children meeting criteria for autism spectrum disorders have a comorbid anxiety disorder (Green, Gilchrist, Burton, & Cox, 2000; Kim, Szatmari, Bryson, Streiner, & Wilson, 2000; Leyfer, Folstein, Bacalman, Davis, Dinh, Morgan et al., 2006; Muris, Steerneman, Merckelback, Holdrinet, & Meesters, 1998).

In order to extend CBT to youth with comrbid disorders, one future direction is to develop treatment protocols that incorporate components to address overlapping symptoms/disorders (rather than only anxiety). For instance, Barlow and colleagues (Barlow, Allen, & Choate, 2004; Moses & Barlow, 2006) argue for the development of a unified approach for the treatment of emotional disorders as a class, rather than anxiety or depression as separate disorders. In particular, Barlow and colleagues (2004) identified three key components of treatment for emotional disorders: (1) changing cognitive distortions (e.g., probability overestimation, catastrophizing), (2) preventing emotional avoidance (e.g., social withdrawal, escape behavior, distraction), and (3) changing action tendencies (i.e., motivated behaviors that serve to help the person escape from intense emotion) within the context of exposure. Future research may also apply a unified treatment to other disorders that may reflect a degree of negative affect, such as eating disorders, conduct disorders, and schizophrenia.

An additional area for future research involves how to apply CBT to treat anxiety when the comorbid disorder compromises cognitive or social functioning, as in the case of youth with autism, mental retardation, Asperger's or schizophrenia. Some of this work has begun with specialized populations (e.g., Rapp Vollmer, & Hovanetz, 2005; Sofronoff, Attwood, & Hinton, 2005; Sze & Wood, 2007). In one single-subject study, researchers effectively treated a specific phobia of water in a 14-year-old boy with schizophrenia who feared his "ears falling off" or "seeing bad guys" if he went in the shower or swimming pool (Nakamura, Schiffman, Lam, Becker, & Chorpita, 2006). Modifications to the treatment included a modular approach to therapy that emphasized simplified psychoeducation, exposure, and positive reinforcement, and omitted cognitive and relaxation strategies. Over the course of 22 weeks of intensive exposure sessions (2-3 times per week), this youth successfully participated in gradual exposure to a hierarchy of feared water situations ranging from putting a wet cloth on his ears to swimming underwater in a pool, despite the continued presence of delusions, hallucinations, and behavioral disorganization.

Promising results were also recently reported by Sofronoff and colleagues (2005) who examined the efficacy of CBT for anxiety among a sample of youth ($N = 71$; ages 10-12) with Asperger's syndrome and excessive anxiety. Children were randomized into a child only group treatment (3 children and 2 therapists per group), a child and parent treatment (parent groups were added to the group child treatment), or a wait-list control condition. The active treatments focused on anxiety reduction and involved six, 2-hour sessions. All children were provided with a workbook and session content focused on positive emotions, recognizing signs and symptoms of anxiety, the use of a "tool box" of skills that children used to learn to "fix" the feeling of anxiety, and the use of social stories (Gray, 1998) for emotion management. Results revealed that children in both active treatments, relative to the wait-list, showed significant reductions on parent-reported child anxiety and generated more positive coping strategies to anxiety-provoking situations. Active parental involvement also appeared to enhance treatment outcomes on some measures.

Enhanced or modified CBT also appears promising for youth with high functioning autism (Sze & Wood, 2007). In their description of how CBT for anxiety was modified for this population, the authors highlight that initial sessions focus on psychoeducation of symptoms for both autism and anxiety and stress that key modifications for this population require reducing abstract language, increasing the use of role-plays and visual materials, and capitalizing on children's idiosyncratic special interests to enhance motivation. Parents are also encouraged to gradually reduce the level of assistance they provide in their children's daily routines.

There is also a dearth of research regarding the efficacy of CBT for anxious children under age 7 given that certain components of standard CBT interventions, such as cognitive restructuring and problem-solving, may be difficult to teach young children. Indeed effective treatments of other childhood behavioral difficulties, such as Parent-Child Interaction Therapy (PCIT) for oppositional behavior (Eyberg, 1988) have begun to be modified for anxious preschoolers. The format of these parent-focused interventions suggests that anxiety treatments that incorporate parent components may have a greater chance of success for young children

than those that provide individual treatment. In a multiple baseline study, PCIT was delivered to 3 families of children ages 4-8, with separation anxiety disorder (Choate, Pincus, Eyberg, & Barlow, 2005). PCIT was selected because it targets child-directed and parent-directed interactions that may maintain child anxiety. Child-directed interactions were set up to enhance children's sense of control and self-efficacy, thereby reducing anxiety. Parent-directed interactions targeted differential reinforcement of children's anxious and brave behaviors and parental overcontrol. Both types of interactions were also intended to improve the parent-child relationship. In this preliminary study, PCIT resulted in recovery from separation anxiety disorder following 6 weeks of treatment. Thus, although randomized controlled trials are lacking, case reports and multiple baseline studies are promising and illustrate how CBT can be creatively extended to new populations.

Novel treatment formats

As treatments move into communities and are modified for new populations, they will also need to be reformatted to address the contextual factors that constrain treatment delivery (costs, access, etc). Several exciting new approaches have been introduced into the literature including bibliotherapy, web-based and computer-assisted CBT, and single-session or massed session treatments. Future studies should continue to examine alternative treatment formats that diverge from the standard weekly therapy session delivered by an experienced therapist in an outpatient clinic.

Research has demonstrated that bibliotherapy may be a feasible and effective alternative to traditional clinic-based therapy. In one randomized study of 267 families in rural and remote communities of Australia, Rapee and colleagues (Rapee, Abbott, & Lyneham, 2006) compared bibliotherapy to group CBT and no-treatment waitlist control. Following the 12-week intervention, children (ages 6-12) who had received bibliotherapy had decreased anxiety symptomatology on most measures compared to the no-treatment group, but evidenced less improvement than children who had received clinic-based group CBT. Unfortunately, bibliotherapy yielded greater attrition than did group CBT. A follow-up randomized study of 100 children (ages 6-12) evaluated the efficacy of bibliotherapy combined with adjunctive therapist support in one of the following forms: (1) therapist-initiated telephone calls or emails, (2) family-initiated contact, or (3) no contact (Lyneham & Rapee, 2006). At post-treatment, children in the active treatments had less symptomatology and improved diagnostic profiles compared to children in the no-contact group. In fact, 79% of children in the therapist-initiated telephone/email group were diagnosis-free at post-treatment, which compares favorably to in-person therapist contact RCTs (Flannery-Schroeder & Kendall, 2000; Silverman et al., 1999a, b), and treatment gains were maintained over 12 months. Thus, the first study suggests that, due to lower rates of improvement and attrition concerns, bibliotherapy without therapist contact may be promising as an adjunct service in certain circumstances (e.g., child anxiety is subclinical or families are unable to meet with therapist due to remote location or transportation issues) and the second study provides evidence that

therapist support may augment bibliotherapy to the level of therapist-delivered CBT, thereby providing a viable option to the delivery of services to families who would otherwise have barriers to participation in standard treatment.

Computer- or web-based interventions can also increase the accessibility of treatments for anxious patients who might not otherwise seek treatment or for those who are geographically isolated from treatment. Web-based CBT may also be desirable for therapists and consumers because of the quick feedback that can be provided to clients. In two separate studies of panic disorder in adults, individuals who completed a 10-week internet-based CBT program exhibited significant improvements compared to waitlist controls and gains were maintained for as long as 9 to 12 months post-treatment (Carlbring, Bohman, Brunt, Buhrman, Westling, Ekselius et al., 2006). Treatment was manualized and included standard CBT modules (e.g., psychoeducation, cognitive restructuring, exposure). Feedback by a therapist was provided within 24 hours. Interactive activities and quizzes with immediate feedback for each module were included. Based on homework responses, the therapist provided the patient with access to the next module. Treatment satisfaction was high (97% of participants were satisfied), although 75% of participants felt the pace was at least a little too fast (Carlbring et al., 2006).

Although web-based CBT has yet to be tested with youth, computer programs are being developed for use in this population (e.g., *Cool Teens* CD-ROM, Cunningham, Rapee, & Lyneham, 2007). Kendall and colleagues have developed the *Coping Cat CD* (CCCD, Khanna & Kendall, 2008). CCCD is based on the *Coping Cat* treatment manual and includes skill-building exercises (e.g., psychoeducation, relaxation, cognitions, problem-solving) and exposure/rehearsal activities within the context of a cast of characters at a sleep-away camp. It is designed as a computer-assisted program to supplement the treatment services provided by the clinician, who plans and facilitates the exposure sessions. Preliminary data provide support for the feasibility of the CCCD and client satisfaction and a pilot study is currently underway to compare CCCD to individual CBT and attention control (Khanna & Kendall, 2008).

In addition to novel formats, another promising area of future study is examining the "dose" and timing of treatment. Although manualized interventions for anxiety prescribe 10 to 16 1-hour sessions, there is growing evidence to support the efficacy of intensive anxiety treatment programs involving longer length (but fewer in numbers) sessions or massed treatment sessions. For example, there is some empirical support for intensive single-session treatment with adults with spider phobias (Hellstrom & Ost, 1995), blood-injection-injury phobias (Hellstrom, Fellenius, & Ost, 1996; Ost, Hellstrom, & Kaver, 1992), and flying phobias (Ost, Brandberg, & Alm, 1997). The efficacy of single-session treatments is less established for phobic youth. In each of two randomized clinical trials, Muris and colleagues found evidence for the efficacy of intensive (90-150 min) exposure for spider phobias compared to eye movement desensitization and reprocessing (EMDR) (Muris, Merkelbach, Holdrinet, & Sijsenaar, 1998; Muris, Merkelbach, van Haaften, & Mayer, 1997). In a more recent study of 60 children with a variety of phobias (animal, blood, injections, claustrophobia, thunderstorms, etc.), Ost and colleagues randomized children (ages 7-17) to one of three conditions: (1) one-session exposure with child alone, (2) one-

session exposure with parent present during exposure, and (3) waitlist control (Ost, Svensson, Hellstrom, & Lindwall, 2001). Exposure sessions lasted a maximum of three hours. Both active treatments were more effective than waitlist control but did not differ from each other in efficacy at post-treatment or 1-year follow-up (more than 80% of children in each active treatment group improved). In a separate study, children also reported favorable experiences with one-session phobia treatments and satisfaction with the pace and amount of control in the study (Svensson, Larsson, & Ost, 2002). Whether such single sessions would be useful for other anxiety disorders is unknown and awaits future research (Ost et al., 2001).

Recently, Storch and colleagues reported a series of case studies showing that OCD was successfully treated in a 3-week intensive treatment program (Storch, Geffken, Merlo, Mann, Duke, Munson et al., 2007). Intensive programs (e.g., 6-hour sessions daily over the course of a week) have also been tested for pediatric panic disorder (Angelosante, Pincus, Trosper, & Goldstein, 2007) and separation anxiety disorder (Santucci, Trosper, Bennett, & Ehrenreich, 2007). These examples of alternative treatment formats represent future directions for research by highlighting how the core CBT strategies may be modified to increase access and positive outcomes.

New settings

Along similar lines, future research of CBT for anxiety disorders needs to extend into new settings, such as schools, community mental health centers, and primary care settings (Ollendick & King, this issue). Work has begun evaluating CBT for anxiety in schools and community mental health centers (Garcia-Lopez, Olivares, Beidel, Albano, Turner, & Rosa, 2006; Ginsburg, Becker, Kingery, & Nichols, 2008; Ginsburg & Drake, 2002b; Masia-Warner, Fisher, Shrout, Rathor, & Klein, 2007; Masia-Warner, Klein, Dent, Fisher, Alvir, Albano et al., 2005) and is beginning in primary care settings for children (Weersing, Gonzalez, Campo, & Lucas, 2008). For instance, in their school-based study, Masia-Warner and colleagues randomized 36 high school students with a primary diagnosis of social phobia to a school-based CBT or an attention control condition (Masia-Warner et al., 2007). Relative to the control condition, youth who received CBT showed significant reductions in anxiety and functioning at post-treatment and these improvements were maintained at a 6-month follow up assessment. There is also evidence of long-term treatment gains following school-based interventions targeting anxiety. For example, Garcia-Lopez and colleagues (2006) found that treatment gains were maintained after five years for youth with social phobia who had received Cognitive Behavioral Group Therapy for Adolescents, Social Effectiveness Therapy for Adolescents (Spanish version), and Intervencion en Adolescentes con Fobia social (Treatment for Adolescents with Social Phobia) delivered in the school setting.

Another area for future research in anxiety treatment related to extending CBT into new settings is to assess the effectiveness of CBT for anxiety disorders in youth when delivered by non-expert CBT therapists (Ollendick & King, this issue). Expert CBT clinicians are often difficult, if not impossible, to find and criticism has been

raised about the ecological validity of efficacy studies on this dimension (i.e., expert CBT therapists with close supervision do not mirror read world practice). Fortunately, recently published studies reported the successful training of school-based clinicians to deliver manualized treatments, thereby providing preliminary evidence of feasibility (e.g., Ginsburg et al., 2008; Stein, Jaycox, Kataoka, Wong, Tu, Elliott et al., 2003). However, additional research is needed to determine the relative efficacy of using CBT expert versus non-CBT experts. Data are also need on training formats and supervision regimens that will maximize therapist competence and treatment efficacy.

New treatments for anxiety disorders in children based on emerging evidence

In addition to augmenting existing treatments and expanding existing treatments to new populations, formats, and settings, a third area for future research involves the development of novel treatments and prevention programs based on emerging evidence in the scientific literature in the fields of developmental psychopathology and neuroscience.

Developmental psychopathology

New evidence based on longitudinal studies is constantly emerging and has begun to address questions about early predictors or risk factors for anxiety and its disorders (Grover, Ginsburg, & lalongo, 2005; Spence, Sheffield, & Donovan, 2002). Not only do these new data have the potential to shed light on the etiology of anxiety they can also inform the development of new treatments and early and preventive interventions. For instance, data from Warren and colleagues have shown that early insecure attachments are associated with the development of anxiety disorders and hence suggest that early interventions targeting early attachment may be fruitful in preventing later anxiety disorders (Warren, Huston, Egeland, & Sroufe, 1997).

Simlarly, early temperament (e.g., behavioral inhibition; BI) has been shown to predict anxiety disorders. Indeed, Rapee and colleagues (Rapee & Jacobs, 2002; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005) designed an intervention for parents of behaviorally inhibited children to evaluate whether this temperamental risk factor could be modified and whether the intervention could prevent the onset of anxiety disorders. They recruited 146 3-5 year-old children who appeared behaviorally inhibited based on questionnaire and laboratory measures and randomized half to an intervention group (parental education) and half into a control group (monitoring only). In a preliminary report, the intervention seemed to have a significant effect on inhibited temperament (per mothers' ratings but not laboratory assessments) - with a greater reduction in the intervention group; there was also a greater reduction in the number of anxiety disorder diagnoses in the intervention group (Rapee & Jacobs, 2002). In a subsequent report, temperament did not appear to be affected by the intervention, though parents who received the intervention reported a significantly

lower prevalence of anxiety disorders in their children at the 12-month follow-up, compared to the control group (50% versus 63%; Rapee et al., 2005).

Similar to research on attachment and BI, parental anxiety disorder has been identified as a key risk factor for child anxiety and holds the promise of extending CBT to offspring in the form of early and/or preventive interventions. Ginsburg and colleagues recently completed a pilot study to assess a brief family-based intervention for anxious parents and their offspring. The study randomized 40 children of anxious parents (7-12 years of age) to either a 6-8 week family-based CBT intervention or a monitoring only control group. Preliminary results are encouraging (Bienvenu & Ginsburg, 2007; Ginsburg, 2009). Specifically, based on independent evaluations of diagnostic status with the Anxiety Disorders Interview Schedule for Children (Silverman & Albano, 1996), by one year post-intervention, 30% of the children in the control group (6/20 based on the intent to treat sample) developed an anxiety disorder compared to zero in the intervention group (0/20). Taken together, findings from the field of developmental psychopathology that identify risk factors for anxiety disorders can be leveraged into developing new treatments or early/preventive interventions for youth.

Neuroscience

Translational research also holds promise for new treatments aimed at reducing anxiety disorders in children. For instance, relationships between BI and physiological measures, such as those indicated by electroencephalogram (EEG), which provides information regarding the activation of the brain may lead to new interventions. Of particular interest to anxiety researchers are the activation patterns of the frontal regions, which are hypothesized to govern motivated approach and withdrawal (Davidson, 1994; Fox, 1991). In particular, the left frontal region directs approach-oriented emotional responses whereas the right frontal region directs withdrawal-oriented responses. Findings from a number of EEG studies have found evidence for the relationship between frontal EEG asymmetry and BI. Infants who displayed stable right frontal EEG asymmetry for their first two years of life were more inhibited than infants who displayed stable left EEG asymmetry during that same period of time (Calkins, Fox, & Marshall, 1996), and were more likely to be inhibited at age 4 (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001). Taken together, the marriage between neuroscience and behavioral research has the potential to identify infants and children at risk for developing anxiety disorders, and early identification is one key component to the prevention of psychopathology. Although the research on pediatric neuroscience is not at the point at which neuro-scientific treatments are being tested, there is preliminary evidence for improvement in adult anxiety, namely obsessive compulsive disorder, following neuro-scientific interventions such as deep brain stimulation (e.g., Abelson, Curtis, Sagher, Albucher, Harrigan, Taylor et al., 2005).

Another example of how findings from neuroscience may inform anxiety treatment is in the area of cognitive enhancers, such as d-cycloserine (DCS). DCS is a partial agonist at the N-methyl-D-aspartate receptor and improves the extinction

of fear in rodents. It is now being considered as an adjunct to exposure-based therapies to accelerate the learning processes. Preliminary support for the combined treatment has been reported for adults with SOP (Hofmann, Meuret, Smits, Simon, Pollack, Eisenmenger et al., 2006) and OCD (Kushner, Kim, Donahue, Thuras, Adson, Kotlyar et al., 2007). Data from these studies are very preliminary and it is unclear if DCS increases the rate of change or if it improves response and remission rates. No published studies with youth exist but studies are underway.

Summary and conclusions

Research on the treatment of anxiety disorders is in an exciting stage. Efficacy studies have identified treatment strategies that reduce anxiety and on the horizon we expect new and creative modifications to these CBT strategies to address the next wave of questions. These questions revolve around how we can 1) improve the response rates of current CBT treatments by identifying predictors and mediators of current treatments, 2) modify treatments for new populations (especially those that have been previously excluded from treatment trials), new formats, and new settings and 3) devise new interventions that capitalize on advances in developmental psychopathology and neuroscience. Initial efforts have begun to address some of these issues and we expect the next decade of research on child anxiety to be just as inspiring and stimulating as the previous.

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