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Efficacy and effectiveness of school-based prevention and early intervention programs for anxiety

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ABSTRACT

A systematic review was conducted of school-based prevention and early intervention programs for anxiety. The aim of the review was to identify and describe the programs available, and to evaluate their effectiveness in reducing symptoms of anxiety. Twenty-seven outcome trials, describing 20 individual programs, were identified through the Cochrane Library, PsycInfo and PubMed databases. Results of the review indicated that most universal, selective and indicated prevention programs are effective in reducing symptoms of anxiety in children and adolescents, with effect sizes ranging from 0.11 to 1.37. Most programs targeted adolescents (59%), were aimed at reducing the symptoms of nonspecific anxiety (67%), and delivered cognitive behavioural therapy (CBT; 78%). Further quality school-based research is required that involves longer-term follow-up, the use of attention control conditions and evaluates teacher delivery.

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Contents

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1. Effectiveness of school-based prevention and early intervention programs for anxiety

Anxiety is one of the most common psychological disorders in school aged children and adolescents. Current prevalence rates range from 4% to 25%, with an average rate of 8% (Boyd, Kostanski, Gullone, Ollendick, & Shek, 2000; Cole, Peeke, Martin, Truglio, & Seroczynski, 1998; Tomb & Hunter, 2004). The actual rate of prevalence, however, may be even higher, with many children and adolescents remaining unidentified and untreated.

The effects of anxiety disorders on the well-being of children and adolescents are substantial, with the child's social, emotional, and academic functioning affected (Donovan & Spence, 2000). Poor social and coping skills, reduced social interactions, low self-esteem and lower academic achievement, are a few of the major effects (McLoone, Hudson, & Rapee, 2006; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005). If left untreated, anxiety disorders in childhood and adolescence can lead to reduced career choices (due to absenteeism and lower schools grades), increased medical use, depression and substance abuse in adulthood (Donovan & Spence, 2000; Rapee et al., 2005).

Given the high prevalence rate and associated adverse effects, the need to prevent the development of anxiety disorders is paramount. The pertinence of prevention is further reflected in research that indicates that only between 25% and 34% of children and adolescents with a diagnosable psychological disorder (e.g., anxiety, depression, or another mental health problem) receive clinical treatment, and of those that do, many terminate the treatment prematurely, or fail to respond to the treatment offered (Donovan & Spence, 2000; Essau, 2005; Farmer, Burns, Phillips, Angold, & Costello, 2003; Farrell & Barrett, 2007). According to Donovan and Spence (2000), the failure to respond to treatment often occurs when treatment is offered too late, and the adverse effects associated with the disorder become ingrained and difficult to reverse. The prevention of anxiety disorders can also result in considerable cost-savings for society in decreasing the need, and thus cost, of clinical treatment (Spence & Dadds, 1996). Other expenses relating to anxiety disorders in adulthood can also be reduced, such as unemployment, welfare assistance and lost productivity (Donovan & Spence, 2000). Further to this, the demand for mental health services far exceeds supply and thus the prevention of future cases of anxiety could help ease the current pressure on mental health services (Donovan & Spence, 2000). It has also been proposed that prevention programs for anxiety could help to prevent the development of depression in some people, with anxiety typically preceding co-morbid depressive disorders (Bienvenu & Ginsburg, 2007; Flannery-Schroeder, 2006).

The school system has been identified as an ideal avenue for the promotion of prevention and early intervention programs for anxiety (Masia-Warner, Nangle, & Hansen, 2006). Schools are viewed as having unparalleled contact with youth and provide an opportunity to reach children and adolescents who have previously been unidentified and untreated (Chatterji, Caffray, Crowe, Freeman, & Jensen, 2004; Ginsburg & Drake, 2002). School-based programs (delivered as part of the formal school curriculum or as an after school endorsed activity targeting school children) can also reduce and alleviate many of the common barriers to treatment in the community, such as time, location, stigmatization, transportation and cost, by offering convenient, low-cost and non-threatening alternatives (Barrett & Pahl, 2006; Masia-Warner et al., 2006). Additionally, the school environment is likely to facilitate the acquisition of skills, as it is viewed as a place of learning (Rambaldo, Wilding, Goldman, McClure, & Friedberg, 2001).

Three types of prevention and early intervention programs tend to be offered in schools, with each exhibiting a number of advantages and disadvantages (Mrazek & Haggerty, 1994). Universal programs are presented to all students regardless of symptoms and are often designed to build resiliency or enhance general mental health (Barrett & Turner, 2004). Selective programs target children and adolescents who are at risk of developing a disorder by virtue of particular risk factors, such as being children of an anxious parent or divorce (Spence, 1996). Lastly, indicated programs are delivered to students with early or mild symptoms of a disorder.

Both indicated and selective programs tend to produce larger effects than universal interventions (Reivich, Gillham, Chaplin, & Seligman, 2005). One possible explanation for this is that there is greater room for change in individuals presenting with a disorder, or at risk of the disorder, as symptom levels in these groups tend to be higher (Reivich et al., 2005). Both efficacy and effectiveness trials have been conducted in the school environment. An efficacy trial assesses a program under optimal and controlled conditions, while an effectiveness trial evaluates an intervention under real world or naturalistic conditions that approximate usual care (Dane & Schneider, 1998; Flay et al., 2005).

Several reviews have been conducted to investigate the efficacy and effectiveness of anxiety prevention and early intervention programs for children and adolescents (e.g., Feldner, Zvolensky, & Schmidt, 2004; Greenberg, Domitrovich, & Bumbarger, 2001). No review however, has focused specifically on the utility of such programs in the school environment, with previous reviews evaluating community and school-based interventions together. Assessing the utility of school-based programs exclusively is important, as schools have been promoted as an ideal setting for the implementation of prevention programs. Also, the needs and circumstances of the children and adolescents evaluated in community settings (e.g. pregnant adolescent mothers, young offenders) can be quite different to those of mainstream school children, as can be the delivery and implementation of these prevention programs.

The current review therefore aims to identify and describe school-based prevention and early intervention programs for anxiety, and their effectiveness in reducing symptoms of anxiety. The current review also attempts to determine the relative effectiveness of universal, selective and indicated programs, and to determine whether the type of control group (attention control vs. other), implementation method (teacher vs. other), or intervention (cognitive behavioural therapy [CBT] vs. other) contributes to reports of program effectiveness.

2. Method

2.1. Search and screening procedures

The Cochrane Library, PsycInfo and PubMed databases were electronically searched, for articles published between 1987 and February 2008, with the key search terms "school* OR school-based OR adolescen* OR child* OR youth", "prevent* OR early intervent*", and "anxiety OR anxious". The titles and abstracts of the 5725 articles initially identified by these searches were screened by the primary author to determine their relevance to the review. Completely irrelevant articles that were unrelated to the topic of this review (i.e., did not discuss anxiety or resilience in children and adolescents) were excluded at this stage, while relevant studies and reviews were retained and the full-text article examined. Additional articles were obtained from reference list searches.

The inclusion criteria for the current review included, (a) study participants were children (5–12 years) or adolescents (13–19 years), (b) the primary aim of the intervention trialed was to reduce or prevent the symptoms or incidence of anxiety, or to build resilience, (c) the intervention reported was a structured school-based program (delivered as part of the formal school curriculum or as an after school endorsed activity targeting school children), (d) one of the primary outcome measures in the study was anxiety symptomatology or diagnosis, (e) the study was a randomized controlled trial (RCT), and (f) the study was published in a peer-reviewed, English language journal. Studies that fulfilled the inclusion criteria were coded by the

primary author and another independent reviewer, with all relevant data collected and recorded. Inter-rater reliability was very high (kappa = 0.91–1.00), with only one coding discrepancy. This discrepancy was due to one coder missing the reasons given for drop-out in one of the papers, and this was resolved by locating the missing information and agreeing upon its inclusion.

2.2. Effect size calculations

To compare the efficacy and effectiveness of the prevention and early intervention programs identified, standardized effect size (ES) estimates were calculated using Cohen's *d* (Cohen, 1988) or *phi*. Cohen's *d* is calculated by subtracting the mean intervention (M_i) score from the mean control score (M_c) and dividing by the pooled standard deviation ($[M_c - M_i]/SD$). Positive standardized effect size estimates indicate that the intervention group improved more than the control group. According to Cohen (1988), an effect size of 0.20 is considered small, while 0.50 is considered moderate and 0.80 is considered large.

Phi was used to calculate the effect size of studies with a dichotomous outcome variable and is obtained by dividing the chi-square statistic by the sample size, and then taking the square root of the result (Castellanos & Conrod, 2006). An effect size of 0.10 is considered small, 0.30 moderate and 0.50 large (Castellanos & Conrod, 2006). All reported effect sizes were calculated using Cohen's *d*, unless otherwise specified. In some cases an effect size could not be calculated as the necessary data was not reported. Effect sizes were reported where appropriate, but a formal meta-analysis was not conducted because of poor quality ratings, the relatively small number of trials and the inability to accurately compare efficacy and effectiveness trials. Effectiveness trials involving classroom teachers have been found to produce smaller effects than efficacy trials conducted with mental health professionals or research staff (Gillham et al., 2006). As the majority (88%) of the effectiveness trials were universal, a bias could be created if the combined effects of universal and indicated programs were compared.

2.3. Quality ratings

Study quality was also assessed by the two coders using a validated measure that assesses quality against three key criteria: randomization, double-blinding, and withdrawals and dropouts (Jadad et al., 1996). Quality ratings were calculated, as poor quality intervention studies can overestimate the size of intervention effects (Moher et al., 1998). Quality ratings can range from 0 to 5, although intervention trials of school-based mental health programs, which often cannot achieve double-blind conditions, rarely receive scores above 3.

3. Results

Overall, 27 randomized controlled trials were identified in the review, describing 20 individual school-based prevention and early intervention programs for anxiety. Tables 1–3 present the efficacy and effectiveness data for the universal, indicated and selective programs

Table 1
Universal school-based prevention and early intervention programs for anxiety

Program	Trial citation	Sample (age)	*N*	Control group	Program content	Program leader	No. s essions	Post-test effect-size	Follow-up effect-size (months)	Quality rating
AMT	Hains (1992)	Adolescent (15–16 years)	16	WL	Relaxation	Grad. +Researcher	9	1.27[a]	NA[b]	1
PC	Garaigordobil (2004)	Adolescent (12–14 years)	174	NI	Commun.	Teacher	Year-long	0.32[a]	NA[b]	2
PSFL	Sheffield et al. (2006)	Adolescent (14–15 years)	1045	NI	CBT	Teacher	8	0.07	−0.08 (12)	3
SIT	Hains and Szyjakowski (1990)	Adolescent (16–17 years)	21	WL	CBT	Researcher	9	0.32[a]	NA[b]	2
	Hains (1992)	Adolescent (15–16 years)	17	WL	CBT	Grad. +Researcher	9	1.13[a]	NA[b]	1
	Hains and Ellmann (1994)	Adolescent (NA)	21	WL	CBT	Grad.+MHP	13	1.37[a,d]	NA[b]	1
SMI	Keogh, Bond, and Flaxman (2006)	Adolescent (15–16 years)	209	NI	CBT	MHP	10	0.05	NA[b]	2
–	Bonhauser et al. (2005)	Adolescent (15–16 years)	198	AC	Exercise	Teacher	Year-long	NA[a,e]	NA[b]	2
–	Hiebert et al. (1989): study 2	Adolescent (13–14 years)	113	NI	Relaxation	Teacher	11	0.31[a]	NA[b]	1
FRIENDS	Lowry-Webster et al. (2001, 2003)	Child+adolescent (10–13 years)	594	WL	CBT	Teacher	10+2 booster	0.62[a]	0.63[a] (12)	2
	Lock and Barrett (2003), Barrett et al. (2006)	Child+adolescent (9–16 years)	737	WL	CBT	MHP	10+2 booster	0.32[a]	0.22[a] (12), 0.39[a,c] (24), 0.70[a,c] (36)	2
	Barrett et al. (2005)	Child+adolescent (9–16 years)	693	NI	CBT	MHP	10+2 booster	−0.21	0.38[a] (12)	2
	Barrett and Turner (2001)	Child (10–12 years)	489	NI	CBT	MHP+teacher	10+2 booster	*M*HP=0.41[a] *T*=0.33[a]	NA[b]	2
OTT	Berger, Pat-Horenczyk, and Gelkopf (2007)	Child (NA)	142	WL	CBT +Psychoed.	Teacher	8	0.96[a]	NA[b]	2
PPP	Pattison and Lynd-Stevenson (2001)	Child (9–12 years)	66	AC+NI	CBT	MHP	10	AC=0.08 NI=0.28	AC=−0.24, NI=0.38 (8)	1
PTP	Rooney et al. (2006)	Child (8–9 years)	136	NI	CBT	MHP	8	0.15	0.22 (9), −0.08 (18)	2

Note. AMT = Anxiety Management Training, OTT = Overshadowing the Threat of Terrorism, PPP = Penn Prevention Program, PC = Positive Communication, PTP = Positive Thinking Program, PSFL = Problem Solving for Life, SIT = Stress Innoculation Training, SMI = Stress Management Intervention, – = No program name. AC = Attention control, WL = Wait-list control, NI = No intervention control. CBT = Cognitive Behavioural Therapy, Commun. = Communication Skills, Psychoed. = Psychoeducation. Grad = Graduate student/intern, MHP = Mental Health Professional. Year-long = sessions presented weekly throughout the school year. NA = Not available.

[a] Significant difference in anxiety scores between intervention and control groups.
[b] No follow-up data collected.
[c] Children 9–10 years only.
[d] Elevated anxiety group only.
[e] *Phi* estimate of effect size.

Table 2
Indicated school-based prevention and early intervention programs for anxiety

Program	Trial citation	Sample	*N*	Control group	Program content	Program leader	No. sessions	Post-test effect-size	Follow-up effect-size (months)	Quality rating
ACE	Sheffield et al. (2006)	Adolescent (14–15 years)	629	NI	CBT	MHP	8	0.04	−0.10 (12)	3
AO	Roberts et al. (2003, 2004)	Adolescent (11–13 years)	189	NI	CBT	MHP	12	0.20[a]	0.24[a] (6), −0.01 (18), 0.19[a] (30)	2
SASS	Masia-Warner et al. (2005)	Adolescent (13–17 years)	42	WL	Psychoed.+SST+Expos.	MHP	12+2 booster	0.25[a]	NA[b]	2
SIT	Kiselica et al. (1994)	Adolescent (NA)	48	NI	CBT	MHP	8	0.76[a]	1.03[a] (1)	1
–	Ginsburg and Drake (2002)	Adolescent (14–17 years)	12	AC	CBT	Grad.	10	0.26[a]	NA[b]	3
FRIENDS	Dadds et al. (1997, 1999)	Child+adolescent (7–14 years)	128	NI	CBT	MHP	10+2 booster	NA	NA[a] (6), 0.04[c] (12), 0.22[a,c] (24)	2
PRP	Gillham et al. (2006)	Child+adolescent (NA)	44	NI	CBT	Researcher	8	0.07	0.63[a] (6), 0.81[a] (12)	2
Cool Kids	Misfud and Rapee (2005)	Child (8–11 years)	91	WL	CBT	MHP	8	0.35	0.57[a] (4)	2

Note. ACE = Adolescents Coping with Emotions, AO = Aussie Optimism, PRP = Penn Resiliency Program, SASS = Skills for Academic and Social Success, SIT = Stress Innoculation Training, – = No program name. AC = Attention control, WL = Wait-list control, NI = No intervention control. CBT = Cognitive Behavioural Therapy, Expos. = Exposure, Psychoed. = Psychoeducation, SST = Social Skills Training. Grad = Graduate studentintern, MHP = Mental Health Professional. NA = Not available.
[a] Significant difference in anxiety scores between intervention and control groups.
[b] No follow-up data collected.
[c] *Phi* estimate of effect size.

identified respectively, as well as the quality ratings and program details for each trial.

3.1. Program target population

Sixteen (59%) of the identified trials were of a universal nature, while eight (30%) were indicated and three (11%) were selective. The three selective trials were targeted towards parental divorce (Children's Support Group [CSG]), behavioural problems (Hero/Heroine Modeling Intervention [HHMI]) and personality specific cognitive distortions (Personality-Targeted Cognitive-Behavioral Intervention [PTCBI]). Approximately two-thirds (67%) of the trials were aimed at reducing symptoms of nonspecific anxiety, while the remaining trials focused on building resilience (22%) or reducing the symptoms of panic (4%), test anxiety (4%) or social anxiety (4%). Adolescents rather than children were the target audience for a large percentage of the trials identified (59%). Approximately 81% of the trials targeted towards adolescents reported significant reductions in anxiety symptoms (ES=0.11–1.37, Median=0.32, n=12), while 50% of the trials delivered to children reported lowered levels of anxiety (ES=0.41–0.96, Median=0.57, n=3).

3.2. Program content

CBT, or components of it, formed the basis of the majority of programs (78%). Other therapeutic approaches employed included psychoeducation, relaxation, and modeling. Of the trials that utilized CBT, 71% reported significantly lower levels of anxiety (ES=0.11–1.37, Median=0.57, n=15), while all of the trials that delivered an alternative therapeutic technique reported significant reductions in symptoms (ES=0.25–1.27, Median=0.32, n=5).

3.3. Program leader

Program leaders tended to be mental health professionals such as psychologists and counselors (45%), although school teachers (24%), graduate students (18%) and members of the research team (12%) did fulfill this role in just over half of the trials. Approximately 88% of the studies that employed a teacher as the program leader reported significant reductions in anxiety (ES=0.31–0.96, Median=0.36, n=6), compared to 75% of trials that utilized another type of program leader (ES=0.11–1.37, Median=0.41, n=14).

Table 3
Selective school-based prevention and early intervention programs for anxiety

Program	Trial citation	Sample	*N*	Control group	Program content	Program leader	No. sessions	Post-test effect-size	Follow-up effect-size (months)	Quality rating
Behavioural problems										
HHMI	Malgady, Rogler, and Constantino (1990)	Adolescent (12–15 years)	90	AC	SL+Modelling	Grad.+Teacher	18	0.39[a]	NA[b]	2
Parental divorce										
CSG	Stolberg and Mahler (1994)	Child (8–12 years)	129	NI	CBT	Grad.+MHP	14	NA	NA (12)	1
Personality										
PTCBI	Castellanos and Conrod (2006)	Adolescent 13–16 years)	423	NI	CBT+Psychoed.	MHP	2	0.11[a,c]	NA[b]	2

Note. CSG = Children's Support Group, HHMI = HeroHeroine Modeling Intervention, PTCBI = Personality-Targeted Cognitive-Behavioral Intervention. AC = Attention control, NI = No intervention control. CBT = Cognitive Behavioural Therapy, Psychoed. = Psychoeducation, SL = Social Learning. Grad = Graduate student/intern, MHP = Mental Health Professional. NA = Not available.
[a] Significant difference in anxiety scores between intervention and control groups.
[b] No follow-up data collected.
[c] *Phi* estimate of effect size.

3.4. Program sessions

Program length ranged from two sessions to being year-long (sessions presented weekly throughout the school year), with the majority of programs presented over eight to 10 sessions. Session length was also quite variable, although over two thirds (70%) of the program sessions ranged from 60 to 90 minutes. Six of the programs (CSG, Cool Kids, FRIENDS, Overshadowing the Threat of Terrorism [OTT], Penn Resiliency Program [PRP], and Skills for Academic and Social Success [SASS]) included parent information sessions, which complemented the school-based program. Parent sessions ranged from two to six. The FRIENDS and SASS programs also included two booster sessions, which were presented one to three months after the completion of the main program.

3.5. Evaluation control group

Half of the trials identified in the review employed a no intervention or usual care control group, while a third (33%) enlisted a wait-list control and only 15% had an attention control. Students in the no intervention and wait-list control conditions tended to continue usual classes during the intervention phase, while students in the attention control group undertook a structured program that did not contain the elements of the intervention being evaluated. Attention control groups are employed to control for extraneous group factors (e.g., adult attention, social support and group cohesion) that could otherwise cloud intervention effects. Of the studies that included an attention control condition, 75% reported significantly lowering participants' levels of anxiety (ES = 0.26–0.39, Median = 0.33, n = 2), while 75% of trials utilizing a wait-list or no-intervention control condition reported reductions in anxiety (ES = 0.11–1.37, Median = 0.49, n = 18).

3.6. Evaluation sample size, randomization, and follow-up

The number of participants in a trial varied considerably and ranged from 12 to 1045. The median number of participants in a trial was 129. The process of randomization differed between trials, with just under half (48%) randomly allocating individuals to the intervention and control condition and 41% randomizing by school and 11% by class. Of the trials identified, 52% did not have any follow-up comparison data past post-test, while 37% of trials had a follow-up period of 12 months or longer and 11% had measurements of at least two years.

3.7. Evaluation outcome measures and study quality

A variety of anxiety symptom measurement scales were utilized in the trials reviewed, with a number of the studies employing multiple measures. The three most commonly used scales were the Revised Children's Manifest Anxiety Scale (RCMAS; 25%), the State Trait Anxiety Inventory (STAI; 21%), and the Spence Children's Anxiety Scale (SCAS; 18%). Other measurement scales included the STAI for children and the Screen for Child Anxiety Related Emotional Disorders (SCARED). Study quality was on the whole poor, with only three trials (11%) receiving a quality rating of 3.

3.8. Overall symptom outcomes

Overall, 21 of the 27 (78%) trials reported a significant improvement in participants' symptoms of anxiety at either post-test or follow-up, or both, with effect sizes ranging from 0.11 to 1.37. Non significant effect sizes for the other 6 trials ranged from −0.24 to 0.38. Seventeen of the 21 (81%) positive trials reported significant effects (ES = 0.11–1.37) at post-test, while the remaining four studies only recorded significant differences at follow-up (ES = 0.22–0.81). Thirteen (48%) trials collected follow-up data, of which 8 (61%) reported significant effects (ES = 0.19–1.03) and 5 did not (ES = −0.24–0.38).

3.9. Indicated program outcomes

Trials were then examined separately as a function of whether they were indicated, universal or selective. Of the eight *indicated* trials, four (50%) showed reductions in anxiety symptoms at post-test (ES = 0.20–0.76), while four studies failed to find a significant effect (ES = 0.04–0.35). Six of the eight (75%) indicated trials measured differences at follow-up, with five (83%) of the trials finding significant effects (ES = 0.19–1.03) and only one did not (ES = −0.10). Two of the eight (25%) indicated trials exhibited significant differences at both post-test and follow-up (Kiselica, Baker, Thomas, & Reedy, 1994; Roberts, Kane, Bishop, Matthews, & Thomson, 2004; Roberts, Kane, Thomson, Bishop, & Hart, 2003).

3.10. Universal program outcomes

Eleven of the sixteen (69%) *universal* trials reported significant differences between the intervention and control conditions at post-test (ES = 0.31–1.37), while five trials did not (ES = −0.21–0.28). Only six of the sixteen (38%) universal program trials included a follow-up measurement period, of which three (50%) reported significant effects (ES = 0.22–0.70) and three failed to find a difference (ES = −0.24–0.38). Two of the 16 (13%) universal trials reported significant effects at both post-test and follow-up (Barrett, Farrell, Ollendick, & Dadds, 2006; Lock & Barrett, 2003; Lowry-Webster, Barrett, & Dadds, 2001; Lowry-Webster, Barrett, & Lock, 2003).

3.11. Selective program outcomes

The effect sizes for the *selective* programs at post-test were 0.11 (personality) and 0.39 (behavioural problems), with two of the three (66%) trials statistically significant. Only one (33%) of the three selective trials included a follow-up period. This trial did not find a significant difference at follow-up. None of the selective trials reported significant differences at both post-test and follow-up.

4. Discussion

4.1. Program evaluation outcomes

Overall the results of this review support the value of prevention interventions for anxiety, with over three-quarters of the trials reporting a significant reduction in symptoms of anxiety. Small (0.11) to large (1.37) effect sizes were reported both at post-test and follow-up. The sizes of effects were quite variable, with possible explanations for the variability unclear, although differences in program fidelity, leader rapport, relevant content and audience appeal are possible explanations. A mundane program that is incorrectly delivered by a disinterested and unprepared program leader is likely to produce poorer results than one that is innovative, based on up-to-date knowledge and delivered in an enthusiastic and engaging manner. The measurement of participant and program leader adherence and engagement would help to ascertain the influence of these factors. Trial quality may also have played a role in the size of intervention effects, with poorly controlled trials potentially over-estimating or underestimating effects.

The significant effects obtained did not seem to depend on the type of intervention (CBT vs. other), type of program leader (teacher vs. other), or type of control group (attention control vs. other). This is contrary to the findings of a parallel school-based depression review (Neil & Christensen, submitted for publication), which found that school-based depression prevention programs were less likely to report significant findings if the program was presented by a classroom teacher or if it was compared to an attention control condition. This difference may suggest that compared to depression programs, anxiety programs may be the intervention of choice in school environments. They can be implemented well by school

teachers, and are relatively robust in producing symptom reduction in the school environment.

At post-test, universal programs in the current review were associated with a higher proportion of significant trials and larger effect sizes compared to indicated and selective programs, although the significance of this difference was not formally tested. Indicated programs achieved a higher proportion of positive outcomes and stronger effects at longer-term follow-up, although this again was not tested. Previous reviews of depression prevention programs have questioned the utility of universal programs (Merry, McDowell, Hetrick, Bir, & Muller, 2004; Merry & Spence, 2007). However, the results of this review with respect to anxiety outcomes do not support this conclusion. Program benefits may also have been masked in some trials that obtained small to medium effects (Misfud & Rapee, 2005; Pattison & Lynd-Stevenson, 2001), but failed to find a significant difference due to a lack of power resulting from small sample sizes. Future trials should be designed with reference to power needs.

4.2. Quality ratings

The quality of the studies reviewed was quite poor, with only three of the 27 (11%) trials receiving a rating of three. The results of this review should therefore be interpreted with this in mind, although it is unlikely that the poor quality ratings impacted results. The low quality scores often resulted from an inability to achieve double-blind conditions and a failure to report the details of the randomization process or withdrawals and drop-outs. With the poor quality ratings often linked to inadequate trial reports, rather than poor trial designs, the results of the current studies can still be interpreted with confidence. In the future, trial reports should include withdrawals and drop-outs and the process of randomization, including specific details of the generation of random number sequences, to ensure trial transparency and quality.

4.3. Program content

A large number of the studies reviewed utilized a prevention or early intervention program based on the principles of CBT. The propensity to employ CBT techniques stems from research supporting CBT as the treatment of choice for anxiety disorders in children and adolescents (Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; Compton et al., 2004). Previous research has found that medium to large effects can be obtained in treatment studies comparing CBT interventions with wait-list, active or inactive controls (Compton et al., 2004). The size of the effects reported in the current review for preventative CBT programs are in-line with the treatment research, in that a median effect size of 0.57 was obtained. Moreover, in the present study the effect of CBT appeared to be marginally larger than that of non CBT interventions, although this was not formally tested. However, not all of the trials utilizing CBT were successful in reducing symptoms of anxiety. This points to the importance of factors other than the underlying generic therapeutic technique in delivering the program. Specific methods and techniques used to deliver the message may be important. If this is the case, program developers should look closely at the delivery styles of consistently effective programs, such as the FRIENDS program, to identify the elements of the program that engage participants and elicit the desired effects.

4.4. Evaluation control group

Few of the studies reviewed included an attention control group, with the majority employing no-intervention or usual care control groups. The absence of an attention control could make it unclear whether the effects obtained are due to the intervention being evaluated or due to other factors such as adult attention or social support (Gillham, Shatté, & Reivich, 2001). The current review found that trials utilizing an attention control condition were as likely as other control condition trials to find a significant effect, although the median effect size of the attention control trials was smaller. This finding suggests that comparisons to wait-list or treatment as usual controls may inflate effect sizes slightly, but also that anxiety prevention programs on the whole are effective beyond the influence of adult attention and other non-specific factors. Nevertheless, future school-based trials of anxiety prevention programs should include attention control conditions, so as to test each intervention against the highest standard of control.

4.5. Program leader

Only a quarter of the trials utilized teachers in the delivery of the intervention program. The remaining trials employed mental health professionals, graduates or researchers. Trials implemented by teachers provide evidence for effectiveness and provide insight into whether the programs are sustainable, or likely to work when not implemented by mental health professionals, which are unlikely to be sustainable. Such program leaders are costly, and the number required to roll-out a program would far exceed the number available to fulfill the role. The results of the current review found that a higher percentage of trials involving teacher program leaders were successful in significantly reducing symptoms of anxiety, than trials involving mental health professionals, researchers or graduate students.

This finding suggests that anxiety prevention programs can be successfully implemented into real-world environments and provided by sustainable program leaders. The median effect size of the studies utilizing teacher program leaders was slightly smaller than those trials employing other program leaders. This finding is to be expected however, as effectiveness trials involving classroom teachers tend to produce smaller effects (Gillham et al., 2006), as teachers are less experienced than mental health professionals, graduates and researchers in the delivery of psychological interventions such as CBT. Future research therefore should focus on the implementation of these programs with classroom teachers, or associated staff, who would be available to deliver the program long-term. This research could include the evaluation of teacher training and support structures, so as to establish whether more training, guidance and support can increase teacher confidence in the delivery of prevention programs and consequently increase intervention effects.

4.6. Long-term evaluations

A number of the trials also did not employ follow-up assessments past post-test. This was particularly apparent amongst the universal trials. The assessment of long-term effects is important however, as a number of studies, including several in the current review (Barrett, Lock, & Farrell, 2005; Dadds et al., 1999; Dadds, Spence, Holland, Barrett, & Laurens, 1997; Gillham et al., 2006; Misfud & Rapee, 2005), did not detect significant changes at post-test but did find improvements during the follow-up period. It has been suggested in the literature that participants may need to pass through a period of elevated risk for preventative effects to emerge and that this might take some time (Gillham et al., 2001). Without long-term follow-ups potential effects could be missed and this could lead to an underestimation of the effectiveness of some school-based programs. The assessment of effects at longer-term follow-up are also essential in determining the overall duration of effects, and the period at which booster sessions may be beneficial (Gillham et al., 2001). Booster sessions may be necessary in some programs to maintain effects past post-test and provide participants with the opportunity to revise and refine the skills and techniques taught in the intervention program. Future studies therefore should include assessment at follow-up to ensure all potential effects are detected and to establish their longevity.

4.7. Booster and parent sessions

The inclusion of booster and parent sessions also need to be investigated further. Only FRIENDS and SASS currently include two booster sessions in their program, which are presented between one and three months after the intervention is completed. Both of these programs had positive effects, although the necessity, and effectiveness, of the booster sessions is unclear as neither program has been tested without them. The effectiveness of parent support programs are also unclear, as a number of the trials employing such programs have been unable to evaluate their effects due to poor parental attendance (Barrett et al., 2005; Lock & Barrett, 2003; Misfud & Rapee, 2005). It is worth pursuing the effectiveness of these programs as family factors, such as parental psychopathology and marital discord, are often implicated in child and adolescent mental health problems (Spence & Shortt, 2007). In order to do this, techniques to maximize parent involvement must firstly be implemented. Possible techniques that could be employed include token reward systems, such as small credits towards school fees, and the introduction of online parent resources.

4.8. Conclusion

Overall the current findings support the usefulness of anxiety prevention and early intervention programs in schools. Both indicated and universal approaches produce positive results with small to moderate reductions in anxiety at post-test and follow-up. Future school-based research should focus on producing higher quality studies, which include adequate follow-up periods, teacher program leaders, attention control conditions, and measurements of adherence and engagement. The introduction of booster sessions and concurrent parent programs may also enable the effects of the current programs to be enhanced and allow even more effective programs to be delivered in schools. With the social, personal and economic costs of anxiety so high, it is essential that this disorder is prevented. School-based programs clearly work, therefore their wider implementation should be encouraged and supported.

References

Barrett, P. M., Farrell, L. J., Ollendick, T. H., & Dadds, M. (2006). Long-term outcomes of an Australian universal prevention trial of anxiety and depression symptoms in children and youth: An evaluation of the friends program. *Journal of Clinical Child and Adolescent Psychology*, *35*, 403–411.

Barrett, P. M., Lock, S., & Farrell, L. J. (2005). Developmental differences in universal preventive intervention for child anxiety. *Clinical Child Psychology and Psychiatry*, *10*, 539–555.

Barrett, P. M., & Pahl, K. M. (2006). School-based intervention: Examining a universal approach to anxiety management. *Australian Journal of Guidance and Counselling*, *16*, 55–75.

Barrett, P., & Turner, C. (2001). Prevention of anxiety symptoms in primary school children: Preliminary results from a universal school-based trial. *British Journal of Clinical Psychology*, *40*, 399–410.

Barrett, P. M., & Turner, C. M. (2004). Prevention strategies. In T. L. Morris, & J. S. March (Eds.), *Anxiety disorders in children and adolescents* (pp. 371–386)., 2nd ed. New York: The Guilford Press.

Berger, R., Pat-Horenczyk, R., & Gelkopf, M. (2007). School-based intervention for prevention and treatment of elementary-students' terror-related distress in Israel: A quasi-randomized controlled trial. *Journal of Traumatic Stress*, *20*, 541–551.

Bienvenu, O. J., & Ginsburg, G. S. (2007). Prevention of anxiety disorders. *International Review of Psychiatry*, *19*, 647–654.

Bonhauser, M., Fernandez, G., Püschel, K., Yañez, F., Montero, J., Thompson, B., et al. (2005). Improving physical fitness and emotional well-being in adolescents of low socioeconomic status in Chile: Results of a school-based controlled trial. *Health Promotion International*, *20*, 113–122.

Boyd, C. P., Kostanski, M., Gullone, E., Ollendick, T. H., & Shek, D. T. L. (2000). Prevalence of anxiety and depression in Australian adolescents: Comparisons with worldwide data. *The Journal of Genetic Psychology*, *161*, 479–492.

Cartwright-Hatton, S., Roberts, C., Chitsabesan, P., Fothergill, C., & Harrington, R. (2004). Systematic review of the efficacy of cognitive behaviour therapies for childhood and adolescent anxiety disorders. *The British Journal of Clinical Psychology*, *43*, 421–436.

Castellanos, N., & Conrod, P. (2006). Brief interventions targeting personality risk factors for adolescent substance misuse reduce depression, panic and risk-taking behaviours. *Journal of Mental Health*, *15*, 645–658.

Chatterji, P., Caffray, C. M., Crowe, M., Freeman, L., & Jensen, P. (2004). Cost assessment of a school-based mental health screening and treatment program in New York City. *Mental Health Services Research*, *6*, 155–166.

Cohen, J. D. (1988). *Statistical power analysis for the behavioral sciences.* Hillsdale, NJ: Lawrence Earlbaum Associates.

Cole, D. A., Peeke, L. G., Martin, J. M., Truglio, R., & Seroczynski, A. D. (1998). A longitudinal look at the relation between depression and anxiety in children and adolescents. *Journal of Consulting and Clinical Psychology*, *66*, 451–460.

Compton, S. N., March, J., Brent, D., Albano, A. M., Weersing, R., & Curry, J. (2004). Cognitive-behavioral psychotherapy for anxiety and depressive disorders in children and adolescents: An evidence-based medicine review. *Journal of the American Academy of Child and Adolescent Psychiatry*, *43*, 930–959.

Dadds, M. R., Holland, D. E., Laurens, K. R., Mullins, M., Barrett, P. M., & Spence, S. H. (1999). Early intervention and prevention of anxiety disorders in children: Results at 2-year follow-up. *Journal of Consulting and Clinical Psychology*, *67*, 145–150.

Dadds, M. R., Spence, S. H., Holland, D. E., Barrett, P. M., & Laurens, K. R. (1997). Prevention and early intervention for anxiety disorders: A controlled trial. *Journal of Consulting and Clinical Psychology*, *65*, 627–635.

Dane, A. V., & Schneider, B. H. (1998). Program integrity in primary and early secondary prevention: Are implementation effects out of control? *Clinical Psychology Review*, *18*, 23–45.

Donovan, C. L., & Spence, S. H. (2000). Prevention of childhood anxiety disorders. *Clinical Psychology Review*, *20*, 509–531.

Essau, C. A. (2005). Frequency and patterns of mental health services utilization among adolescents with anxiety and depressive disorders. *Depression and Anxiety*, *22*, 130–137.

Farmer, E. M. Z., Burns, B. J., Phillips, S. D., Angold, A., & Costello, E. J. (2003). Pathways into and through mental health services for children and adolescents. *Psychiatric Services*, *54*, 60–66.

Farrell, L. J., & Barrett, P. M. (2007). Prevention of childhood emotional disorders: Reducing the burden of suffering associated with anxiety and depression. *Child and Adolescent Mental Health*, *12*, 58–65.

Feldner, M. T., Zvolensky, M. J., & Schmidt, N. B. (2004). Prevention of anxiety psychopathology: A critical review of the empirical literature. *Clinical Psychology: Science and Practice*, *11*, 405–424.

Flannery-Schroeder, E. C. (2006). Reducing anxiety to prevent depression. *American Journal of Preventive Medicine*, *31*, S136–S142.

Flay, B. R., Biglan, A., Boruch, R. F., Castro, F. G., Gottfredson, D., Kellam, S., et al. (2005). Standards of evidence: Criteria for efficacy, effectiveness and dissemination. *Prevention Science*, *6*, 151–175.

Garaigordobil, M. (2004). Effects of a psychological intervention on factors of emotional development during adolescence. *European Journal of Psychological Assessment*, *20*, 66–80.

Gillham, J. E., Reivich, K. J., Freres, D. R., Lascher, M., Litzinger, S., Shatté, A., et al. (2006). School-based prevention of depression and anxiety symptoms in early adolescence: A pilot of a parent intervention component. *School Psychology Quarterly*, *21*, 323–348.

Gillham, J. E., Shatté, A. J., & Reivich, K. (2001). Needed for prevention research: Long-term follow up and the evaluation of mediators, moderators, and lay providers. *Prevention & Treatment*, *4*.

Ginsburg, G. S., & Drake, K. L. (2002). School-based treatment for anxious African-American adolescents: A controlled pilot study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *41*, 768–775.

Greenberg, M. T., Domitrovich, C., & Bumbarger, B. (2001). The prevention of mental disorders in school-aged children: Current state of the field. *Prevention & Treatment*, *4*.

Hains, A. A. (1992). Comparison of cognitive-behavioral stress management techniques with adolescent boys. *Journal of Counseling & Development*, *70*, 600–605.

Hains, A. A., & Ellmann, S. W. (1994). Stress inoculation training as a preventative intervention for high school youths. *Journal of Cognitive Psychotherapy: An International Quarterly*, *8*, 219–232.

Hains, A. A., & Szyjakowski, M. (1990). A cognitive stress-reduction intervention program for adolescents. *Journal of Counseling Psychology*, *37*, 79–84.

Hiebert, B., Kirby, B., & Jaknavorian, A. (1989). School-based relaxation: Attempting primary prevention. *Canadian Journal of Counselling*, *23*, 273–287.

Jadad, A. R., Moore, R. A., Carroll, D., Jenkinson, C., Reynolds, D. J. M., Gavaghan, D. J., et al. (1996). Assessing the quality of reports of randomised clinical trials: Is blinding necessary? *Controlled Clinical Trials*, *17*, 1–12.

Keogh, E., Bond, F. W., & Flaxman, P. E. (2006). Improving academic performance and mental health through a stress management intervention: Outcomes and mediators of change. *Behaviour Research and Therapy*, *44*, 339–357.

Kiselica, M. S., Baker, S. B., Thomas, R. N., & Reedy, S. (1994). Effects of stress inoculation training on anxiety, stress, and academic performance among adolescents. *Journal of Counseling Psychology*, *41*, 335–342.

Lock, S., & Barrett, P. M. (2003). A longitudinal study of developmental differences in universal preventive intervention for child anxiety. *Behaviour Change*, *20*, 183–199.

Lowry-Webster, H. M., Barrett, P. M., & Dadds, M. R. (2001). A universal prevention trial of anxiety and depressive symptomatology in childhood: Preliminary data from an Australian study. *Behaviour Change*, *18*, 36–50.

Lowry-Webster, H. M., Barrett, P. M., & Lock, S. (2003). A universal prevention trial of anxiety symptomatology during childhood: Results at 1-year follow-up. *Behaviour Change*, *20*, 25–43.

Malgady, R. G., Rogler, L. H., & Costantino, G. (1990). Hero/heroine modelling for Puerto Rican adolescents: A preventive mental health intervention. *Journal of Consulting and Clinical Psychology*, *58*, 469–474.

Masia-Warner, C., Klein, R. G., Dent, H. C., Fisher, P. H., Alvir, J., Albano, A. M., et al. (2005). School-based intervention for adolescents with social anxiety disorder: Results of a controlled study. *Journal of Abnormal Child Psychology*, *33*, 707–722.

Masia-Warner, C., Nangle, D. W., & Hansen, D. J. (2006). Bringing evidence-based child mental health services to the schools: General issues and specific populations. *Education and Treatment of Children*, *29*, 165–172.

McLoone, J., Hudson, J. L., & Rapee, R. (2006). Treating anxiety disorders in a school setting. *Education and Treatment of Children*, *29*, 219–242.

Merry, S., McDowell, H., Hetrick, S., Bir, J., & Muller, N. (2004). Psychological and/or educational interventions for the prevention of depression in children and adolescents. *Cochrane Database of Systematic Reviews*, *2*.

Merry, S. N., & Spence, S. H. (2007). Attempting to prevent depression in youth: A systematic review of the evidence. *Early Intervention in Psychiatry*, *1*, 128–137.

Misfud, C., & Rapee, R. M. (2005). Early intervention for childhood anxiety in a school setting: Outcomes for an economically disadvantaged population. *Journal of the American Academy of Child and Adolescent Psychiatry*, *44*, 996–1004.

Moher, D., Pham, B., Jones, A., Cook, D. J., Jadad, A. R., Moher, M., et al. (1998). Does quality of reports of randomised trials affect estimates of intervention efficacy reported in meta-analyses? *The Lancet*, *352*, 609–613.

Mrazek, P. J., & Haggerty, R. J. (1994). *Reducing risks for mental disorders: Frontiers for preventive intervention research.* Washington: National Academy Press.

Neil, A. L., & Christensen, H. (submitted for publication). Systematic review of school-based prevention and early intervention programs for depression. Manuscript submitted for publication.

Pattison, C., & Lynd-Stevenson, R. M. (2001). The prevention of depressive symptoms in children: The immediate and long-term outcomes of a school-based program. *Behaviour Change*, *18*, 92–102.

Rambaldo, L. R., Wilding, L. D., Goldman, M. L., McClure, J. M., & Friedberg, R. D. (2001). School-based interventions for anxious and depressed children. In L. VandeCreek, & T. L. Jackson (Eds.), *Innovations in clinical practice: A source book* (pp. 347–358). Sarasota, FL: Professional Resource Press.

Rapee, R. M., Kennedy, S., Ingram, M., Edwards, S., & Sweeney, L. (2005). Prevention and early intervention of anxiety disorders in inhibited preschool children. *Journal of Consulting and Clinical Psychology*, *73*, 488–497.

Reivich, K., Gillham, J. E., Chaplin, T. M., & Seligman, M. E. P. (2005). From helplessness to optimism: The role of resilience in treating and preventing depression in youth. In S. Goldstein & R. B. Brooks (Eds.), *Handbook of resilience in children* (pp. 223–237). New York: Kluwer Academic/Plenum Publishers.

Roberts, C., Kane, R., Bishop, B., Matthews, H., & Thomson, H. (2004). The prevention of depression symptoms in rural school children: A follow-up study. *International Journal of Mental Health Promotion*, *6*, 4–16.

Roberts, C., Kane, R., Thomson, Bishop, B., & Hart, B. (2003). The prevention of depressive symptoms in rural school children: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*, *71*, 622–628.

Rooney, R., Roberts, C., Kane, R., Pike, L., Winsor, A., White, J., et al. (2006). The prevention of depression in 8- to 9-year-old children: A pilot study. *Australian Journal of Guidance & Counselling*, *16*, 76–90.

Sheffield, J. K., Spence, S. H., Rapee, R. M., Kowalenko, N., Wignall, A., Davis, A., et al. (2006). Evaluation of universal, indicated, and combined cognitive-behavioral approaches to the prevention of depression among adolescents. *Journal of Consulting and Clinical Psychology*, *74*, 66–79.

Spence, S. H. (1996). The prevention of anxiety disorders in childhood. In P. Cotton, & H. Jackson (Eds.), *Early intervention & prevention in mental health* (pp. 87–107). Melbourne: The Australian Psychological Society.

Spence, S. H., & Dadds, M. R. (1996). Preventing childhood anxiety disorders. *Behaviour Change*, *13*, 241–249.

Spence, S. H., & Shortt, A. L. (2007). Research review: Can we justify the widespread dissemination of universal, school-based interventions for the prevention of depression among children and adolescents? *Journal of Child Psychology and Psychiatry*, *48*, 526–542.

Stolberg, A. L., & Mahler, J. (1994). Enhancing treatment gains in a school-based intervention for children of divorce through skill training, parental involvement, and transfer procedures. *Journal of Consulting and Clinical Psychology*, *62*, 147–156.

Tomb, M., & Hunter, L. (2004). Prevention of anxiety in children and adolescents in a school setting: The role of school-based practitioners. *Children & Schools*, *26*, 87–101.