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## School-based prevention programs for depression and anxiety in adolescence - a systematic review --Manuscript Draft--

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<b>Abstract:</b>	<p><b>Background</b> 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.</p> <p><b>Methods</b> 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 May 2nd, 2011.</p> <p><b>Results</b> The majority of interventions turn out to be effective, both for depression (15:8) and anxiety (11:4). However, the obtained overall mean effect sizes calculated from the most utilized questionnaires can be considered very small.</p> <p><b>Conclusions</b> The majority of the reviewed school-based interventions show 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.</p>

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

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# Abstract

## Background

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.

## Methods

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 May 2<sup>nd</sup>, 2011.

## Results

The majority of interventions turn out to be effective, both for depression (15:8) and anxiety (11:4). However, the obtained overall mean effect sizes calculated from the most utilized questionnaires can be considered very small.

## Conclusions

The majority of the reviewed school-based interventions show 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.

**Keywords:** adolescents; evaluation; mental health; school-based prevention; depression; anxiety

## 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 [1, 2]. Being a major mental health problem, depression is characterized by a high prevalence [3, 4]. In the US, an estimated 20% of adolescents will experience a depressive episode by the age of 18 [5, 6]. In Germany, depressive disorders show a lifetime prevalence of 16.8% among probands between 14 and 24 years [7]. 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 [8, 9]. Besides its significant morbidity, depression has an adverse effect on school performance and associated outcomes [10, 11].

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 [12-14]. For the global population, a high lifetime prevalence of 16.6% of anxiety disorders is stated [15]. Frequently considered a regular experience in adolescent age and development [16], anxiety disorders are also accompanied by a broad variety of negative life consequences in a social, emotional and academic functioning manner [17].

The setting “school” seems promising to oppose these aberrations early enough. It allows to bypass obstacles other settings exhibit: geographic distance is obsolete, private practitioner’s costs can be circumvented by trained school staff and the intervention operates directly inside the youth’s environment [18, 19]. Compatible goals in prevention programs and formal education can be pursued, namely the education of optimistic students and an increase of their life quality [20].

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Additionally, a framework may be imposed where students are best reached and more open towards preventive contents [21].

Depending on the specific target group, prevention strategies are divided into universal, selective and indicative approaches [22]. 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 as 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 [23].

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. [24] by excluding prevention interventions conducted outside of the school setting. In contrast to Neil et al. [22], it excludes early intervention programs, and focuses on prevention only. Additionally, the review's computation of effect sizes includes only the most utilized questionnaires in the reviewed articles, the CDI for depression and the RCMAS for anxiety.

# Methods

## Search strategy

As shown in Fig. 1, 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 May 2<sup>nd</sup>, 2011. Studies' abstracts were examined in detail, and, if required, extended by a full text revision.

- Fig. 1 diagram showing filtering process of literature used -

## 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 in English and German language based on evaluation of primary data were considered. Finally, to depict actuality, articles had to originate from after the year 2000.

## 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* [25]. Weighted by the inverse of its random-effects variance, the standardized mean differences were aggregated for post-intervention and follow-up [26]. 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

1 depression. Three studies [1, 27, 28] included several intervention groups in their  
2 comparison, another analyzed two control groups and one intervention group [29]. In  
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4 this case, the means and standard deviations were pooled before being compared to  
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6 the control group. As Sheffield et al. [30] evaluated an intervention with a universal,  
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8 an indicated and a combined approach, the intervention groups were computed  
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10 separately. Barrett et al. [16] did not provide numbers for allocation to the  
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12 intervention and the control group for their high-school sample, leaving only the  
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14 elementary school sample considered. Studies varied in the length of their follow-up  
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16 periods (from three months [31] up to four years [32]). We divided analysis into  
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18 immediate post-intervention effects, short-term follow-up effects (at six months) and  
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20 long-term follow-up effects, in which the effect size at the last reported interval was  
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22 examined.  
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## 30 **Results**

### 34 **Reviewed Articles**

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37 796 papers were found via online search, of which 596 articles remained after de-  
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39 duplication. Additional 135 papers were found via bibliographic search in reference  
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41 lists of eligible articles, resulting in a total of 731 studies. After the exclusion of  
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43 systematic reviews, studies not dealing with school-based prevention interventions,  
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45 not focusing on depression or anxiety and not utilizing German or English language,  
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47 129 studies remained. Finally, 28 studies remained because of being randomized  
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49 controlled trials; with a sample size of at least 100 participants and originating from  
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51 after the year 2000 (see Figure 1). The studies describe interventions in Germany,  
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54 Australia, USA, Canada, New Zealand, the UK and Chile.  
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1 Due to their significance in characterizing the reviewed articles, the following  
2 information were systematically extracted (see Table 1 and Table 2): authors and year  
3 of publication, preventive approach(es), program information, type of  
4 randomisation/allocation, data collection, result for effectiveness and outcome  
5 measure instruments.  
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### 15 **Depression**

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18 A total of 24 studies evaluated depressive symptoms as an outcome of the respective  
19 intervention (see Table 1). This includes 18 universal and five indicated approaches.  
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22 One study evaluated a program performing a universal, an indicated and a combined  
23 approach [30]. Several universal approach studies further stratified their samples to  
24 show the respective intervention's effects on subgroups: six authors analyzed their  
25 participants by their initial risk-group status [13, 23, 32-35], while five studies  
26 stratified their sample by initial symptoms [4, 27, 31, 36, 37]. One study did both  
27 [38]. 12 studies randomised their participants by school, five used class membership  
28 and seven studies followed individual characteristics to randomise their samples.  
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30 Another distinguishing aspect between the interventions was the conducting  
31 personnel: 13 programs were implemented by trained school staff and nine were  
32 conducted by mental health professionals. Barrett and Turner evaluated a program  
33 containing both, one teacher-led and one psychologist-led intervention [1]. In the  
34 evaluation by Sheffield et al. [30], the universal part is implemented by teachers,  
35 while the indicated approach is conducted by mental health professionals. Concerning  
36 the number of sessions conducted to implement the evaluated program, the reviewed  
37 articles show a wide range from two sessions [39] up to daily meetings held over a  
38 period of 36 weeks [40]. A comparable variety is found when analyzing the age of the  
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1 participants, which ranges from 3<sup>rd</sup>- [19] to 12<sup>th</sup>-graders [40]. The same can be stated  
2 for the applied follow-up periods of the evaluations which range from articles  
3 presenting only pre-post evaluations [1, 28, 41] up to 48 month-follow-up time [32].  
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5 Regarding effectiveness, 15 studies report effective outcomes, meaning lower  
6 depression scores of the IG group compared to the CG after post-intervention or  
7 follow-up, while eight evaluations do not.  
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### 10 **Anxiety**

11 As an outcome, anxiety was evaluated by 15 studies (see Table 2). Included are 12  
12 universal and two indicated approaches. One study evaluated a program performing a  
13 universal, an indicated and a combined approach [30]. As seen for depression,  
14 stratification took place among several universal approach intervention evaluations in  
15 order to analyze for subgroup effects: four authors grouped their participants after risk  
16 status [13, 33-35], while one studies stratified its participants by initial symptoms  
17 [37]. Here also, one study did both [38]. Randomisation by school took place in eight  
18 studies; class membership was applied in three cases. Remaining, individual  
19 characteristics were decisive in four interventions. Trained school staff conducted the  
20 intervention measures in six evaluations, while seven were implemented by mental  
21 health professionals. Sheffield et al.'s and Barrett and Turner's evaluations included  
22 both groups [1, 30]. Resembling what was stated for depression, a large variation in  
23 the number of conducted sessions of the respective programs (from eight sessions [30,  
24 37] up to one weekly meeting over a whole academic year [42]), the age of the  
25 participants (from 2<sup>nd</sup>-graders [43] to 19-year old students [16, 44]) and the applied  
26 follow-up time (from pre-post evaluations [1, 42-44] up to 36 months [13]) can be  
27 found in the studies evaluating anxiety as an outcome.  
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1 Overall, eleven studies report effectiveness for their interventions, meaning lower  
2 scores for anxiety in the IG compared to the CG after post-intervention or follow-up,  
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4 four do not.  
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### 7 **Distribution of Effect sizes**

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10 Overall mean effect sizes were computed for the most frequently utilized  
11 questionnaires for depression (CDI) and anxiety (RCMAS). Negative effect sizes  
12 indicate that the intervention group mean is lower in scores relative to the control  
13 group. According to Cohen [25], an effect sizes of 0.2 is considered small, 0.5 is  
14 considered moderate and 0.8 is considered large.  
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### 22 **CDI**

23 A summary of all effect sizes for depression is presented in Table 3. At post-  
24 intervention, effect sizes for the CDI range from 0.30 to -0.57, the weighted overall  
25 mean effect size for the CDI is -0.12. Regarding effect sizes for the short-term follow-  
26 up, the overall mean effect size rises back up to 0.06, ranging from 0.12 to -0.07. At  
27 long-term follow-up, it lowers again to -0.05, ranging from 0.14 to -0.35. Overall, the  
28 interventions prove to be effective at a very small scale at post-intervention, lose their  
29 effect at short-term follow-up, but again show small-scaled positive effects at long-  
30 term follow-up for the CDI.  
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### 46 **RCMAS**

47 A summary of all effect sizes for anxiety is presented in Table 4. At post-intervention,  
48 effect sizes for the RCMAS ranged from 0.19 to -0.67, the weighted overall mean  
49 effect size was -0.29, an effect considered small. Regarding effect sizes for the short-  
50 term follow-up time, the range of effect sizes goes from 0 to -0.25, with an overall  
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1 mean effect size of -0.10. At long-term follow-up, the overall mean effect size is -  
2 0.05, ranging from 0.17 to -0.42.  
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4 Overall, the interventions show to be effective at a small scale at post-intervention  
5 with a continuously shrinking, yet stable positive effect.  
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9 - Table 4 -  
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## 11 **Discussion**

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13 This systematic review identified school-based interventions aimed at preventing or  
14 reducing the prevalence of depression and anxiety. The majority of interventions turn  
15 out to be effective, both for depression (15:8) and anxiety (11:4). Limiting the  
16 positive result, the obtained overall mean effect sizes calculated from the most  
17 utilized questionnaires can be considered very small. Nevertheless, except from the  
18 mean effect size for the CDI at short-term follow-up (0.06), all results prove  
19 effectiveness. Effect sizes for the RCMAS decrease linearly while staying in the  
20 effective range. Calculations for the CDI show the highest effectiveness at post-  
21 intervention, followed by a converse value at short-term follow-up.  
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24 The reviewed interventions varied in a large number of possible confounders whose  
25 influences on the outcomes remain ambiguous. The programs involve diverse sample  
26 sizes, preventive approaches, randomization and allocation procedures, conducting  
27 staff and data collection instruments, which makes it hard to compare them and  
28 identify the responsible aspects for success and failure. As even the same programs  
29 report varying outcomes, and no design delivers a clear layout leading to  
30 effectiveness, emerged limitations will be presented that may restrict from drawing  
31 conclusive inferences. Where they occur, small sample sizes limit generalisability.  
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33 Even though we excluded studies involving less than 100 participants, a small number  
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1 of participating classes or schools prevented more in-depth cluster randomization and  
2 respective analyses. Another aspect is the recurring low participation of included  
3 parents, making it impossible to measure their influence [1, 27, 34]. If sufficiently  
4 large, the heterogeneity of the particular sample may also affect validity. E.g., the  
5 large initial cultural and demographic differences and the diverging length of time the  
6 analyzed migrant groups had been residing in Australia hampered comparison [16,  
7 44]. Also, possible cohort and time confounding when evaluating groups in  
8 consecutive school years may have biased results [27]. In general, the wide range of  
9 ages, school types and number of sessions of the respective program implementation  
10 included in this review needs to be considered when valuing its conclusion. Also, low  
11 compliance of participants over the whole follow-up period, especially where those at  
12 highest risk dropped out, may affect representativeness [4, 32, 34]. Studies only  
13 including post-intervention evaluations, partly due to short dated changes in school  
14 administrations [28], may not include long-term effects that need confrontation with  
15 real-life situations before fully unfolding [38, 45]. In the majority of reviewed studies,  
16 analysis relied on self-reported data that may lack impartiality, as no diagnostic  
17 information was available. The class-based environment of the interventions may  
18 have influenced the students' willingness to participate openly in regard of possible  
19 stigmatisation [38, 45]. Also, possible influence of the observers on the participants  
20 during the interventions may have biased their behaviour [1]. A related difficulty is  
21 the application of different questionnaires: e.g. in Merry et al.'s study, the RADS led  
22 to other results than the BDI and the BHS questionnaires, possibly due to the  
23 diverging range of standard deviation compared with the means [46]. Another issue is  
24 to secure a stable and high quality of program implementation by the conductors, who  
25 could have prioritized one topic over the other [47], gained more experience over time  
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1 [38, 45] or diverged in the amount of therapist contact between the IG and the CG  
2 [39]. Even though no significant differences could be found in effect sizes, the  
3 influence of the conductor's professional background should be considered. Also, the  
4 amount of the CG's activities outside the intervention's frame potentially biasing their  
5 non-intervention character is unknown [48]. Several studies reported benefits of their  
6 evaluated interventions only for low age groups [1, 13, 34, 35, 43], showing that  
7 prevention should start early before negative routines can establish, as the prevalence  
8 of mental disorders in young age groups is high and rising [1, 2]. In this context,  
9 universal approaches may show an advantage over indicated and selective  
10 interventions: besides the higher recruitment rate, the group of participants without  
11 initial symptoms or at elevated risk of developing such would not have benefited from  
12 a purely indicated approach [27, 38, 45]. Then again, other evaluations showed that  
13 their interventions are better suited to treat mild depression instead of performing a  
14 preventive function [23], which may support the idea of mixing approaches to fit a  
15 target group as large as possible.  
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### 37 **Implications for Practice**

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

52 The authors declare that they have no conflict of interest.  
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Fig. 1 - diagram showing filtering process of literature used

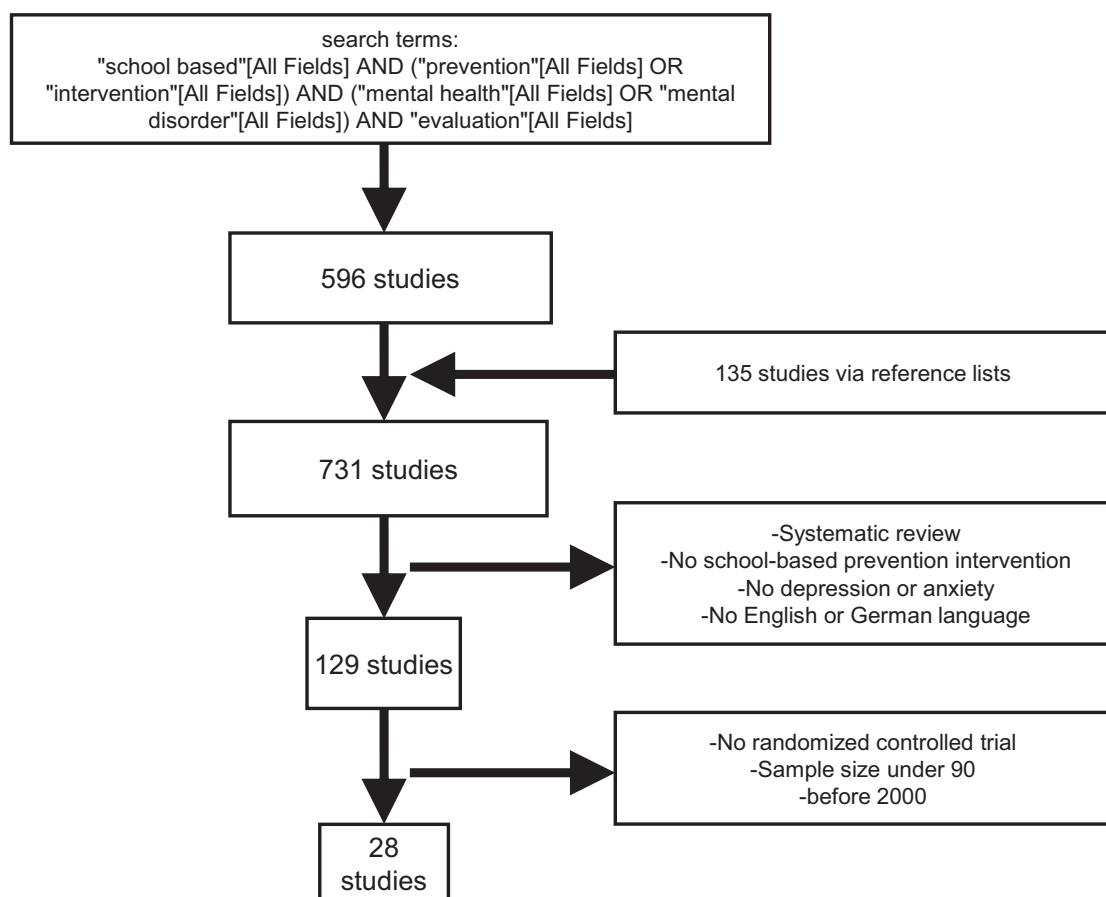


Table 1 – overview of articles for depression (in alphabetical order)

source	preventive approach	program	randomization/allocation	data collection	effectiveness (✓ = yes, X = no)	instruments
<b>Barrett &amp; Turner 2001</b>	universal	<b>FRIENDS for children:</b> CBT, coping strategies & homework activities (workbooks); ten weekly 75min-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
<b>Barrett 2005</b>	universal (selective stratification)	<b>two versions of FRIENDS:</b> CBT, coping strategies & homework activities (workbooks); ten weekly 60min-sessions + two booster sessions + four sessions for parents by mental health professionals; <b>FRIENDS for children</b> for 6th-grade students; <b>FRIENDS for youths</b> for 9th-grade students; AUS	by school; 6th- & 9th grade; seven schools; IG: 423, CG: 269	baseline, post-intervention, 12 month follow-up	✓	CDI
<b>Barrett 2006</b>	universal (selective stratification)	<b>two versions of FRIENDS:</b> CBT, coping strategies & homework activities (workbooks); ten weekly 60min-sessions + two booster sessions + four sessions for parents by mental health professionals; <b>FRIENDS for children</b> for 6th-grade students; <b>FRIENDS for youths</b> for 9th-grade students; AUS	by school; 6th- & 9th-grade; six schools; IG: 379, CG: 290	baseline, post-intervention, twelve month, 24 month, 36 month follow-up	X	CDI
<b>Bonhauser 2005</b>	universal	<b>Physical Activity Program:</b> effects of physical activity on mental health; three weekly 90min-sessions for 10 weeks by trained school staff; CHI	by class; 9th-grade; one school; IG: 98, CG: 100	baseline, post-intervention	X	HADS
<b>Cardemil 2007</b>	universal (selective stratification)	<b>Penn Resiliency Program:</b> CBT & social problem-solving to reduce & prevent depressive symptoms; twelve weekly 90min-sessions by trained school staff; USA	individually; 5th- & 6th-grade; two schools; Latino IG: 25, Latino CG: 28, Afro IG: 50, Afro CG: 65	baseline, post-intervention, three month, six month, twelve month, 24 month follow-up	✓	CDI

<b>Castellanos 2006</b>	indicated	<b>Substance Misuse Prevention Program:</b> CBT, psycho-educational, motivational & coping skills training components; two 90min-sessions by mental health professionals; UK	individually; 9th-11th-grade; twelve schools; IG: 224, CG: 119	baseline, six month follow-up	✓	BSI
<b>Chaplin 2006</b>	universal	<b>Penn Resiliency Program:</b> CBT & social problem-solving skills; twelve weekly 90min-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
<b>Eggert 2002</b>	indicated	<b>Counselor-Care (C-CARE):</b> assessment + adult motivation; 2h interview, 2h counseling session & social network-building by trained school staff; <b>Coping and Support Training (CAST):</b> assessment, adult motivation, peer support, skills training; <b>C-CARE</b> + twelve 1h-sessions in six 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; ten weeks, nine month follow-up	✓	HSQ
<b>Jones 2010</b>	universal	<b>4Rs Program:</b> 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
<b>Lowry-Webster 2003</b>	universal (selective stratification)	<b>FRIENDS:</b> CBT, coping strategies & homework activities (workbooks); ten weekly 75min-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
<b>Manassis 2009</b>	indicated	<b>Feelings Club:</b> CBT, recognize & manage negative thoughts and feelings, develop strategies of coping; twelve 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
<b>Manz 2001</b>	universal (indicated & selective stratification)	<b>GO!:</b> CBT, information, specific & unspecific treatment components; twelve hours in eight weeks by mental health professionals; GER	by class; 9th & 10th grade; four schools; IG: 325, CG: 302	baseline, post-intervention, six month follow up	✓	BDI

<b>Merry 2004</b>	universal	<b>RAP-KIWI:</b> CBT, interpersonal therapy principles; eleven weekly sessions by trained school staff; NZ	individually; 9th- & 10th-grade; two schools; IG: 207, placebo-CG: 185	baseline, post-intervention, six month, 12 month, 18 month follow-up	✓	BDI, RADS
<b>O'Kearney 2009</b>	universal (indicated stratification)	<b>Mood-GYM:</b> internet-based CBT to identify problems & develop coping skills; six weeks duration with every module open for two weeks; part of regular curriculum by trained school staff; AUS	by class; 10th-grade girls; one school; IG: 67, CG: 90	baseline, post-intervention, five month follow-up	✓	CES-D, DLC, Griffiths-scale
<b>Pössel 2004</b>	universal (indicated stratification)	<b>LISA-T:</b> CBT, relationship between cognition, emotion & behavior, social competence training; ten 90min-sessions by mental health professionals; GER	by class; 8th-grade; six schools; IG: 200, CG: 147	baseline, post-intervention, three month, six month follow-up	✓	CES-D
<b>Pössel 2008</b>	universal (indicated stratification)	<b>LARS &amp; LISA:</b> CBT, cognitive and social aspects; successor to LISA-T; 10 weekly sessions à 1,5h (9 + 1 motivation section); by mental health professionals; GER	by class; 8th-grade & teachers; four schools; IG: 163, CG: 138	baseline, post-intervention, six month follow-up	✓	SBB-DES
<b>Roberts 2004</b>	indicated	<b>Penn Prevention Program:</b> linking thoughts & feelings, conveying coping & social problem solving skills; twelve 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
<b>Roberts 2009</b>	universal (selective stratification)	<b>Aussie Optimism Program:</b> optimistic thinking & social life skills; 20 weekly 1h-lessons by trained school staff; AUS	by school; 7th-grade; 12 schools; IG: 274, CG: 222	baseline, post-intervention, six month, 18 month follow-up	X	CDI
<b>Rooney et al., 2006</b>	universal (indicated stratification)	<b>Positive Thinking Program:</b> CBT, oriented after Aussie Optimism Program; 8 weekly 1h sessions by mental health professionals; AUS	by school; 4th- & 5th-grade; four schools; IG: 72, CG: 48	baseline, post-intervention, nine month, 18 month follow-up	✓	CDI
<b>Sawyer 2010</b>	universal	<b>BeyondBlue:</b> improve solving & social skills, resilient thinking styles, coping strategies; 10 45min-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

<b>Sheffield 2006</b>	universal & indicated & combined	<b>universal:</b> CBT, cognitive-restructuring & problem solving skills, eight weekly 45-min sessions by trained school staff; <b>indicated:</b> eight weekly 90min-session in smaller group (8-10 pers.) by mental health professionals; <b>combined:</b> 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, six month, 18 month follow-up	X	CDI, CES-D, ADIS-C
<b>Shochet 2001</b>	universal (indicated stratification)	<b>Resourceful Adolescent Program:</b> CBT; <b>RAP-A:</b> adolescents, self-management, cognitive restructuring & problem solving skills; eleven weekly 40-50min-sessions; <b>Rap-F:</b> conflict settlement by strengthening protective factors; three extra 3h-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, ten month follow-up	✓	CDI, RADS
<b>Spence 2005</b>	universal (selective stratification)	<b>Problem Solving For Life:</b> CBT, cognitive restructuring & problem solving skills training; 11 45min-sessions for eight weeks by trained school staff; AUS	by school; 8th-grade; 16 schools; IG: 751, CG: 749	baseline, post-intervention, twelve month, 24 month, 36 month, 48 month follow-up	✓	BDI
<b>Thompson 2000</b>	indicated	<b>Personal Growth Class:</b> (1) mood management & life-skills training, (2) applying skills into real-life situations; 55min. 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, five month, ten month follow-up	✓	CES-D

Table 2 – overview of article for anxiety (in alphabetical order)

source	preventive approach	program	randomization/allocation	data collection	effectiveness (✓ = yes, X = no)	instruments
<b>Manassis 2009</b>	indicated	<b>Feelings Club:</b> CBT, recognize & manage negative thoughts and feelings, develop strategies of coping; twelve 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
<b>Roberts 2004</b>	indicated	<b>Penn Prevention Program:</b> linking thoughts & feelings, conveying coping & 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
<b>Bonhauser 2005</b>	universal	<b>Physical Activity Program:</b> effects of physical activity on mental health; three weekly 90min-sessions for 10 weeks by trained school staff; CHI	by class; 9th-grade; one school; IG: 98, CG: 100	baseline, post-intervention	✓	HADS
<b>Barrett &amp; Turner 2001</b>	universal	<b>FRIENDS for children:</b> CBT, coping strategies & homework activities (workbooks); ten weekly 75min-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	✓	SCAS, RCMAS
<b>Barrett 2001</b>	universal	<b>FRIENDS:</b> CBT, coping strategies & homework activities (workbooks); 10 1h-sessions by mental health professionals; AUS	individually (migrational background); 7-19 years old; six schools; IG: 121, CG: 83	baseline, post-intervention	✓	RCMAS
<b>Barrett 2003</b>	universal	<b>FRIENDS:</b> CBT, coping strategies & homework activities (workbooks); 10 1h-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

<b>Sheffield 2006</b>	universal & indicated & combined	<b>universal:</b> CBT, cognitive-restructuring & problem solving skills, eight weekly 45-min sessions by trained school staff; <b>indicated:</b> eight weekly 90min-session in smaller group (8-10 pers.) by mental health professionals; <b>combined:</b> 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, six month, 18 month follow-up	X	SCAS
<b>Manz 2001</b>	universal (indicated & selective stratification)	<b>GO!:</b> CBT, information, specific & unspecific treatment components; twelve hours in eight weeks by mental health professionals; GER	by class; 9th & 10th grade; four schools; IG: 325, CG: 302	baseline, post-intervention, six month follow up	✓	BAI, ASI
<b>Lowry-Webster 2003</b>	universal (selective stratification)	<b>FRIENDS:</b> CBT, coping strategies & homework activities (workbooks); ten weekly 75min-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
<b>Barrett 2005</b>	universal (selective stratification)	<b>two versions of FRIENDS:</b> CBT, coping strategies & homework activities (workbooks); ten weekly 60min-sessions + two booster sessions + four sessions for parents by mental health professionals; <b>FRIENDS for children</b> for 6th-grade students; <b>FRIENDS for youths</b> for 9th-grade students; AUS	by school; 6th- & 9th grade; seven schools; IG: 423, CG: 269	baseline, post-intervention, 12 month follow-up	✓	SCAS
<b>Barrett 2006</b>	universal (selective stratification)	<b>two versions of FRIENDS:</b> CBT, coping strategies & homework activities (workbooks); ten weekly 60min-sessions + two booster sessions + four sessions for parents by mental health professionals; <b>FRIENDS for children</b> for 6th-grade students; <b>FRIENDS for youths</b> for 9th-grade students; AUS	by school; 6th- & 9th-grade; six schools; IG: 379, CG: 290	baseline, post-intervention, 12 month, 24 month, 36 month follow-up	✓	SCAS, RCMAS



<b>Roberts 2009</b>	universal (selective stratification)	<b>Aussie Optimism Program:</b> optimistic thinking & social life skills; 20 weekly 1h-lessons by trained school staff; AUS	by school; 7th-grade; 12 schools; IG: 274, CG: 222	baseline, post-intervention, six month, 18 month follow-up	X	RCMAS
<b>Rooney et al., 2006</b>	universal (indicated stratification)	<b>Positive Thinking Program:</b> CBT, oriented after Aussie Optimism Program; 8 weekly 1h sessions by mental health professionals; AUS	by school; 4th- & 5th-grade; four schools; IG: 72, CG: 48	baseline, post-intervention, nine month, 18 month follow-up	X	RCMAS
<b>Garaigordobil, 2004</b>	universal	promotion of positive communication and conflict-solving; weekly 2h-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
<b>Berger 2007</b>	universal	<b>Overshadowing the Threat of Terrorism:</b> coping with threat and exposure to terrorism; eight 90min-sessions by trained school staff; ISR	by class; 2nd-6th-grade; one school; IG: 70, CG: 72	baseline, post-intervention	✓	SCARED

Table 3 - effect sizes for depression (in alphabetical order of articles)

source	post-intervention (IG/CG)				short-term follow-up (IG/CG)				long-term follow-up (IG/CG)				
	mean	SD	N	SMD	mean	SD	N	SMD (months follow-up time)	mean	SD	N	SMD (months follow-up time)	
<b>Barrett &amp; Turner 2001</b>	10.01/ 7.4	9.18/ 6.19	405/ 84	0.30	no short-term follow-up				no long-term follow-up				
<b>Chaplin 2006</b>	5.51/ 8.55	6.90/ 7.69	65/ 38	-0.42	no short-term follow-up				no long-term follow-up				
<b>Manassis 2009</b>	49.11 /49	9/ 9.19	76/ 69	0.01	no short-term follow-up				47.04/ 48.74	9.35/ 8.66	76/ 69	-0.19 (12)	
<b>Roberts 2003</b>	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				
<b>Roberts 2004</b>	no post-intervention				no short-term follow-up				5.98/ 8.44	7.06/ 7.03	41/ 163	-0.35 (30)	
<b>Roberts 2009</b>	7.24/ 6.29	6.66/ 6.84	237/ 190	0.14	6.66/ 5.85	6.71/ 6.53	227/ 168	0.12 (6)	6.66/ 6.29	6.56/ 6.92	199/ 180	0.05 (18)	
<b>Rooney et al., 2006</b>	10.28/ 15.43	7.8/ 10.51	70/ 47	-0.57	no short-term follow-up				10.68/ 11.18	7.6/ 8.43	59/ 39	-0.06 (18)	
<b>Sheffield 2006 (indicated)</b>	17.63/ 19.1	10.51/ 10.25	112/ 136	-0.14	17.44/ 17.29	9.86/ 9.29	103/ 129	0.02 (6)	16.37/ 15.09	10.36/ 8.6	100/ 125	0.14 (18)	
<b>Sheffield 2006 (universal)</b>	18.33/ 19.1	9.17/ 10.25	126/ 136	-0.08	18.05/ 17.29	10.6/ 9.29	112/ 129	0.08 (6)	15.23/ 15.09	8.83/ 8.6	107/ 125	0.02 (18)	
<b>Sheffield 2006 (combined)</b>	17.77/ 19.1	9.35/ 10.25	105/ 136	-0.13	17.71/ 17.29	10.7/ 9.29	117/ 129	0.04 (6)	15.89/ 15.09	10.38/ 8.6	110/ 125	0.08 (18)	
<b>Shochet 2001</b>	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	-0.29 (10)	
<b>Total (95% CI)</b>									0.06				

Table 4 - effect sizes for anxiety (in alphabetical order of articles)

source	post-intervention (IG/CG)				short-term follow-up (IG/CG)				long-term follow-up (IG/CG)			
	mean	SD	N	SMD	mean	SD	N	SMD (months follow-up time)	mean	SD	N	SMD (months follow-up time)
<b>Barrett 2001</b>	7.51/ 11.76	5.89/ 7.29	121/ 83	-0.65	no short-term follow-up				no long-term follow-up			
<b>Barrett &amp; Turner 2001</b>	7.23/ 9.58	6.62/ 6.44	405/ 84	-0.36	no short-term follow-up				no long-term follow-up			
<b>Barrett 2003</b>	7.52/ 11.95	5.99/ 7.55	87/ 44	-0.67	7.71/ 10.11	10.66/ 6.57	87/ 44	-0.25 (6)	no long-term follow-up			
<b>Roberts 2003</b>	7.38/ 8.79	6.81/ 7.43	84/ 95	-0.2	6.02/ 7.59	6.95/ 6.34	62/ 71	-0.24 (6)	no long-term follow-up			
<b>Roberts 2004</b>	no post-intervention				no short-term follow-up				5.67/ 8.3	6.1/ 6.28	41/ 165	-0.42 (30)
<b>Roberts 2009</b>	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)
<b>Rooney et al., 2006</b>	10.97/ 11.92	6.24/ 6.68	70/ 47	-0.15	no short-term follow-up				11.19/ 10.65	6.9/ 7.1	59/ 40	0.08 (18)
<b>Total (95% CI)</b>				-0.29				-0.1				-0.05