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REVIEW PAPER

Community-Based Prevention Programs for Anxiety and Depression in Youth: A Systematic Review

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Abstract Little is known about the effectiveness of prevention and early intervention programs for young people and adolescents once they leave or dropout from school. The effectiveness of 18 anxiety and 26 depression studies addressing prevention in community programs were identified using systematic review methodology. Anxiety and depression symptoms were reduced in ~60% of the programs. Cognitive behavioral therapy programs were more common than other interventions and were consistently found to lower symptoms or prevent depression or anxiety. Automated or computerized interventions showed promise, with 60% of anxiety programs and 83% of depression programs yielding successful outcomes on at least one measure. Further research is needed to determine the active components of successful programs, to explore cost-effectiveness and scalability factors, to investigate individual predictors of successful outcome, and to design best practice prevention programs.

Keywords Anxiety · Depression · Prevention · Adolescents · Young adults

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Depression is a major cause of disability worldwide, with the prevalence highest amongst youth. Approximately 21–28% of adolescents experience an episode of major depression by the age of 19 years (Hankin et al. 1998; Lewinsohn et al. 1998). Youth depression is associated with impairments in academic achievement and personal relationships. It may lead to suicide and is associated with long-term psychiatric sequelle (Gladstone and Beardslee 2009). There is increasing recognition of the importance of prevention as a means of reducing the burden associated with mental disorders in young people.

To date, most prevention research has involved the evaluation of small-scale intervention programs, most of which are school-based (e.g., Horowitz and Garber 2006; Merry et al. 2004; Merry and Spence 2007). Schools provide a structured learning environment in which to deliver programs (see Farrell and Barrett 2007). School-based programs offer considerable promise, with a recent systematic review reporting positive outcomes for school-based anxiety programs (Neil and Christensen 2009). However, very little is known about the success of programs that are delivered outside of school settings. Not all young—even very young—people attend school, and non-attendees are known to be at increased risk for mental disorders (Fortin et al. 2006; Van Ameringen et al. 2003). Higher rates of depression and stress have also been found in risk groups that do not attend mainstream educational settings including, for example, street youth (Ayerst 1999) and pregnant and postpartum adolescents

(Barnet et al. 1996). Young adults are at risk in the transition from school to the work force or to higher education as these transitions involve the negotiation of a number of new roles and situations (Schulenberg et al. 2004a, b). Even for those in tertiary education settings, there is a clear need to determine both the effectiveness and feasibility of prevention programs. These environments differ from school settings where students have inflexible timetables, little control over whether they attend or not, and where they must respect tight rules. Moreover, students in tertiary settings are selected on the basis of their educational attainment and thus may respond differentially to prevention programs compared to younger students.

To our knowledge, there is no systematic review of prevention in these non-school-based community settings. The aim of the present review is to identify and review the efficacy or effectiveness of community-based prevention programs for young adults and adolescents, which are not delivered in standard school environments. Our goal is to address the practical question: what prevention programs will work for youth once they leave school?

In this paper, we adopted the prevention definitions provided by Mrazek and Haggerty (1994), who distinguished three types of prevention. *Universal prevention* involves preventing new episodes of a mental disorder in the population through interventions directed at the entire population. *Selective prevention* involves preventing new episodes of a disorder in those at risk of the disorder. Risk factors include variables such as having a relative or parent with the disorder, prior child abuse history, comorbidities, recent trauma, and genetic vulnerability. There is considerable interest in identifying genes or genetic vulnerabilities that will assist in this process and in identifying adverse behaviors that lead to risk of depression or anxiety in those with vulnerability (Sullivan et al. 2000). *Indicated prevention* involves the prevention of new episodes in those with subthreshold symptoms or who are symptomatic but do not satisfy diagnostic criteria for a disorder. The term *early intervention* is applied when individuals have a diagnosable disorder but where the intervention occurs at an early stage and/or before the disorder becomes severe. In practice, it is often difficult to distinguish indicated and early intervention trials. This is especially the case if programs are designed to treat subthreshold disorders.

In the present review, we included all three forms of prevention trials. In addition, studies that did not expressly aim to prevent anxiety or depression as a primary goal were included as long as they included a secondary measure of anxiety or depression. To illustrate, a study which addressed the effects of an intervention program on parenting behavior in young mothers was included because the study reported depression outcomes. These trials provide incidental information about mental health outcome. Because of our concern that this focus might influence outcomes, we developed a rating scale to describe the focus of the prevention trials (Appendix A). This scale seeks to capture the extent to which the explicit aim of a trial was to prevent depression or anxiety. Because the intent of the review was to be comprehensive in an area where methodologies were still evolving, we included both randomized trials (where participants were randomized to an experimental programs or to a control condition) and controlled trials (where participants were assigned to one or more programs but were not randomized).

Finally, it is worth briefly clarifying typical outcome measures in prevention research. The best direct outcome variable for prevention research is a reduction in incident cases of the disorder over the ensuring months following the intervention. However, this measure is not usually used because the expected number of incident cases is low (perhaps 3% for anxiety disorders), and it is unrealistic to expect to detect differences in incidence in studies with low numbers of participants. Researchers often report proxy caseness derived from cutoffs on various anxiety and depression scales. Using cutoffs does not solve the power issue because it remains the case that few participants reach thresholds for "caseness" given the low incidence rate of disorders. Because of these constraints, many prevention trials simply report changes in symptom levels. Both types of outcome measure were included in the present review.

In addition to the broader research question, the review has a number of sub-aims. These are (a) to establish whether universal, selective, or indicated programs yielded different outcomes; (b) to identify variables that contribute to program outcomes including those such as the type of intervention (e.g., cognitive behavioral, stress management, exercise), the target group (e.g., university students, individuals

with co-morbidity), and the setting (e.g., universities, alternative educational setting); and (c) the quality of the trial methodology using Jadad et al.'s (1996) criteria. The review also considers the potential of these programs to deliver at a population level. Though the first priority for prevention programs is efficacy and effectiveness (Flay et al. 2005), prevention programs must be scalable. Given costs and capacity, intensive face-to-face prevention programs will prove to be less practical than equally effective ones that offer minimal intervention using little manpower.

Method

Search and Screening Procedures

The Cochrane Central Register of Controlled Trials, PsycINFO (1967 to March, Week 1, 2008), and MEDLINE (1950 to February, Week 4, 2008) were searched in March 2008 using key search terms "adolescen* OR youth OR young OR teen* OR college OR student*" AND "prevent* OR early intervent*" AND "anxiety OR anxious OR depress* OR internalizing." To limit the retrieved references primarily to controlled trials and randomized controlled trials the terms "control* OR random* OR trial" were added. To be included in the review, articles were required to be published in peer-reviewed English language journals, to include anxiety or depression outcome variables, and to include a control group drawn from a population equivalent to the intervention group. The titles and abstracts of identified articles were screened to determine whether they were potentially relevant to the review, and a full text article was then retrieved. The full-text articles were further screened by contacting the corresponding author to clarify information in cases where inclusion was not clear. Articles were also hand searched for additional papers.

Exclusion Criteria

Using a specially designed checklist, we began by excluding all studies that were not community-based, did not address youth (11–25 years), or had fewer than 10 participants. Studies that focused on preventing bipolar disorder, medical or dental anxiety, or post-traumatic stress disorder (PTSD); that solely measured transitory changes in state anxiety and/or state mood over short time periods (e.g., hours); that reported that the primary focus was suicide prevention; or that included participants who were rated at high suicide risk were excluded. At this point we also excluded studies where the specific aim of the intervention was the treatment of individuals with significant anxiety and depression and studies where the sample met criteria for a diagnosis of anxiety or depression. Bipolar disorder was excluded because it differs in etiology and symptom pattern from unipolar depression, while medical and dental anxieties were excluded as they are specific to particular contexts. PTSD, unlike the other conditions, was excluded as it is tied to a specific traumatic event, and may have different etiological pathways than other anxiety disorders. No other disorders were excluded.

Once this was achieved, the remaining studies could be grouped into two broad sets of papers: a set of studies specifically aimed to reduce or prevent anxiety and depression symptoms and a set of studies aimed to prevent a range of other outcomes including poor parenting, poor management of diabetes, and poor quality of life but which evaluated the effect of the particular program on anxiety or depression measures as a secondary outcome. All studies were rated for their anxiety or prevention focus (see Appendix A). This allowed us to evaluate whether programs with the explicit aim of prevention of anxiety or depression yielded better outcomes than trials aiming to change another behavior.

Community settings were defined as health and social care organizations, home environments, post-secondary educational settings (such as university or continuing education campuses), or specialized education settings (such as those specifically catering to pregnant and parenting adolescents where formal schooling structures were not observed). Studies were excluded that took place in mainstream secondary or high school settings, either during or after school hours. Youth in the present study was defined as individuals at least 11 years or older and a mean age of 25 years or less. There are various definitions of youth and adolescents (see for example, World Health Organization 2006), but we chose 11 years

as a minimum because this was the age of entry to high school (and hence captured a comparable group to our previous reviews of anxiety and depression). We chose 25 as an upper age limit consistent with other definitions of youth (15–24 years). Sub-samples of young people as part of larger studies were included if results were reported separately.

Coding

Relevant articles were coded by two reviewers. Agreement was sought on all items by the two reviewers, with any disagreements resolved through discussion with a third reviewer and by reference to the information in the paper. Although many systematic reviews determine the reliability of coding by calculating interrater reliability between two coders, the method used in this study was deemed more appropriate given the low quality and heterogeneity of the research papers, the difficulty locating information needed to determine effect sizes, the complexity of the interventions, and the necessity to make informed judgments about inclusion and exclusion criteria.

Type of Prevention

Universal, selective, and indicated interventions were included (Mrazek and Haggerty 1994). Since selective and indicated interventions are not mutually exclusive, as participants may be targeted both on the basis of a risk factor (parent with depression) and of initial symptoms (subthreshold anxiety symptoms), some interventions were classified as joint selective and indicated programs.

Type of Intervention

Interventions were categorized as primarily based on cognitive behavior therapy (CBT), exercise, stress management, or other.

Setting Type, Target Group, and Other Factors

Studies were examined for setting type (e.g., university, health service) and target group (anxiety or depression), as well as for age and ethnic group, follow-up length, duration of the program and intervention format. The format of each program was classified as group-based, individual, or both. We also noted the type of instructor and whether the intervention was computerized or automated.

Type of Control Condition

Control conditions were noted to be placebo, treatment as usual, or waitlist.

Strength of Prevention Focus

The relevance/focus of the studies in relation to prevention was rated on a scale from A to E (see Appendix A).

Effect Size Calculations

Where relevant data were included in the papers, standardized effect size estimates were calculated using Cohen's *d* formula ($M_c - M_i/SD_{pooled}$; Cohen 1988). Cohen's *d* is calculated by subtracting the mean score of the intervention group (M_i) from the mean score of the control group (M_c) at posttest or follow-up and dividing by the pooled standard deviation ($\sqrt{[(SD_c^2+SD_i^2)/2]}$). Using this equation, positive effect size estimates indicate that the intervention group improved more than the control group. Cohen (1988) effect sizes are generally categorized as small (0.2), moderate (0.5), or large (0.8). Where more than one outcome measure was used for anxiety and/or depression, results are reported for each. Although effect sizes were calculated, no statistical analysis of the data is reported. Studies were heterogeneous, and statistical power was low.

Quality Ratings

As poor quality intervention studies can overestimate the size of intervention effects (Moher et al. 1998), a validated measure devised by Jadad et al. (1996) was used to rate the quality of included studies. This measure (scored 0–5) assesses quality against three criteria: randomization (2 points with extra point included if method is described and appropriate), double blinding (2 points with extra point if method is described and appropriate), and withdrawals and dropouts (1 point). Prevention trials rarely achieve scores above 3 (because of an inability to double

blind), and nonrandomized prevention trials rarely achieve scores above 1.

Positive Findings and Study Success

Studies were coded as having a positive outcome if there was a significant difference between the experimental and control conditions on at least one measure. Positive findings were deemed to indicate the success of the intervention.

Results

Overall, 18 anxiety and 26 depression studies were identified in this review. Some studies included more than one experimental arm (in which two or more programs were compared to a control condition in the same study) resulting in a total of 20 separate comparisons for the anxiety studies and 30 comparisons for the depression trials. Studies that included both anxiety and depression outcomes were included in both Tables. Anxiety (Table 1) and depression (Table 2) are discussed separately below.

Anxiety

Overall Outcomes

Of 18 studies relevant to anxiety prevention identified, 11 were universal, 6 were selective, and one was a joint selective and indicated program. Participants were recruited to the selective trials on the basis of anxiety sensitivity, attributional style, depression, recent negative life events, or being the offspring of parents with AIDS. Approximately 60% of the universal and selective trials were associated with a positive (successful) outcome (a significant difference between the control and experimental arm), with effect sizes ranging from 0.57 to 1.09 for universal trials and 0.02 to 0.48 for selective and indicated trials.

Type of Intervention

Most trials offered an intervention based on cognitive behavioral therapy (CBT), and these interventions were all associated with a positive outcome. This included four universal trials (Braithwaite and Fincham 2007; Cukrowicz and Joiner 2007; Deckro et al. 2002; Sharif and Armitage 2004) and four selective or joint selective and indicated trials (Gardenswartz and Craske 2001; Kenardy et al. 2003, 2006; Seligman et al. 1999, 2007). Other interventions were less successful. Exercise, for instance, was the basis of two universal trials (Goldwater and Collis 1985; Kim et al. 2004) and one selective trial (Roth and Holmes 1987) of which only one of the universal trials (Kim et al. 2004) reported a significant reduction in anxiety. Stress management programs had a success rate of approximately 50% in universal approaches (Allen 1981; Johansson 1991; McWhirter et al. 1995; Nicholson et al. 1989) whereas a psychoeducation program in a selective trial (Schmidt et al. 2007) did not yield a positive outcome. Relaxation training in association with self esteem enhancement was not associated with positive outcomes in a universal (Schreiber and Schreiber 1995) or a selective trial (Roth and Holmes 1987), and a universal approach using a relationship enhancement program (Braithwaite and Fincham 2007) also did not find effects. However, an illness coping and legacy planning program for parents with AIDS and their adolescent offspring (Rotheram-Borus et al. 2001) was associated with significant positive outcomes in a selective trial.

Setting Type

The vast majority of identified anxiety prevention trials used young adult samples (aged 17 or 18 years and above), and were based in a university or college setting (including one study that took place in a university health center). Indeed, only two studies had younger adolescents as part of the sample (Rotheram-Borus et al. 2001; Schmidt et al. 2007). With so few non-college studies it is not possible to comment on the effect of setting type.

Format

Thirteen of the 20 (65%) comparisons investigated a group program, seven (54%) of which were associated with at least one positive outcome. Five (25%) comparisons used an individual format, three of which (60%) were associated with a positive outcome, and two comparisons (10%) had a program based on both a group and individual format, both of which reported at least one positive outcome (100%).

Table 1 Anxiety prevention studies

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Universal interventions:							
Braithwaite and Fincham (2007) USA	To examine the efficacy of a relationship focused preventive intervention (Prevention and Relationship Enhancement Program: ePREP), and a depression and anxiety based preventive intervention (Cognitive Behavioral Analysis System of Psychotherapy; CBASP) Anxiety prevention relevance rating: A	RCT; (2 intervention groups): ePREP and CBASP vs. attention placebo controls (information on depression, anxiety, and relationships; overall $n = 91$); Setting: university/college; Format: individual; Instructor: automated/computer based; Duration: 1 × 1 h; Follow-up points: none	Universal intervention: though participants had all been in a relationship for at least 4 m; Age: 18–28 years (M = 19.3 years); Gender: 59% female; Ethnicity: 60.9% Caucasian, 18.7% Asian, 5.5% African American, 14.3% other	Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Positive and Negative Affect Schedule (PANAS), and measures of conflict, relationships, communication, and trust	Compared to attention placebo controls, participants in the CBASP condition had significantly reduced scores on the BAI. Participants in the ePREP condition had a trend towards reduced BAI scores, though this did not reach significance. However, there were no significant differences in anxiety scores between the two intervention conditions (ePREP and CBASP)	Insufficient information to calculate Cohen's d for BAI	1
Cukrowicz and Joiner (2007) USA	To evaluate the efficacy of a computer-based preventive intervention for depression and anxiety symptoms, based on the Cognitive Behavioral Analysis System of Psychotherapy (CBASP) Anxiety prevention relevance rating: A	RCT; CBASP ($n = 81$) vs. attention placebo controls (information on anxiety and depression; $n = 71$); Setting: university computer lab; Format: individual; Instructor: automated/computer based; Duration: 1 × 2 h computer session, plus 8 weekly emails (reminding of content); Follow-up points: none	Universal intervention: at baseline participants scored 18 or under on the BAI and 19 or under on the BDI; Age: 95% between 18–21 years (M = 19.2 years); Gender: 73% female; Ethnicity: 71% Caucasian, 13% African American, 11% Hispanic, 5% other	Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Positive and Negative Affect Schedule (PANAS), and the State form of the State Trait Anxiety Inventory (STAI-S)	Compared to controls, intervention participants reported significantly lower scores on the BAI at post test. However, there were no significant differences in mean STAI-S scores	Effect size for BAI = 0.57 (s) Effect size for STAI-S = 0.13 (ns)	1
Johansson (1991) USA	To develop and evaluate the effectiveness of a stress management program in reducing anxiety and depression amongst nursing students Anxiety prevention relevance rating: C	RCT; Stress management (including cognitive restructuring and relaxation training; $n = 38$) vs. attention placebo controls (20 min education session on stress; $n = 38$); Setting: university/college; Format: group; Instructor: registered nurse; Duration: 6 sessions (2 per week for 3 weeks); Follow-up points: none	Universal intervention; Age: 19–40 years (M = 22 years); Gender: female; Ethnicity: 92% Caucasian	State form of the State-Trait Anxiety Inventory (STAI-S; given 2 × weekly for 3 weeks before beginning the program—and given in the same way at the posttest) and the IPAT Depression Scale (given 1 × weekly for 3 weeks at pretest and posttest)	Results are separated into sophomore and senior participant grade levels. Compared to controls, intervention participants showed a significant reduction in STAI-S scores at post test	Effect size for STAI-S: Sophomores = 0.71 (s) Seniors = 1.09 (s)	1

Table 1 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Kim et al. (2004) South Korea	To evaluate the effects of meridian exercise on the anxiety, depression, and self-esteem of female college students in South Korea Anxiety prevention relevance rating: C	RCT; Meridian exercise (n = 26) vs. no intervention controls (n = 28); Setting: university/college; Format: group; Instructor: Meridian exercise instructor; Duration: 30 min, 2 per week for 6 weeks; Follow-up points: none	Universal intervention; Age: 96% between 19–24 years, 4% above 25 years; Gender: female; Ethnicity: not stated	State form of the State-Trait Anxiety Inventory (STAI-S), Depression Status Inventory (DSI), and the Self-Esteem Inventory (SEI)	Compared to controls, intervention participants showed a significant reduction in STAI-S scores at post test	Insufficient information to properly calculate Cohen's d for STAI-S	1
McWhirter et al. (1995) USA	To evaluate the effects of a 5-week stress management course on the self-reported anxiety levels, coping resources, and self-esteem of university students Anxiety prevention relevance rating: C	CT; University course in stress and coping (n = 195) vs. no intervention controls from other psychology courses (n = 55 and n = 84); Setting: university/college; Format: group; Instructor: advanced students in educational psychology; Duration: 5 week course; Follow-up points: none	Universal intervention; Age: 83% between 18–24 years (university students); Gender: 59% female; Ethnicity: 83% White, 6% Hispanic, 4% African American, 7% other	State Trait Anxiety Inventory (STAI), a coping resources measure, and a self-esteem scale	Results are reported separately for the two control groups (each from different courses). Compared to controls, there were no significant changes in mean trait anxiety (STAI-T) scores or mean state anxiety (STAI-S) scores at posttest	Effect size for STAI-T: vs. Control 1 = −0.01 (ns) vs. Control 2 = −0.16 (ns) Effect size for STAI-S: vs. Control 1 = 0.04 (ns) vs. Control 2 = 0.01 (ns)	0
Sharif and Armitage (2004) Iran	To evaluate the effectiveness of psychological and educational counseling in reducing anxiety amongst nursing students Anxiety prevention relevance rating: C	RCT; Anxiety theory and practice program (n = 50) vs. no intervention controls (n = 50); Setting: university/college; Format: group; Instructor: not stated; Duration: 2 h per week for 12 weeks; Follow-up points: after one semester	Universal intervention; Age: undergraduate nursing students; Gender: not stated; Ethnicity: not stated	Hamilton Anxiety Scale (HAM-A) and a measure of self-esteem	Although there were no significant differences at posttest, intervention participants showed a significant reduction in HAM-A scores at follow-up (compared to controls)	Insufficient information to calculate Cohen's d for HAM-A	1
Deckro et al. (2002) USA	To evaluate the effectiveness of a mind/body intervention in reducing psychological distress, anxiety, and perception of stress amongst college students Anxiety prevention relevance rating: D	RCT; Mind/body intervention (relaxation response and cognitive behavioral techniques; n = 46) vs. waitlist controls (n = 44); Setting: university health services; Format: group; Instructor: medical institute and health services staff; Duration: 6 weekly sessions for 90 min; Follow-up points: none	Universal intervention; Age: 17–60 years (M = 24 years); Gender: 60% female; Ethnicity: not stated	Primary outcome measure was the Global Severity Index of the Symptom Checklist-90-R. Secondary measures were the State Trait Anxiety Inventory (STAI), and measures of perceived stress and health-promoting behaviors	Due to multiple secondary outcome measures, a Bonferroni correction was applied, resulting in a more stringent significance level ($p < .0125$). On this basis, compared to controls, the intervention group demonstrated a trend towards reduction of trait anxiety scores (as measured by the STAI-T), but this did not reach significance. However, there was a significant reduction in mean state anxiety (STAI-S) scores	Effect size for STAI-T = 0.25 (ns) Effect size for STAI-S = 0.70 (s)	2

Table 1 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Allen (1981) USA	To evaluate the biomedical and psychometric efficacy of a Controlling Stress and Tension program amongst college students Anxiety prevention relevance rating: E	CT; Controlling stress and tension classes (n = 653) vs. no intervention controls from other classes (n = 264); Setting: university/college; Format: group; Instructor: not stated; Duration: 3 credit course over one semester; Follow-up points: none	Universal intervention; Age: 18–59 years (M = 22 years); Gender: 55% female; Ethnicity: not stated	Psychophysiological measures, stress response measures, Type A/B behavior measure, locus of control measure, and the Taylor Manifest Anxiety Scale (MAS)	Compared to controls, the intervention participants had significantly reduced scores on the MAS	Insufficient information to calculate Cohen's d for MAS	0
Goldwater and Collis (1985) Canada	To evaluate the effectiveness of a cardiovascular conditioning program in improving general psychological well being amongst college students Anxiety prevention relevance rating: E	RCT; Cardiovascular training (n = 14) vs. attention placebo controls (motor activities with minimal cardiovascular benefits; n = 18); Setting: university/college; Format: group; Instructor: not stated; Duration: 90 min; 5 per week for 6 weeks (intervention) and 60 min; 2 per week for 6 weeks (controls); Follow-up points: none	Universal intervention: participants not already regularly exercising; Age: 19–30 years (college students); Gender: male; Ethnicity: not stated	Cardiovascular fitness test, Taylor Manifest Anxiety Scale (MAS), a lie scale, a measure of introversion/extroversion, a measure of general subjective well-being, and ratings by participants of their perceived level of fitness	Compared to controls, the intervention group demonstrated a trend towards reduction of MAS scores, but this did not reach significance	Insufficient information to calculate Cohen's d for MAS	2
Nicholson et al. (1989) USA	To evaluate the effectiveness of stress management counseling in improving an individual's ability to cope with stress Anxiety prevention relevance rating: E	CT; Stress management program vs. waitlist controls (overall n = 56); Setting: university/college; Format: group; Instructor: stress counselor with a masters degree and an assistant; Duration: 2 h per week for 3 weeks; Follow-up points: none	Universal intervention; Age: 18–45 years (M = 24.2 years); Gender: 68% female; Ethnicity: 79% White, 9% Black, 10% other, 2% unknown	State Trait Anxiety Inventory (STAI) and the General Well-Being Schedule	There were no significant differences in mean trait anxiety (STAI-T) scores or mean state anxiety (STAI-S) scores between the intervention group and the controls at posttest	Effect size for STAI-T = −0.54 (ns) Effect size for STAI-S = 0.05 (ns)	0
Schreiber and Schreiber (1995) USA	To examine the effectiveness of Jacobson's muscle relaxation (accompanied by encouragement of positive self-esteem) in improving the academic examination scores of undergraduate students Anxiety prevention relevance rating: E	CT; Relaxation and positive self-concept group (n = 22) vs. attention placebo controls (academic guidance; n = 30); Setting: university/college; Format: group; Instructor: authors' colleague; Duration: 15 min, 2 per week for 10 weeks; Follow-up points: none	Universal intervention; Age: 19–40 years (M = 23 years); Gender: 63% female; Ethnicity: predominantly Caucasian	Mean grades on midterm and final examinations, and the Cattell and Scheier Anxiety Scale (CSAS; a measure of anxiety and self-esteem)	There were no significant differences in the mean CSAS scores between the intervention group and the controls at posttest. Results for men and women are reported separately	Effect size for CSAS: Men = −0.15 (ns) Women= 0.35 (ns)	0

Table 1 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Selective interventions:							
Kenardy et al. (2003, 2006) Australia	To evaluate the efficacy of an internet-based cognitive behavioral preventive intervention for individuals at risk of developing anxiety pathology and panic disorder Anxiety prevention relevance rating: A	RCT; Cognitive behavioral preventive intervention (n = 36) vs. waitlist controls (n = 38)—N.B. smaller n in follow-up paper (n = 19 and n = 23); Setting: university and home access; Format: individual; Instructor: automated/computer based; Duration: 6 computer 'sessions' (5–7 days recommended for each session); Follow-up points: 6 m (2006 paper)	Selective intervention: participants scored 24+ on the Anxiety Sensitivity Index (a risk factor for anxiety and other Axis I disorders); Age: 17–51 years (M = 20.7 years); Gender: 62% female; Ethnicity: not stated	Frequency and severity of panic attacks in past 4 weeks, Anxiety Sensitivity Index, The Body Sensations Questionnaire (BSQ), The Catastrophic Cognitions Questionnaire-Modified (CCQ), The Agoraphobic Cognitions Questionnaire (ACQ), The Centre for Epidemiologic Studies Depression Scale (CES-D), and a measure of program satisfaction	Compared to controls, intervention participants showed a significant reduction in ACQ and CCQ scores at both post test and 6 m follow-up (N.B. effect size for ACQ at 6m follow-up is very small—see next column). However, there were no significant effects in relation to panic frequency, panic severity, or mean BSQ scores (at either posttest or 6 m follow-up)	Post test (2003 paper): Effect size for ACQ = 0.25 (s) CCQ = 0.38 (s) BSQ = 0.29 (ns) 6 m FU (2006 paper): Effect size for ACQ = 0.02 (described as significant) CCQ = 0.31 (s) BSQ = 0.28 (ns)	2
Schmidt et al. (2007) USA	To evaluate a longitudinal prevention program targeting anxiety sensitivity (a risk factor for anxiety and other Axis I disorders) Anxiety prevention relevance rating: A	RCT; Anxiety Sensitivity Amelioration Training; a presentation on the nature and effects of stress, and descriptions of behavioral exercise (n = 189) vs. attention placebo controls (information on health and nutrition; n = 215); Setting: university/college lab; Format: individual; Instructor: automated/computer based and time to question researcher; Duration: 30 min computer presentation and 10 min questions; Follow-up points: 12 and 24 m	Selective intervention: participants had high scores on the Anxiety Sensitivity Index (>1.5 SDs above community norms) but no current or recent psychiatric diagnoses; Age: M = 19.3 years (high school and college age); Gender: 61% female; Ethnicity: 74% White, 10% African American, 9% Asian American, 2% Hispanic, 3% other	Structured diagnostic interview, Global Assessment of Functioning, Acute Panic Inventory, Anxiety Sensitivity Index, Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Fear of Negative Evaluation, Injury Sensitivity Index, and a behavioral measure of fear responding (a CO_2 challenge)	There were no significant differences in the mean BAI scores between the intervention group and the controls at 12 or 24 m follow-up (not measured at posttest). In relation to diagnosis, over the entire follow-up period, 7.6% of the control group and 3.8% of the intervention group developed an anxiety disorder. However, this trend did not reach statistical significance	Effect size for BAI: 12 m FU = 0.15 (ns) 24 m FU = 0.11 (ns)	1

Table 1 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Seligman et al. (1999) USA	To evaluate the effectiveness of an 8-week cognitive behavioral workshop designed to prevent depression and anxiety amongst individuals identified as at risk for depression. A secondary aim was to examine mediators of any prevention effects Anxiety prevention relevance rating: A	RCT; Cognitive behavioral prevention program (n = 106) vs. assessment only controls (n = 119); Setting: university/college; Format: group and individual; Instructor: cognitive therapists and clinical psychology trainees; Duration: 2 h per week for 8 weeks (and homework) and 6 individual meetings with trainer; Follow-up points: 6 times over 3 years	Selective intervention: participants scored in the bottom quartile on the Attributional Style Questionnaire (ASQ). However, they had BDI scores of 19 or less and did not meet diagnostic criteria for an Axis 1 disorder; Age: first year undergraduates; Gender: 52% female; Ethnicity: not stated	Episodes of major depressive disorder and generalized anxiety disorder (assessed by diagnostic interview; LIFE), Beck Depression Inventory (BDI), Structured Interview Guide for the Hamilton Depression Rating Scale (SIGH-D; clinician-rated), Beck Anxiety Inventory (BAI), Structured Interview Guide for the Hamilton Anxiety Rating Scale (SIGH-A; clinician-rated), grade point average, and measures of possible mediating variables (attributional style, hopelessness, self-concept, and dysfunctional attitudes)	Based on all posttest and follow-up scores, the intervention group had significantly fewer anxiety symptoms (as measured by the BAI) compared to the control group. Significant differences were also specifically reported at the second and third follow-up. There were no significant effects overall in relation to the clinician rated SIGH-A, though there was a significant difference at posttest. In relation to diagnosis, over the course of the study, the intervention group had significantly fewer episodes of generalized anxiety disorder (as assessed by the LIFE interview)	Effect size for SIGH-A: Post = 0.42 (s) FU1 = 0.07 (ns) FU2 = 0. 15 (ns) FU3 = 0.19 (ns) FU4 = −0.04 (ns) FU5 = −0.06 (ns) FU6 = 0.04 (ns) Effect size for BAI: Post = 0.08 (ns) FU1 = 0.06 (ns) FU2 = 0.21 (s) FU3 = 0.47 (s) FU4 = 0.03 (ns) FU5 = 0.17 (ns) FU6 = 0.21 (ns)	2
Seligman et al. (2007) USA	To evaluate the efficacy of a brief classroom-based cognitive behavioral workshop (alongside web-based materials and email coaching) in preventing depression and anxiety amongst individuals at risk for depression Anxiety prevention relevance rating: A	RCT; Cognitive behavioral intervention (n = 102) vs. no intervention controls (n = 125); Setting: university/college; Format: group and individual; Instructor: cognitive therapists; Duration: 2 h per week for 8 weeks and an individual session with group leader early on in workshop (plus 6 emails from trainers, web-based material always available, and a face-to-face booster triggered by repeated increase in BDI (10 participants); Follow-up points: 6 and 8 m	Selective intervention (but indicated in depression studies table): BDI scores of 9+ (but less than 24); Age: college freshmen; Gender: 65% female; Ethnicity: not stated	Episodes of major depressive disorder and generalized anxiety disorder. Initially assessed by shortened version of LIFE diagnostic interview; and where indicated, by the Structured Clinical Interview for the DSM-IV (SCID). The Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), two measures of well-being, and a measure of attributional style (as a potential mediator)	Compared to controls, the participants in the intervention group showed a significant reduction in BAI scores at posttest and 6 m follow-up (but not 8 m follow-up). Attributional style was also a significant mediator of the prevention effects on anxiety symptoms. On the short self-report LIFE measure, there were no significant differences between the intervention and control group at 6 m FU, but there was a significantly lower level of anxiety at the 8 m FU. However, based on the SCID interviews, there were no significant differences in the number of episodes of generalized anxiety disorder	Effect size for BAI: Post = 0.34 (s) 6 m FU = 0.48 (s) 8 m FU = 0.12 (ns) Effect size for LIFE (GAD self report): 6 m FU = 0.18 (ns) 8 m FU = 0.32 (s)	2

Table 1 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Roth and Holmes (1987) USA	To evaluate whether aerobic exercise training or relaxation training can be effective in reducing the negative effects of life stress on physical and psychological health Anxiety prevention relevance rating: C	RCT; (2 intervention groups): aerobic exercise training (n = 18) and relaxation training (n = 19) vs. no intervention controls (n = 18); Setting: university/college; Format: group; Instructor: individual trained in clinical psychology and exercise physiology; Duration: 30 min sessions, 3 per week for 11 weeks; Follow-up points: 2 m	Selective intervention: participants reported at least five recent negative life events and were not currently involved in an exercise or relaxation program; Age: M = 18.9 years; Gender: 51% female; Ethnicity: not stated	Measures of physical fitness and of health problems, Beck Depression Inventory (BDI), State Trait Anxiety Inventory (STAI), and the Symptom Checklist-90	There were no significant differences in mean STAI scores between the three conditions at mid-intervention point, posttest, or 2 m follow-up	Effect size for STAI: Exercise Condition: Mid-point = 0.37 (ns) Post = 0.02 (ns) 2 m FU = 0.32 (ns) Relaxation Condition: Mid-point = 0.05 (ns) Post = −0.20 (ns) 2 m FU = 0.08 (ns)	1
Rotheram-Borus et al. (2001) USA	To evaluate the effectiveness of an intervention designed to improve the behavioral and mental health outcomes for adults with AIDS and their adolescent offspring Anxiety prevention relevance rating: C	RCT; Illness coping and legacy planning vs. usual care controls (n unclear, but overall n invited to attend = 118); Setting: community centre; Format: group; Instructor: social workers and graduate students in clinical psychology; Duration: module 1 (parents only) = 8 sessions over 4 weeks, module 2 (parents and adolescents) = 16 sessions over 8 weeks; Follow-up points: posttest at 3 m and follow-ups every 3 m for 2 years	Selective intervention: all the adolescents had parents diagnosed with AIDS; Age: 11–18 years (M = 14.8 years); Gender: 53% female; Ethnicity: Intervention group: 51% Latino, 35% African American, 4% White, 10% other; Controls: 49% Latino, 40% African American, 2% White, 9% other	Parent and adolescent outcomes measured. In adolescents: Brief Symptom Inventory (BSI), and measures of problem behaviors, conduct problems, family events, and self-esteem	Between 3 m posttest and 15 m FU, adolescent participants in the intervention group showed a significantly faster rate of reduction in BSI (anxiety subscale) scores compared to controls. The rate of decrease in symptoms was comparable across conditions from 18 m FU to 24 m FU	Insufficient information to calculate Cohen's d for BSI-anxiety	1

Table 1 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Selective and indicated interventions:							
Gardenswartz and Craske (2001) USA	To empirically evaluate a comprehensive prevention intervention for panic disorder in 'at risk' college students Anxiety prevention relevance rating: A	RCT; Preventive intervention (based on cognitive behavioral principles; $n = 55$) vs. waitlist controls ($n = 66$); Setting: university/college; Format: group; Instructor: clinical psychology graduate student and another graduate student or research assistant; Duration: 5 h workshop; Follow-up points: posttest at 6 m	Selective and Indicated intervention: participants scored 16 or more on the Anxiety Sensitivity Index. In addition, they reported at least one panic attack in the past year (though they did not meet criteria for panic disorder); Age: 18–39 years ($M = 20.3$ years); Gender: 69% female; Ethnicity: 39.3% Caucasian, 30.3% Asian American, 10.6% Hispanic, 5.7% African American, 10.6% other	Panic disorder was diagnosed using a brief version of the Comprehensive International Diagnostic Interview (panic section; CIDI), other measures included reported frequency and severity of panic attacks in the past 4 weeks, as well as measures of avoidance behavior and anxiety sensitivity. In relation to anxiety and depressive symptoms, the Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI) were used. The Life Experiences Survey was also administered as a possible moderator of panic disorder status	During the course of the study, nine (13.6%) of the waitlist controls developed panic disorder, compared to only one (1.8%) of the intervention group (a significant difference). In addition, compared to controls, there was a significant decrease in the interaction between panic frequency and intensity amongst the intervention sample. However, there was no significant effect of the intervention on mean BAI scores at post test	Effect size for BAI = −0.07 (ns)	2

[a] The relevance/focus of studies in relation to anxiety or depression prevention was rated on a scale from A–E. Those rated A were clearly stated as anxiety/depression prevention trials with anxiety/depression diagnosis and/or symptoms as the main outcomes of interest. Those rated B may not have been explicitly called prevention trials, but anxiety/depression was part of the main outcome measures (and there was an implied sense of reducing anxiety/depression disorders long-term). Those rated C may not have been explicitly called prevention studies, but anxiety/depression measures were part of the main outcome measures (though there may also have been other primary measures). Those rated as D may not have been explicitly described as prevention studies, but anxiety/depression was explicitly mentioned, and anxiety/depression measures were part of the secondary outcome measures. Studies rated as E did not specifically discuss reducing anxiety/depression in the text, but anxiety/depression measures were part of the secondary outcome measures. Studies that appear in both tables were separately rated for their relevance to anxiety prevention and to depression prevention

[b] Where possible, the number of participants cited in the table refers to the number actually used in the analysis rather than the initial number recruited. Similarly, where more than one mean age was cited in the paper, we have quoted that relating to the participants used in the analysis rather than that cited for all those initially recruited

[c] Quality rating based on Jadad et al.'s (1996) criteria. Studies score between 0 and 5 on the basis of three criteria: use and description of randomisation, use and description of double-blinding, and description of withdrawals and dropouts

Table 2 Depression prevention studies

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Universal interventions:							
Braithwaite and Fincham (2007) USA	To examine the efficacy of a relationship focused preventive intervention (Prevention and Relationship Enhancement Program: ePREP), and a depression and anxiety based preventive intervention (Cognitive Behavioral Analysis System of Psychotherapy; CBASP) Depression prevention relevance rating: A	RCT; (2 intervention groups): ePREP and CBASP vs. attention placebo controls (information on depression, anxiety, and relationships; overall $n = 91$); Setting: university/college; Format: individual; Instructor: automated/computer based; Duration: 1 × 1 h; Follow-up points: none	Universal intervention: though participants had all been in a relationship for at least 4 m; Age: 18–28 years ($M = 19.3$ years); Gender: 59% female; Ethnicity: 60.9% Caucasian, 18.7% Asian, 5.5% African American, 14.3% other	Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Positive and Negative Affect Schedule (PANAS), and measures of conflict, relationships, communication, and trust	Compared to attention placebo controls, participants in both the ePREP and CBASP conditions had significantly reduced BDI and PANAS negative affect scores. There were no significant differences on either of these measures between the two intervention conditions (ePREP and CBASP)	Insufficient information to calculate Cohen's *d* for BDI or PANAS	1
Cukrowicz and Joiner (2007) USA	To evaluate the efficacy of a computer-based preventive intervention for depression and anxiety symptoms, based on the Cognitive Behavioral Analysis System of Psychotherapy (CBASP) Depression prevention relevance rating: A	RCT; CBASP ($n = 81$) vs. attention placebo controls (information on anxiety and depression; $n = 71$); Setting: university computer lab; Format: individual; Instructor: automated/computer based; Duration: 1 × 2 h computer session, plus 8 weekly emails (reminding of content); Follow-up points: none	Universal intervention: at baseline participants scored 18 or under on the BAI and 19 or under on the BDI; Age: 95% between 18–21 years ($M = 19.2$ years); Gender: 73% female; Ethnicity: 71% Caucasian, 13% African American, 11% Hispanic, 5% other	Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Positive and Negative Affect Schedule (PANAS), and the State form of the State Trait Anxiety Inventory (STAI-S)	Compared to controls, intervention participants reported significantly lower BDI scores at post test. However, there were no significant differences in negative affect scores (as measured on the PANAS)	Effect size for BDI = 0.50 (s) Effect size for PANAS = 0.11 (ns)	1
Johansson (1991) USA	To develop and evaluate the effectiveness of a stress management program in reducing anxiety and depression amongst nursing students Depression prevention relevance rating: C	RCT; Stress management (including cognitive restructuring and relaxation training; $n = 38$) vs. attention placebo controls (20 min education session on stress; $n = 38$); Setting: university/college; Format: group; Instructor: registered nurse; Duration: 6 sessions (2 per week for 3 weeks); Follow-up points: none	Universal intervention; Age: 19–40 years ($M = 22$ years); Gender: female; Ethnicity: 92% Caucasian	State form of the State-Trait Anxiety Inventory (STAI-S; given 2 × weekly for 3 weeks before beginning the program—and given in the same way at the posttest) and the IPAT Depression Scale (given 1 × weekly for 3 weeks at pretest and posttest)	Results are separated into sophomore and senior participant grade levels. Compared to controls, intervention participants showed a significant reduction in IPAT Depression Scale scores at post test	Effect size for IPAT: Sophomores = 0.69 (s) Seniors = 0.75 (s)	1

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Kim et al. (2004) South Korea	To evaluate the effects of meridian exercise on the anxiety, depression, and self-esteem of female college students in South Korea Depression prevention relevance rating: C	RCT; Meridian exercise (n = 26) vs. no intervention controls (n = 28); Setting: university/college; Format: group; Instructor: Meridian exercise instructor; Duration: 30 min, 2 per week for 6 weeks; Follow-up points: none	Universal intervention; Age: 96% between 19–24 years, 4% above 25 years; Gender: female; Ethnicity: not stated	State form of the State-Trait Anxiety Inventory (STAI-S), Depression Status Inventory (DSI), and the Self-Esteem Inventory (SEI)	Compared to controls, intervention participants showed a significant reduction in DSI scores at post test	Insufficient information to properly calculate Cohen's d for DSI	1
Koivisto et al. (2007) Finland	To evaluate the effectiveness of the School-to-Work Group Method; an intervention designed to promote career management and prevent mental health problems associated with employment difficulties Depression prevention relevance rating: D	RCT; School-to-Work Group Method (including boosting self-efficacy and preparedness for work; n = 165) vs. attention placebo controls (practice job application; n = 169); Setting: vocational colleges; Format: group; Instructor: trainers (teachers from college and employment service agents); Duration: 20 h (over 1 week); Follow-up points: psychological variables retested at 10 m	Universal intervention; Age: 17–25 years (M = 19 years); Gender: 69% female; Ethnicity: not stated	Employment status and quality, personal goals, 12-item version of the General Health Questionnaire (GHQ-12), the Depression Scale (DEPS-10), and an employment self-efficacy measure	There were no significant main effects of the intervention at the 10 m follow-up on DEPS-10 scores. However, amongst those classified at baseline as 'at risk of psychological disorders' (GHQ-12 $\geq$ 3), a significant reduction in DEPS-10 scores was found at 10m	Insufficient information to calculate Cohen's d for DEPS-10	1

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Selective interventions:							
Bearman et al. (2003) USA	To evaluate a cognitive behavioral intervention targeting body dissatisfaction for the prevention of both depression and bulimic pathology Depression prevention relevance rating: A	RCT; Cognitive behavioral intervention (n = 38) vs. waitlist controls (n = 35); Setting: university/college; Format: group; Instructors: clinical psychology graduate student and undergraduate co-facilitator; Duration: 4 × 1 h sessions; Follow-up points: 1, 3 m, and for intervention group only: 6 m	Selective intervention: recruitment procedure designed to recruit women with body image concerns; Age: 17–20 years (M = 18.9 years); Gender: female; Ethnicity: 47% Caucasian, 32% Asian/Pacific Islanders, 14% Hispanic, 4% other	A body dissatisfaction scale, Positive and Negative Affect Schedule-Expanded Form (PANAS-X), Beck Depression Inventory (BDI), a restrained eating scale, and an eating disorders questionnaire	Compared with waitlist controls, the intervention participants had significantly reduced scores on the BDI. This effect was apparent at posttest and 3 m follow-up (but not at 1 and 6 m follow-up). The intervention was also associated with significantly reduced negative affect (as measured on the PANAS-X). It is reported that this effect was apparent at posttest, 1 and 3 m follow-up, but was no longer evident at 6 m follow-up	Effect size for BDI: Post = 0.29 (s) 1 m FU = −0.32 (ns) 3 m FU = 0.27 (s) Effect size for PANAS: Post = 0.54 (s) 1 m FU = −0.06 (described as significant) 3 m FU = 0.42 (s) Insufficient information to calculate Cohen's d for 6m FU	1
Logsdon et al. (2005) USA	To evaluate the effectiveness of a social support intervention (targeted at pregnant adolescents) in preventing symptoms of depression at 6 weeks postpartum Depression prevention relevance rating: A	RCT; (3 intervention groups): Social support information: pamphlet (n = 26), video (n = 27), and pamphlet + video (n = 32) vs. no intervention controls (n = 24); Setting: alternative public school for pregnant and parenting adolescents; Format: individual; Instructor: N/A; Duration: 1 session to distribute materials; Follow-up points: none	Selective intervention: pregnant adolescents (between 32–36 weeks gestation); Age: 13–18 years (M = 16 years); Gender: female; Ethnicity: 56% African American, 38% White, 6% other	The Centre for Epidemiological Studies of Depression (CES-D), a measure of perceived postpartum support, and a measure of self-esteem	There were no significant differences in mean CES-D scores between any of the intervention groups and the controls at posttest	Insufficient information to calculate Cohen's d for CES-D	2

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Seligman et al. (1999) USA	To evaluate the effectiveness of an 8-week cognitive behavioural workshop designed to prevent depression and anxiety amongst individuals identified as at risk for depression. A secondary aim was to examine mediators of any prevention effects Depression prevention relevance rating: A	RCT; Cognitive behavioural prevention program (n = 106) vs. assessment only controls (n = 119); Setting: university/college; Format: group and individual; Instructor: cognitive therapists and clinical psychology trainees; Duration: 2 h per week for 8 weeks (and homework) + 6 individual meetings with trainer; Follow-up points: 6 times over 3 years	Selective intervention: participants scored in the bottom quartile on the Attributional Style Questionnaire (ASQ). However, they had BDI scores of 19 or less and did not meet diagnostic criteria for an Axis 1 disorder; Age: first year undergraduates; Gender: 52% female; Ethnicity: not stated	Episodes of major depressive disorder and generalized anxiety disorder (as assessed by diagnostic interview; LIFE), Beck Depression Inventory (BDI), Structured Interview Guide for the Hamilton Depression Rating Scale (SIGH-D; clinician-rated), Beck Anxiety Inventory (BAI), Structured Interview Guide for the Hamilton Anxiety Rating Scale (SIGH-A; clinician-rated), grade point average, and measures of possible mediating variables (attributional style, hopelessness, self-concept, and dysfunctional attitudes)	Based on all posttest and follow-up scores, the intervention group had significantly fewer depression symptoms (as measured by the BDI) compared to the control group. There were also significant differences at various follow-up points. There were no significant effects overall in relation to the clinician rated SIGH-D, though there was a significant difference at posttest. Over the course of the study, there was a trend for the intervention group to have fewer depressive episodes, but this did not reach significance. However, analysing different levels of depression separately, the intervention group was found to have had significantly fewer episodes of 'moderate' depressive episodes, but no fewer episodes of 'severe' depression. In addition, the intervention group demonstrated significant improvements on a number of variables that mediated depressive symptoms	Effect size for SIGH-D: Post = 0.31 (s) FU1 = 0.04 (ns) FU2 = 0.08 (ns) FU3 = 0.14 (ns) FU4 = −0.14 (ns) FU5 = −0.13 (ns) FU6 = 0.12 (ns) Effect size for BDI: Post = 0.34 (s) FU1 = 0.11 (ns) FU2 = 0.25 (s) FU3 = 0.41 (s) FU4 = -0.08 (ns) FU5 = 0.10 (ns) FU6 = 0.29 (s)	2
Gortner et al. (2006) USA	To evaluate the benefits of an expressive writing intervention in reducing depression symptoms amongst participants who have previously been depressed (and to assess whether these effects are greater for participants high in suppression) Depression prevention relevance rating: B	RCT; Emotionally expressive writing (n = 52) vs. attention placebo controls (writing about time management; n = 38); Setting: university/college; Format: individual; Instructor: experimenter instructed them to start, but instructions were computer based/automated; Duration: first session in lab, two further sessions on own. Also, booster session for half of participants at 5 weeks; Follow-up points: 6 m	Selective intervention: participants reported previously elevated symptoms of depression (>25 on the Inventory to Diagnose Depression-Lifetime Version), but at baseline scored <13 on the BDI. Participants were also separated into high and low suppressors (based on a subscale of the Emotion Regulation Questionnaire); Age: 18–36 years (M = 19 years); Gender: 73% female; Ethnicity: 77.8% Anglo, 12.2% Latino/Hispanic, 7.8% Asian/Asian American/Pacific Islander, 2.2% other	Beck Depression Inventory (BDI), Ruminative Response Scale, a measure of emotion regulation, and questions about their subjective experience of the study	It is reported that overall, there were no significant main effects of the intervention at posttest or follow-up. Results in the paper are therefore reported separately for low and high suppression participants. There were no significant effects at either time point amongst low suppression participants. However, amongst high suppression participants, a significant reduction in BDI scores was found at the 6 m follow-up (high-suppression intervention participants compared to high-suppression controls)	Effect size for BDI: Low Suppression Group: Post = −0.67 (ns) 6 m FU = −0.50 (ns) High Suppression Group: Post = −0.16 (ns) 6 m FU = 0.45 (s)	1

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Hyun et al. (2005) South Korea	To evaluate the effectiveness of a cognitive behavioural program on improving the self-esteem, depression symptoms, and self-efficacy of runaway adolescents living in a shelter in Seoul, South Korea Depression prevention relevance rating: B	RCT; Cognitive behavioural program (n = 14) vs. waitlist controls (n = 13); Setting: runaway shelter; Format: group; Instructor: psychiatric nursing professor; Duration: 8 weekly sessions for 50 min; Follow-up points: none	Selective intervention: participants were runaway and homeless adolescents; Age: M = 15.5 years; Gender: male; Ethnicity: not stated	Self-esteem Inventory, Beck Depression Inventory (BDI), and Self-efficacy Scale	Using non-parametric statistics, there was a significant reduction in BDI scores (pretest to posttest) amongst intervention participants, but not amongst controls	Effect size for BDI = 0.72 (s)	2
Philpot and Bamburg (1996) USA	To develop and evaluate an intervention designed to increase self-esteem and decrease depression (by increasing positive self-statements and restructuring negative self-statements into more adaptive ones) Depression prevention relevance rating: B	RCT; Positive statement rehearsal (n = 30) vs. no intervention controls (n = 30); Setting: recruited at university, but practice in own home; Format: individual; Instructor: participants given positive self-statements and asked to rehearse on own; Duration: recommended practice was 3 per day for 2 weeks; Follow-up points: none	Selective intervention: low self-esteem (0.5 SDs below the mean on the Coopersmith Self-Esteem Inventory); Age: M = 21.4 years; Gender: 63% female; Ethnicity: 80% Caucasian, 20% Black	Frequency of positive and negative self-statements, Beck Depression Inventory (BDI), and the Coopersmith Self-Esteem Inventory	Compared to controls, intervention participants showed a significant reduction in BDI scores at post test	Effect size for BDI = 0.58 (s)	1
Sandler et al. (1992) USA	To evaluate the effectiveness of a program designed to prevent mental health problems in children (aged 7–17 years) who had experienced the death of a parent Depression prevention relevance rating: B	RCT; Family grief workshop and family advisor program (within the adolescent age-group (12 years+) n = 12) vs. waitlist controls (n = 18); Setting: not clear where workshop took place, but individual sessions in families' homes; Format: group and individual; Instructor: trained family advisors; Duration: 3 workshop sessions and 13 individual sessions; Follow-up points: none	Selective intervention: families where one parent had died in the last 2 years; Age: 7–17 years; but results for 12–17 year olds analysed separately; Gender: not stated; Ethnicity: not stated	Measures of theoretical mediating variables (most of which were rated both by parents and children): parent's psychological symptoms, measures of parental warmth, reports of family cohesion, and of stable positive and negative events, family coping, discussion of grief related issues, and ratings of satisfaction with support, shortened form of the Child Assessment Schedule (CAS; structured diagnostic interview), the Child Depression Inventory (CDI), and Child Behaviours Checklist (CBCL; parental reports of children's depressive symptoms and conduct disorder)	In the 12–17 year old age group: compared to controls, intervention participants showed a significant reduction in parent reported depression scores (CBCL) at post test. However, there were no significant differences in child-rated depression scores either on the (CDI) or on a shortened form of a structured diagnostic interview (CAS)	Insufficient information to calculate Cohen's d for CDI or CBCL	1

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Barnet et al. (2007) USA	To evaluate the impact of a community-based home-visiting program on repeat pregnancy, depression, school dropout, poor parenting, and primary care linkage Depression prevention relevance rating: C	RCT; Parenting and adolescent curriculum (n = 44) vs. usual care controls (n = 40); Setting: home visits; Format: individual; Instructor: home visitors with community knowledge; Duration: bi-weekly visits from 3rd trimester until child's 1st birthday, then monthly until child's 2nd birthday; Follow-up points: post test at 12 m and follow up at 24 m	Selective intervention: pregnant adolescents; Age: 12–18 years (M = 16.9 years); Gender: female; Ethnicity: predominantly African American (91%)	A measure of parenting attitudes and beliefs, reported contraception use, repeat pregnancy or birth, the Centre for Epidemiologic Studies Depression scale (CES-D), school status, and linkage with primary care	There was no significant difference in the rates of 'moderate to severe depression' (CES-D > 21) between the intervention group and controls at posttest or follow-up	Intent to treat analysis; Insufficient information to calculate Cohen's d for CES-D	2
MacMahon and Gross (1988) USA	To evaluate the effectiveness of aerobic exercise in improving the self-concept, depression level, and physical fitness of juvenile delinquents Depression prevention relevance rating: C	CT; Aerobic exercise (n = 32) vs. attention placebo controls ('limited exertion' exercise program; n = 37); Setting: young offenders institution; Format: group; Instructor: physical education staff; Duration: 3 per week for 3 m; Follow-up points: none	Selective intervention: juvenile delinquents; Age: 14–18 years (M = 16.3 years); Gender: male; Ethnicity: 51% White, 42% Hispanic, 6% Black, 1% Asian	A measure of self-concept, Beck Depression Inventory (BDI), and cardiovascular physical fitness	Compared to controls, intervention participants showed a significant reduction in BDI scores at post test	Insufficient information to properly calculate Cohen's d for BDI	1
Roth and Holmes (1987) USA	To evaluate whether aerobic exercise training or relaxation training can be effective in reducing the negative effects of life stress on physical and psychological health Depression prevention relevance rating: C	RCT; (2 intervention groups): aerobic exercise training (n = 18) and relaxation training (n = 19) vs. no intervention controls (n = 18); Setting: university/college; Format: group; Instructor: individual trained in clinical psychology and exercise physiology; Duration: 30 min sessions, 3 per week for 11 weeks; Follow-up points: 2 m	Selective intervention: participants reported at least five recent negative life events and were not currently involved in an exercise or relaxation program; Age: M = 18.9 years; Gender: 51% female; Ethnicity: not stated	Measures of physical fitness and of health problems, Beck Depression Inventory (BDI), State Trait Anxiety Inventory (STAI), and the Symptom Checklist-90	Compared to both controls and participants in the relaxation condition, participants in the exercise condition showed a significant reduction in BDI scores at the mid-point of the intervention. There were no significant differences between conditions at the posttest or 2 m follow-up, though there was a trend approaching re-emergence of the differences at follow-up	Effect size for BDI: Exercise Condition: Mid-point = 0.47 (s) Post = 0.20 (ns) 2 m FU = 0.64 (ns) Relaxation Condition: Mid-point = 0.02 (ns) Post = −0.08 (ns) 2 m FU = −0.08 (ns)	1

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Rotheram-Borus et al. (2001) USA	To evaluate the effectiveness of an intervention designed to improve the behavioural and mental health outcomes for adults with AIDS and their adolescent offspring Depression prevention relevance rating: C	RCT; Illness coping and legacy planning vs. usual care controls (n unclear, but overall n invited to attend = 118); Setting: community centre; Format: group; Instructor: social workers and graduate students in clinical psychology; Duration: module 1 (parents only) = 8 sessions over 4 weeks, module 2 (parents and adolescents) = 16 sessions over 8 weeks; Follow-up points: posttest at 3 m and follow-ups every 3 m for 2 years	Selective intervention: all the adolescents had parents diagnosed with AIDS; Age: 11–18 years (M = 14.8 years); Gender: 53% female; Ethnicity: Intervention group: 51% Latino, 35% African American, 4% White, 10% other; Controls: 49% Latino, 40% African American, 2% White, 9% other	Parent and adolescent outcomes measured. In adolescents: Brief Symptom Inventory (BSI), and measures of problem behaviours, conduct problems, family events, and self-esteem	There were no significant differences in BSI (depression subscale) change scores between the intervention group and the controls	Insufficient information to calculate Cohen's d for BSI-depression	1
Gardenswartz and Craske (2001) USA	To empirically evaluate a comprehensive prevention intervention for panic disorder in 'at risk' college students Depression prevention relevance rating: D (but A in anxiety table)	RCT; Preventive intervention (based on cognitive behavioural principles; n = 55) vs. waitlist controls (n = 66); Setting: university/college; Format: group; Instructor: clinical psychology graduate student and another graduate student or research assistant; Duration: 5 h workshop; Follow-up points: posttest at 6 m	Selective intervention (but selective and indicated in anxiety studies table): participants scored 16 or more on the Anxiety Sensitivity Index. In addition, they reported at least one panic attack in the past year (though they did not meet criteria for panic disorder); Age: 18–39 years (M = 20.3 years); Gender: 69% female; Ethnicity: 39.3% Caucasian, 30.3% Asian American, 10.6% Hispanic, 5.7% African American, 10.6% other	Panic disorder was diagnosed using a brief version of the Comprehensive International Diagnostic Interview (panic section; CIDI), other measures included reported frequency and severity of panic attacks in the past 4 weeks, as well as measures of avoidance behaviour and anxiety sensitivity. In relation to anxiety and depressive symptoms, the Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI) were used. The Life Experiences Survey was also administered as a possible moderator of panic disorder status	There was no significant effect of the intervention on mean BDI scores at post test	Effect size for BDI = −0.08 (ns)	2

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Kenardy et al. (2003, 2006) Australia	To evaluate the efficacy of an internet-based cognitive behavioural preventive intervention for individuals at risk of developing anxiety pathology and panic disorder Depression prevention relevance rating: D (but A in anxiety table)	RCT; Cognitive behavioural preventive intervention (n = 36) vs. waitlist controls (n = 38)—N.B. smaller n in follow-up paper (n = 19 and n = 23); Setting: university and home access; Format: individual; Instructor: automated/computer based; Duration: 6 computer 'sessions' (5–7 days recommended for each session); Follow-up points: 6 m (2006 paper)	Selective intervention: participants scored 24+ on the Anxiety Sensitivity Index (a risk factor for anxiety and other Axis I disorders); Age: 17–51 years (M = 20.7 years); Gender: 62% female; Ethnicity: not stated	Frequency and severity of panic attacks in past 4 weeks, Anxiety Sensitivity Index, The Body Sensations Questionnaire (BSQ), The Catastrophic Cognitions Questionnaire-Modified (CCQ), The Agoraphobic Cognitions Questionnaire (ACQ), The Centre for Epidemiologic Studies Depression Scale (CES-D), and a measure of program satisfaction	Compared to controls, intervention participants showed a significant reduction in CES-D scores at both post test and 6 m follow-up	Post test (2003 paper): Effect size for CES-D = 0.90 (s) 6 m FU (2006 paper): Effect size for CES-D = 0.78 (s)	2
Schmidt et al. (2007) USA	To evaluate a longitudinal prevention program targeting anxiety sensitivity (a risk factor for anxiety and other Axis I disorders) Depression prevention relevance rating: D (but A in anxiety table)	RCT; Anxiety Sensitivity Amelioration Training; a presentation on the nature and effects of stress, and descriptions of behavioural exercises (n = 189) vs. attention placebo controls (information about health and nutrition; n = 215); Setting: university/college lab; Format: individual; Instructor: automated/computer based and time to question researcher; Duration: 30 min computer presentation and 10 min questions; Follow-up points: 12 and 24 m	Selective intervention: participants had high scores on the Anxiety Sensitivity Index (>1.5 SDs above community norms) but no current or recent psychiatric diagnoses; Age: M = 19.3 years (high school and college age); Gender: 61% female; Ethnicity: 74% White, 10% African American, 9% Asian American, 2% Hispanic, 3% other	Structured diagnostic interview, Global Assessment of Functioning, Acute Panic Inventory, Anxiety Sensitivity Index, Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Fear of Negative Evaluation, Injury Sensitivity Index, and a behavioural measure of fear responding (a CO_2 challenge)	There were no significant differences in the mean BDI scores between the intervention group and the controls at 12 or 24 m follow-up (not measured at posttest). In relation to diagnosis, it is reported that the incidence of any Axis I disorder was significantly higher amongst controls between the 12 and 24 m FU (although there was no significant effect over the entire study period). However, separate figures for depression related diagnoses were not given	Effect size for BDI: 12 m FU = 0.15 (ns) 24m FU = 0.12 (ns)	1

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Barnet et al. (2002) USA	To evaluate the effectiveness of a volunteer home visitation program on parenting and mental health outcomes in teenage mothers Depression prevention relevance rating: E	RCT; Parenting curriculum (n = 77) vs. usual care controls (n = 70); Setting: home visits and meetings during classes at alternative school for pregnant and parenting adolescents; Format: individual and group; Instructors: female community volunteers (for home visits) and social workers; Duration: weekly home visits until child's 1st birthday and monthly group meetings with home visitors and social workers at the school; Follow-up points: posttest at 15 m	Selective intervention: participants were at least 28 weeks gestation or had delivered their babies in the last 6 m; Age: 14–17 years (M = 16 years); Gender: female; Ethnicity: predominantly African American (98%)	Measures of parenting stress and parenting behaviors, the short form of the Mental Health Inventory (MHI-5), and measures of satisfaction with social support and perceived need for social support	There was no significant difference in mean MHI-5 scores between the intervention group and controls at posttest. There was also no significant difference in rates of 'poor mental health' (defined as MHI-5 $\geq$ 67)	Intent to treat analysis; Effect size for MHI-5 = 0.21 (ns)	3
Grey et al. (1998) USA	To evaluate the effectiveness of coping skills training combined with intensive diabetes management in the improvement of metabolic control and quality of life (in adolescents with diabetes) Depression prevention relevance rating: E	RCT; Intensive diabetes management and coping skills training (including social problem solving and cognitive behavioral modification; n = 34) vs. enhanced physical care (intensive diabetes management only; n = 31); Setting: diabetes clinic; Format: small groups (2–3 participants; Instructor: nurse practitioner in psychiatry and diabetes care; Duration: 4–8 weekly sessions (median = 6) for 1–1.5 h, followed by monthly visits; Follow-up points: posttest at 3 m	Selective intervention: participants had a diagnosis of diabetes with evidence of recent poor blood glucose control; Age: 13–20 years (M = 15.4 years); Gender: 57% female; Ethnicity: 92% White, 8% Black or Hispanic	A diabetes self-efficacy scale, the Children's Depression Inventory (CDI), a coping with diabetes scale, a diabetes quality of life scale, and hemoglobin levels. In addition, the frequency of severe hypoglycemic events and body mass index were measured	There was no significant difference in mean CDI scores between the intervention group and controls at 3 m posttest	Effect size for CDI = −0.24 (ns)	2

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Selective and indicated interventions:							
Clarke et al. (2001) USA	To evaluate the effectiveness of a group cognitive therapy program in preventing depression amongst 'at-risk' adolescent offspring of adults with a history of depression Depression prevention relevance rating: A	RCT; Cognitive therapy (n = 45) vs. usual care controls (n = 49); Setting: health maintenance organization (HMO) clinic; Format: group; Instructor: Masters level therapists; Duration: 15 × 1 h sessions; Follow-up points: 12 and 24 m	Selective and Indicated intervention: participants' parents had previously been treated for depression and the adolescents reported some symptoms of depression and/or scored 24+ on the CES-D; Age: 13–18 years (M = 14.6 years); Gender: 60% female; Ethnicity: predominantly Caucasian (96% in controls, 82% in intervention group)	Centre for Epidemiologic Studies Depression (CES-D), Hamilton Rating Scale for Depression (HAM-D), structured diagnostic interview assessing suicide symptoms as well as affective and other diagnoses (K-SADS-E), Child Behavior Checklist (CBCL; rated by parents), and the Global Assessment of Functioning	Compared to controls, intervention participants had significantly reduced scores on the CES-D (predominantly pretest to posttest and posttest to 12 m FU). Main program effects were reported for the HAM-D, though scores were not significantly different at any cross-sectional times. There were no significant effects on the CBCL-D (depression) scores. Survival analysis for major depressive episodes demonstrated a significant benefit for the intervention group at 12 m FU (9.3% cumulative estimated incidence compared to 28.8% amongst controls). This effect faded, but remained significant at 18 and 24 m. Amongst the nine intervention and 12 control participants who reported a mood disorder during the course of the study, there was a significant delay in the time to onset amongst intervention participants (M = 14 m) compared to controls (M = 6.3 m)	Intent to treat analysis; Effect size for CES-D: Post = 0.47 (s) 12 m FU = 0.54 (s) 24 m FU = 0.04 (ns) Effect size for HAM-D: Post = 0.31 (ns) 12 m FU = 0.28 (ns) 24 m FU = 0.10 (ns) (main program effects, but not significant at cross-sectional times) Effect size for CBCL-D: Post = −0.30 (ns) 12 m FU = −0.37 (ns) 24 m FU = −0.81 (ns)	2

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Martinovic et al. (2006) Serbia	To evaluate the effectiveness of a cognitive behavioral intervention in preventing depressive episodes amongst adolescents with newly diagnosed epilepsy Depression prevention relevance rating: A	RCT; Cognitive behavioral intervention (CBI; $n = 15$) vs. usual care (therapeutic counseling without CBI; $n = 15$); Setting: university outpatient epilepsy clinic; Format: individual; Instructor: researchers; Duration: 12 sessions (2 per week for 2 m, then 1 per month for 4 m); Follow-up points: posttest at 6 m and further follow-up at 9 m	Selective and Indicated intervention: participants had a recent diagnosis of epilepsy and also had subthreshold depression (assessed by DSM-IV interview); Age: 13–19 years ($M = 17.4$ years); Gender: 60% female; Ethnicity: not stated	A semi-standardized diagnostic interview, the Beck Depression Inventory (BDI), the Centre for Epidemiological Studies of Depression (CES-D), Hamilton Depression Scale (HAM-D), rating of positive and negative thoughts on a 4-point scale, a quality of life in epilepsy measure, and assessment of seizure control	Seven to nine months after baseline, three control participants but no intervention participants developed their first depressive episode. However, due to small numbers this difference is not statistically significant. Compared to controls, intervention participants showed a significant reduction in BDI, CES-D, and HAM-D scores both at the 6 m posttest and 9 m after baseline	Effect size for BDI: Post = 0.85 (s) 9 m FU= 0.85 (s) Effect size for CES-D: Post = 0.86 (s) 9 m FU= 0.65 (s) Effect size for HAM-D: Post = 1.50 (s) 9 m FU= 1.40 (s)	2
Indicated interventions:							
Gillham et al. (2006) USA	To evaluate the effectiveness of the Penn Resiliency Program (PRP) in preventing depression amongst early adolescents (delivered by therapists in a primary care setting) Depression prevention relevance rating: A	RCT; PRP (cognitive behavioral and social problem solving skills; $n = 147$) vs. usual care controls ($n = 124$); Setting: two health maintenance organization (HMO) clinics; Format: group; Instructor: child psychologist or child social worker; Duration: 12 × 90 min sessions; Follow-up points: 6, 12, 18, and 24 m	Indicated intervention: participants scored above the 50th percentile on the CDI (7+ for girls and 9+ for boys); Age: 11–12 years; Gender: 53% female; Ethnicity: Clinic A: 69% White, 11% African American, 11% Latino, 2% Asian, 8% other; Clinic B: 86% White, 2% African American, 2% Latino, 5% Asian, 6% other	A measure of attributional style was used, along with the Children's Depression Inventory (CDI). Information on anxiety- and depression-related diagnoses was also obtained via the HMO database	There was no significant reduction in CDI depression scores for the whole sample. However, there was a significant reduction in CDI scores at the 12 m FU amongst girls in the intervention condition (but not amongst boys). In relation to clinical diagnoses, no significant intervention effect was found specifically for depressive disorders. However, when all anxiety- or depression- related diagnoses were combined, PRP did have a significant preventive effect amongst participants with high CDI scores at baseline (≥13)	Intent to treat analysis; Effect size for CDI: Post = −0.02 (ns) 6 m FU = 0.22 (ns) 12 m FU = 0.24 (ns) 18 m FU = 0.16 (ns) 24 m FU = 0.07 (ns)	3

Table 2 continued

Trial	Stated aims of the research[a]	Study design/description[b]	Trial type/sample demographics	Outcome measures	Outcomes of interest	Analytic details	JQR[c]
Peden et al. (2000, 2001) USA	To evaluate the effectiveness of a cognitive behavioral preventive intervention in reducing depressive symptoms and negative thinking, and enhancing self-esteem in young women at risk for depression Depression prevention relevance rating: A	RCT; Cognitive behavioral intervention ($n = 46$) vs. no intervention controls ($n = 46$); Setting: university/college; Format: group; Instructor: not stated; Duration: 6 weekly sessions; Follow-up points: 1 m posttest, 6 m FU in 2000 paper and 18 m FU in 2001 paper	Indicated intervention: participants were identified as at risk for depression based on scoring 9+ on the BDI or 16+ on the CES-D; Age: 18–24 years ($M = 19.3$ years); Gender: female; Ethnicity: not stated	Beck Depression Inventory (BDI), Centre for Epidemiological Studies of Depression (CES-D), a measure of negative thoughts, and a measure of self-esteem	Compared to controls, intervention participants showed a significant reduction in both BDI and CES-D scores at post test, 6 m follow-up, and 18 m follow-up. In addition, the prevalence of 'at least mild' depression (defined as BDI ≥ 9) and high scores on the CES-D (≥ 16) was compared between groups. Although rates were similar at baseline, there was a significantly faster decline in these high scores amongst the intervention group. This effect remained significant at the 18 m follow-up	Insufficient information to calculate Cohen's d for BDI and CES-D	1
Seligman et al. (2007) USA	To evaluate the efficacy of a brief classroom-based cognitive behavioral workshop (alongside web-based materials and email coaching) in preventing depression and anxiety amongst individuals at risk for depression Depression prevention relevance rating: A	RCT; Cognitive behavioral intervention ($n = 102$) vs. no intervention controls ($n = 125$); Setting: university/college; Format: group and individual; Instructor: cognitive therapists; Duration: 2 h per week for 8 weeks and an individual session with group leader early on in workshop (plus six emails from trainers, web-based material always available, and a face-to-face booster triggered by repeated increase in BDI (10 participants); Follow-up points: 6 and 8 m	Indicated intervention: BDI scores of 9+ (but less than 24); Age: college freshmen; Gender: 65% female; Ethnicity: not stated	Episodes of major depressive disorder and generalized anxiety disorder. Initially assessed by shortened version of LIFE diagnostic interview; and where indicated, by the Structured Clinical Interview for the DSM-IV (SCID). The Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), two measures of well-being, and a measure of attributional style (as a potential mediator)	Compared to controls, the participants in the intervention group showed a significant reduction in BDI scores at posttest, 6, and 8 m follow-up. Attributional style was also a significant mediator of the prevention effects on depressive symptoms. On the short self-report LIFE measure, the intervention group had a significantly lower level of depression at 6m and 8 m FU. However, based on the SCID interviews, there were no significant differences in the number of depressive episodes	Effect size for BDI: Post = 0.65 (s) 6 m FU = 0.63 (s) 8 m FU = 0.23 (s) Effect size for LIFE (MDD self report): 6 m FU = 0.45 (s) 8 m FU = 0.36 (s)	2

[a] The relevance/focus of studies in relation to anxiety or depression prevention was rated on a scale from A–E. Those rated A were clearly stated as anxiety/depression prevention trials with anxiety/depression diagnosis and/or symptoms as the main outcomes of interest. Those rated B may not have been explicitly called prevention trials, but anxiety/depression was part of the main outcome measures (and there was an implied sense of reducing anxiety/depression disorders long-term). Those rated C may not have been explicitly called prevention studies, but anxiety/depression measures were part of the main outcome measures (though there may also have been other primary measures). Those rated as D may not have been explicitly described as prevention studies, but anxiety/depression was explicitly mentioned, and anxiety/depression measures were part of the secondary outcome measures. Studies rated as E did not specifically discuss reducing anxiety/depression in the text, but anxiety/depression measures were part of the secondary outcome measures. Studies that appear in both tables were separately rated for their relevance to anxiety prevention and to depression prevention

[b] Where possible, the number of participants cited in the table refers to the number actually used in the analysis rather than the initial number recruited. Similarly, where more than one mean age was cited in the paper, we have quoted that relating to the participants used in the analysis rather than that cited for all those initially recruited

[c] Quality rating based on Jadad et al.'s (1996) criteria. Studies score between 0 and 5 on the basis of three criteria: use and description of randomisation, use and description of double-blinding, and description of withdrawals and dropouts

The five comparisons that solely used the individual format used an automated or computer based program, with three of the five (60%) comparisons yielding positive results. Most of the group programs used an instructor who was a health or mental health professional (9 of 15 [60%] comparisons). Six of these nine interventions (67%) described positive outcomes. Other studies used mental health workers or trainees (Gardenswartz and Craske 2001; Nicholson et al. 1989; Rotheram-Borus et al. 2001; Seligman et al. 1999, 2007), other health staff (Deckro et al. 2002; Johansson 1991), or an individual trained in both clinical psychology and exercise physiology (Roth and Holmes 1987). The duration of programs cited in this review ranged from a 30-min presentation followed by 10 min for questions to a program that took place over a number of weeks during an academic year.

Follow-Up

Only eight of the 20 (40%) comparisons reported data for one or more follow-up points with the duration of follow-up varying from 2 months to 3 years. Five (63%) of these studies reported at least one positive result at follow-up. Based on our synthesis of these studies, we were not able to detect any association between the duration of interventions and the likelihood of finding a positive outcome.

Control Group

Seven of the 20 (35%) comparisons used attention placebos of some form (although in two cases the duration of the placebo condition was somewhat shorter than that of the active group; Goldwater and Collis 1985; Johansson 1991), with three (43%) of these reporting a positive outcome. One study (Rotheram-Borus et al. 2001) used a usual care control condition and reported significant outcomes in the active group. The remaining 12 comparisons used waitlist controls, assessment only, or no intervention controls, with eight (67%) comparisons reporting at least one significant outcome.

Relevance Rating

Seven trials (eight comparisons) achieved a rating of A for relevance, six (86%) of which reported at least one significant outcome. Six studies (seven comparisons) had a rating of C, four (67%) of which reported a significant outcome. One trial had a rating of D and was associated with significant results, and four studies had a rating of E, one (25%) of which reported at least one significant result.

Quality Rating

Four controlled trials (Allen 1981; McWhirter et al. 1995; Nicholson et al. 1989; Schreiber and Schreiber 1995) achieved a score of 0 based on Jadad et al.'s (1996) criteria, with only one (25%) of these trials associated with a positive outcome. Eight studies obtained a score of 1, with six (75%) of these associated with at least one positive outcome. Of the six studies that scored 2, five (83%) were associated with at least one positive outcome.

Depression

Overall Outcomes

Twenty-six trials relevant to depression prevention were identified (see Table 2) of which five were universal, 16 were selective, three were indicated, and two were combined selective and indicated trials. Participants in the selective programs were included based on a range of factors including scores on anxiety sensitivity, attributional style, low self-esteem, body image concerns, past experience of panic attacks, previous depression symptoms, and negative life events. Other studies targeted pregnant and parenting adolescents, adolescents with a diagnosis of diabetes or epilepsy, juvenile delinquents, runaway and homeless young people, and the offspring of adults with AIDS or depression.

As noted above, because of multiple arms in three of the studies, 30 comparisons emerged from the 26 studies. For the purposes of this section of the paper, these arms were regarded as separate trials and are labeled "comparisons." Five of the six (83%) universal comparisons reported significant results for the full sample, with effect sizes ranging from 0.50 to 0.75. Nine of the 19 (47%) selective comparisons reported at least one positive depression outcome, although for one study the significant finding was observed only at the mid-point of the trial. The effect sizes for the significant selective

comparisons ranged from 0.27 to 0.90 All three of the indicated trials were associated with at least one significant outcome: two of the three (67%) were based on the full sample, whereas the third study (Gillham et al. 2006) reported significant reductions on a depression measure amongst female participants only. The range of effect sizes for the indicated trials was 0.23–0.65. The two selective and indicated programs were associated with significant outcomes at posttest and follow-up, with significant effect sizes ranging from 0.47 to 1.50.

Type of Intervention

CBT programs were the most common interventions, with 12 of the 26 (46%) depression studies containing a CBT intervention. Of these 12 studies, two were universal (Braithwaite and Fincham 2007; Cukrowicz and Joiner 2007), five were selective (Bearman et al. 2003; Gardenswartz and Craske 2001; Hyun et al. 2005; Kenardy et al. 2003, 2006; Seligman et al. 1999), three were indicated (Gillham et al. 2006; Peden et al. 2000, 2001; Seligman et al. 2007) and two were combined indicated and selective studies (Clarke et al. 2001; Martinovic et al. 2006). Eleven of the 12 (92%) CBT programs reported at least one positive outcome. All three exercise programs (Kim et al. 2004; MacMahon and Gross 1988; Roth and Holmes 1987) were associated with positive findings, whereas only one of the three (33%) stress or coping skills training programs (Grey et al. 1998; Johansson 1991; Schmidt et al. 2007) was associated with positive outcomes (Johansson 1991). Other programs were difficult to classify into higher order categories and a number of these interventions were not successful. For instance, two trials (Barnet et al. 2002, 2007) investigating the impact of parenting programs on depression levels found no significant effects, and a study investigating the impact of social support information for pregnant and parenting adolescents also found no significant effects. Other interventions that reported no significant outcomes included illness coping and legacy planning (Rotheram-Borus et al. 2001) and relaxation (Roth and Holmes 1987).

Setting Type

Approximately half of the identified studies used young adult samples (17 or 18 years and above) and were based in university or college settings. Fourteen of the seventeen (82%) comparisons in these settings reported at least one significant effect. Other participants were accessed via a range of settings including health-care and community organizations, alternative schools, young offender institutions, and runaway shelters.

Format

Twelve of the 30 (43%) comparisons were offered in an individual format, with seven (58%) of these associated with a successful outcome. Of these individual programs, six (50%) used an automated or computer-based program, of which five (83%) reported significant effects. Fourteen of the remaining comparisons were delivered in a group format, of which 10 (71%) were associated with at least one positive outcome. Four comparisons incorporated both group and individual elements, and three (75%) of these comparisons reported at least one positive outcome. Most group comparisons employed mental health staff or trainees, registered nurses, or trained family advisors with approximately 64% of these comparisons meeting with success. The duration of interventions varied considerably, with the shortest involving the distribution of information materials while the longest intervention involved home visits over the course of more than a year.

Follow-Up

Thirteen (43%) of the comparisons reported one or more follow-up points after posttest, although a further two comparisons gave posttest data either 3 or 10 months after baseline. Of those 13 comparisons that reported follow-up data, 9 (69%) reported at least one significant result.

Control Group

Eight of the 30 (27%) comparisons used attention placebos of some form, of which seven (88%) reported a positive outcome. Seven (23%) of the comparisons used a treatment as usual control, with three of the seven (43%) reporting at least one significant effect. The remaining studies used waitlist controls, assessment only, or no intervention controls. Of these 15 comparisons, ten (67%) reported at least one significant outcome.

Relevance Rating

Ten of the 26 (38%) trials (thirteen comparisons) were rated A for relevance. Ten of these 13 (77%) comparisons reported at least one significant outcome. Four (15%) studies had a rating of B, all of which had at least one positive outcome. Six (23%) studies had a rating of C, four of which (67%) reported at least one positive outcome, and four (15%) studies had a rating of D, two (50%) of which reported at least one significant outcome. Finally, two (8%) studies were rated as E for relevance, but neither of these trials reported significant effects for depression.

Quality Rating

Sixteen of the 30 (53%) comparisons received a quality rating of 1, and 13 (81%) of these reported at least one positive outcome. Of the twelve (40%) comparisons that obtained a score of 2, six (50%) were associated with at least one positive outcome. Two (7%) comparisons gained a score of 3 (one selective and one indicated program), of which one (50%) reported a significant effect.

Discussion

This review sought to address the issue of what prevention programs are likely to work for anxiety and depression. We aimed to establish how useful prevention approaches were in reducing symptoms and preventing cases of anxiety and depression; to determine the relative merits of universal, selective, and indicated approaches; to examine the associations between program content and outcomes; to determine the importance of program format; and to determine the influence of study quality and prevention focus.

The findings of the review for both the anxiety and depression literature suggest that prevention programs are successful ($\sim$60% of those examined for anxiety and 63% for depression). For anxiety, universal programs appeared to be as useful as selective approaches. For depression, universal and indicated programs were associated with higher percentage of successful outcomes than selective programs, although the content of the programs within these categories differed, making it difficult to draw strong conclusions. By far the most common intervention for both anxiety and depression was CBT, and it was associated with reliably positive outcomes. There was some support for exercise programs in the prevention of depression, but the evidence for anxiety was mixed. Too little evidence was available to support any statements about the effectiveness of other interventions. Computer delivered programs met with success for both depression (83%) and anxiety (60%), but whether this was because of the content of the program, the target audience, or the format is not clear.

Ratings of quality and preventive focus appear to have influenced the likelihood of a successful prevention program. For anxiety, the use of a more credible control condition (i.e., attention placebo rather than waitlist control) was associated, as might be expected, with lower rates of positive outcomes. This is because the placebo effect was essentially stripped from the intervention, diminishing the chances of a significant difference between an intervention and the placebo when the intervention condition was weak. For depression, attention placebo trials were associated with as strong or stronger effects than waitlist control or treatment as usual. The reason for this effect is not clear.

Higher quality study design was associated with stronger positive outcomes for anxiety and depression. Previous authors have suggested that studies with lower quality ratings may overestimate the size of program effects (Moher et al. 1998). However, we found no support for this position, although we need to acknowledge that the rating scale we used to assess study quality (Jadad et al. 1996), previously used in the context of clinical trials (Bhandari et al. 2001; Clark et al. 1999), may have been relatively insensitive for this set of research studies where blinding to the program type was not possible. Overall, when considered together, the quality of the trials was poor suggesting that trial design needs to improve. Because of the small study numbers, we were not able to draw conclusions about format or setting variables.

A stronger preventive focus on anxiety and depression was found to be associated with stronger outcomes. Trials with a low preventive focus were less likely to show an effect. We attribute this as reflecting the nature of the intervention that was

employed in the low preventive focus studies. Interventions designed to shift primary outcomes such as parenting are less likely to directly influence secondary outcomes such as anxiety and depression.

Findings from the present review are largely in accord with what we know about prevention efforts in schools. Parallel reviews of anxiety prevention programs in schools (Neil and Christensen 2009) indicate 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. Seventy-eight percent of these trials delivered cognitive behavioral therapy. A recent review of depression programs (Calear and Christensen 2009) found a lower rate of success than the anxiety programs—a rate of 50%. This review also concluded that an indicated approach may be more likely to succeed in school environments. The present review found some support for universal as well as indicated approaches.

Systematic reviews of the literature, such as this one, have advantages and disadvantages in summarizing the research literature. One advantage is that broad trends in the research literature can be identified readily. In the present case one of the clear messages to emerge is that CBT approaches offer the most promise as the form of intervention for both anxiety and depression. Moreover, there appears to be no clear advantage in taking a universal, selective or indicated approach to the issue, based on the present synthesis of findings, although a selective approach may be less useful for depression. A second advantage is that the corpus of programs can be summarized in some detail using a similar outcome metric (or effect size; see Tables 1 and 2). An additional clear advantage of a review of this type is that it allows gaps in research knowledge to be readily identified. We found that youth community prevention programs were more common for depression than anxiety. Indicated programs were common for depression but not for anxiety. Depression programs were more heterogeneous than anxiety ones, with a focus on broader "at risk" groups including young mothers and offenders. In contrast, anxiety programs generally targeted college students. In the present review, it is clear that indicated prevention programs need investigation. Moreover, there are clear gaps in studies investigating the specific disorders of Panic Disorder and Social Anxiety.

Systematic reviews like the present one also have drawbacks when the number of studies is relatively low and the studies represent a "mixed bag." A major problem in categorizing and summarizing the findings is that studies differ radically on more than one variable, making it difficult to determine which factor may be responsible for prevention success. For example, some of the findings may suggest that higher risk target groups such as young mothers do not respond to prevention efforts, whereas a more useful interpretation may be that parenting programs are not the right intervention if depression is the outcome change most sought. Another problem is that, although effects sizes were calculated for each of the studies, combining them to yield a summary outcome measure is risky if studies are heterogeneous. Heterogeneity can be calculated if formal meta-analysis is attempted, and it potentially can be reduced by extracting studies sharing common variables. However, this requires that the categories of common variables are useful or that there are enough of them. In the present study, the development of a sufficient number of these categories to attempt formal meta-analysis was not feasible.

The review also has other limitations. As with all systematic reviews, our search criteria may have excluded relevant research studies focusing on risk factors (e.g., Maltby et al. 2005). In addition, the review is limited in that many studies had insufficient data to calculate effect sizes, and most did not include a follow-up period, making it difficult to assess the long-term effectiveness of programs (Mrazek and Haggerty 1994; Gillham et al. 2001). Conversely, because individuals have more opportunity to become depressed with longer follow-ups, later emerging prevention effects may be missed, and effectiveness may actually be underestimated (Gillham et al. 2001). The potential generalizability of the findings to different settings is also limited. The majority of the reviewed interventions took place in the USA, and although these studies typically reported recruiting participants from a range of ethnic groups, they most frequently took place in university or college settings where only approximately half of youth at that age end up (Eisenberg et al. 2007).

The current review also provides insight into the challenges of undertaking prevention research. Diagnostic outcomes were only measured in a minority of studies (Clarke et al. 2001; Gillham et al. 2006;

Martinovic et al. 2006; Seligman et al. 1999, 2007). Prevention, early treatment, or relapse prevention studies are often difficult to distinguish, especially when all information is not available. In the present review, the majority of trials did not screen for past depression. Experts differ as to the definition of prevention outcomes and the nature of prevention trials. For example, Gillham et al. (2000, 2001) assert that prevention effects are evident only when expected increases in symptoms or the prevalence of disorders are reduced in those receiving the prevention program.

The current review also points to the importance of comparing face-to-face programs to Internet or computer-based interventions, particularly since the latter would allow wide dissemination of programs at relatively low cost. Parental involvement in programs for younger age groups also needs further research. Though CBT programs appear to have the best potential, research directed at determining the "active ingredients" in these programs is needed, especially if the aim is to develop brief, scalable interventions. More thought could be given to the content of prevention programs. Whereas CBT is clearly a treatment of choice for depression and anxiety disorders, prevention programs that focus more on engagement and resilience may be more useful than simply transferring programs found to be effective for treatment. Research designs would be welcome where researchers consider the appropriateness of the selected control condition rather than simply adopting a waitlist or treatment as usual condition. Research is needed that incorporates an intention to treat analysis approach and reports full information on withdrawals and dropouts. In addition, researchers should consider the importance of the appropriate presentation of data to enable effect sizes to be calculated, the reporting of power analyses, and a focus on outcomes that examine the number of diagnoses averted.

In conclusion, the current findings provide support for the use, development, and evaluation of prevention programs in community settings. CBT-type programs are likely to be associated with good outcomes, exercise may be of value in the prevention of depression, and computer-based programs may be useful if programs are to be rolled out to larger numbers. We need more high-quality research that incorporates diagnostic outcomes, examines programs in non-tertiary environments such as workplaces, investigates a range of anxiety disorders, and adopts a more innovative approach to the design of content. In short, the current findings provide strong support for the development, evaluation, and dissemination of anxiety and depression programs in non-school-based settings for youth.

Appendix A

Prevention Focus of the Study

Score of A

- Clearly stated as a prevention trial
- Clearly stated as intending to reduce anxiety/depression disorders (even though outcomes may be symptom based)
- Anxiety/depression measures were the main/primary outcome measures

Score of B

- May not be explicitly called a prevention trial—but at least an implied sense of reducing anxiety/depression disorders on a long-term basis
- Anxiety/depression measures were part of the main/primary outcome measures

Score of C

- May not be explicitly called a prevention trial—but one of the stated goals is to reduce anxiety/depression symptoms (sometimes with a notion of pre-existing symptoms—and sometimes measured using state anxiety measures)
- May state that a main aim is improving general mental health rather than anxiety/depression per se—but anxiety/depression are still explicitly discussed
- Anxiety/depression measures are part of the main outcome measures, though there may be others too

Score of D

- May not be explicitly called a prevention trial—but the improvement of anxiety/depression or general mental health is stated in the aims/goals of the study (though secondary to other aims)
- Anxiety/depression measures are secondary outcome measures, though anxiety/depression symptoms are explicitly referred to in the text

Score of E

- May not be explicitly called a prevention trial
- They have anxiety/depression outcome measures—but don't specifically talk about reducing anxiety/depression in the text
- Anxiety/depression are secondary outcome measures.

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