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School-based prevention programs for depression and anxiety in adolescence: a systematic review

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SUMMARY

School-based interventions are considered a promising effort to prevent the occurrence of mental disorders in adolescents. This systematic review focuses on school-based prevention interventions on depression and anxiety disorders utilizing an RCT design, starting from the year 2000. Based on an online search (PubMed, Scirus, OVID, ISI) and bibliographic findings in the eligible articles, 28 studies providing information were reviewed. The search process ended on 2 May 2011. The majority of interventions turn out to be effective, both for depression

(65%) and anxiety (73%). However, the obtained overall mean effect sizes calculated from the most utilized questionnaires can be considered rather small (CDI: -0.12 ; RCMA: -0.29). The majority of the reviewed school-based interventions shows effectiveness in reducing or preventing mental disorders in adolescents. However, effect size computation revealed only small-scale effectiveness. Future studies have to consider the impact of program implementation variations.

Key words: adolescents; evaluation; prevention; mental health

INTRODUCTION

Adolescence is considered a critical time in which mental disorders have the potential to manifest themselves, leading to a higher risk of chronic mental illnesses in the future (Weissman *et al.*, 1999; Barrett and Turner, 2001). Being a major mental health problem, depression is characterized by a high prevalence (Rushton *et al.*, 2002; O'Kearney *et al.*, 2009). In the USA, an estimated 20% of adolescents will experience a depressive episode by the age of 18 (Birmaher *et al.*, 1996a,b). In Germany, depressive disorders show a lifetime prevalence of 16.8% among probands between 14 and 24

years (Wittchen *et al.*, 1998). In Australia, 14.2% of adolescents report symptoms of depression, and up to 25% are likely to have experienced a clinically significant depressive episode by the age of 18 (National Health and Medical Research Council, 1997; Boyd *et al.*, 2000). Besides its significant morbidity, depression has an adverse effect on school performance and associated outcomes (Rutter *et al.*, 2006; Frojd *et al.*, 2008).

Often preceding or bonding in comorbidity, anxiety poses a subsequent threat that appears to be most common among DSM-IV disorders, at least in the American and Australian youth (Williamson *et al.*, 2005; Barrett *et al.*, 2006;

Merikangas *et al.*, 2010). For the global population, a high lifetime prevalence of 16.6% of anxiety disorders is stated (Starcevic, 2006). Frequently considered a regular experience in adolescent age and development (Barrett *et al.*, 2003), anxiety disorders are also accompanied by a broad variety of negative life consequences in a social, emotional and academic functioning manner (Donovan and Spence, 2000).

The setting ‘school’ seems promising to oppose these aberrations early enough. It allows to bypass obstacles other settings exhibit: geographic distance is obsolete, the intervention operates directly inside the youth’s environment and trained school staff may play an executive or supportive role (Kidger *et al.*, 2009; Manassis *et al.*, 2010). Additionally, a framework may be imposed where students are best reached and more open towards preventive contents (Klingman and Hochdorf, 1993).

Depending on the specific target group, prevention strategies are divided into universal, selective and indicative approaches (Neil and Christensen, 2009). Irrespective of risk status, universal school-based interventions address all adolescents as primary prevention measure. Selective programs aim at adolescents identified as at-risk to mental disorders, due to individual or environmental characteristics. Indicated programs target adolescents already showing low-to-moderate symptoms, and therefore being at high risk to develop disorders in the future. These interventions could also be considered early treatment rather than prevention in a broader sense, as they deal with adolescents that were already symptomatic at baseline assessment. Still, mild symptoms regularly act as indication for the future development of severe depressive disorders (Cardemil *et al.*, 2007).

This review gives an overview of school-based interventions to prevent the occurrence of depression and anxiety disorders utilizing an RCT design. It contributes to the existing research by bringing together two of the youth’s most prevalent mental health problems in one review while focusing on school environment. It emancipates from recent work by Fisak *et al.* (Fisak *et al.*, 2011) by excluding prevention interventions conducted outside of the school setting. In contrast to Neil and Christensen (Neil and Christensen, 2009), it excludes early intervention/treatment programs, and focuses on prevention only. To ensure compatibility of effect sizes, the review’s computation includes only

the most utilized questionnaires in the reviewed articles, the CDI for depression and the RCMAAS for anxiety.

METHODS

Search strategy

An online search (PubMed, ISI, OVID, Scirus) was conducted to identify studies. Search terms included combinations of the following keywords: ‘school based’[All Fields] AND (‘prevention’[All Fields] OR ‘intervention’[All Fields]) AND (‘mental health’[All Fields] OR ‘mental disorder’[All Fields]) AND ‘evaluation’[All Fields]. The search process ended on 2 May 2011. Studies’ abstracts were examined in detail by the primary author and, if required, extended by a full text revision.

Inclusion and exclusion criteria

Studies not dealing with original data of depression and/or anxiety in school-based prevention interventions were excluded. Only RCT studies with a minimum sample size of 100 participants per study (to ensure validity) in English and German language based on evaluation of primary data were considered. Finally, to depict actuality, articles had to origin from after the year 2000.

Reviewed articles

A total of 796 papers were found via online search, of which 596 articles remained after de-duplication. Additional 135 papers were found via bibliographic search in reference lists of eligible articles, resulting in a total of 731 studies. After the exclusion of systematic reviews, studies not dealing with school-based prevention interventions, not focusing on depression or anxiety and not utilizing German or English language, 129 studies remained. Finally, 28 studies remained because of being randomized controlled trials; with a sample size of at least 100 participants and originating from after the year 2000. The studies describe interventions in Germany, Australia, USA, Canada, New Zealand, the UK and Chile.

Due to their significance in characterizing the reviewed articles, the following information were systematically extracted (Tables 1 and 2):

authors and year of publication, preventive approach(es), program information, type of randomization/allocation, data collection, result for effectiveness and outcome measure instruments.

Computation of effect sizes

Effect sizes were measured by dividing the difference between the intervention group mean and the control group mean score by the pooled standard deviation, known as Cohen's *d* (Cohen, 1988). Weighted by the inverse of its random-effects variance, the standardized mean differences were aggregated for post-intervention and follow-up (Hedges and Olkin, 1985). Therefore, only studies providing sufficient data were included in the calculation, excluding studies not providing sample sizes. Considering the large variety of applied instruments, we only included studies utilizing the most frequently used questionnaires to ensure compatibility: the RCMAS for anxiety and the CDI for depression. Three studies (Barrett and Turner, 2001; Shochet *et al.*, 2001; Chaplin *et al.*, 2006) included several intervention groups in their comparison, another analysed two control groups and one intervention group (Roberts *et al.*, 2004). In this case, the means and standard deviations were pooled before being compared with the control group. As Sheffield *et al.* (Sheffield *et al.*, 2006) evaluated an intervention with a universal, an indicated and a combined approach, the intervention groups were computed separately. Barrett *et al.* (Barrett *et al.*, 2003) did not provide numbers for allocation to the intervention and the control group for their high-school sample, leaving only the elementary school sample considered. Studies varied in the length of their follow-up periods [from 3 months (Pössel *et al.*, 2004) up to 4 years (Spence *et al.*, 2005)]. We divided analysis into immediate post-intervention effects, short-term follow-up effects (at 6 months) and long-term follow-up effects, in which the effect size at the last reported interval was examined (with a median of 18 months).

RESULTS

Depression

A total of 24 studies evaluated depressive symptoms as an outcome of the respective intervention (Table 1). This includes 18 universal (75%)

and 5 indicated (21%) approaches. One study evaluated a program performing a universal, an indicated and a combined approach (Sheffield *et al.*, 2006). Several universal approach studies further stratified their samples to show the respective intervention's effects on subgroups: six authors analysed their participants by their initial risk-group status (Lowry-Webster *et al.*, 2003; Barrett *et al.*, 2005, 2006; Spence *et al.*, 2005; Cardemil *et al.*, 2007; Roberts *et al.*, 2009) (25%), while five studies stratified their sample by initial symptoms (Shochet *et al.*, 2001; Pössel *et al.*, 2004, 2008; Rooney *et al.*, 2006; O'Kearney *et al.*, 2009) (21%). One study did both (Manz *et al.*, 2001b). Twelve studies randomized their participants by school (50%), five used class membership (21%) and seven studies followed individual characteristics to randomize their samples (29%). Another distinguishing aspect between the interventions was the conducting personnel: 13 programs were implemented by trained school staff (54%) and 9 were conducted by mental health professionals (38%). Barrett and Turner (Barrett and Turner, 2001) evaluated a program containing both, one teacher-led and one psychologist-led intervention. In the evaluation by Sheffield *et al.* (Sheffield *et al.*, 2006), the universal part is implemented by teachers, while the indicated approach is conducted by mental health professionals. Concerning the number of sessions conducted to implement the evaluated program, the reviewed articles show a wide range from two sessions (Castellanos and Conrod, 2006) up to daily meetings held over a period of 36 weeks (Thompson *et al.*, 2000). A comparable variety is found when analysing the age of the participants, which ranges from 8 (Manassis *et al.*, 2010) to 16 years (Thompson *et al.*, 2000). The same can be stated for the applied follow-up periods of the evaluations which range from articles presenting only pre-post evaluations (Barrett and Turner, 2001; Chaplin *et al.*, 2006; Jones *et al.*, 2010) up to 48-month-follow-up time (Spence *et al.*, 2005).

Regarding effectiveness, 16 studies report effective outcomes (67%), meaning lower depression scores of the IG group compared with the CG after post-intervention or follow-up, while 8 evaluations do not (33%).

Anxiety

As an outcome, anxiety was evaluated by 15 studies (Table 2). Included are 12 universal

Table 1: Overview of articles for depression (in alphabetical order)

Source	Preventive approach	Program	Randomization/ allocation: IG: intervention group; CG: control group	Data collection	Effectiveness (✓ = yes, X = no)	Instruments
Barrett and Turner (2001)	Universal	FRIENDS for children: cognitive behavioural therapy (CBT), coping strategies and homework activities (workbooks); 10 weekly 75 min-sessions + two booster sessions by trained school staff + four sessions for parents; AUS	By school; 6th-grade; ten schools; psychologist IG: 188, teacher IG: 263, CG: 137	Baseline, post-intervention	X	CDI
Barrett <i>et al.</i> (2005)	Universal (selective stratification)	Two versions of FRIENDS: CBT, coping strategies and homework activities (workbooks); 10 weekly 60 min-sessions + two booster sessions + four sessions for parents by mental health professionals; FRIENDS for children for 6th-grade students; FRIENDS for youths for 9th-grade students; AUS	By school; 6th- and 9th-grade; seven schools; IG: 423, CG: 269	Baseline, post-intervention, 12-month follow-up	✓	CDI
Barrett <i>et al.</i> (2006)	Universal (selective stratification)	Two versions of FRIENDS: CBT, coping strategies and homework activities (workbooks); 10 weekly 60 min sessions + two booster sessions + four sessions for parents by mental health professionals; FRIENDS for children for 6th-grade students; FRIENDS for youths for 9th-grade students; AUS	By school; 6th- and 9th-grade; six schools; IG: 379, CG: 290	Baseline, post-intervention, 12-month, 24-month, 36-month follow-up	X	CDI
Bonhauser <i>et al.</i> (2005)	Universal	Physical Activity Program: effects of physical activity on mental health; three weekly 90 min sessions for 10 weeks by trained school staff; CHI	By class; 9th-grade; one school; IG: 98, CG: 100	Baseline, post-intervention	X	HADS
Cardemil <i>et al.</i> (2007)	Universal (selective stratification)	Penn Resiliency Program: CBT and social problem solving to reduce and prevent depressive symptoms; 12 weekly 90 min-sessions by trained school staff; USA	Individually; 5th- and 6th-grade; two schools; Latino IG: 25, Latino CG: 28, Afro IG: 50, Afro CG: 65	Baseline, post-intervention, 3-month, 6-month, 12-month, 24-month follow-up	✓	CDI
Castellanos and Conrod (2006)	Indicated	Substance Misuse Prevention Program: CBT, psycho-educational, motivational and coping skills training components; two 90 min sessions by mental health professionals; UK	Individually; 9th – 11th-grade; 12 schools; IG: 224, CG: 119	Baseline, 6-month follow-up	✓	BSI

Chaplin <i>et al.</i> (2006)	Universal	Penn Resiliency Program: CBT and social problem-solving skills; 12 weekly 90 min sessions by trained school staff; USA	Individually; 6th- to 8th-grade; two schools; all girl IG: 35, co-ed IG: 68, CG: 105	Baseline, post-intervention	✓	CDI
Eggert (2002)	Indicated	Counselor-Care (C-CARE): assessment + adult motivation; 2 h interview, 2 h counseling session and social network-building by trained school staff; Coping and Support Training (CAST): assessment, adult motivation, peer support, skills training; C-CARE + 12 1 h sessions in 6 weeks by trained school staff; USA	By school; 9th–12th-grade; seven schools; C-CARE IG: 117, CAST IG: 103, CG: 121	Baseline; post-intervention; 10 weeks, 9-month follow-up	✓	HSQ
Jones <i>et al.</i> (2010)	Universal	4Rs Program: social-emotional learning and literacy development; 7 units of literacy-based curriculum by trained school staff; USA	By school; 3rd-grade; 18 schools; IG: 515, CG: 427	Baseline, post-intervention	✓	DISCPS
Lowry-Webster <i>et al.</i> (2003)	Universal (selective stratification)	FRIENDS: CBT, coping strategies and homework activities (workbooks); 10 weekly 75 min sessions + two booster sessions by trained school staff + four sessions for parents; AUS	By school; 5th–7th-grade; seven schools; IG: 432, CG: 162	Baseline, post-intervention, 12-month follow-up	✓	CDI
Manassis <i>et al.</i> (2010)	Indicated	Feelings Club: CBT, recognize and manage negative thoughts and feelings, develop strategies of coping; 12 weeks + three parent sessions by mental health professionals; CAN	Individually; 3rd–6th-grade; 26 schools; IG: 78, CG: 70	Baseline, post-intervention, 12-month follow-up	X	CDI
Manz (2001a,b)	Universal (indicated and selective stratification)	GO!: CBT, information, specific and unspecific treatment components; 12 h in 8 weeks by mental health professionals; GER	By class; 9th- and 10th-grade; four schools; IG: 325, CG: 302	Baseline, post-intervention, 6-month follow up	✓	BDI
Merry <i>et al.</i> (2004)	Universal	RAP-KIWI: CBT, interpersonal therapy principles; 11 weekly sessions by trained school staff; NZ	Individually; 9th- and 10th-grade; two schools; IG: 207, placebo-CG: 185	Baseline, post-intervention, 6-month, 12-month, 18-month follow-up	✓	BDI, RADS
O’Kearney <i>et al.</i> (2009)	Universal (indicated stratification)	Mood-GYM: Internet-based CBT to identify problems and develop coping skills; 6 weeks duration with every module open for 2 weeks; part of regular curriculum by trained school staff; AUS	By class; 10th-grade girls; one school; IG: 67, CG: 90	Baseline, post-intervention, 5-month follow-up	✓	CES-D, DLC, Griffiths-scale

Continued

Table 1: Continued

Source	Preventive approach	Program	Randomization/ allocation: IG: intervention group; CG: control group	Data collection	Effectiveness (✓ = yes, X = no)	Instruments
Pössel <i>et al.</i> (2004)	Universal (indicated stratification)	LISA-T: CBT, relationship between cognition, emotion and behaviour, social competence training; ten 90 min sessions by mental health professionals; GER	By class; 8th-grade; six schools; IG: 200, CG: 147	Baseline, post- intervention, 3-month, 6-month follow-up	✓	CES-D
Pössel <i>et al.</i> (2008)	Universal (indicated stratification)	LARS & LISA: CBT, cognitive and social aspects; successor to LISA-T; 10 weekly sessions à 1.5 h (9 + 1 motivation section); by mental health professionals; GER	By class; 8th-grade and teachers; four schools; IG: 163, CG: 138	Baseline, post- intervention, 6-month follow-up	✓	SBB-DES
Roberts <i>et al.</i> (2004)	Indicated	Penn Prevention Program: linking thoughts and feelings, conveying coping and social problem solving skills; 12 sessions by trained school staff; AUS	By school; 7th-grade; 36 schools; IG: 90, CG: 99, CG-2: 114	Baseline, 18-month, 30 month follow-up	X	CDI
Roberts <i>et al.</i> (2009)	Universal (selective stratification)	Aussie Optimism Program: optimistic thinking and social life skills; 20 weekly 1 h lessons by trained school staff; AUS	By school; 7th-grade; 12 schools; IG: 274, CG: 222	Baseline, post- intervention, 6-month, 18-month follow-up	X	CDI
Rooney <i>et al.</i> (2006)	Universal (indicated stratification)	Positive Thinking Program: CBT, oriented after Aussie Optimism Program; 8 weekly 1 h sessions by mental health professionals; AUS	By school; 4th- and 5th-grade; four schools; IG: 72, CG: 48	Baseline, post- intervention, 9-month, 18-month follow-up	✓	CDI
Sawyer (2010)	Universal	Beyond Blue: improve solving & social skills, resilient thinking styles, coping strategies; 10 45 min-sessions in each of the three years of the intervention by trained school staff; AUS	By school; 8th-grade; 50 schools; IG: 1785, CG: 1727	Baseline, post- intervention, 12-month, 24-month follow-up	X	CES-D

Sheffield <i>et al.</i> (2006)	Universal and indicated and combined	Universal: CBT, cognitive-restructuring and problem solving skills, 8 weekly 45-min sessions by trained school staff; indicated: 8 weekly 90 min sessions in smaller group (8–10 pers.) by mental health professionals; combined: first universal, then indicated; AUS	By school; 9th-grade; 34 schools; universal IG: 526 (107 high-symptom), indicated IG: 722 (110 high-symptom), combined IG: 636 (100 high-symptom), CG: 519 (125 high-symptom)	Baseline, post-intervention, 6-month, 18-month follow-up	X	CDI, CES-D, ADIS-C
Shochet <i>et al.</i> (2001)	Universal (indicated stratification)	Resourceful Adolescent Program: CBT; RAP-A: adolescents, self-management, cognitive restructuring and problem solving skills; 11 weekly 40–50 min sessions; Rap-F: conflict settlement by strengthening protective factors; three extra 3 h sessions for parents by mental health professionals; AUS	Individually; 9th-grade; one school; RAP-A IG: 53, RAP-F IG: 51, CG: 90	Baseline, post-intervention, 10-month follow-up	✓	CDI, RADS
Spence <i>et al.</i> (2005)	Universal (selective stratification)	Problem Solving For Life: CBT, cognitive restructuring and problem solving skills training; eleven 45 min sessions for 8 weeks by trained school staff; AUS	By school; 8th-grade; 16 schools; IG: 751, CG: 749	Baseline, post-intervention, 12-month, 24-month, 36-month, 48-month follow-up	✓	BDI
Thompson <i>et al.</i> (2000)	Indicated	Personal Growth Class: (1) mood management and life-skills training, (2) applying skills into real-life situations; 55 min. daily for (1) 18 respectively (2) 36 weeks by trained school staff USA	Individually; 9th–12th-grade; five schools; (1) 5-month IG: 36, (2) 10-month IG: 35, CG: 35	Baseline, 5-month, 10-month follow-up	✓	CES-D

Table 2: Overview of articles for anxiety (in alphabetical order)

Source	Preventive approach	Program	Randomization/ allocation: IG: intervention group; CG: control group	Data collection	Effectiveness (✓ = yes, X = no)	Instruments
Manassis et al. (2010)	Indicated	Feelings Club: cognitive behavioural therapy (CBT), recognize and manage negative thoughts and feelings, develop strategies of coping; 12 weeks + three parent sessions by mental health professionals; CAN	Individually; 3rd–6th-grade; 26 schools; IG: 78, CG: 70	Baseline, post-intervention, 12-month follow-up	X	MASC, ADIS
Roberts et al. (2004)	Indicated	Penn Prevention Program: linking thoughts and feelings, conveying coping and social problem solving skills; twelve sessions by trained school staff; AUS	By school; 7th-grade; IG: 90, CG: 99, no-intervention CG: 114	Baseline, 18-month, 30-month follow-up	✓	RCMAS
Bonhauser et al. (2005)	Universal	Physical Activity Program: effects of physical activity on mental health; three weekly 90 min sessions for 10 weeks by trained school staff; CHI	By class; 9th-grade; IG: 98, CG: 100	Baseline, post-intervention	✓	HADS
Barrett and Turner (2001)	Universal	FRIENDS for children: CBT, coping strategies and homework activities (workbooks); 10 weekly 75 min sessions + two booster sessions by trained school staff + four sessions for parents; AUS	By school; 6th-grade; 10 schools; psychologist IG: 188, teacher IG: 263, CG: 137	Baseline, post-intervention	✓	SCAS, RCMAS
Barrett and Turner (2001)	Universal	FRIENDS: CBT, coping strategies and homework activities (workbooks); ten 1 h sessions by mental health professionals; AUS	Individually (migrational background); 7–19 years old; six schools; IG: 121, CG: 83	Baseline, post-intervention	✓	RCMAS
Barrett et al. (2003)	Universal	FRIENDS: CBT, coping strategies and homework activities (workbooks); 10 1 h sessions by mental health professionals; AUS	Individually (migrational background); 7–19 years old; six schools; IG: 166, CG: 154	Baseline, post-intervention for new sample; 6-month follow-up for Barrett 2001 sample	✓	RCMAS, TSCL

Sheffield <i>et al.</i> (2006)	Universal and indicated and combined	Universal: CBT, cognitive-restructuring and problem solving skills, 8 weekly 45-min sessions by trained school staff; indicated: 8 weekly 90 min sessions in smaller group (8–10 pers.) by mental health professionals; combined: first universal, then indicated; AUS	By school; 9th-grade; 34 schools; universal IG: 526 (107 high-symptom), indicated IG: 722 (110 high-symptom), combined IG: 636 CG: 519 (125 high-symptom)	Baseline, post-intervention, 6-month, 18-month follow-up	X	SCAS
Manz (2001a,b)	Universal (indicated and selective stratification)	GO!: CBT, information, specific and unspecific treatment components; 12 h in 8 weeks by mental health professionals; GER	By class; 9th- and 10th-grade; four schools; IG: 325, CG: 302	Baseline, post-intervention, 6-month follow up	✓	BAI, ASI
Lowry-Webster <i>et al.</i> (2003)	Universal (selective stratification)	FRIENDS: CBT, coping strategies and homework activities (workbooks); 10 weekly 75 min sessions + two booster sessions by trained school staff + four sessions for parents; AUS	By school; 5th–7th-grade; seven schools; IG: 432, CG: 162	Baseline, post-intervention, 12-month follow-up	✓	SCAS, RCMAS, ADIS-C
Barrett <i>et al.</i> (2005)	Universal (selective stratification)	Two versions of FRIENDS: CBT, coping strategies and homework activities (workbooks); 10 weekly 60 min sessions + two booster sessions + four sessions for parents by mental health professionals; FRIENDS for children for 6th-grade students; FRIENDS for youths for 9th-grade students; AUS	By school; 6th- and 9th-grade; seven schools; IG: 423, CG: 269	Baseline, post-intervention, 12-month follow-up	✓	SCAS
Barrett <i>et al.</i> (2006)	Universal (selective stratification)	Two versions of FRIENDS: CBT, coping strategies and homework activities (workbooks); 10 weekly 60 min sessions + two booster sessions + four sessions for parents by mental health professionals; FRIENDS for children for 6th-grade students; FRIENDS for youths for 9th-grade students; AUS	By school; 6th- and 9th-grade; six schools; IG: 379, CG: 290	Baseline, post-intervention, 12-month, 24-month, 36-month follow-up	✓	SCAS, RCMAS
Roberts <i>et al.</i> (2009)	Universal (selective stratification)	Aussie Optimism Program: optimistic thinking and social life skills; 20 weekly 1 h-lessons by trained school staff; AUS	By school; 7th-grade; 12 schools; IG: 274, CG: 222	Baseline, post-intervention, 6-month, 18-month follow-up	X	RCMAS

Continued

Table 2: Continued

Source	Preventive approach	Program	Randomization/ allocation: IG: intervention group; CG: control group	Data collection	Effectiveness (✓ = yes, X = no)	Instruments
Rooney <i>et al.</i> (2006)	Universal (indicated stratification)	Positive Thinking Program: CBT, oriented after Aussie Optimism Program; 8 weekly 1 h sessions by mental health professionals; AUS	By school; 4th- and 5th-grade; four schools; IG: 72, CG: 48	Baseline, post-intervention, 9-month, 18-month follow-up	X	RCMAS
Garaigordobil, (2004)	Universal	Promotion of positive communication and conflict-solving; weekly 2 h sessions for one academic year in regular curriculum by trained school staff; ESP	Individually; 12–14 years; two schools; IG: 125, CG: 49	Baseline, post-intervention	✓	STAIC
Berger <i>et al.</i> (2007)	Universal	Overshadowing the Threat of Terrorism: coping with threat and exposure to terrorism; eight 90 min sessions by trained school staff; ISR	By class; 2nd–6th-grade; one school; IG: 70, CG: 72	Baseline, post-intervention	✓	SCARED

(80%) and 8 indicated approaches (13%). One study evaluated a program performing a universal, an indicated and a combined approach (Sheffield *et al.*, 2006). As seen for depression, stratification took place among several universal approach intervention evaluations in order to analyse for subgroup effects: four authors grouped their participants after risk status (Lowry-Webster *et al.*, 2003; Barrett *et al.*, 2005, 2006; Roberts *et al.*, 2009) (27%), while one study stratified its participants by initial symptoms (Rooney *et al.*, 2006). Here also, one study did both (Manz *et al.*, 2001b). Randomization by school took place in eight studies (53%); class membership was applied in three cases (20%). Remaining, individual characteristics were decisive in four interventions (27%). Trained school staff conducted the intervention measures in six evaluations (40%), while seven were implemented by mental health professionals (47%). Sheffield *et al.*'s and Barrett and Turner's evaluations included both groups (Barrett and Turner, 2001; Sheffield *et al.*, 2006). Resembling what was stated for depression, a large variation in the number of conducted sessions of the respective programs [from eight sessions (Rooney *et al.*, 2006; Sheffield *et al.*, 2006) up to one weekly meeting over a whole academic year (Garaigordobil, 2004)], the age of the participants [from 7 (Berger *et al.*, 2007) to 19-year-old students (Barrett *et al.*, 2001, 2003)] and the applied follow-up time [from pre–post evaluations (Barrett and Turner, 2001; Barrett *et al.*, 2001; Garaigordobil, 2004; Berger *et al.*, 2007) up to 36 months (Barrett *et al.*, 2006)] can be found in the studies evaluating anxiety as an outcome.

Overall, 11 studies report effectiveness for their interventions (73%), meaning lower scores for anxiety in the IG compared with the CG after post-intervention or follow-up, 4 do not (27%).

Distribution of effect sizes

Overall mean effect sizes were computed for the most frequently utilized questionnaires for depression (CDI) and anxiety (RCMAS). Negative effect sizes indicate that the intervention group mean is lower in scores relative to the control group. According to Cohen (Cohen, 1988), an effect size of 0.2 is considered small, 0.5 is considered moderate and 0.8 is considered large.

CDI

A summary of all effect sizes for depression is presented in Table 3. At post-intervention, effect sizes for the CDI range from 0.30 to -0.57 , the weighted overall mean effect size for the CDI is -0.12 (universal: -0.14 , indicated: -0.08). Regarding effect sizes for the short-term follow-up, the overall mean effect size rises back up to 0.06 (universal: 0.06, indicated: 0.04), ranging from 0.12 to -0.07 . At long-term follow-up, it lowers again to -0.05 (universal: -0.05 , indicated: -0.13), ranging from 0.14 to -0.35 . Overall, the interventions prove to be effective at a very small scale at post-intervention, lose their effect at short-term follow-up, but again show small-scaled positive effects at long-term follow-up for the CDI. No difference was between universal and indicated programs.

RCMAS

A summary of all effect sizes for anxiety is presented in Table 3. At post-intervention, effect sizes for the RCMAS ranged from 0.19 to -0.67 , the weighted overall mean effect size was -0.29 , an effect considered small. Regarding effect sizes for the short-term follow-up time, the range of effect sizes goes from 0 to -0.25 , with an overall mean effect size of -0.10 . At long-term follow-up, the overall mean effect size is -0.05 (universal: 0.15, indicated: -0.42), ranging from 0.17 to -0.42 . The indicated program by Roberts *et al.* (Roberts *et al.*, 2004) proved to be nearly moderately effective, while the universal programs revealed a small negative effect.

Overall, the interventions showed to be effective at a small scale at post-intervention with a continuously shrinking positive effect that was kept stable only for the indicated program at long-term follow-up.

DISCUSSION

Overview

This systematic review identified school-based interventions aimed at preventing or reducing the prevalence of depression and anxiety. The majority of interventions turn out to be effective, both for depression (65%) and anxiety (73%). Limiting the positive result, the obtained overall mean effect sizes calculated from the most

utilized questionnaires can be considered very small. Nevertheless, except from the mean effect size for the CDI at short-term follow-up (0.06) and the universal programs' effect size for the RCMAS at long-term follow-up (0.15), all results prove effectiveness. Calculations for the CDI show the highest effectiveness at post-intervention, followed by a converse value at short-term follow-up. The overall mean effect sizes for the RCMAS decrease linearly while staying in the effective range. At long-term follow-up, the indicated program shows nearly moderate effectiveness while the universal programs do not.

Confounders

The reviewed interventions varied in a large number of possible confounders whose influences on the outcomes remain ambiguous. The programs involve diverse sample sizes, preventive approaches, randomization and allocation procedures, conducting staff and data collection instruments, which makes it hard to compare them and identify the responsible aspects for success and failure. As even the same programs report varying outcomes, and no design delivers a clear layout leading to effectiveness, emerged limitations will be presented that may restrict from drawing conclusive inferences. Where they occur, small sample sizes limit generalizability. Even though we excluded studies involving less than 100 participants, a small number of participating classes or schools prevented more in-depth cluster randomization and respective analyses. Another aspect is the recurring low participation of included parents, making it impossible to measure their influence (Barrett and Turner, 2001; Shochet *et al.*, 2001; Barrett *et al.*, 2005). If sufficiently large, the heterogeneity of the particular sample may also affect validity. For example, the large initial cultural and demographic differences and the diverging length of time the analysed migrant groups had been residing in Australia hampered comparison (Barrett *et al.*, 2001, 2003). Also, possible cohort and time confounding when evaluating groups in consecutive school years may have biased results (Shochet *et al.*, 2001). In general, the wide range of ages, school types and number of sessions of the respective program implementation included in this review need to be considered when valuing its conclusion. Also, low compliance of participants over the whole follow-up period, especially where those

Table 3: Effect sizes for depression and anxiety (in alphabetical order)

Depression		Post-intervention (IG/CG)			Short-term follow-up (IG/CG)			Long-term follow-up (IG/CG)				
Source	Mean	SD	N	SMD	Mean	SD	N	SMD	Mean	SD	N	SMD
				(months follow-up time)				(months follow-up time)				(months follow-up time)
Barrett and Turner (2001)	10.01/7.4	9.18/6.19	405/84	0.30	No short-term follow-up			-0.07 (6)	No long-term follow-up			
Chaplin et al. (2006)	5.51/8.55	6.90/7.69	65/38	-0.42	No short-term follow-up			0.12 (6)	No long-term follow-up			-0.35 (30)
Manassis et al. (2010)	49.11/49	9/9.19	76/69	0.01	No short-term follow-up			0.06 (18)	47.04/48.74	9.35/8.66	76/69	-0.19 (12)
Roberts et al. (2003)	8.51/8.97	9.26/9.9	84/95	-0.05	6.35/6.9	7.3/7.61	65/72	-0.07 (6)	No long-term follow-up			-0.35 (30)
Roberts et al. (2004)	No post-intervention				No short-term follow-up			0.12 (6)	5.98/8.44	7.06/7.03	41/163	0.05 (18)
Roberts et al. (2009)	7.24/6.29	6.66/6.84	237/190	0.14	6.66/5.85	6.71/6.53	227/168	0.02 (6)	6.66/6.29	6.56/6.92	199/180	-0.06 (18)
Rooney et al. (2006)	10.28/15.43	7.8/10.51	70/47	-0.57	No short-term follow-up			0.02 (6)	10.68/11.18	7.6/8.43	59/39	0.14 (18)
Sheffield et al. (2006) (indicated)	17.63/19.1	10.51/10.25	112/136	-0.14	17.44/17.29	9.86/9.29	103/129	0.08 (6)	16.37/15.09	10.36/8.6	100/125	0.02 (18)
Sheffield et al. (2006) (universal)	18.33/19.1	9.17/10.25	126/136	-0.08	18.05/17.29	10.6/9.29	112/129	0.04 (6)	15.23/15.09	8.83/8.6	107/125	0.08 (18)
Sheffield et al. (2006) (combined)	17.77/19.1	9.35/10.25	105/136	-0.13	17.71/17.29	10.7/9.29	117/129	0.06	15.89/15.09	10.38/8.6	110/125	-0.29 (10)
Shochet et al. (2001)	5.83/8.9	4.61/7.87	121/107	-0.48	No short-term follow-up				6.05/7.82	4.86/7.14	104/90	-0.05
Total (95% CI)				-0.12								
Anxiety		Post-intervention (IG/CG)			Short-term follow-up (IG/CG)			Long-term follow-up (IG/CG)				
Source	Mean	SD	N	SMD	Mean	SD	N	SMD	Mean	SD	N	SMD
				(months follow-up time)				(months follow-up time)				(months follow-up time)
Barrett and Turner (2001)	7.51/11.76	5.89/7.29	121/83	-0.65	No short-term follow-up			-0.25 (6)	No long-term follow-up			-0.42 (30)
Barrett and Turner (2001)	7.23/9.58	6.62/6.44	405/84	-0.36	No short-term follow-up			-0.24 (6)	No long-term follow-up			0.17 (18)
Barrett et al. (2003)	7.52/11.95	5.99/7.55	87/44	-0.67	7.71/10.11	10.66/6.57	87/44	0 (6)	11.19/10.65	6.9/7.1	59/40	-0.05
Roberts et al. (2003)	7.38/8.79	6.81/7.43	84/95	-0.2	6.02/7.59	6.95/6.34	62/71	-0.25 (6)	No long-term follow-up			0.08 (18)
Roberts et al. (2004)	No post-intervention				No short-term follow-up			0 (6)	5.67/8.3	6.1/6.28	41/165	-0.42 (30)
Roberts et al. (2009)	6.57/5.46	6.18/5.32	237/191	0.19	5.74/5.75	5.7/5.7	227/169	0 (6)	5.6/4.71	5.85/4.74	198/180	0.17 (18)
Rooney et al. (2006)	10.97/11.92	6.24/6.68	70/47	-0.15	No short-term follow-up			-0.1	11.19/10.65	6.9/7.1	59/40	0.08 (18)
Total (95% CI)				-0.29								

at highest risk dropped out, may affect representativeness (Barrett *et al.*, 2005; Spence *et al.*, 2005; O’Kearney *et al.*, 2009). Studies only including post-intervention evaluations, partly due to short dated changes in school administrations (Chaplin *et al.*, 2006), may not include long-term effects that need confrontation with real-life situations before fully unfolding (Manz *et al.*, 2001a,b). In the majority of reviewed studies, analysis relied on self-reported data that may lack impartiality, as no diagnostic information was available. The class-based environment of the interventions may have influenced the students’ willingness to participate openly in regard of possible stigmatization (Manz *et al.*, 2001a,b). Also, possible influence of the observers on the participants during the interventions may have biased their behaviour (Barrett and Turner, 2001). A related difficulty is the application of different questionnaires: for example in Merry *et al.*’s (Merry *et al.*, 2004) study, the RADS led to other results than the BDI and the BHS questionnaires, possibly due to the diverging range of standard deviation compared with the means. Another issue is to secure a stable and high quality of program implementation by the conductors, who could have prioritized one topic over the other (Roberts *et al.*, 2003), gained more experience over time (Manz *et al.*, 2001a,b) or diverged in the amount of therapist contact between the IG and the CG (Castellanos and Conrod, 2006). Even though no significant differences could be found in effect sizes, the influence of the conductor’s professional background should be considered. Also, the amount of the CG’s activities outside the intervention’s frame potentially biasing their non-intervention character is unknown (Bonhauser *et al.*, 2005). Several studies reported benefits of their evaluated interventions only for low age groups (Barrett and Turner, 2001; Lowry-Webster *et al.*, 2003; Barrett *et al.*, 2005, 2006, 2007), showing that prevention should start early before negative routines can establish, as the prevalence of mental disorders in young age groups is high and rising (Weissman *et al.*, 1999; Barrett and Turner, 2001).

Program approaches

In this context, universal approaches may show an advantage over indicated and selective interventions: besides the higher recruitment rate, the group of participants without initial

symptoms or at elevated risk of developing such would not have benefited from a purely indicated approach (Manz *et al.*, 2001a,b; Shochet *et al.*, 2001). Then again, other evaluations showed that their interventions are better suited to treat mild depression instead of performing a preventive function (Cardemil *et al.*, 2007), which may support the idea of mixing approaches to fit a target group as large as possible.

CONCLUSION

The majority of the reviewed studies proved preventive school-based interventions on depression and anxiety to be effective. However, effect size computation revealed only small scale effectiveness. Future studies have to consider the impact of the described program implementation variations.

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