A Comparison of Universal School-Based Prevention Programs for Children: Building Resilience to Manage Worry

by

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Table of Contents

Abstract

Anxiety and depression are prevalent in child populations, and can negatively impact a child's emotional, social, and cognitive development. However, these disorders tend to remain undiagnosed in children, leading to a prolonged negative impact on functioning and quality of life. Moreover, the high rates of comorbidity between anxiety and depression often lead to more chronic symptomology and a poorer response to treatment. Thus, preventing the onset of anxiety and depression in childhood may be beneficial.

The purpose of this thesis was to develop and investigate the efficacy of universal school-based prevention programs for children. The research began by conducting a meta-analysis of previous anxiety and depression prevention programs. Its results showed that most programs demonstrated small or null effects for the reduction and prevention of symptomology, with very few studies showing benefits for reducing both anxiety and depression together. Two limitations were suggested to account for the small effects. First, all programs were based on Cognitive Behavioural Therapy (CBT); however, it has been suggested that children may not possess the cognitive functioning required to fully engage in CBT-based programs. Second, many of the programs were not originally designed to target both anxiety and depression. Thus, the development and application of simpler transdiagnostic protocols that target common underlying symptoms of both disorders was warranted.

Accordingly, two novel prevention programs were developed: an emotion regulation-based (ER) program and a behavioural activation-based (BA) program. Both programs aimed to build resilience to manage worry, a symptom of both anxiety and depression. In so doing, both disorders could be targeted and prevented simultaneously. The first experimental study was a randomised controlled pilot study designed to assess the efficacy of the ER and BA

programs against a control condition. There was a significantly greater increase in resilience for children who completed the BA program compared to the control condition. Additionally, expressive suppression (a maladaptive emotion regulation strategy) mediated the relationship between condition and worry for both programs. It was suggested that the relatively short follow-up period and the overly theoretical nature of the programs may have contributed to the lack of significant reductions in worry, anxiety and depression.

Both programs were revised based on the recommendations from the pilot study, and a second randomised controlled trial was conducted. This included a 12-month follow-up an assessment of the change in the percentage of participants who met the clinical cut-off scores for anxiety and depressive disorders over time, and a measure of working memory. Although there were no statistically significant changes in outcome variables, level of emotion regulation was found to mediate the relationship between condition and worry at post-program. Moreover, results showed that the percentage of children in the BA program who met the clinical cut-off scores for generalised anxiety disorder and major depressive disorder significantly reduced from baseline to 12-month follow-up. For those in the ER program, the percentage of participants who met the clinical cut-off score for obsessive compulsive disorder also significantly reduced at 12-month follow-up, indicating the clinical significance of the programs.

Collectively, the two studies show some promising results for the use of ER and BA as universal prevention programs. Suggestions for future research are proposed, such as investigating the effectiveness of the programs when delivered to a larger sample by school personnel, which may serve to provide benefits to a greater number of students at little cost to the schools involved.

Declaration

'I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and to the best of my knowledge and belief, does not contain any material previously published or written by another person except where due reference is made in the text.'

Kristy Johnstone

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Chapter 1: General Introduction

Overview

Anxiety and depression are highly prevalent within child and adolescent populations (Lawrence et al., 2015), and both have been shown to cause significant impairments to emotional and social functioning and development (Braet et al., 2014; Hoff et al., 2015; Verboom, Sijtsema, Verhulst, Penninx, & Ormel, 2014), and to negatively impact working memory capacity, which can affect academic achievement and progress (Owens, Stevenson, Hadwin, & Norgate, 2012). Research has shown that the average age of onset is 11 years for anxiety disorders (Kessler et al., 2005), and 11-13 years for depressive disorders (Merikangas, Nakamura, & Kessler, 2009). However, despite the prevalence and adverse impact of these disorders, the majority of children experiencing anxiety or depression either do not access health care services for psychological support or do not reach full recovery after receiving treatment (Ginsburg et al., 2011; Lawrence et al., 2015). As a result, these disorders often persist throughout adolescence and into adulthood, and tend to become chronic over time (Bittner et al., 2007; Keller et al., 1992; Pine, Cohen, Gurley, Brook, & Ma, 1998). For instance, it has been reported that by the age of 16, more than 1 in 10 youth have experienced an anxiety disorder or depression (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). To address this, universal prevention programs have been developed with the aim of preventing anxiety and/or depression in childhood (e.g., Barrett & Turner, 2001; Rooney et al., 2006).

In contrast to selective or indicated prevention programs, which target youth who are deemed to be ‘at risk’ of developing a disorder, universal programs are designed to be delivered to a whole population, including both high- and low-risk individuals (World Health Organisation, 2004). These programs, therefore, tend to be more cost effective, and are readily available to a wide group of people, such as a class or school. Accordingly, universal prevention programs are thought to be less stigmatising compared to programs that only

select youth who are ‘at risk’ of developing a disorder (Barrett & Turner, 2001). One aim of universal prevention programs is to increase the protective factors associated with the development of a disorder (World Health Organisation, 2004). A factor that has been shown to protect against the development of anxiety and depression is emotional resilience (Rooney, Hassan, Kane, Roberts, & Nesa, 2013). Research suggests that resilience can moderate the effect of stressors that may contribute to mental illness by equipping the individual with the skills needed to overcome adverse situations in adaptive ways (Luthar, Cicchetti, & Becker, 2000). Assisting children with the development of emotional resilience may, therefore, help protect against the development of disorders, such as anxiety and depression, in later life (Pophillat et al., 2016).

Research has found adolescence to be a time of increased stress, with peer relationship issues, academic pressures, and the transition from primary to high school contributing to increased stress for this population (Kuperminc, Leadbeater, & Blatt, 2001). Therefore, it is not surprising that anxiety and depression tend to emerge during late childhood or early adolescence (Kessler et al., 2005; Merikangas et al., 2009). As such, it has been suggested that implementing prevention programs in childhood, prior to this critical developmental period, may be beneficial as this will assist children with the development of skills necessary for managing challenging situations and emotions they may face during adolescence (Pophillat et al., 2016). Although many studies have been conducted to assess the efficacy of childhood universal prevention programs (e.g., Barrett & Turner, 2001; Essau et al., 2012; Rooney et al., 2006), they tend to share one common limitation: the majority are single targeted protocols which aim to prevent one disorder (e.g., either anxiety or depression) without taking comorbid conditions (e.g., both anxiety and depression) into consideration (Craske, 2012). Anxiety and depression are highly comorbid, and they share a significant overlap in symptoms, such as negative affect, sleep disturbance, fatigue, and

concentration difficulties, as well as risk factors, such as familial mental health issues and socioeconomic disadvantage (Garber & Weersing, 2010; Shanahan, Copeland, Costello, & Angold, 2008). Compared to those with a singular disorder, individuals with comorbid disorders have been found to show poorer outcomes to treatment, greater levels of impairment, increased length of symptomology, and a greater risk of relapse (Birmaher et al., 1996; Ezpeleta, Domenech, & Angold, 2006). Given the high rates of comorbidity between anxiety and depression, and the shared risk factors for their development, programs that aim to prevent both disorders are needed.

To date, only a small number of studies have been published that have examined the efficacy of universal prevention programs for both anxiety and depression in children (e.g., Barrett & Turner, 2001; Essau et al., 2012; Pophillat et al., 2016). A key limitation of these programs is that they show small or null effects, with studies often demonstrating benefits in reducing or preventing symptomology for only one disorder, rather than both (e.g., Pophillat et al., 2016; Rooney et al., 2006). Another limitation is that a number of the programs were originally designed to prevent anxiety, and then subsequently used to prevent symptoms of depression (Barrett & Turner, 2001; Essau et al., 2012). This could explain why many programs failed to show significant prevention effects for both disorders, because although anxiety and depression share a number of symptoms and risk factors, they are still discrete disorders with some important distinctions, such as differences in onset and symptomology, that may impact upon program efficacy (Cummings, Caporino, & Kendall, 2014).

To overcome the difficulties associated with treating and preventing comorbid conditions, recent research has focused on the development of transdiagnostic interventions for addressing comorbid anxiety and depression (Chu et al., 2016). Transdiagnostic approaches target shared symptoms underlying multiple disorders, which serves to treat or prevent multiple conditions simultaneously, rather than sequentially (Chu, 2012). One shared

symptom that has been suggested to be a transdiagnostic feature between anxiety and depression is worry (Barlow, Allen, & Choate, 2004). Worry is defined as a repetitive thinking process focused on possible future negative events (Roemer & Borkovec, 1993), and it has been identified as a cognitive avoidance response to negative stimuli (Borkovec & Roemer, 1995). Worriers tend to overly focus on mentally preparing for or avoiding anticipated future negative outcomes, and are often found to engage in a number of behavioural strategies, such as reassurance-seeking, checking, and overt avoidance behaviours, such as actively avoiding worrisome situations (Beesdo-Baum et al., 2012). Worriers often view these strategies as positive coping mechanisms as overly preparing for a negative outcome allows them to feel a sense of control over the anticipated event, resulting in decreased stress within the short-term (Borkovec, Ray, & Stober, 1998). Ellis and Hudson (2010) investigated positive beliefs about worry (e.g., "worry helps me to solve problems", and "worry helps me avoid the worst") in children and adolescents and found that as positive beliefs about worry increased so did the level of worry. As argued by Borkovec et al. (1998), worry allows an individual to process emotional information at an abstract, conceptual level, rather than connecting with the concrete information on an emotional level, thus preventing aversive emotions, images, or autonomic arousal from being activated. As a result, distress is maintained in the long-term as worry interferes with emotional processing of fear, which is necessary for successful habituation and extinction of the feared response (Borkovec et al., 1998). Such avoidance prevents the individual from developing effective problem-solving strategies to overcome their worry and their worry is maintained (Mennin, Heimberg, Turk, & Fresco, 2002).

Worry and has long been identified as a feature of Generalised Anxiety Disorder, Panic Disorder and Separation Anxiety Disorder (American Psychiatric Association, 2013), however recent research has also suggested that worry is a symptom of depression (Hong,

2007). Although worry has been targeted within treatments for comorbid anxiety and depression (Chen, Liu, Rapee, & Pillay, 2013; Chu et al., 2016), to the best of our knowledge, worry has not been targeted within prevention studies for anxiety and depression. One approach that may be beneficial in targeting worry to prevent anxiety and depression in childhood is emotion regulation. Emotion regulation refers to attempts to "influence which emotions we have, when we have them, and how these emotions are experienced or expressed" (Gross, 1998, p. 224). Emotion regulation is an important factor in the development of resilience (Tugade & Fredrickson, 2007). When faced with adversity, the ability to identify and modulate emotions is essential to cognitively process the event, reduce distress, and overcome the situation in an adaptive way (King & Rothstein, 2010). As such, encouraging children to develop the skills and strategies needed to adaptively regulate negative emotions will equip them to manage emotional states arising from adversity in an adaptive manner, rather than resorting to maladaptive coping strategies, such as worrying or avoidance (Mennin et al., 2002).

To date, only one paper has examined the use of emotion regulation for the prevention of anxiety and depression in children. In a pilot study, (Ehrenreich-May & Bilek, 2011) showed a small decrease in anxiety-related symptoms but no change in depression symptoms (Ehrenreich-May & Bilek, 2011). However, their study had two main limitations. First, as a pilot study, it did not include a follow-up assessment, and thus prevention effects could not be measured. Second, the program did not result in an increase in emotion regulation skills, which the authors hypothesised could reflect the more general nature of the skills taught which were not specifically tailored to target the age and developmental stage of the participants (Ehrenreich-May & Bilek, 2011). Consequently, children may not have developed the emotion regulation skills that were theorised to prevent anxiety and depression. Thus, the present thesis posits that a prevention program that effectively targets and increases

emotional regulation skills will help children develop the necessary resilience to manage challenging situations using adaptive emotion regulation strategies, rather than resorting to maladaptive strategies, such as worrying and avoidance, which would prevent against the development of anxiety and depression.

A second approach which has been shown to be effective in reducing avoidance behaviours, such as worry, is behavioural activation (Chu, Colognori, Weissman, & Bannon, 2009). Behavioural activation helps to overcome patterns of avoidance by developing alternative and adaptive behaviours through goal setting and monitoring performance (Chu et al., 2009). Behavioural activation has previously been used as a transdiagnostic treatment, with results demonstrating significant reductions in worry in adults (Chen et al., 2013), and reduced anxiety and depression in youth (Chu et al., 2016); however, behavioural activation has not yet been used as a prevention approach for anxiety and depression in children. As previously stated, one factor that has been shown to protect against the development of anxiety and depression is emotional resilience (Hjemdal, Vogel, Solem, Hagen, & Stiles, 2011). Behavioural activation may be a potentially suitable approach to develop resilience, as it has been theorised that encouraging children to set adaptive goals and achieve these goals by engaging in adaptive behaviours will serve to build confidence and self-esteem (Chu et al., 2009), both of which have been associated with increased resilience (Lee et al., 2013). Hence, it was expected that Behavioural Activation would contribute to an increase in resilience, a decrease in worry, and a subsequent reduction in levels of anxiety and depression, in children.

Compared to previous universal prevention programs, most of which are based on the principles of cognitive behavioural therapy (CBT), Emotional Regulation and Behavioural Activation have a number of advantages. First, compared to traditional programs which often contain 10-15 sessions, the Emotional Regulation and Behavioural Activation programs

consist of a shorter 8 sessions, which may make implementation in schools easier. Second, as these programs contain fewer components compared to CBT-based programs, the strategies taught are briefer, potentially making them easier for children to understand (Hopko, Lejuez, Ruggiero, & Eifert, 2003). Third, given that the programs are less complicated compared to CBT-based programs, it is likely that they will be able to be delivered by teachers and trained staff, rather than psychologists, making them more cost effective for schools.

The overall purpose of this thesis was to develop and examine the efficacy of two universal school-based prevention programs for children (i.e., an emotion regulation- and a behavioural activation-based program) by building resilience to target excessive worry, a transdiagnostic feature of anxiety and depression. This included a rigorous evaluation of the available prevention literature, the development of two transdiagnostic school-based universal prevention programs for anxiety and depression, followed by examination of the effectiveness of the two prevention programs in a community sample of primary school-aged children, with comparisons against a usual class control condition. The structure of this PhD thesis is summarised below.

Summary of chapters

This thesis consists of five chapters. The current chapter, **Chapter 1,** provides a general introduction to the thesis. This includes an overview of the research project, an explanation of the key concepts examined in this research and relevant theoretical framework, followed by an overview of the thesis structure.

Chapter 2 (Study 1) describes a meta-analysis which aimed to investigate the efficacy of universal school-based prevention programs targeting both anxiety and depression in children under 13 years of age. It examined the prevention effects of both short-term and long-term programs, as well as the roles of potential moderators (i.e., the type of program, the

primary target of program, and the number of sessions delivered). The resulting paper has been published in *Clinical Child and Family Psychology Review* (Johnstone, Kemps, & Chen, 2018).

Building on the findings of the meta-analysis, **Chapter 3** (Study 2) presents a preliminary investigation of two universal school-based prevention programs, namely an Emotion Regulation program and a Behavioural Activation program, for anxiety and depression in children. The study aimed to examine the efficacy of the two programs by comparing them against a usual class control condition at post-program and at 6-month follow-up. The two prevention programs were developed for the purpose of this study. The emotion regulation program was largely based on modules outlined in Emotion Regulation in Children and Adolescents: A Practitioner's Guide, by Southam-Gerow (2013), while the behavioural activation program was based on the Behavioural Activation for Worry treatment manual developed by Chen et al. (2013). Participants were 295 students between the ages of 8 and 13 years, who were randomly assigned to receive either one of the two prevention programs or their usual classroom lessons (control condition). Outcome measures of resilience, worry, anxiety and depression, behavioural activation, and emotion regulation were taken. The manuscript has been published in the *Journal of Clinical Psychology* (Johnstone, Middleton, Kemps, & Chen, 2020).

Chapter 4 (Study 3) describes a randomised controlled trial which aimed to investigate the efficacy of an Emotion Regulation program and a Behavioural Activation program for anxiety and depression in children aged 8 to 13 years. The study expanded upon the preliminary study presented in Chapter 3 by incorporating amendments to both programs. These included: (a) a longer-term 12-month follow-up; (b) an assessment of the change in the percentage of participants who met the clinical cut-off scores for major depressive disorder and specific anxiety disorders over time; and (c) an additional measure of working memory to

assess changes in cognitive functioning as a result of a reduction in anxiety and depression symptomology.

To conclude, **Chapter 5** takes the form of a general discussion which commences with an overview of the main findings of this thesis, followed by a thorough discussion of its limitations and suggestions for future research directions.

Reader navigation

Chapters 2, 3 and 4 of this thesis are stand-alone manuscripts written for publication. Consequently, there is some repetition of background information to provide context for each study. References, tables and figures are presented throughout each chapter.

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Chapter 2: A meta-analysis of universal school-based prevention programs for anxiety and depression in children

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Candidate's contribution:

Kristy designed the study in collaboration with supervisors, reviewed the literature, analysed data, and prepared the manuscript under the supervision of Kemps and Chen.

Research design: 90%; Literature review: 90%; Statistical analysis 90%; Writing & editing: 60%

Abstract

Objective: Anxiety and depression are among the most common mental health issues experienced in childhood. Implementing school-based prevention programs during childhood, rather than adolescence, is thought to provide better mental health outcomes. The present meta-analysis aimed to investigate the efficacy of universal school-based prevention programs that target both anxiety and depression in children (aged 13 years or below), and examine three moderators (i.e., program type, primary target of program, and number of sessions) on prevention effects. **Methods:** PsycINFO, PubMED, and Google Scholar were systematically searched for relevant articles published up to and including January 2018. **Results:** Fourteen randomised controlled trials, consisting of 5970 children, met eligibility criteria. Prevention programs led to significantly fewer depressive symptoms at post-program (g = 0.172) and at long-term follow-up periods (g = 0.180), but not at short-term follow-up. Programs were not found to prevent anxiety symptoms across any time point. Considerable heterogeneity was observed for all effects. Program type and length were found to moderate the relationship between prevention program and outcomes. **Discussion:** Prevention programs were effective in preventing depressive symptoms at post-program and long-term follow-up, while no significant preventative effect on anxiety symptoms was observed. The FRIENDS Program, and programs which contained a greater number of sessions, showed beneficial effects on anxiety and depressive symptoms. **Conclusion:** Universal programs aimed at preventing both anxiety and depression in children are limited. Future research should investigate the long-term evaluation of school-based prevention programs for anxiety and depression in children.

Introduction

It is estimated that up to 20% of children and adolescents experience mental illness worldwide (Belfer, 2008), with anxiety and depressive disorders among the most commonly diagnosed (Lawrence et al., 2015; Merikangas et al., 2010). Prevalence rates for anxiety disorders in children between the ages of 4 to 11 years range from 1.57% to 6.9%, and those for Major Depressive Disorder range from 0.12% to 1.1% ("Global Health Data Exchange," 2018; Korkodilos, 2016; Lawrence et al., 2015). These figures increase with age, with 4.4% to 31.9% of adolescents experiencing an anxiety disorder, and 1.4% to 11.7% experiencing Major Depressive Disorder or Dysthymia (Korkodilos, 2016; Lawrence et al., 2015; Merikangas et al., 2010). Anxiety and depression are also highly comorbid (Cummings, Caporino, & Kendall, 2014), with comorbidity rates reaching 75% in clinical youth samples (Sorensen, Nissen, Mors, & Thomsen, 2005; Weersing et al., 2017). It has been suggested that this high comorbidity rate between anxiety and depression can be partially explained by the shared overlap in symptoms between these disorders, such as fatigue, sleep disturbance, and concentration difficulties. In addition, both disorders also share risk factors, such as familial mental health issues, underlying general negative affectivity, socioeconomic disadvantage, and a history of abuse or other stressful life events (Axelson & Birmaher, 2001; Garber & Weersing, 2010; Shanahan, Copeland, Costello, & Angold, 2008).

Childhood anxiety and depression are associated with numerous adverse personal, social and academic outcomes. Childhood anxiety and depression have been found to negatively impact emotion regulation (Bender, Reinholdt-Dunne, Esbjorn, & Pons, 2012), social and interpersonal functioning (Kingery, Erdley, Marshall, Whitaker, & Reuter, 2010; Verboom, Sijtsema, Verhulst, Penninx, & Ormel, 2014), academic performance (Owens, Stevenson, Hadwin, & Norgate, 2012), and executive functioning (Visu-Petra, Stanciu, Benga, Miclea, & Cheie, 2014; Wagner, Muller, Helmreich, Huss, & Tadic, 2015), leading to

an overall decreased quality of life (Stevanovic, 2013). Moreover, as symptoms tend to persist and increase in severity in adolescence and adulthood if left untreated (Prinzie, van Harten, Dekovic, van den Akker, & Shiner, 2014), children with symptoms of anxiety or depression are at a higher risk of developing an anxiety disorder or Major Depressive Disorder (Bittner et al., 2007; Dunn & Goodyer, 2006), as well as substance abuse problems (Kendall, Safford, Flannery-Schroeder, & Webb, 2004), and attempting or completing suicide in later life (Wanner, Vitaro, Tremblay, & Turecki, 2012). Notably, the outcomes for comorbid anxiety and depression are poorer than either single condition, and include greater social impairment, poorer response to treatment, increased suicide attempts, and higher rates of mental health service use (Birmaher et al., 1996; Ezpeleta, Domenech, & Angold, 2006).

Despite the high prevalence and negative consequences of anxiety and depression, currently less than one quarter of children experiencing these mental health issues receive treatment (Korkodilos, 2016; Lawrence et al., 2015; Merikangas et al., 2010). Furthermore, a substantial number of children who do receive psychological treatment do not experience sustained benefits (Ginsburg et al., 2011; Weisz, McCarty, & Valeri, 2006). A potential strategy to overcome these limitations, and to manage the high prevalence of anxiety and depression and their negative consequences, is to focus on the prevention, in addition to the treatment, of these conditions.

Prevention programs aim to reduce the incidence or onset of mental health disorders by reducing risk factors, and developing protective factors to prevent the development of these disorders (World Health Organisation, 2004). Typically, prevention programs are either universal, selective or indicated in nature. Universal programs target whole populations and do not require that participants be selected based on their level of risk. Selective programs target individuals or groups who have been identified as being ‘at risk’ of developing a mental health disorder. Lastly, indicated programs target individuals or groups who have mild

levels of a mental health disorder, and are therefore at an extremely high risk of developing the target disorder (World Health Organisation, 2004). Universal prevention programs are widely used within prevention research, and have a number of advantages when compared to selective or indicated programs. First, although a few universal programs have been delivered in non-school-based settings, such as during a recreational camp (Ehrenreich-May & Bilek, 2011) or via the internet (Calear, Christensen, Mackinnon, Griffiths, & O'Kearney, 2009), such programs are usually delivered in a classroom/school setting. This makes them easily accessible to a wide range of children at no inconvenience to the parents/guardians (Masia-Warner, Nangle, & Hansen, 2006). Second, universal programs are potentially less stigmatising compared to selective or indicated programs as students are not screened for inclusion (Barrett & Turner, 2001). Lastly, universal school-based prevention programs overcome many of the barriers to accessing treatment, such as cost, location, and time (Barrett & Pahl, 2006).

Several meta-analyses have been conducted to assess the efficacy of prevention programs for either or both anxiety and depression in children (e.g., Stockings et al., 2016; Werner-Seidler, Perry, Calear, Newby, & Christensen, 2017). Typically, these reviews show that prevention programs have a small but significant effect on reducing and preventing depression and anxiety symptoms compared to control conditions (Stockings et al., 2016; Werner-Seidler et al., 2017). In addition, a number of factors have been suggested to lead to greater outcomes within these programs. For instance, the type of program used in prevention studies has been shown to affect outcomes. Previous reviews have found that the FRIENDS Program, developed by Barrett and Turner (2001), is more efficacious in preventing anxiety symptoms compared to studies that utilise other programs, such as the Cool Kids Program, Aussie Optimism Program, Reach for Resilience, and the Penn Resiliency Program (Fisak Jr, Richard, & Mann, 2011; Stallard, 2013). In addition, it has been suggested that the number of

sessions included within a program may affect outcomes, with researchers arguing that programs may be more effective if they contained a greater number of sessions (Horowitz & Garber, 2006).

However, these meta-analyses carry a number of limitations which could impact on the reliability and validity of the findings. As noted by Fisak, Richard, and Mann (2011), there have been relatively few anxiety prevention programs developed for children in contrast to prevention programs for other mental health conditions, such as depression and eating disorders. This limits the generalisability of meta-analyses conducted in this area as they may not include an adequate sample size to provide a valid representation of the effectiveness of programs. In addition, there are two other limitations of previous meta-analyses which the current review sought to address. First, most previous reviews report outcomes from programs for both children and adolescents together, without separating these age groups (Stockings et al., 2016). Research has suggested that prevention efficacy may vary depending on the age or developmental stage of the child at the time of implementation (Farrell & Barrett, 2007; Fisak Jr et al., 2011). It has been shown that the average age of onset for anxiety disorders is 11 years (Kessler et al., 2005), and 11-13 years for depressive disorders (Merikangas, Nakamura, & Kessler, 2009), with the development of emotional disorders increasing throughout adolescence (Lawrence et al., 2015). This difference in disorder incidence could result in differing outcomes of prevention programs between these age groups. Thus, it has been suggested that implementing prevention programs within the early years of children's lives, rather than during adolescence, may be advantageous as children's cognitions and behaviour are more easily able to be adapted during these formative years (Gladstone, Beardslee, & O'Connor, 2011; Werner-Seidler et al., 2017). Therefore, this meta-analysis assessed the independent efficacy of preventative programs within childhood, rather than combining outcomes with those of adolescents.

Second, although there have been some meta-analyses that have sought to demonstrate the efficacy of anxiety and depression prevention programs, these have tended to combine the effects of studies that aimed to prevent either anxiety *or* depression (rather than studies that measured impacts on *both* anxiety and depression), or combine effects from universal, targeted, and selected programs. This does not allow for an assessment of whether the programs are effective in preventing both disorders within a universal framework (Ahlen, Lenhard, & Ghaderi, 2015; Stockings et al., 2016; Werner-Seidler et al., 2017). Given the high rates of comorbidity between anxiety and depression (Lawrence et al., 2015), and taking into account that these conditions have common risk factors, it is necessary to investigate the efficacy of universal transdiagnostic prevention programs that measure impacts on both anxiety and depressive symptoms to assess their preventative effects on both disorders. Transdiagnostic prevention programs seek to prevent both anxiety and depression simultaneously by incorporating techniques designed to change cognitions, emotions, and behaviours relevant to both conditions (Roberts et al., 2010). To the best of our knowledge, there have been no reviews that have assessed the efficacy of transdiagnostic prevention programs that aim to prevent both anxiety and depression in children.

This review addressed the aforementioned limitations by investigating the efficacy of universal school-based prevention programs that measure impacts on both anxiety and depression in children, and determining whether these programs are effective in preventing the onset of these disorders at long-term follow-up periods. As stated by Stallard (2013), prevention research should include long-term follow-up assessments to determine whether the program was effective in preventing the onset of new disorder diagnoses over time. Research within the area of childhood prevention tends to focus on children under 13 years of age (Kosters, Chinapaw, Zwaanswijk, van der Wal, & Koot, 2015; Pella, Drake, Tein, & Ginsburg, 2016). We therefore focused on this age group in our review. Furthermore, given

the benefits of universal school-based programs (i.e., low cost and easily accessible), and taking into account that school-based prevention programs are often universal in nature (Masia-Warner et al., 2006), we focused on evaluating the efficacy of school-based universal prevention programs. Lastly, we investigated the impact of three potential moderators on prevention effects as previous studies have suggested that prevention effects can vary depending on program characteristics (Fisak Jr et al., 2011; Werner-Seidler et al., 2017). First, we aimed to determine whether the type of program used moderated the relationship between program and outcomes. Although all programs included in this review are based on the principles of Cognitive Behavioural Therapy (CBT), they do contain different components which could result in different prevention effects across studies. For example, Fisak Jr et al. (2011) found that the type of program moderated the intervention effects in their meta-analysis of child and adolescent anxiety and depression prevention programs. Specifically, they found that studies that used the FRIENDS program showed larger effects than other programs. Second, we examined whether the primary target of the program moderated the relationship between program and outcomes. Although all of the included studies measured impacts on both anxiety and depression, some primarily aimed to prevent anxiety *or* depression, while others aim to prevent both. Given the overlap in symptoms and risk factors between anxiety and depression, researchers have suggested that programs that target anxiety may also be effective in reducing depression (Essau, Conradt, Sasagawa, & Ollendick, 2012; Gallegos, Linan-Thompson, Stark, & Ruvalcaba, 2013). However, to the best of our knowledge, no research has examined whether the primary target of program moderates outcome effects. Lastly, the number of sessions within a program has previously been suggested to moderate outcomes (Fisak Jr et al., 2011). We therefore sought to determine whether the number of sessions moderated the impact of prevention effects. Specifically, the review aimed to: 1) identify the overall efficacy of universal prevention

programs on both anxiety and depression symptoms in children, 2) ascertain the long-term effects of anxiety and depression prevention programs, and 3) investigate the effect of potential moderators (i.e., program type, primary target of program, and number of sessions) on the impact of the prevention effects.

Method

Literature search and eligibility criteria

The literature search was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Statement (Moher, Liberati, Tetzlaff, Altman, & Group, 2009), and in consultation with a research librarian. Searches of all databases took place in January 2018, using the PsycINFO (OVID), PubMED, and Google Scholar electronic databases. Two searches of titles and abstracts were conducted per database; the first included the keywords *prevention AND children AND anxiety OR depression*; the second included the keywords *transdiagnostic AND children AND anxiety OR depression*.

Eligibility Criteria

Inclusion criteria were: 1) published articles up to and including January 2018, 2) employed a universal, school-based prevention program, 3) randomised controlled trials, using either waitlist, placebo, or usual care control conditions, 4) the prevention program was based on psychological principles (e.g., educational or physical-based programs were excluded), 5) assessed children aged 13 years or below, 6) published in English, 7) studies reported valid and reliable outcome measures of both anxiety and depressive symptoms for children, and 8) essential data (i.e., means, standard deviations, and sample sizes) were presented, or data could be obtained from the authors. Fourteen studies met eligibility criteria (Figure 1 shows the PRISMA diagram of the review process).

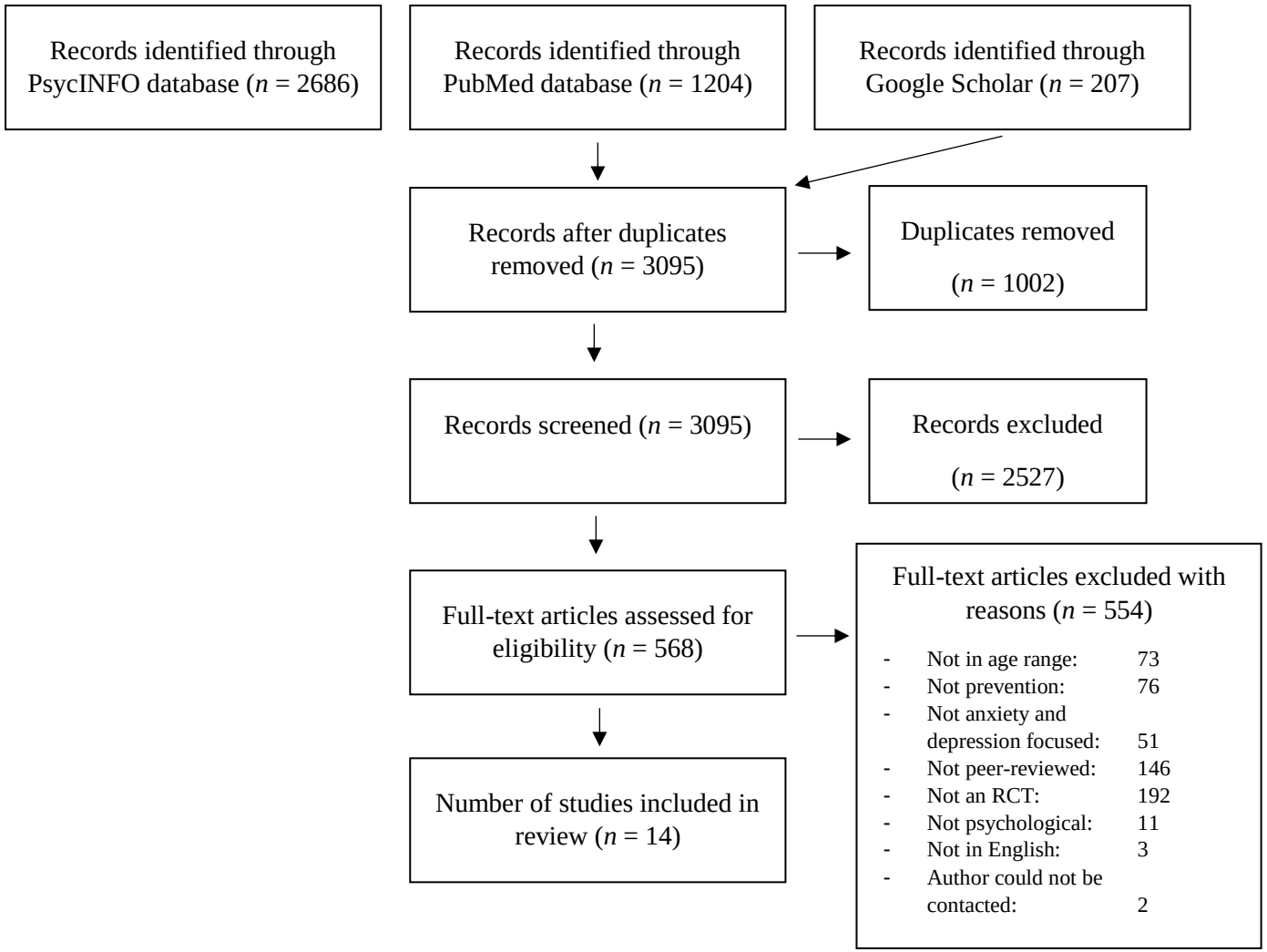

Fig. 1 PRISMA diagram of review process

Data extraction

Independent literature searches were conducted by the first author and a research assistant. Data were extracted from eligible articles by the first author and are presented in Table 1. In the case of missing data, the authors of the article were contacted via e-mail to obtain the essential information. In instances were an article reported combined results from a sample of pooled children and adolescents, the authors of the article were contacted to obtain data from the child sample only.

Table 1

Summary of School-Based Prevention Programs for Anxiety and Depression

Study	Age range	*N*	% Female	Control	Sessions	Session Length	Delivery	Outcome Measures	Mode of Delivery	ST Follow-Up	LT Follow-Up	Program Description
Ahlen et al. (2018)	8 – 11	Active – 353 CT - 342	48%	Waitlist	10	60	Weekly	SCAS CDI-S	Teachers	NA	12-month	Cognitive behavioural program targeting general anxiety in German children (FRIENDS Program – Swedish version)
Barrett & Turner (2001)[a]	10 - 12	Active - 188 CT - 137	45.5%	UCC	10 + 2 booster	75	Weekly	SCAS CDI	Psychologist	NA	NA	Cognitive behavioural program targeting general anxiety in Australian children (FRIENDS Program)
Essau et al. (2012)	9 - 12	Active – 302 CT – 336	45.8%	Waitlist	10 + 2 booster	60	Weekly	SCAS – German version RCADS	Psychology graduates	6-month	12-month	Cognitive behavioural program targeting general anxiety in German children (FRIENDS Program – German version)
Gallegos et al. (2013)	8 - 13	Active – 534 CT - 496	52.6%	UCC	10 + 2 booster	75	Weekly	SCAS – Spanish version CDI – Spanish version	Teachers	6-month	NA	Cognitive behavioural program targeting general anxiety and depression in Mexican children (FRIENDS Program – Spanish version)
Lowry-Webster et al. (2001); Lowry-Webster et al. (2003)	10 - 13	Active – 432 CT – 162	52.9%	Waitlist	10 + 2 booster	60	Weekly	SCAS CDI	Teachers	N/A	12-month	Cognitive behavioural program targeting general anxiety in Australian children (FRIENDS Program)
Pattinson & Lynd-Stevenson (2001)[b]	9 - 12	Active – 32 CT - 34	52%	Attention & UCC	10 + 1 review	120	Weekly	STAI-T-C CDI	Mental health workers	8-month	NA	Cognitive behavioural program targeting depressive symptoms and enhancing social skills in Australian children (Penn Prevention Program)

Pophillat et al. (2016)	6 – 8	Active – 106 CT - 100	51.9%	UCC	10	N/A	NA	SCAS CDI	Teachers	N/A	NA	Cognitive behavioural and social/emotional program targeting anxiety and depression in Australian children (Aussie Optimism Program: Feelings and Friends)
Roberts et al. (2010)	11 – 13	Active – 274 CT - 222	54.4%	UCC	20	60	Weekly	RCMAS CDI	Teachers	6-month	18-month	Cognitive behavioural and social/emotional program targeting anxiety and depression in Australian children (Aussie Optimism Program)
Rooney et al. (2006)	8 – 9	Active – 72 CT – 48	52%	UCC	8	60	Weekly	RCMAS CDI	Psychologists	9-month	18-month	Cognitive behavioural program targeting general anxiety and depression in Australian children (Positive Thinking Program)
Rooney et al. (2013a); Rooney et al. (2013b); Johnstone et al. (2014)	9 – 10	Active – 467 CT – 443	48.6%	UCC	10	60	Weekly	SCAS CDI	Teachers	6-month	18-month, 30-month, 42-month, 54-month	Cognitive behavioural and social/emotional program targeting anxiety and depression in Australian children (Aussie Optimism Program: Positive Thinking Skills Program)
Stallard et al. (2014)[c]	9 – 10	Active – 489 CT - 401	52.2%	UCC	9	60	Weekly	RCADS	Trained health facilitators	NA	12-month	Cognitive behavioural program targeting general anxiety in English children (FRIENDS Program)

Notes. Abbreviations: CT: Control, Sessions: Number of Sessions, ST Follow-Up: Short-Term Follow-Up, LT Follow-Up: Long-Term Follow-Up, NA: Not Applicable. Measures: SCAS: Spence Children's Anxiety Scale, CDI: Children's Depression Inventory, CDI-S: Children's Depression Inventory – Short Version, RCADS: Revised Children's Anxiety and Depression Scale, STAI-T-C: State-Trait Anxiety Inventory – Trait Subscale (child version), RCMAS: Revised Children's Manifest Anxiety Scale.

[a c] Barrett and Turner (2001) and Stallard et al. (2014) employed both a mental health worker and a teacher to deliver the same program independently. Research has identified that prevention programs show larger effect sizes when presented by mental health professionals than teachers (Fisak Jr, Richard, & Mann, 2011; Stallard et al., 2014). Therefore, outcomes from the mental health professional-led program only were included to present a valid and reliable representation of the potential efficacy of the program.

[b] Pattinson and Lynd-Stevenson (2001) included two versions of the same prevention program (i.e., one standard program and one reversed version of standard program) and two control conditions. Data were combined to create one prevention and one control condition, as per the guidelines outlined in Borenstein, Hedges, Higgins, and Rothstein (2009).

Statistical analysis

Comprehensive Meta-Analysis (version 3.0) was used to conduct all analyses. For each study, scores from standardised anxiety and depression measures were obtained for each prevention and control/comparison condition. Although studies often differed in the measures used, outcomes from differing measures were included, as long as they were standardised to measure the intended construct, to increase the power of the analysis and avoid selection bias (Puhan, Soesilo, Guyatt, & Schunemann, 2006). For each comparison between the prevention and control/comparison conditions, the difference between the two conditions at each time point was calculated by effect size (Hedge's *g*). Comprehensive Meta-Analysis uses the following formula to calculate Hedge's g: $M^1 - M^2$ / *SD* (pooled and weighted). Significant heterogeneity between studies was expected, as is often found with meta-analyses conducted in this field of research (e.g., Werner-Seidler et al., 2017). Therefore, effect sizes were calculated using a random effects model which assumes that significant heterogeneity exists between the included studies, and that the studies included in the analysis are a random sample of the effect sizes that could have been observed. Cohen's criteria for Hedge's *g* were used to determine the magnitude of the effect size, whereby effect sizes of 0.2, 0.5, and 0.8 referred to small, moderate, and large effects, respectively (Cohen, 1988). Categorical moderator analyses and meta-regressions were used to determine whether program type, primary target of program, and/or the number of sessions moderated the impact of prevention effects.

Publication bias

Studies that show non-significant results often go unpublished, which can result in a publication bias (Egger, Davey Smith, Schneider, & Minder, 1997). To assess this potential bias a fail-safe *N* was calculated for every significant meta-analysis. The fail-safe *N* is an

estimate of the number of studies with a mean effect size of zero needed to reduce the effect size to non-significance (Rosenthal, 1979). Additionally, funnel plots of the effect sizes for each significant meta-analysis were observed. A funnel plot that appears symmetrical around the mean effect size indicates no risk of publication bias (Egger et al., 1997).

Results

Study characteristics and outcome measures

The literature search resulted in 4097 potential articles. Based on the eligibility criteria, only randomised controlled trials which assessed universal, school-based prevention programs using psychological principles for children 13 years or under were included in the analysis. After removing duplicates, a total of 3095 article titles were screened for eligibility, with 568 full-text articles assessed. This resulted in 14 articles meeting eligibility criteria (see Fig. 1). All studies were randomised controlled trials. Of the 14 articles included in the analysis, three reported post-prevention, short-term, and long-term results from the same data set across three different articles (Johnstone, Rooney, Hassan, & Kane, 2014; Rooney, Hassan, et al., 2013; Rooney, Morrison, et al., 2013); another two reported post-prevention and long-term follow-up results from the same data set across two articles (Lowry-Webster, Barrett, & Dadds, 2001; Lowry-Webster, Barrett, & Lock, 2003). Effectively, this means that 11 of the 14 articles reported findings from original data sets, and three were follow-up studies. All 14 studies evaluated the impacts of the prevention programs on *both* anxiety and depression using self-reported symptomology measures as outcome variables. However, seven studies aimed to prevent both anxiety and depressive disorders, while four aimed to primarily prevent depression, and three aimed to primarily prevent anxiety. A total of 5970 participants were randomly assigned in the trials (3249 in the prevention program conditions, and 2721 in the control conditions). There were between 66 and 1030 participants per study

with participant age ranging from 6 – 13 years. The majority of studies were conducted in Australia (n = 10), one in Germany, one in England, one in Sweden, and one in Mexico. See Table 1 for a summary of included studies.

Program content and delivery

All prevention programs used within the studies were primarily based on the principles of CBT, and included variations of the FRIENDS Program, the Aussie Optimism Program (AOP), and the Penn Prevention Program. The FRIENDS Program teaches children strategies to assist with recognising anxiety, and identifying and challenging unhelpful thoughts. It also teaches children to use coping skills (e.g., problem solving strategies and relation), and self-rewards for achieving goals (Barrett, 2005). The FRIENDS Program also contains four sessions for parents designed to introduce them to the program and to provide them with the opportunity to discuss parenting and reinforcement strategies, such as praise (Barrett, 2005). The AOP consists of two components. The first component focuses on optimistic thinking skills, which includes learning how to identify feelings, link thoughts and feelings, and challenge unhelpful thoughts (Roberts et al., 2010). The second component focuses on social life skills, and teaches strategies for decision making, assertiveness, negotiation, and coping skills (Roberts et al., 2010). Lastly, the PPP also contains two components: a cognitive component and a problem solving and coping component (Gillham, Reivich, Jaycox, & Seligman, 1995). As part of the cognitive component, children are taught to identify negative beliefs, evaluate evidence for the beliefs, and generate more optimistic or realistic alternative explanations (Gillham et al., 1995). The problem solving and coping component focuses on teaching social problem solving and adaptive coping skills. This component also includes behavioural techniques to enhance assertiveness, negotiation, and relaxation (Gillham et al., 1995).

The mean number of program sessions was 11.45 (range = 8 – 20 sessions); mean session length was 69 minutes (range = 60 – 120 minutes). Regarding the control conditions, nine studies utilised a usual care condition whereby children received standard curriculum lessons taught by the regular classroom teacher, and four studies used a waitlist control condition. Nine studies employed teachers to implement the program and five studies employed mental health professionals (i.e., psychologists, psychology graduates, or trained health workers).

Data collection periods

The majority of the studies reported both pre- and post-program outcomes for anxiety and depression (n = 13), with one study reporting only pre- and 12-month follow-up data (Stallard et al., 2014). However, there was inconsistency in the length of follow-up periods across studies. To ensure follow-up data could be compared across studies, two overarching follow-up period categories were created. The short-term follow-up category consisted of periods ranging from 6 – 11 months; the long-term follow-up consisted of periods ranging from 12 – 54 months. See Table 1 for a summary of the follow-up periods.

Post-prevention effect sizes between treatment conditions

Ten studies were included in the analyses of post-prevention effects. Between-group effect sizes were calculated between each prevention and control condition, with positive effect sizes indicating higher mean scores on the outcome variables in the prevention condition than in the control condition. Between group effect sizes (prevention vs. control conditions) are presented in Appendix A. The post-prevention effect sizes for anxiety scores ranged from -0.260 to 0.653. The overall effect was small and non-significant (g = 0.094, 95% CI = -0.074 – 0.263, p = 0.273), with significant heterogeneity (I^2 = 86.27, p < .001).

Regarding post-prevention depressive symptoms, effect sizes ranged from -0.141 to 0.570. The overall effect size was small, but it was statistically significant (g = 0.172, 95% CI = 0.060 – 0.284, p = .003), with significant heterogeneity (I^2 = 65.55, p = .002). To address the potential publication bias, a funnel plot of post-prevention depression scores was created (see Fig. 2). The fail-safe N was 64, indicating that 64 unpublished studies would be needed to influence the statistical significance of the included studies. As the fail-safe N is larger than the number of observed studies (n = 10), it is unlikely that publication bias has a significant impact on the estimates of the overall effect size. Hence, the current results are likely to be a valid estimation of the overall effect size of post-prevention depression scores.

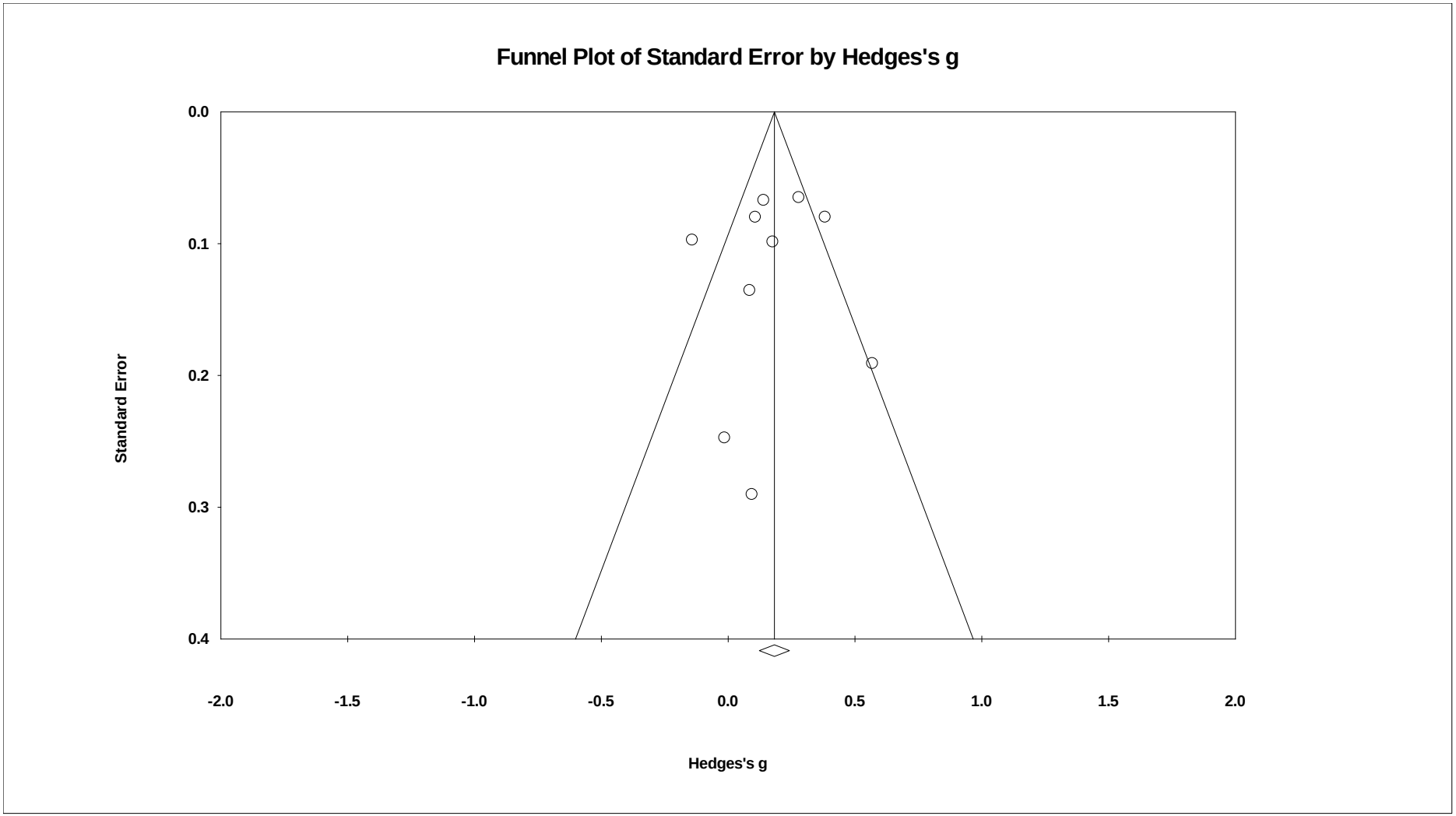

Fig. 2 Funnel plot of depression scores at post-intervention

Short-term effect sizes

Six studies reported short-term prevention effects. Between group effect sizes are presented in Appendix B. Short-term effect sizes for anxiety scores ranged from -0.032 to 0.467. The overall effect was small and non-significant (g = 0.125, 95% CI = -0.028 - 0.278, p = .109), with significant heterogeneity (I^2 = 67.07, p = .010). Regarding depressive symptoms, short-term effect sizes ranged from -0.122 to 0.492. The overall effect size was small and not significant (g = 0.163, 95% CI = -0.009 – 0.334, p = .063), with significant heterogeneity (I^2 = 73.53, p = .002).

Long-term effect sizes

Nine studies reported long-term prevention effects. Of these, two studies reported long-term follow-up results at 30-months (Rooney, Morrison, et al., 2013) and 42- and 54-months (Johnstone et al., 2014) from the same data set utilised in Rooney, Hassan, et al. (2013). These studies could not be treated as independent outcomes as this would lead to incorrect estimates of the effect, as the same participants would be included several times in the analysis. Therefore, data from these studies were combined to create one synthetic effect size, as per the guidelines outlined in Borenstein et al. (2009).

The effect sizes for anxiety and depression measures at long-term follow-up are presented in Appendix C. Regarding anxiety symptoms, long-term effect sizes ranged from -0.166 to 0.688. The overall effect was small and non-significant (g = 0.182, 95% CI = -0.049 - 0.413, p = .123), with significant heterogeneity (I^2 = 91.59, p < .001). Regarding depressive symptoms, long-term effect sizes ranged from -0.055 to 0.642. The overall effect was small but it was significant (g = 0.180, 95% CI = 0.009 – 0.352, p = .039), with significant heterogeneity (I^2 = 78.18, p < .001).

To address the potential publication bias, a funnel plot of depression scores at long-term follow-up was again created (see Fig. 3). The fail-safe *N* was 27, which is larger than the number of observed studies ($n = 8$), indicating that it is unlikely that publication bias has a significant impact on the estimates of the overall effect size. Hence, the current results are likely to be a valid estimation of the overall effect size of long-term follow-up depression scores.

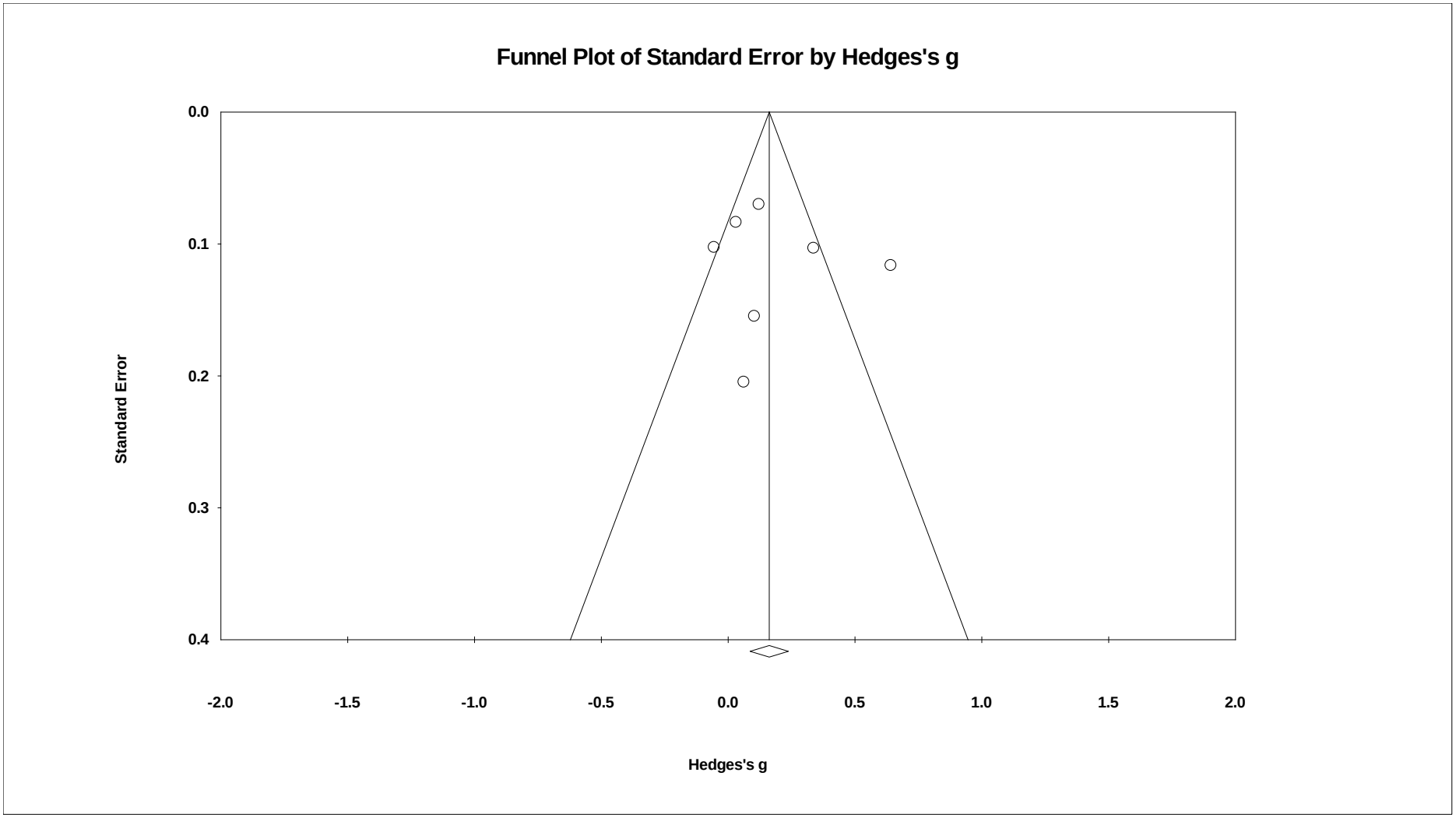

Fig. 3 Funnel plot of depression scores at long-term follow-up

Moderator analyses

Program Type

Categorical moderator analyses were conducted with program type (i.e., FRIENDS or AOP) as a subgroup to determine if the type of program moderated the relationship between prevention and outcome effects. As only one study used the Penn Prevention Program, it was excluded from the moderator analysis.

Program type was found to moderate the effect of prevention on anxiety symptoms (Qbetween(1) = 12.95, $p < .001$). Prevention conditions within studies that used the FRIENDS Program showed significantly fewer symptoms of anxiety at post-prevention compared to control, with small to moderate effects ($g = 0.253$, $Z = 2.46$, $p = .014$). Conversely, prevention conditions in studies which used the AOP demonstrated small but significant effects in the opposite direction ($g = -0.165$, $Z = -3.059$, $p = .002$).

Regarding follow-up periods, program type did not moderate the effect of prevention on anxiety symptoms at short-term follow-up (Qbetween(1) = 2.09, $p = .148$); however, it did moderate long-term anxiety effects (Qbetween(1) = 6.57, $p = .010$). Studies that used the FRIENDS manual were found to be effective in reducing symptoms of anxiety at long-term follow-up ($g = 0.377$, $Z = 2.25$, $p = 0.024$), while no difference was found for studies that employed the AOP manual ($g = -0.068$, $Z = -1.451$, $p = .147$).

Program type did not moderate the effect of prevention on depression symptoms, at post-prevention (Qbetween(1) = 0.35, $p = .553$), short-term follow-up (Qbetween(1) = 1.39, $p = .238$), nor at long-term follow-up (Qbetween(1) = 3.41, $p = .065$).

Primary Target of Program

Categorical moderator analyses were also conducted with the primary target of each program (i.e., programs that primarily target anxiety, depression, or both) as subgroups to assess whether the primary target of each program moderated the relationship between prevention and outcome effects.

Target of program did not moderate the effect of programs on anxiety symptomology at post-program (Qbetween(2) = 3.88, p = 0.143), nor at long-term follow-up (Qbetween(2) = 3.38, p = 0.185). Regarding short-term follow-up effects, only one study primarily targeted anxiety and measured short-term outcomes (Essau et al., 2012). We therefore removed this study from the analysis as it would not provide an accurate representation of short-term outcomes for programs that primarily target anxiety. As a result, only programs that targeted depression or targeted both depression and anxiety were included in the analysis. Results found that target of program did not moderate anxiety symptomology at short-term follow-up (Qbetween(1) = 0.70, p = .404).

Regarding depressive symptoms, target of program did not moderate the effect of programs on depressive symptomology at post-program (Qbetween(2) = 0.96, p = .614), nor at long-term follow-up (Qbetween(2) = 1.04, p = .594). Similar to the analysis on anxiety symptoms described above, the short-term follow-up moderation analysis only focused on programs that targeted depression or depression and anxiety, as only one study targeted anxiety and therefore was not included. Target of program did not moderate depressive symptomology at short-term follow-up (Qbetween(1) = 1.02, p = .313).

Number of Sessions

A meta-regression was conducted to determine whether the number of sessions moderated the relationship between prevention and outcome effects. The majority of

programs consisted of 8 to 12 sessions, and one program (Roberts et al., 2010) included 20 sessions. The analyses were recomputed with this outlier removed. As its inclusion substantially affected results, it was removed from the analyses to prevent this study from having an unwarranted impact on the results. For anxiety symptoms, the number of sessions were not found to moderate the effects at post-prevention (Q = 2.97, *df* = 1, *p* = .085) or at short-term follow-up (Q = 0.26, *df* = 1, *p* = .609). However, number of sessions did moderate the effects at long-term follow-up (Q = 8.93, *df* = 1, *p* = .003). As the number of sessions increased so did the magnitude of the effect.

For depression symptoms, number of sessions did not moderate the relationship between prevention and depression symptoms at post-prevention (Q = 0.00, *df* = 1, *p* = .987), or at short-term follow-up (Q = 0.14, *df* = 1, *p* = .711). However, number of sessions was a significant moderator of the effects of the prevention on depression symptoms at long-term follow-up (Q = 6.20, *df* = 1, *p* = .013). As the number of sessions increased so did the magnitude of the effect.

Discussion

The present review aimed to investigate the efficacy of universal school-based prevention programs for children, and overcome the gaps in previous literature by focusing on studies that evaluated the impacts of the programs on both anxiety and depression. This is important given the high rates of comorbidity (Lawrence et al., 2015) and common risk factors shared between the two conditions (Axelson & Birmaher, 2001; Garber & Weersing, 2010; Shanahan et al., 2008). Furthermore, this review focused on outcomes from studies that investigated children rather than adolescents, as it has been suggested that implementing prevention programs in the early years of children's lives, rather than during adolescence, may provide better mental health outcomes (Gladstone et al., 2011; Werner-Seidler et al.,

2017). In addition, this review investigated the effects of three moderators (i.e., program type, primary target of program, and number of sessions) on prevention effects.

Fourteen randomised controlled trials consisting of 5970 participants were included in the analysis. Results demonstrated small but significant effects for symptoms of depression at post-program and at long-term follow-up periods, but not at short-term follow-up. It is typical for meta-analyses of universal prevention programs to show small effects as these programs measure outcomes from whole populations of students, many of whom would not be at risk of developing anxiety or depression (Barrett & Turner, 2001). Consequently, prevention effects for children who do develop a disorder may be masked by a majority who were never at risk (Barrett & Turner, 2001). Therefore, even small effects demonstrate the clinical and practical significance of these programs (Ahlen et al., 2015). The present results are broadly in line with those of Ahlen et al.'s (2015) and Werner-Seidler et al.'s (2017) meta-analyses which found small but significant effects for depressive symptoms at post-prevention (g = 0.11 and g = 0.23 respectively). Consistent with the present study, Werner-Seidler et al. (2017) found small but significant effects for depressive symptoms at long-term (> 12-month) follow-up (g = 0.11). However, in contrast to the present study, their results also showed significant effects for depressive symptoms at 6 - 12-month follow-up (g = 0.12). It should be noted, however, that the periods of short- and long-term follow-up differed between the present study and that of Werner-Seidler et al. (2017) which could have contributed to the inconsistency between outcomes. Similarly, Ahlen et al.'s (2015) meta-analysis found small but significant effects for depression at follow-up (g = 0.10); however, their follow-up period combined short-term and long-term follow-up data (ranging from 3 to 48 months), and therefore cannot be compared directly to the present results. In addition, the effect size at short-term follow-up found in the current meta-analysis (g = 0.163) was similar to that of Werner-Seidler et al. (g = 0.12). However, there were fewer studies included in this

analysis (n = 14) compared to that of Werner-Seidler et al. (n = 81), indicating that the present analysis may not have had enough power to show significant findings. Lastly, it is important to recognise that the results reported from studies at the short-term follow-up period may not necessarily be from the same studies that reported the long-term follow-up data as several studies did not report both short-term and long-term data. This sampling difference could have contributed to the differences in effects between short-term and long-term follow-up periods.

Children in the prevention conditions did not show any difference in anxiety symptoms when compared to the control conditions across any of the time points. This is in contrast to previous meta-analyses that showed small but significant effects for anxiety symptoms at post-program (g = 0.13 in Ahlen et al., 2015; d = 0.18 in Fisak Jr et al., 2011; d = 0.16 in Stockings et al., 2016; g = 0.20 in Werner-Seidler et al., 2017). In regards to short-term and long-term follow-up effects, previous meta-analyses generally show small but significant prevention effects at 6 - 12 months post-prevention; however, these effects tend to decay by 12-month follow-up (Ahlen et al., 2015; Fisak Jr et al., 2011; Stockings et al., 2016; Werner-Seidler et al., 2017). Furthermore, given that previous meta-analyses include data from both child and adolescent samples, whereas the current meta-analysis specifically focused on children aged 13 years or younger, direct comparisons of those meta-analyses and the current meta-analysis may not be appropriate. In view of this, floor effects could potentially explain the lack of findings here. As children generally show a lower rate of anxiety symptoms compared to adolescents (Lawrence et al., 2015), it is possible that the difference in symptoms in a child-only sample may be too small to be significantly observable as there is less room for improvement in scores, in contrast to adolescent samples where there is likely a greater capacity for improvement. A potential explanation for why significant effects were found for depression outcomes but not for anxiety outcomes could be

the personnel who delivered the programs. Research has typically found prevention programs for children and adolescents to be more effective when delivered by trained mental health professionals than by teachers (Calear & Christensen, 2010; Fisak Jr et al., 2011; Stallard et al., 2014). Werner-Seidler et al.'s (2017) results are broadly in line with these findings, and showed that programs delivered by external facilitators (i.e., trained mental health professionals, researchers and graduate students) produced greater effects for depression (g = 0.30) compared to programs delivered by school staff (g = 0.17). However, the type of facilitator was found not to have an impact on anxiety symptoms. Werner-Seidler et al. argued that the less favourable effects of externally delivered prevention programs on anxiety could be because the majority of anxiety programs included in their analysis were aimed at children rather than adolescents. They theorised that younger anxious children may feel less comfortable participating in anxiety-prevention programs delivered by unfamiliar external facilitators, thus hindering the effectiveness of the program on anxiety outcomes. In the present study, approximately half of the programs were delivered by external facilitators, which could similarly explain the observed differences in effects between anxiety and depression outcomes among children.

Results of the moderation analyses showed that the type of program did not have an impact on the relationship between the prevention conditions and depressive outcome across any time point. However, program type was found to have an impact on the relationship between the prevention conditions and anxiety outcomes at post-program and long-term follow-up, but not at short-term follow-up. Prevention conditions that used the FRIENDS Program showed significantly fewer symptoms of anxiety compared to the control condition, with small to moderate effect sizes (post-program: g = 0.253, long-term follow-up: g = 0.377). By contrast, there was a statistically significant difference between prevention programs that employed the AOP program and control conditions, whereby the AOP program

was associated with greater anxiety symptoms at post-program than the control condition, although at long-term follow-up this difference was no longer significant (post-prevention: *g* = -0.165, long-term follow-up: *g* = -0.068). The difference in the effectiveness of the FRIENDS and AOP programs could explain why there was no significant difference in anxiety outcomes between conditions across any of the time points overall. As the AOP program was found to have no impact (i.e., at long-term follow-up) or a detrimental impact (i.e., at post-program) on reducing or preventing anxiety symptoms, this may have negated any positive impact that the FRIENDS program may have had on anxiety symptoms, thus impacting on the overall difference in anxiety outcomes over time.

Results from the second moderation analysis showed that the primary target of the program did not impact anxiety or depressive outcomes across any time point. This indicates that programs which primarily targeted anxiety *or* depression showed no differences in outcomes compared to those transdiagnostic programs which aimed to target both anxiety and depression. To the best of our knowledge, no studies have been conducted that examine the primary target of program as a moderator of program outcomes. This finding may have implications for future research and clinical interventions as these results suggest that interventions which primarily aim to target anxiety, such as the FRIENDS program, can also be used to prevent depressive symptoms, and vice versa.

The final variable, number of sessions, was found to moderate the effect of the prevention on anxiety or depression outcomes at long-term follow-up, but not at any other time point. Specifically, programs which contained a greater number of sessions showed larger effects for anxiety and depression outcomes at long-term follow-up, compared to programs containing fewer sessions. Regarding anxiety outcomes, the results from this analysis are in line with those of Fisak Jr et al.'s (2011) and Ahlen et al.'s (2015) meta-analyses of child and adolescent anxiety prevention programs, which found that the number

of sessions did not have an impact on anxiety outcomes at post-prevention (R = .22 and β = .00 respectively). Similarly, regarding depression outcomes, Horowitz and Garber's (2006) meta-analysis found no effect for the number of sessions on depressive outcomes at post-prevention (Delta R^2 = <.001) or at 6-month follow-up (Delta R^2 = .11). However, to the best of our knowledge, no study has yet assessed number of sessions as a moderator of anxiety outcomes at short- or long-term follow-up periods, or as a moderator of depressive outcome effects at long-term follow-up.

The results from the current meta-analysis suggest that the components involved in the prevention program, rather than the primary target of the program, may have a greater impact on anxiety and depression outcomes. Future research should focus on improving the content of prevention programs to achieve stronger outcomes for both anxiety and depression. Furthermore, our results suggest that future prevention protocols should consider including a greater number of sessions to allow for better long-term effects. However, it should be noted that the results could potentially be explained by the type of programs used. The FRIENDS Program typically consists of 10 sessions plus two booster sessions, whereas the AOP program typically consists of 8 to 10 sessions. Given that the FRIENDS Program was found to be more effective in preventing anxiety symptoms compared to the AOP program, and has been found to produce greater outcomes in previous reviews (e.g., Fisak Jr et al., 2011), it is possible that these results were confounded by the type of program used, and it was, in fact, program type, rather than the number of sessions, which led to the greater outcomes.

There are several limitations with regard to this analysis. First, although all studies did measure both anxiety and depressive symptoms, not all studies were actively designed to prevent both anxiety and depression in children. Some programs primarily aimed to target anxiety and then targeted depression as a secondary outcome, or vice versa. However, given

the high comorbid rates of anxiety and depression, researchers have suggested that programs that target anxiety may be effective in reducing depression (Essau et al., 2012; Gallegos et al., 2013). Indeed, studies have shown that programs which typically have a focus on preventing anxiety can also show a decrease in depressive symptoms (Barrett & Turner, 2001; Essau et al., 2012). This was also supported by the present meta-analysis as the primary target of the program was found not to moderate outcome effects, indicating that the intended target of the program does not have an effect on anxiety or depression outcomes. Second, the majority of included studies used self-report measures rather than clinician-rated outcomes. Although it is impractical to suggest that clinicians should conduct diagnostic assessments of all participants within school-based studies due to the time and cost involved, the use of self-report measures may impact on the validity of the outcomes due to demand effects and responding in a socially desirable manner (Logan, Claar, & Scharff, 2008). Lastly, the majority of studies did not include a long-term follow-up period that exceeded 12-months (*n* = 8). This relatively short time frame may not be sufficient to allow for an assessment of whether the program has been effective in preventing the onset of anxiety or depression. As noted by Stallard (2013), purely measuring short-term symptom reduction does not allow for an assessment of whether the program is actually effective in preventing the onset of new diagnoses over time.

Moving forward, the field of prevention research would benefit from expanding upon the current transdiagnostic prevention programs available for children. Taking into account the high rates of comorbidity between anxiety and depression (Lawrence et al., 2015), and the similarities in symptoms and risk factors for both disorders (Axelson & Birmaher, 2001; Garber & Weersing, 2010), it is necessary that future research continues to develop and investigate the efficacy of school-based anxiety and depression prevention programs for children. All programs included within this meta-analysis were based upon the principles of

CBT, and although the results show that these programs do produce some small benefits there is still room for improvement. Therefore, future research could explore employing different therapeutic techniques or strategies to determine whether these would provide greater outcomes. A second area for improvement within this field would be the inclusion of long-term follow-up periods to assess the development or onset of disorder diagnosis over time.

Overall, the results of this analysis suggest that current anxiety and depression prevention programs may be effective in preventing symptoms of depression at post-prevention and at long-term follow-up periods. However, no evidence was found to suggest that these programs have an effect on anxiety symptoms. Moderation analyses showed that program type impacted anxiety outcomes over time. The FRIENDS Program showed a beneficial effect on anxiety symptoms at post-program and long-term follow-up; by contrast, participants who received the AOP program did not display any significant improvement in symptomology over time. The number of sessions delivered was also found to moderate the relationship between program and outcome, whereby programs that contained more sessions showed larger effects for both anxiety and depression at long-term follow-up, compared to programs with fewer sessions. Lastly, the primary target of program was found not to impact anxiety or depressive outcomes across any time point. Future research should focus on the long-term evaluation of school-based transdiagnostic prevention programs for depression and anxiety in children, and improving the content of the programs to achieve better outcomes.

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Appendix A

Effect Sizes of Anxiety and Depression Measures at Post-Intervention

Study	Hedge's g	*SE*	95% CI		*z*	*p*
			Lower	Upper		
Anxiety outcome measures						
Ahlen et al. 2018	0.049	0.079	-0.106	0.204	0.621	0.534
Barrett et al. 2001	0.325	0.136	0.057	0.592	2.382	0.017
Essau et al. 2012	0.199	0.079	0.043	0.354	2.504	0.012
Gallegos et al. 2013	0.087	0.065	-0.040	0.213	1.337	0.181
Lowry-Webster et al. 2001	0.653	0.101	0.456	0.850	6.494	0.000
Pattison & Lynd-Stevenson 2001	0.135	0.250	-0.355	0.625	0.541	0.588
Pophillat et al. 2016	-0.260	0.153	-0.560	0.041	-1.691	0.091
Roberts et al. 2010	-0.191	0.097	-0.381	0.000	-1.960	0.050
Rooney et al. 2006	0.147	0.188	-0.221	0.515	0.784	0.433
Rooney et al. 2013a	-0.178	0.067	-0.310	-0.047	-2.655	0.008
Depression outcome measures						
Ahlen et al. 2018	0.108	0.080	-0.049	0.265	1.349	0.177
Barrett et al. 2001	0.086	0.136	-0.180	0.351	0.631	0.528
Essau et al. 2012	0.383	0.080	0.226	0.540	4.791	0.000
Gallegos et al. 2013	0.279	0.065	0.152	0.407	4.293	0.000

Lowry-Webster et al. 2001	0.177	0.099	-0.017	0.370	1.788	0.074
Pattison & Lynd-Stevenson 2001	-0.013	0.247	-0.498	0.472	-0.054	0.957
Pophillat et al. 2016	0.095	0.290	-0.475	0.664	0.326	0.745
Roberts et al. 2010	-0.141	0.097	-0.331	0.050	-1.446	0.148
Rooney et al. 2006	0.570	0.191	0.195	0.944	2.982	0.003
Rooney et al. 2013a	0.141	0.067	0.009	0.272	2.094	0.036

Appendix B

Effect Sizes for Anxiety and Depression Outcome Measures at Short-Term Follow-Up

Study	Hedge's g	*SE*	95% CI		*z*	*p*
			Lower	Upper		
Anxiety outcome measures						
Essau et al. 2012	0.467	0.115	0.242	0.693	4.061	0.000
Gallegos et al. 2013	0.102	0.069	-0.032	0.237	1.493	0.135
Pattison & Lynd-Stevenson 2001	0.057	0.270	-0.472	0.586	0.211	0.833
Roberts et al. 2010	0.002	0.101	-0.197	0.201	0.017	0.986
Rooney et al. 2006	0.216	0.188	-0.152	0.584	1.151	0.250
Rooney et al. 2013a	-0.032	0.069	-0.166	0.102	-0.469	0.639
Depression outcome measures						
Essau et al. 2012	0.492	0.115	0.266	0.718	4.273	0.000
Gallegos et al. 2013	0.097	0.069	-0.038	0.232	1.408	0.159
Pattison & Lynd-Stevenson 2001	0.489	0.294	-0.088	1.066	1.662	0.097
Roberts et al. 2010	-0.122	0.102	-0.321	0.077	-1.199	0.231
Rooney et al. 2006	0.252	0.188	-0.117	0.620	1.339	0.181
Rooney et al. 2013a	0.065	0.069	-0.069	0.200	0.952	0.341

Appendix C

Effect sizes of Anxiety and Depression measures at Long-Term Follow-Up

Study	Hedge's g	*SE*	95% CI		*z*	*p*
			Lower	Upper		
Anxiety outcome measures						
Ahlen et al. 2018	0.020	0.082	-0.141	0.181	0.243	0.808
Essau et al. 2012	0.688	0.117	0.459	0.917	5.888	0.000
Lowry-Webster et al. 2003	0.685	0.105	0.479	0.891	6.516	0.000
Roberts et al. 2010	-0.166	0.103	-0.368	0.036	-1.612	0.107
Rooney et al. 2006	-0.077	0.203	-0.475	0.322	-0.378	0.706
Rooney et al. 2013a/b	0.030	0.055	-0.077	0.137	0.548	0.584
Stallard et al., 2014	0.148	0.070	0.010	0.285	2.104	0.035
Depression outcome measures						
Ahlen et al. 2018	0.032	0.084	-0.132	0.196	0.380	0.704
Essau et al. 2012	0.642	0.116	0.414	0.870	5.518	0.000
Lowry-Webster et al. 2003	0.338	0.103	0.135	0.540	3.270	0.001
Roberts et al. 2010	-0.055	0.103	-0.256	0.146	-0.534	0.593
Rooney et al. 2006	0.062	0.205	-0.339	0.464	0.305	0.760
Rooney et al. 2013a/b	0.078	0.130	-0.178	0.334	0.598	0.550
Stallard et al., 2014	0.122	0.070	-0.015	0.260	1.742	0.082

Chapter 3: A pilot investigation of universal school-based prevention programs for anxiety and depression in children: A randomised controlled trial

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Candidate's contribution:

Kristy designed the study in collaboration with supervisors and fellow postgraduate student T. Middleton. Kristy delivered the programs, collected and analysed data, and prepared the manuscript under the supervision of Kemps and Chen.

Research design: 80%; Program delivery & data collection: 60%; Statistical analysis 90%; Writing & editing: 80%

Abstract

Objective: The current study aimed to provide a preliminary evaluation of two universal school-based prevention programs, namely Emotion Regulation (ER) and Behavioural Activation (BA), by increasing resilience to manage excessive worry, a transdiagnostic feature across anxiety and depression. **Method:** Primary school children (N = 295; 52.5% female; 8-13 years) from five Australian schools were cluster randomised to an ER, BA or usual class control condition. Outcome measures included resilience, worry, anxiety and depression; emotion regulation and behaviour activation were measured as potential mediators. Participants completed measures at pre- and post-program, and at 6-month follow-up. **Results:** Children in the BA condition showed increased resilience at 6 months. Expressive suppression mediated the effects of both programs on worry. **Conclusion:** The improvement in resilience in the BA condition, along with the mediation relationships, provides promising avenues for further exploration. Future research should include a longer-term follow-up to enable assessment of disorder diagnosis incidence.

Introduction

Anxiety and depression are the most prevalent mental health conditions affecting children and adolescents (Lawrence et al., 2015; Merikangas et al., 2010). It is estimated that up to 6.9% of children between the ages of 4 to 11 years meet the criteria for an anxiety disorder and approximately 1% for childhood depression ("Global Health Data Exchange," 2018; Korkodilos, 2016; Lawrence et al., 2015). The average age of disorder onset is 11 years for anxiety disorders (Kessler et al., 2005) and 11-13 years for depressive disorders (Merikangas, Nakamura, & Kessler, 2009). However, rates of diagnosis increase with age, with approximately 32% of adolescents (aged 13 to 18 years) diagnosed with anxiety, and 14% diagnosed with depression (Korkodilos, 2016; Merikangas et al., 2010). In addition, sub-clinical symptoms in childhood predict the development of disorder onset in adulthood (Keenan, Feng, Hipwell, & Klostermann, 2009; Meyer & Kröner-Herwig, 2017).

Anxiety and depression in childhood are debilitating, and interfere with emotion regulation and functioning (Braet et al., 2014; Suveg & Zeman, 2004), interpersonal and social interactions (Kingery, Erdley, Marshall, Whitaker, & Reuter, 2010; Verboom, Sijtsema, Verhulst, Penninx, & Ormel, 2014), and academic performance (Owens, Stevenson, Hadwin, & Norgate, 2012). If left untreated, these disorders tend to become chronic and are associated with negative outcomes in later life, such as substance use issues (Kendall, Safford, Flannery-Schroeder, & Webb, 2004), and an increased risk of suicidal behaviours (Wanner, Vitaro, Tremblay, & Turecki, 2012). Furthermore, comorbidity rates between anxiety and depression can reach 75% in clinical youth samples (Sorensen, Nissen, Mors, & Thomsen, 2005; Weersing et al., 2017). Outcomes for comorbid anxiety and depression tend to be poorer than those of a singular condition, with greater impairment, longer duration of symptomology, and poorer response to treatment (Feske, Frank, Kupfer, Shear, & Weaver, 1998). Given the significant impact of childhood mental health disorders, several manualised

intervention programs (e.g., Coping Cat, Confident Kids, and the FRIENDS program) have been developed to improve the mental health of young people; these have shown good outcomes for reducing anxiety, as well as internalising and externalising behaviours in children (Barrett & Turner, 2001; McNally Keehn, Lincoln, Brown, & Chavira, 2013; Trinder, Soltys, & Burke, 2008).

Despite the high prevalence of anxiety and depression in youth, the World Health Organisation (2018) reported that mental health disorders remain underdiagnosed and undertreated in this population. Parents/caregivers of children aged 4 – 11 years with mental disorders identified several barriers to seeking psychological treatment, predominately stemming from direct costs of treatment and low mental health literacy (Lawrence et al., 2015). Moreover, approximately 32 - 54% of children who do receive treatment do not reach full recovery (Cox et al., 2012; Ginsburg et al., 2011). This leads to a decreased quality of life for these individuals and a greater economic burden for society. As a result, the World Health Organisation (2004) proposed that the only sustainable method for reducing the burden caused by mental health disorders is prevention.

Prevention programs aim to reduce the risk factors and strengthen protective factors associated with the development of disorders, subsequently reducing the incidence of developing psychological disorders (World Health Organisation, 2004). Universal programs are widely used within prevention research as they are delivered to a whole population, such as a class or a school, making them easily available to all children (Rooney, Hassan, Kane, Roberts, & Nesa, 2013). Compared to selective or indicated programs which only target high-risk children, universal programs are typically less costly and do not require children to be screened for inclusion, which is potentially less stigmatising (Barrett & Turner, 2001).

Many universal prevention programs focus on building emotional resilience (e.g., Lowry-Webster, Barrett, & Dadds, 2001; Pophillat et al., 2016), which has been shown to be a protective factor against the development of depression and anxiety (Moore & Woodcock, 2017), and to be related to increased wellbeing in youth (Panter-Brick & Leckman, 2013). Indeed, several school-based intervention programs that focus on developing resilience have been shown to reduce symptoms of anxiety and depression in clinical child samples (Baum et al., 2013; Tol et al., 2014), and substance use and violent behaviour in adolescents (Griffin, Holliday, Frazier, & Braithwaite, 2009). Although there is some debate regarding how best to define resilience, it is most often conceptualised as "a process by which individuals manage to use resources to develop and maintain adaptive functioning in the face of adversity" (Daigneault, Dion, Hebert, McDuff, & Collin-Vezina, 2013, p. 161). Promoting resilience is especially suited to universal programs as it can be beneficial for all children to learn adaptive skills to manage challenging or adverse situations in everyday life, such as peer problems or academic stressors, regardless of their risk of developing a psychological disorder (Farrell & Barrett, 2007). Nevertheless, the majority of studies that assess prevention programs do not directly measure change in resilience as an outcome, but focus instead on anxiety and depressive symptoms (e.g., Barrett & Turner, 2001; Lowry-Webster et al., 2001; Pophillat et al., 2016). This is possibly due to the different definitions and conceptualisations of resilience within the literature, and the limited number of youth resilience measures available (Daigneault et al., 2013). Another limitation of current universal prevention research is that the majority of studies are single-targeted protocols, which often focus on only one specific disorder without addressing comorbid conditions (Farchione et al., 2012). Given the high comorbidity and shared risk factors in anxiety and depression, and the negative impact of comorbidity on treatment outcomes (Taylor, Abramowitz, & McKay,

2012), the impact of comorbid conditions should be taken into account within prevention research.

To date, only a small number of studies have aimed to prevent both anxiety and depression in children simultaneously (e.g., Ehrenreich-May & Bilek, 2011; Lowry-Webster et al., 2001; Pophillat et al., 2016). A meta-analysis conducted by Johnstone, Kemps, & Chen (2018) found that these studies tend to show small effects for reducing and preventing depressive symptoms; however, there is less consistency regarding the reduction in anxiety symptoms. It should be noted that universal prevention programs measure outcomes from a whole population, many of whom would not be at risk of developing psychological disorders. Therefore intervention effects for children who do manifest a risk for developing a disorder may be masked by the majority of those who were never at risk (Barrett & Turner, 2001). Consequently, even small effects indicate that these programs do offer clinical and practical significance (Ahlen, Lenhard, & Ghaderi, 2015). It is also important to recognise that many of the prevention protocols used in these studies, for instance the FRIENDS Program (Barrett & Turner, 2001), were originally designed and validated to prevent symptoms of anxiety, although they were also used to target depressive symptoms. While anxiety and depression are highly comorbid and share a number of similarities, there are important distinctions between the two disorders (Cummings, Caporino, & Kendall, 2014), such as differences in age of onset and symptomology (e.g., anxiety is characterised by feelings of fear, but not necessarily sadness which is a core feature of depressive disorders). This could explain why many of these studies failed to find any adequate changes in symptomology of both disorders over time.

Given that anxiety and depression share common risk factors, a prevention approach that targets common features or risks underlying both disorders, such as a transdiagnostic protocol, may be a more efficacious strategy. Transdiagnostic approaches target common

symptoms and vulnerability factors underlying multiple disorders, rather than focusing on one single diagnosis (Chu, 2012). Potentially, such approaches serve as a more efficient, economical and effective treatment for the vast number of clients presenting with comorbid disorders as multiple conditions can be treated simultaneously rather than sequentially (Farchione et al., 2012).

Recent transdiagnostic research has focused on worry as a transdiagnostic symptom across anxiety and depression (Barlow, Allen, & Choate, 2004). Worry is defined as a repetitive thinking process focused on possible future negative events (Roemer & Borkovec, 1993), and has been identified as a core diagnostic feature of Generalised Anxiety Disorder (GAD). In addition, research has indicated that worry is a process also seen in depression as well as other anxiety disorders (Hong, 2007). In identifying the similarities in emotional reactivity between individuals with GAD and Major Depressive Disorder, Barlow et al. (2004) argued that worry is used in both disorders as a strategy to avoid situations which may induce negative affect. Based on these findings, it has been suggested that targeting worry as a transdiagnostic feature across both anxiety and depression may be of value (Chen, Liu, Rapee, & Pillay, 2013).

To the best of our knowledge, the only prevention programs that target both anxiety and depression are based on Cognitive Behavioural Therapy (CBT). Reviews investigating the use of CBT in children have found that although it can be used with children, it is generally more effective in adolescents (Durlak, Fuhrman, & Lampman, 1991; Reynolds, Wilson, Austin, & Hooper, 2012). Some researchers have suggested that children have not developed adequate cognitive and interpersonal functioning to fully engage in CBT-based therapies (Durlak et al., 1991; Reynolds et al., 2012). Therefore, the development and application of simpler prevention programs that examine specific techniques for preventing

mood disorders in children is warranted, as they may provide benefits that have not been observed in the current prevention literature.

One such approach that may be beneficial in the prevention of childhood anxiety and depression may be an emotion regulation-focused program. It has been suggested that a significant feature in the development of anxiety and depressive disorders is an inability to regulate negative emotions (Kovacs, Joormann, & Gotlib, 2008; Schneider, Arch, Landy, & Hankin, 2016). Conversely, adaptive emotion regulation has been identified as an important factor in the development of resilience (Kay, 2016). According to King and Rothstein's (2010) model of resiliency, when an individual is faced with adversity, the ability to control emotions is essential to cognitively process and make sense of the event, reduce distress, and conjure the self-efficacy to overcome the situation. An impaired ability to regulate negative emotions such as sadness, anxiety and distress in an adaptive manner can leave a child vulnerable to developing depressed mood or anxious symptoms and subsequent depressive or anxiety disorders (Kovacs et al., 2008; Schneider et al., 2016). Conversely, children with adaptive emotion regulation skills are more comfortable with experiencing emotional states and are more skilled in employing adaptive strategies (e.g., problem-solving, accepting or reappraising the situation), than maladaptive strategies (e.g., worry, rumination, withdrawal or avoidance) to manage intense emotional distress (Braet et al., 2014; Carthy, Horesh, Apter, & Gross, 2010; Suveg & Zeman, 2004).

To the best of our knowledge, emotion regulation (ER) has not yet been used to target worry in children. However, one study investigated the effects of an emotion regulation-focused program for the prevention of anxiety and depression in children (Ehrenreich-May & Bilek, 2011). Ehrenreich-May and Bilek (2011) developed a 15-session transdiagnostic anxiety and depression prevention program, the Emotion Detectives Prevention Program (EDPP), with a focus on improving emotion regulation in children aged 7 to 10 years, using

principles of CBT and ER therapy. On completion of the program, a significant decrease in anxiety-related symptoms was found; however, consistent with previous research, the effect size was small (d = 0.26) and no changes in depressive symptoms or ER were observed. Given that a reduction in depressive symptoms often does not become apparent until 12-months post-program (Lock & Barrett, 2003), the lack of follow-up data did not allow for a clear conclusion regarding the effects of the program on depressive symptoms. Interestingly, despite the aim of the program to develop ER, no change in levels of ER were observed on completion of the program. Ehrenreich-May and Bilek (2011) argued that the ER skills taught within EDPP were quite general and were not tailored to the relevant deficits of the specific age groups targeted. They suggest that future prevention research should teach ER strategies in a more developmentally sensitive and specific manner, as ER skills fluctuate throughout child development.

Another approach which has been suggested to help individuals overcome worry is Behavioural Activation (BA). As worry has been identified as cognitive or behavioural avoidance, Chen et al. (2013) developed and investigated the application of BA as a transdiagnostic approach targeting worry in adults with both anxiety and depression. Theoretically, BA aims to overcome patterns of avoidance by increasing alternative, goal-directed behaviours (Chu, Colognori, Weissman, & Bannon, 2009). Specifically, BA assists individuals to achieve their goals, which serves to build confidence and self-esteem (Chu et al., 2009), both of which are associated with increased resilience (Benetti & Kambouropoulos, 2006; Gilligan, 1999).

BA has been found to be an effective transdiagnostic treatment to reduce worry in adults (Chen et al., 2013); however, research investigating its efficacy for children is limited. Chu et al. (2016) developed a group BA treatment for youth (GBAT) with anxiety and/or depression and assessed its efficacy within a randomised controlled trial. Youth aged 12-14

years were assigned to either a GBAT treatment (N = 21) or a waitlist control condition (N = 14). At post-treatment, 57% of those in the GBAT condition achieved remission from their principle diagnosis, compared to 28% of youth in the control condition, with a large effect size (d = 0.85). In terms of participants' secondary diagnosis, 70% of those in the GBAT condition achieved remission, compared to 10% in the control condition (d = 1.69). Although direct comparisons between the efficacy of GBAT against CBT have not yet been conducted, the effect sizes observed in Chu at al. (2016) appear to be comparable, if not superior, to those found for CBT-based anxiety and depression treatment programs for adolescents (d = 0.35 - 0.61; Ishikawa, Okajima, Matsuoka, & Sakano, 2007; Weisz, McCarty, & Valeri, 2006). To the best of our knowledge, BA has not yet been used as a prevention strategy for anxiety and depression. However, it is expected that treatment strategies can be translated for use as a prevention program, as is the case with CBT strategies that have been translated into prevention programs, such as the FRIENDS Program (Barrett & Turner, 2001).

Given the limited benefits of the existing CBT-based prevention programs for anxiety (Johnstone et al., 2018), novel transdiagnostic approaches that aim to improve the preventive effects of both anxiety and depression by using ER and BA strategies await exploration. Although CBT-based programs often contain elements of ER and BA, they tend to primarily focus on cognitive restructuring using thought challenging (e.g., Barrett & Turner, 2001; Roberts et al., 2010). By implementing ER and BA as two individual protocols, instead of combining these approaches into one program, we may be able to identify and evaluate the specific strategy that targets the potential underlying mechanisms of anxiety and depression, such as emotion regulation or behavioural activation.

Compared to traditional CBT-based programs, ER and BA approaches have several advantages. First, the strategies taught within ER and BA are briefer as they contain fewer components, potentially making them easier for children to understand (Hopko, Lejuez,

Ruggiero, & Eifert, 2003). As CBT-based programs contain multiple elements (e.g., both emotion regulation and behavioural activation) which may not be fully understood or engaged in by children due to their insufficient cognitive development (Durlak, et al., 1991; Reynolds, et al., 2012), separating multiple elements into programs including only a singular component is beneficial. In the current study, by separating the ER- and BA-based skills into two different programs, the number of elements taught in each program and the amount of material covered were substantially reduced, thereby making the programs easier to grasp for children. Second, traditional CBT-based programs typically consist of 10-15 weekly sessions (e.g., the FRIENDS Program; Barrett & Turner, 2001), which can make implementation in schools difficult due to budget restrictions and time constraints. In contrast, the ER and BA programs consist of eight sessions, making implementation easier as these programs can fit within one school term. Lastly, ER and BA are likely easier for professionals to deliver. In fact, BA has been shown to be equally effective when delivered by psychologists or generic mental health workers with little training (Ekers, Richards, McMillan, Bland, & Gilbody, 2011). As such, there is potential for teachers, rather than psychologists, to deliver the program, which will be more cost effective for schools.

The current pilot trial aimed to provide a preliminary evaluation of the efficacy of two universal school-based prevention programs for children, aged between 8 and 13 years, by targeting excessive worry, a transdiagnostic process across anxiety and depression. The outcomes of an ER- and a BA-based program were evaluated. The ER program was based on modules outlined in Emotion Regulation in Children and Adolescents: A Practitioner's Guide, by Southam-Gerow (2013), and components were modified to primarily target symptoms of excessive worry. The BA program was based on Chen et al.'s (2013) transdiagnostic Behavioural Activation for worry manual, and was modified to be applicable for children. The primary aim was to investigate the efficacy of these two programs in

preventing anxiety and depression symptomology by comparing them with a usual class control (UCC) condition. Each program consisted of eight, 50-minute sessions delivered weekly. Excessive worry, resilience, anxiety, depression, emotion regulation, and behavioural activation were assessed at baseline, post-program, and at 6-month follow-up. A secondary aim was to explore *how* change takes place by examining potential mediators for the two programs. It was expected that the level of emotion regulation would primarily mediate change in worry for those in the ER program, and behavioural activation would primarily mediate change in worry for those receiving the BA program. Accordingly, we hypothesised that participants in the ER and BA conditions would report significantly: 1) fewer symptoms of excessive worry, anxiety and depression, and 2) greater levels of resilience, at post-program and at 6-month follow-up, compared to those in the UCC. Furthermore, we expected that for participants in the ER condition, the level of emotion regulation would primarily mediate change in worry, while for the BA condition, the level of behavioural activation would primarily mediate change in worry.

Method

Participants

Participants were 295 students recruited from five primary schools within metropolitan and rural Australia. In line with previous research in the area of childhood prevention, children between the ages of 8 and 13 years were eligible to participate (Barrett & Turner, 2001; Essau, Conradt, Sasagawa, & Ollendick, 2012). Mean participant age was 11.04 years (*SD* = 1.40); 6.1% were 8 years, 9.8% 9 years, 14.2% 10 years, 26.4% 11 years, 28.1% 12 years, and 14.2% 13 years. The sample comprised of 155 girls (52.5%) and 140 boys (47.5%).

A power analysis showed that to detect a Cohen's d effect size of 0.3, with a power level of 0.80, 387 participants were required, with 129 participants per condition (Hedeker, Gibbons, & Waternaux, 1999). An effect size of 0.3 is typical for universal school-based studies, given that small effects still offer practical significance (Ahlen et al., 2015).

Study design

The study used a cluster (school) based randomised controlled design. Clustering at the school level, rather than the class level, was used as this method avoids potential contamination within schools with all classes at one school allocated to the same condition. A researcher with no other involvement in the study generated a random block sequence for the allocation of schools to condition using IBM Statistical Package for the Social Sciences, Version 25 (IBM SPSS). The sequence contained twelve sets of ones, twos and threes, corresponding to ER, BA and control respectively. Schools were allocated to a condition after consenting to participate in the study, and neither schools nor participants were blind to their allocated condition. Outcome measures were assessed on three occasions: baseline, post-program, and at 6-month follow-up. This created a 3 (Condition: ER, BA, control) by 3 (Time: baseline, post-program, follow-up) repeated measures design. The study was approved by the University Social and Behavioural Research Ethics Committee, the Department for Education and Child Development, and Catholic Education South Australia.

Protocols

Both the ER and BA programs consisted of eight 50-minute sessions delivered weekly. The programs were delivered by a provisional psychologist and a research assistant in a classroom format, with each class consisting of 20-30 students. The prevention programs were incorporated into the Australian teaching curriculum through the area of Personal and Social Capability, as part of the General Capabilities.

Emotion Regulation (ER) program. The ER program was largely based on modules outlined in Emotion Regulation in Children and Adolescents: A Practitioner's Guide, by Southam-Gerow (2013), with content adapted as a prevention program for children aged 8 - 13 years. The modules outlined in this guide were specifically developed to be adapted to a wide variety of presenting issues, rather than focusing on one disorder, indicating its suitability for use as a transdiagnostic protocol. The ER Program has as its main focus building emotion regulation skills by teaching children to identify and understand emotions, and develop positive emotion regulation strategies to manage negative emotions. The latter was thought to improve resilience and thus, in turn, reduce worry, anxiety, and depression. Specifically, the program contains three main components: 1) identifying and understanding one's own emotions and the emotions of others, 2) developing an understanding that thoughts, feelings and behaviours are interrelated and how thoughts can interfere with emotion regulation, and 3) practical prevention strategies, such as improving physical health and self-efficacy. Table 1 shows the outline of session contents.

Table 1

Outline of Session Contents for the ER Program

Session no.	Content
Session 1	○ Introduction and group rules. ○ Description of program. ○ Psychoeducation for worry.
Session 2	○ Emotion awareness skills – ○ Learn and practice the skills involved in being aware of our own feelings and the feelings of others.
Session 3	○ Emotion understanding skills – ○ Learn about emotional triggers, how emotions can be hidden, and how people can experience multiple emotions simultaneously. ○ Develop an understanding of how different emotions can have different effects on people's bodies.
Session 4	○ Cognitive skills 1 – ○ Develop an understanding of the link between thoughts, feelings, and behaviours. ○ Introduction of some common 'Thinking Traps', i.e., unhelpful ways of thinking.
Session 5	○ Cognitive skills 2 – ○ Teach and practice skills related to challenging our unhelpful thoughts with more helpful ways of thinking.
Session 6	○ Cognitive Skills 3 – ○ Learn and practice ways to 'Change the Channel' on Worry, i.e., identify when we are worrying unnecessarily about something, and learn strategies to overcome our worry.
Session 7	○ Prevention skills – ○ Learn and practice practical strategies that promote adaptive emotion regulation, i.e., healthy eating, engaging in exercise, and developing good sleep hygiene. ○ Practice ways to achieve and sustain a sense of mastery during an activity to increase self-efficacy.
Session 8	○ Quiz - review of all sessions and accomplishments. ○ Summary: What did you learn?

Behaviour Activation for Worry – Child (BA) program. The BA program is based on the Behavioural Activation for Worry treatment manual developed by Chen et al. (2013). The original manual was designed to target adult worry and was then modified for

adolescents (14-18 years old). In the current study, it was further modified for use with children by including age-appropriate language and activities. The pivotal goal of the BA program is to develop adaptive behaviours to cope with avoidance by helping participants to identify patterns of avoidant behaviour, and encouraging the development and practice of alternative behaviours. This serves to provide participants with increased opportunities for positive reinforcement, and decreased aversive experiences which serve to extinguish threat associations and reduce worry. It was thought that by developing adaptive behaviours, resilience would also be improved as children would be better equipped to manage challenging situations by using adaptive strategies. The BA program began with psychoeducation relating to the functional impact of worry. Participants then learned about how avoidance can impact upon worry, and were given opportunities to reflect upon their own patterns of worry and its consequences. Participants were encouraged to identify short-term goals which, together with the assessment of their avoidance patterns, help to develop alternative goal-oriented behaviours. Participants were then encouraged to engage in these alternative behaviours whilst monitoring their own practice and rewarding themselves for successful implementation. Table 2 provides an outline of session contents.

Table 2

Outline of Session Contents for the BA Program

Session no.	Content
Session 1	○ Introduction and group rules. ○ Description of program. ○ Psychoeducation for worry.
Session 2	○ Discuss avoidance behaviour and its impact on worry. ○ Introduction of the worry cycle and steps to break it. ○ Learn how to monitor worry when it happens.
Session 3	○ Understand what makes you worry. ○ Understand the links between worry, behaviours and emotion ○ How to gain control over worry: ○ Step 1: Recognizing worry when it happens ○ Setting goals for the program.

Session 4	○ Review & Discuss practice task:
	  ○ Recognizing worry when it happens by using the two-minute rule
	○ How to gain control over worry:
	  ○ Step 2: Looking at the behaviours that make you more worried
	  ○ Step 3: Finding active coping behaviours

Session 5	○ Review & Discuss practice task
	  ○ Finding active coping behaviours
	○ Choosing active coping behaviours and creating doable steps
	○ How to gain control over worry:
	  ○ Step 4: Making active coping behaviours regular in your life
	○ Long-term and short-term goals: Ensuring your behaviours are aligned

Session 6	○ Creating the coping behaviour ladder and practising your steps in your daily life
	○ Self-rewarding for effort
	○ How to gain control over worry:
	  ○ Step 5: Observe the results
	  ○ Step 6: Now evaluate

Session 7	○ Review & Discuss practice task:
	  ○ How to gain control over worry:
	  Step 5: Observe the results
	  Step 6: Evaluate the results
	○ Putting it all together

Session 8	○ Quiz - review of all sessions and accomplishments. ○ Summary: What did you learn?

Training and Supervision

Each program was delivered by a provisional psychologist with experience working in child settings, with assistance from a research assistant, who had completed or was completing an undergraduate degree in psychology. All sessions were audio recorded (with written consent from all participants and their parents/guardians). Weekly supervision of the provisional psychologist either in person or via email was conducted. The supervisor attended a randomly selected in-person session and reviewed a random selection of the audio recordings to ensure the facilitator's adherence to the prevention protocols.

Measures

Penn State Worry Questionnaire – Child version (PSWQ-C; Chorpita, Tracey, Brown, Collica, & Barlow, 1997). The PSWQ-C is a 14-item self-report questionnaire that measures trait pathological worry (e.g., "I am always worrying about something") in children and adolescents using a 4-point Likert scale, ranging from 0 (*not at all true*) to 3 (*always true*). The PSWQ- C has demonstrated excellent internal consistency (α = .91) and test-retest reliability (r = 0.92; Chorpita et al., 1997; Pestle, Chorpita, & Schiffman, 2008). The internal consistency for the present study ranged from .92 to .93 across the three time points.

The Child and Youth Resilience Measure – Short Version (CYRM-12; Liebenberg, Ungar, & LeBlanc, 2013). The CYRM-12 is a 12-item, self-report questionnaire that measures a child's available resources to build resilience. The CYRM-12 was deemed to be a particularly appropriate measure for a non-clinical, universal sample because it measures protective factors (e.g., personality traits and behaviours) associated with resilience, rather than actual responses to hardship, which some children in the present study may not have experienced. The CYRM-12 has been standardised for use with youth aged between 5 and 23 years, and is a shortened version of the original 28-item CYRM (Ungar &

Liebenberg, 2011). This measure uses a 3-point Likert scale (1 = *no*; 2 = *sometimes*; 3 = *yes*) and includes items such as 'Do you have people you want to be like?', and 'Is doing well in school important to you?' The CYRM-12 has been found to show sufficient content validity to be used to screen for resilience in youth (α = .84; Liebenberg et al., 2013). For the present study, the internal consistency ranged from .67 to .81 across time points.

Revised Child Anxiety and Depression Scales (RCDAS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000). The 47-item RCADS is a self-report questionnaire that assesses symptoms of anxiety and depression in children. Given that the programs in this study were designed to target anxiety and depression simultaneously, the RCADS was deemed to be an appropriate measure as it provides an overall score for anxiety and depression. Items are measured on a 4-point Likert scale, ranging from 0 (*Never*) to 3 (*Always*). Examples of items include 'I feel sad or empty', and 'I worry about things'. The RCADS has been shown to have good internal consistency (α = .78 - .88), test-retest reliability (r = .65 - .80), and convergent validity (r = .22 - .65; Chorpita, Moffitt, & Gray, 2005; Chorpita et al., 2000; de Ross, Gullone, & Chorpita, 2002). The internal consistency in the present study ranged from .95 to .97.

Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012). The ERQ-CA is a 10-item self-report questionnaire that assesses two well-researched emotion regulation strategies, namely cognitive reappraisal (6 items), and expressive suppression (4 items). Cognitive reappraisal is an adaptive emotion regulation strategy which involves "redefining a potentially emotion-eliciting situation in such a way that its emotional impact is changed", and includes items such as "When I am worried about something, I make myself think about it in a way that helps me feel better". Conversely, expressive suppression is a maladaptive strategy which involves inhibiting the expression of emotion, and includes items such as "I keep my feelings to myself". This measure was

chosen as it incorporates a wide range of emotion regulation strategies, including maladaptive strategies, which not only allow for an observation of an increase in adaptive strategies, but also a potential decrease in maladaptive strategies. Children were asked to rate the extent to which each statement applies to them on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The ERQ-CA has been shown to have good internal consistency (α = .75 - .83) and adequate convergent validity (r = 0.2 - 0.37). In the present study, the internal consistency ranged from .70 to .80.

Behavioural Activation for Depression Scale – Short Form (BADS-SF; Manos, Kanter, & Luo, 2011). The BADS-SF is a 9-item self-report questionnaire that measures activating and avoidant behavior change in adults over time. The adult version of the BADS-SF was modified for use in children, by amending the wording of certain questions to enable them to be read and comprehended by children aged 8 - 12 years (see the Appendix for an outline of the amendments made to the BADS-SF). The BADS-SF consists of items that measure behavior activation (e.g., "I did many different activities") and avoidance (e.g., "I did activities that would distract me from feeling bad"). Children are asked to rate the extent to which each statement applied to them during the past week, on a 7-point Likert scale, ranging from 0 (*not at all*) to 6 (*completely*). Items in the avoidance subscales are reversed scored, with a higher total score indicating greater activation. The BADS-SF has been shown to have good internal consistency (α = .82) and adequate test-retest reliability (r = .45; Manos et al. 2011). In the present study, the internal consistency ranged from .68 to .75.

Socio-economic status of schools. The socio-economic status (SES) of schools was calculated based on the Department for Education and Child Development's (2017) Index for Educational Disadvantage by School. Within this index, schools are given a rating of 1 (*low SES*) to 7 (*high SES*).

Procedure

Recruitment was initiated by approaching geographically accessible metropolitan and rural public and private school principals or counsellors by email to invite their school to participate in the project. The principal researcher then attended a meeting with the relevant school staff member.

Following approval from the school principals, whole schools were randomly allocated to either the ER or BA programs, or the UCC condition. The schools themselves selected the classes for participation. Information sheets and consent forms were sent home with students of those classes to obtain consent from parents/caregivers. Participation required a signed consent from parents/guardians and students (i.e., opt-in), prior to the commencement of the first wave of data collection. Parents/guardians were also asked to provide their postal address so that follow-up questionnaires could be sent to their child in the event that they moved schools during the study. Data collection took place on school grounds, at times convenient for the school.

The principal researcher and research assistant administered the baseline assessment of measures (PSWQ-C, CYRM-12, RCADS, ERQ-CA and BADS-SF) to all students (Time 1). The researcher read each question aloud to ensure that all students understood it. Students responded using pens/pencils and paper. The researcher and research assistant returned to the school approximately one week later to deliver the assigned program. The programs were delivered during normal school hours. Each session ran for approximately 50 minutes and was delivered on a weekly basis for 8 weeks. The usual classroom teacher was present at all times to ensure duty of care was upheld for the students. Students in the UCC received Health and Physical Education as outlined in the Australian Curriculum, delivered by their usual class teacher.

Approximately one week after completion of the program, the researchers returned to the school to administer the post-program measures to all students (Time 2). To obtain follow-up data, the researcher returned to the school approximately 6-months after completion of the final session to collect the follow-up (Time 3) measures. For students who had moved school or transitioned into high school, hard copies of the questionnaire booklet were mailed to them with a reply-paid envelope. Figure 1 shows a flowchart of the procedure.

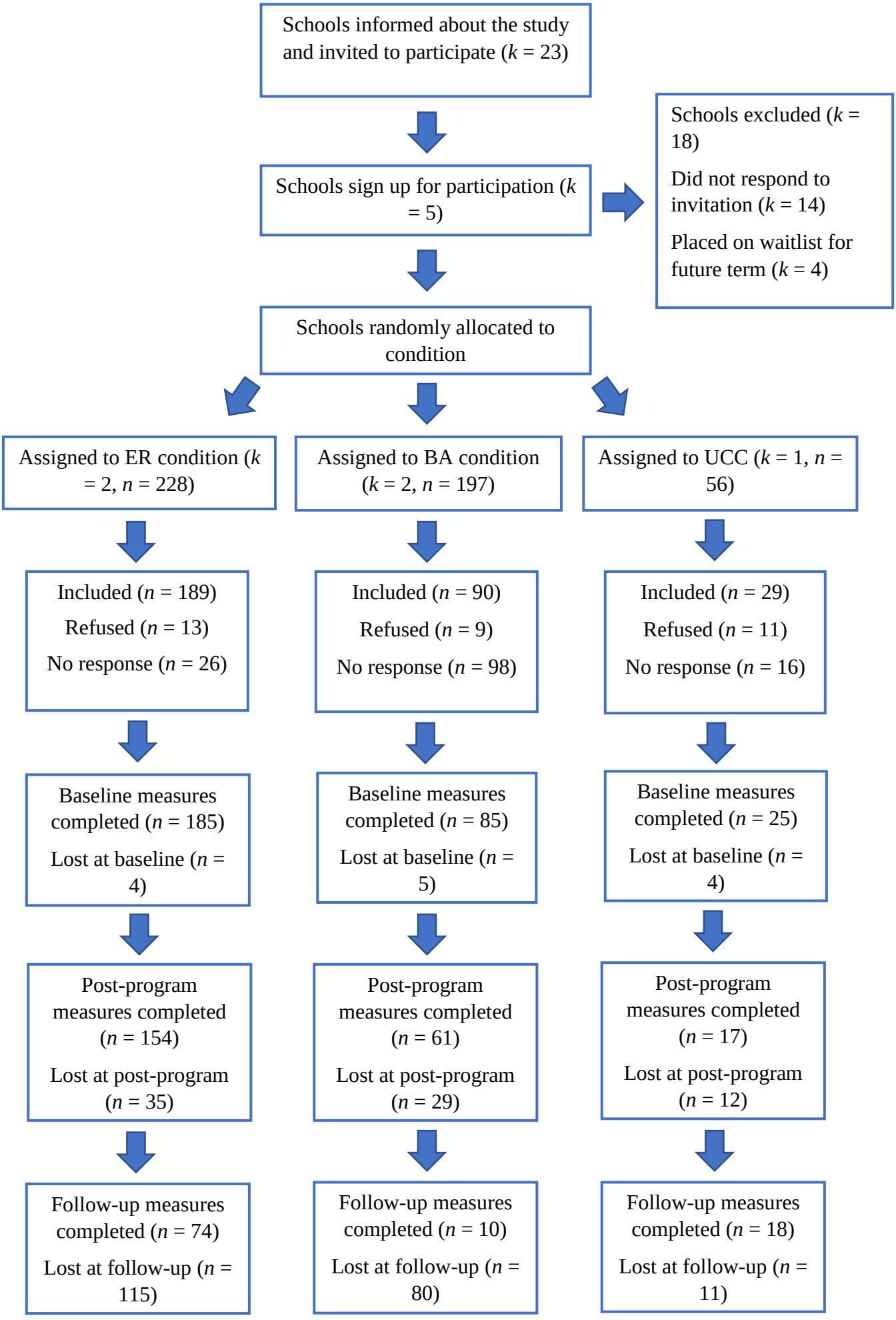

Fig 1. Flowchart of participants through the procedure

Statistical Analysis

One-way ANOVAs were conducted to examine baseline differences between conditions. Outcome analyses were conducted using Linear Mixed Modelling (LMM), the recommended technique for analysing repeated measures designs (Gueorguieva & Krystal, 2004). LLM has a number of advantages over a standard repeated measures ANOVA. In particular, it can include participants with missing data and it can handle unequal numbers per group. It can also more reliably account for correlated data, such as repeated measurements from the same participants (Gueorguieva & Krystal, 2004). The regression model was "mixed" as it included both random effects (student) and fixed effects (condition, time). Separate LMMs were conducted for each outcome variable (PSWQ-C, CYRM-12, RCADS, ERQ-RE, ERQ-ES and BADS-SF). All analyses were conducted using the IBM SPSS. Cohen's d effect sizes were calculated for within-groups effects using the formula: (*M1 – M2)*/*SDpooled.*

The mediating roles of level of emotion regulation and level of behavioural activation were explored separately using the bootstrap method via the PROCESS macro for SPSS (A. F. Hayes, 2013). The PROCESS macro was deemed to be a more appropriate method of conducting mediation analyses compared to traditional regression analyses as it does not require a significant interaction between variables to provide a valid analysis (A. F. Hayes, 2013). The bootstrap method produces a 95% confidence interval based on 5000 bootstrap samples to examine the significance of the indirect effect of the independent variable (Condition) on the dependent variable (worry) through the proposed mediators (emotion regulation and behavioural activation). Separate analyses were conducted for each proposed mediator at Time 2 and Time 3. A variable is considered to demonstrate a significant indirect effect (i.e., deemed to significantly mediate the relationship) if the confidence interval does not contain zero (A. F. Hayes, 2013).

Results

Sample Characteristics

Figure 1 shows the flow of participants through the study. Of the 23 schools invited, five public schools agreed to participate (1 rural and 4 metropolitan schools). A total of 64.03% of parents consented to their child's participation, 6.8% actively requested that their child did not participate, and 29.1% failed to return the consent form. Rates of attrition were high, with 15.8% of students not completing the post-program measures, and 42.82% of the sample failing to complete 6-month follow-up measures. These attrition rates were due to two factors. First, two schools (one in the ER and the other in the BA condition) did not respond to several requests to complete the 6-month follow-up data collection, and thus were deemed to have withdrawn. Second, many of the students, particularly in the two active conditions, were in Year 7, and consequently had transitioned into high school prior to the 6-month follow-up. Although 81 surveys were sent to those who had provided their postal address (27.12% of total sample), only 19 surveys (23.46%) were returned.

The mean SES of participating schools was 5.23, and ranged from 2 to 7. On a participant level, 20.7% attended a level 2 school, 16.6% a level 4 school, 23.4% a level 6 school, and 39.3% a level 7 school.

Preliminary Analyses

Data for resilience (CYRM-12) were significantly negatively skewed (skewness = -1.156) and could not be normalised using data transformation algorithms. Therefore, these data were used in their original form in the subsequent analyses. The results of ANOVAs that examined baseline differences between conditions showed significant differences between groups in CYRM-12 scores, F (2, 0.06) = 4.92, p = .008, RCADS scores, F (2, 8951.61) = 16.16, p < .001, and BADS-SF scores, F (2, 366.54) = 5.43, p = .005. To control for these

differences in subsequent analyses, baseline scores for these three measures were included as covariates.

Primary Analyses

Descriptive statistics (means and standard deviations) and within-group effect sizes for the three conditions across each time point are presented in Table 3. Results from the mixed model analyses and between group effect sizes are presented in Table 4. Between group effect sizes (Hedges' g) were calculated using differences in standardised change scores between groups based on the method recommended by (Morris, 2008). Hedges' g was calculated by using the pooled standard deviation at baseline as the variance estimate, and including a bias correction factor to estimate population effect.

Table 3

Descriptive Statistics and Within-Group Effect Sizes for the Emotion Regulation, Behavioural Activation, and Control Conditions at Baseline (T1), Post-Program (T2) and 6-Month Follow-Up (T3)

Variable		Emotion Regulation				Behavioural Activation				Control			
		Mean	*SD*	Within-group ES		Mean	*SD*	Within-group ES		Mean	*SD*	Within-group ES	
Worry	T1	18.56	9.53	T1 vs T2	0.23	19.62	10.28	T1 vs T2	0.05	20.21	9.11	T1 vs T2	0.04
	T2	17.20	9.32	T2 vs T3	0.45	19.33	9.84	T2 vs T3	0.06	20.45	9.06	T2 vs T3	0.23
	T3	13.91	8.45	T1 vs T3	0.58	18.91	7.61	T1 vs T3	0.09	18.76	8.93	T1 vs T3	0.20
Resilience	T1	18.79	3.48	T1 vs T2	0.06	17.18	3.78	T1 vs T2	0.28	17.87	3.33	T1 vs T2	0.29
	T2	18.58	4.03	T2 vs T3	0.14	16.16	4.31	T2 vs T3	0.92	18.88	4.14	T2 vs T3	0.37
	T3	19.24	4.08	T1 vs T3	0.12	20.55	3.64	T1 vs T3	0.88	17.10	3.99	T1 vs T3	0.20
Anxiety and Depression	T1	40.24	26.16	T1 vs T2	0.75	50.96	26.79	T1 vs T2	0.05	44.34	29.20	T1 vs T2	0.42
	T2	37.45	27.25	T2 vs T3	0.33	49.90	28.48	T2 vs T3	0.23	53.18	29.75	T2 vs T3	0.50
	T3	30.09	20.89	T1 vs T3	0.45	44.59	18.07	T1 vs T3	0.28	40.68	24.40	T1 vs T3	0.14
Emotion Regulation - *Cognitive Reappraisal*	T1	20.53	4.41	T1 vs T2	0.11	19.64	4.71	T1 vs T2	0.38	19.76	4.24	T1 vs T2	0.16
	T2	19.99	4.59	T2 vs T3	0.03	17.68	4.68	T2 vs T3	0.50	18.98	4.58	T2 vs T3	0.12
	T3	19.85	4.72	T1 vs T3	0.12	20.24	4.77	T1 vs T3	0.11	19.60	4.71	T1 vs T3	0.03

Emotion Regulation - *Expressive Suppression*	T1	11.87	3.03	T1 vs T2	0.19	11.98	3.26	T1 vs T2	0.19	12.40	2.96	T1 vs T2	0.30
	T2	11.30	3.15	T2 vs T3	0.10	11.37	3.27	T2 vs T3	0.48	13.31	3.07	T2 vs T3	0.52
	T3	11.05	2.71	T1 vs T3	0.30	12.59	2.66	T1 vs T3	0.21	11.99	2.93	T1 vs T3	0.15
Behavioural Activation	T1	35.08	8.44	T1 vs T2	0.03	32.14	9.20	T1 vs T2	0.13	30.39	8.16	T1 vs T2	0.15
	T2	35.27	8.36	T2 vs T3	0.22	33.21	8.67	T2 vs T3	0.89	31.49	8.32	T2 vs T3	0.18
	T3	36.80	9.06	T1 vs T3	0.21	39.81	9.73	T1 vs T3	0.88	32.76	9.18	T1 vs T3	0.30

Note. ES = effect size (Cohen's *d*); At T1, *N* = 169 (Emotion Regulation) *N* = 84 (Behavioural Activation) *N* = 23 (Control); T2, *N* = 123 (Emotion Regulation) *N* = 59 (Behavioural Activation) *N* = 17 (Control); T3, *N* = 70 (Emotion Regulation) *N* = 9 (Behavioural Activation) *N* = 18 (Control). Measures: Worry = Penn State Worry Questionnaire – Child Version; Resilience = The Child and Youth Resilience Measure – Short Version; Anxiety and Depression = Revised Children's Anxiety and Depression Scale; Emotion Regulation – Cognitive Reappraisal and Expressive Suppression subscales = Emotion Regulation Questionnaire for Children and Adolescents; Behavioural Activation = Behavioural Activation for Depression Scale – Short Form.

Table 4

Mixed Model Analyses with Between-Group Effect Sizes

	Condition	Time	Condition x Time	Random Intercept		Post-program (T2)			6-month follow-up (T3)		
Outcome Measures						Adjusted mean difference (*95% CI*)		ES	Adjusted mean difference (*95% CI*)		ES
Worry	*F* (2, 260.36) = 2.79, *p* = .63	*F* (2, 129.07) = 2.24, *p* = .11	*F* (4, 128.54) = 1.14, *p* = .34	45.69	ER v BA	-2.00	*(-5.52 – 1.53)*	0.11	-4.79	*(-11.17 – 1.59)*	0.40
					ER v CT	-3.25	*(-8.91 – 2.42)*	0.17	-4.85	*(-10.48 – 0.78)*	0.34
					BA v CT	-1.25	*(-7.29 – 4.79)*	0.05	-0.06	*(-7.89 – 7.76)*	0.07
Resilience	*F* (2, 197.13) = 1.17, *p* = .31	*F* (2, 110.54) = 2.41, *p* = .09	*F* (4, 130.30) = 4.01, *p* < .001	6.94	ER v BA	2.22**	*(0.63 – 3.81)*	0.23	-1.60	*(-4.76 – 1.55)*	0.81
					ER v CT	-0.29	*(-2.88 – 2.31)*	0.35	2.16	*(-0.42 – 4.74)*	0.35
					BA v CT	-2.51	*(-5.29 – 0.27)*	0.55	3.76	*(-0.51 – 7.47)*	1.11
Anxiety and Depression	*F* (2, 203.40) = 5.63, *p* < .001	*F* (2, 106.74) = 4.49, *p* = .01	*F* (4, 111.68) = 0.92, *p* = .45	262.45	ER v BA	-11.39*	*(-21.85 – -0.93)*	0.07	-12.42	*(-27.57 – 2.73)*	0.14
					ER v CT	-15.47	*(-33.88 – 2.94)*	0.44	-10.22	*(-25.49 – 5.06)*	0.24
					BA v CT	-4.08	*(-23.62 – 15.46)*	0.36	2.20	*(-17.66 – 22.06)*	0.10
Emotion Regulation - *Cognitive Reappraisal*	*F* (2, 213.56) = 0.76, *p* = .47	*F* (2, 131.04) = 3.34, *p* = .04	*F* (4, 131.97) = 1.45, *p* = .22	9.99	ER v BA	2.13**	*(0.40 – 3.90)*	0.31	-0.72	*(-4.73 – 3.28)*	0.28
					ER v CT	1.04	*(-1.82 – 3.90)*	0.05	0.34	*(-2.66 – 3.34)*	0.12
					BA v CT	-1.10	*(-4.13 – 1.94)*	0.25	1.06	*(-3.58 – 5.70)*	0.16

Emotion Regulation - *Expressive Suppression*	*F* (2, 253.16) = 2.16, *p* = .12	*F* (2, 114.65) = 0.17, *p* = .85	*F* (4, 114.45) = 1.78, *p* = .14	4.73	ER v BA	-0.01	*(-1.20 – 1.19)*	0.01	-1.45	*(-3.70 – 0.81)*	0.46
					ER v CT	-2.01*	*(-3.93 – -0.09)*	0.49	-0.94	*(-2.79 – 0.91)*	0.14
					BA v CT	-2.01	*(-4.06 – 0.04)*	0.47	0.51	*(-2.19 – 3.20)*	0.21
Behavioural Activation	*F* (2, 209.64) = 2.82, *p* = .06	*F* (2, 105.97) = 4.52, *p* = .01	*F* (4, 107.06) = 0.87, *p* = .49	35.64	ER v BA	2.06	*(-1.11 – 5.24)*	0.10	-3.04	*(-11.31 – 5.22)*	0.68
					ER v CT	3.73	*(-1.46 – 8.92)*	0.11	3.95	*(-1.94 – 9.83)*	0.08
					BA v CT	1.67	*(-3.85 – 7.19)*	0.00	6.99	*(-2.45 – 16.42)*	0.56

Note. ES = effect size (Hedges' *g*); At T1, *N* = 169 (Emotion Regulation) *N* = 84 (Behavioural Activation) *N* = 23 (Control); T2, *N* = 123 (Emotion Regulation) *N* = 59 (Behavioural Activation) *N* = 17 (Control); T3, *N* = 70 (Emotion Regulation) *N* = 9 (Behavioural Activation) *N* = 18 (Control). Measures: Worry = Penn State Worry Questionnaire – Child Version; Resilience = The Child and Youth Resilience Measure – Short Version; Anxiety and Depression = Revised Children's Anxiety and Depression Scale; Emotion Regulation – Cognitive Reappraisal and Expressive Suppression subscales = Emotion Regulation Questionnaire for Children and Adolescents; Behavioural Activation = Behavioural Activation for Depression Scale – Short Form.
*p < .05. **p < .01. ***p < .001

Penn State Worry Questionnaire – Child version. The Condition x Time interaction was non-significant. There were also no significant main effects for Condition or Time.

The Child and Youth Resilience Measure – Short version. The Condition x Time interaction was significant. Bonferroni post-hoc analysis revealed that for participants in the BA condition, resilience levels did not show any meaningful change from Time 1 to Time 2 (p = .14, 95% CI [-0.21, 2.37]); however, resilience scores increased significantly from Time 1 to Time 3 (p = .01, 95% CI [-6.23, -0.54]) and from Time 2 to Time 3 (p < .001, 95% CI [-7.47, -1.52]). Participants in the ER condition did not show any significant change in resilience scores from Time 1 to Time 2 (p = 1.00, 95% CI [-0.64, 1.06]), Time 2 to Time 3 (p = .56, 95% CI [-1.89, 0.55]), or Time 1 to Time 3 (p = .96, 95% CI [-1.57, 0.66]). Similarly, there were no significant differences in scores from Time 1 to Time 2 (p = .92, 95% CI [-3.40, 1.37]), Time 2 to Time 3 (p = .26, 95% CI [-0.71, 4.27]), nor Time 1 to Time 3 (p = 1.00, 95% CI [-1.28, 2.81]) in the control condition. There were no significant main effects of Condition nor Time.

Revised Child Anxiety and Depression Scales. The interaction between Condition x Time was non-significant. However, there were significant main effects of Condition and Time. Overall, participants in the BA condition reported significantly higher scores on the RCADS compared to those in the ER condition (p = .01), with no differences between the BA and control condition (p = 1.00) nor between the ER and control condition (p = .245). Regarding the main effect of Time, participants reported significantly lower scores at Time 3 compared to both Time 1 (p = .07) and Time 2 (p = .01), while no difference in scores was found between Times 1 and 2 (p = 1.00).

Emotion Regulation Questionnaire for Children and Adolescents. As previously stated, the ERQ-CA is separated into two emotion regulation strategies namely an adaptive strategy (cognitive reappraisal) and a maladaptive strategy (expressive suppression). Regarding cognitive reappraisal, there was no significant Condition x Time interaction. The main effect of Condition was also non-significant; however, there was a significant main effect of Time. Overall, participants displayed significantly less cognitive reappraisal at Time 2 compared to Time 1 (p = .04), but there was no difference between Time 1 and Time 3 (p = 1.00), nor between Time 2 and Time 3 (p = .35). In terms of expressive suppression, the Condition x Time interaction was non-significant, as were the main effects of Condition and Time.

Behavioral Activation for Depression Scale – Short Form. The interaction between Condition x Time was non-significant, as was the main effect of Condition. However, there was a significant main effect of Time. Pairwise comparisons showed that although there were no significant differences between scores at Time 1 and Time 2 (p = .87), or between Time 2 and Time 3 (p = .06), participants scored significantly higher at Time 3 compared to Time 1 (p = .01), indicating a greater use of behavioural activation skills over time.

Mediation Analyses

To test the hypothesis that level of emotion regulation and level of behavioural activation would mediate the relationship between condition and worry at Times 2 and 3, mediation analyses were conducted across the entire sample to assess mediation effects at Time 2 and Time 3. Results of the bootstrapping analyses are shown in Table 5. As predicted, the level of expressive suppression mediated the relationship between condition and worry at post-program for participants in the ER condition. At post-program, participants in the ER condition displayed lower levels of expressive suppression (M = 11.30, SD = 3.15) and lower

levels of worry (*M* = 17.02, *SD* = 9.32) compared to those in the control condition (expressive suppression: *M* = 13.31, *SD* = 3.07; worry: *M* = 20.24, *SD* = 9.06). However, contrary to prediction, level of expressive suppression also mediated the relationship between condition and worry for participants in the BA condition at post-program. That is, participants in the BA condition also displayed lower levels of expressive suppression (*M* = 11.37, *SD* = 3.17) and lower levels of worry (*M* = 19.33, *SD* = 9.84) compared to those in the control condition. There were no other indirect effects at any other time point.

Table 5

Results of Bootstrapping Mediation Analysis for ERQ-CR, ERQ-ES and BADS-SF as Mediators

Variable	Emotion Regulation compared to Control				Behavioural Activation compared to Control			
	Coeff.	*SE*	*CI lower*	*CI upper*	*Coeff.*	*SE*	*CI lower*	*CI upper*
ERQ-CR - Time 2	-1.06	1.02	-3.26	0.79	0.25	1.02	-1.82	2.35
ERQ-CR - Time 3	-0.00	0.40	-0.98	0.79	0.32	1.22	-1.96	3.31
ERQ-ES - Time 2	-2.19	0.96	-4.21	-0.40	-2.00	1.04	-4.23	-0.11
ERQ-ES - Time 3	-0.22	0.05	-0.12	0.08	-0.06	0.11	-0.32	0.11
BADS-SF - Time 2	-0.25	0.13	-0.50	0.01	-0.05	0.13	-0.31	0.20
BADS-SF - Time 3	-1.09	1.30	-4.01	1.07	-1.09	2.18	-6.14	2.72

Note. ERQ-CR = Emotion Regulation Questionnaire for Children and Adolescents – Cognitive Reappraisal subscale; ERQ-ES = Emotion Regulation Questionnaire for Children and Adolescents – Expressive Suppression subscale; BADS-SF = Behavioural Activation for Depression Scale – Short Form.

Discussion

The present study aimed to provide a preliminary investigation into the efficacy of two universal school-based prevention programs for children. An emotion regulation-based program and a behavioural activation-based program were developed with the aim of building resilience to prevent worry, which served as a transdiagnostic process of both anxiety and depression.

Reductions in Worry, Anxiety and Depression Symptomology

The hypothesis that participants in the two active conditions would report significantly fewer symptoms of excessive worry, anxiety and depression at post-program and at 6-month follow-up, was not supported. There was no significant change in symptomology over time for the active conditions compared to the control condition. This finding is partially in line with that of Ehrenreich-May and Bilek's (2011) pilot study, which found no significant reductions in depressive symptoms at post-program following their emotion regulation-based Emotion Detectives Prevention Program. However, they did find a reduction in anxiety symptoms which showed a small effect (d = .26). It should be noted, however, that Ehrenreich-May and Bilek (2011) conducted their pilot study without a control condition or a follow-up assessment. To the best of our knowledge, there are no other prevention programs that utilise an emotion regulation or behaviour activation framework to compare the present results against, nor are there any childhood prevention programs that include an outcome measure of excessive worry as a transdiagnostic feature. However, one of the main aims of this research was to explore the benefits of ER and BA over traditional CBT-based approaches. It was theorised that due to the simplistic nature of the ER and BA programs, children may more easily grasp the concepts taught, compared to CBT-based programs, which may lead to better outcomes. When comparing the between conditions

effect sizes observed in the present study against those found for the CBT-based prevention programs reported in Johnstone et al. (2018), the ER program demonstrates larger effects than CBT-based interventions at post-program (ER: g = 0.44, CBT: g = 0.09 for anxiety and g = 0.17 for depression), and at short-term follow-up (ER: g = 0.24, CBT: g = 0.13 for anxiety and g = 0.18 for depression). The BA condition also demonstrated larger effects than CBT-based programs at post-program (g = 0.36), however the effect sizes were comparable at short-term follow-up (g = 0.10). These findings should be interpreted with caution as direct comparisons between ER, BA and CBT were not conducted; however, they do indicate the potential benefit of the ER program over traditional CBT-based prevention programs. This suggests that the simplicity of the approaches for children may result in better preventive outcomes.

The lack of reduction in worry, anxiety and depression could be due to a number of factors. First, as this study used a universal approach, the vast majority of participants showed low levels of worry, anxiety, and depression at baseline. Thus, there was less room for a further reduction in symptomology which could have contributed to the null findings. As discussed by Barrett and Turner (2001) and Ahlen et al. (2015), universal prevention programs target a non-clinical population of individuals, many of whom would not develop anxiety or depression, therefore universal prevention programs that show small effects could still offer clinical and practical significance. In support, moderate to large effects were seen for worry, anxiety, and depression, as well as in resilience, in the present study (Table 4). These results present a promising avenue for further exploration in promoting resilience to prevent worry, anxiety and depression. Second, there has been evidence to suggest that prevention programs do not show effects for depression until 12-months post-program (Lock & Barrett, 2003). Furthermore, as previously discussed, anxiety and depression typically develop between the ages of 11 and 13 years (Kessler et al., 2005; Merikangas et al., 2009).

In the present study there were a significant number of participants aged under 11 years; therefore, it may have been unlikely that these children would have had the opportunity to develop anxiety or depression. Consequently, it would be beneficial to assess these participants at a longer-term follow-up to determine whether the current prevention programs could impact disorder onset at these critical ages.

Improvement in Resilience

There was partial support for the hypothesis that participants in the active conditions would report significantly increased resilience scores at post-program and at 6-month follow-up. Our results showed that participants in the BA condition reported greater levels of resilience at 6-month follow-up compared to Time 2. However, the change from Time 1 to Time 3 was non-significant. There were no changes in resilience scores between any time points in the ER or control conditions. Furthermore, it should be recognised that one of the BA schools withdrew from the study and a number of students from this condition had transitioned into high school prior to the collection of the follow-up data. Although these participants were posted a survey, only a very small number completed and returned it (n = 9). Therefore, these results should be interpreted with caution as the participants who chose to respond may not be representative of the overall sample.

Relatively few studies have included resilience as an outcome measure within universal school-based prevention programs, and these studies show mixed findings. A preliminary investigation into the efficacy of the 12-week SPARK Resilience Programme found resilience scores to improve in 11 to 13-year-old girls at post-program and at 6- and 12-month follow-up assessments (Pluess, Boniwell, Hefferon, & Tunariu, 2017). However, the researchers only included high-risk, low socio-economic schools. As previously stated, resilience is a process whereby an individual is able to maintain adaptive functioning despite

facing adversity (Daigneault et al., 2013). As low socio-economic status is highly correlated with a number of adverse life situations, such as child maltreatment and domestic violence (Drake & Pandey, 1996; Pearlman, Zierler, Gjelsvik, & Verhoek-Oftedahl, 2003), it is possible that the participants in Pluess et al.'s (2017) study had encountered greater adversity, and thus had greater opportunity to develop their resilience skills. Furthermore, the measure of resilience used by Pluess et al. (2017) assessed personality and behavioural characteristics related to resilience (e.g., "I am determined"), rather than protective factors associated with resilience as used in the current study. In contrast, Anticich, Barrett, Silverman, Lacherez, and Gillies (2013) found no change in the resilience levels of 4 to 7 year-old children at post-program nor at 12-month follow-up after completing the 12-week Fun FRIENDS Programme. Although the age range of their study differs from that of the present study, it too included children from varied socio-economic backgrounds. Although Anticich et al. (2013) used a different measure of resilience to the one used in the present study, it similarly captured protective factors associated with resilience. The lack of improvement in resilience in the present study may be explained by differences in the conceptualisation and measurement of resilience across studies. In addition, it has been argued that resilience can only arise after experiencing significant adversity (Miller-Lewis, Searle, Sawyer, Baghurst, & Hedley, 2013). Given the relatively young age and the overall high socio-economic status participants in the present study, it is possible that many had not experienced sufficient adversity required to develop emotional resilience, in contrast to studies which only include low socio-economic schools.

Mediation Relationships

The hypothesis that level of emotion regulation would mediate the relationship between condition and worry was partially supported. At post-program, participants in the ER condition displayed lower levels of the maladaptive emotion regulation strategy, expressive

suppression, and lower levels of worry compared to those in the control condition. As previously stated, expressive suppression involves inhibiting one's emotional responses (Gullone & Taffe, 2012), and has been linked to increased negative emotional experiences, such as worry (Gross & John, 2003). A primary focus of the ER program was to encourage students to identify and accept their emotional experiences, and to teach them that feeling and expressing, rather than inhibiting, their emotions is normal and beneficial for positive functioning. These components of the ER program would therefore have encouraged students to reduce the use of expressive suppression, thus resulting in decreased worry.

Unexpectedly, level of expressive suppression also mediated the relationship between condition and worry for participants who completed the BA program, which was not designed to target emotion regulation skills. However, a closer examination of the potential impact of the BA program on expressive suppression could explain why this mediation relationship occurred. Expressive suppression is often used as a strategy to disengage from or avoid unpleasant emotions, such as worry (Ehring, Tuschen-Caffier, Schnulle, Fischer, & Gross, 2010). Conceptually, this is similar to experiential avoidance, which is defined as attempts to avoid or suppress unwanted emotions, thoughts or physical sensations (S. C. Hayes et al., 2004). As stated previously, worry has been defined as a form of experiential avoidance (Chen et al., 2013). An important focus of the BA program was to encourage students to identify and reduce patterns of avoidance by engaging in alternative behaviours. As such, it is possible that the avoidance and worry reduction strategies taught in the BA program also served to reduce expressive suppression, which in turn, led to lower levels of worry.

No other mediation relationships were observed, which was not surprising as the programs did not meaningfully affect symptoms of worry. This may also reflect a limitation of the programs themselves in that neither effectively targeted and improved emotion

regulation or behavioural activation skills. However, given the relatively short follow-up period, it is possible that the improvement in skills required a longer term to become apparent, as it takes time and practice to develop and become proficient at using newly learned skills. The lack of improvement in ER and BA skills may explain the lack of change in the primary outcomes at 6-month follow-up, as without any meaningful improvement in skills one would not expect to see any change in resilience or worry.

Limitations and Directions for Future Research

The present study has several limitations which should be taken into account in future research. First, it did not include a longer-term follow-up to assess the prevention of disorder diagnoses over time. As this was the first preliminary investigation into the efficacy of these programs, the inclusion of a longer-term follow-up was deemed to be outside the scope of this pilot study. Indeed, the main focus was to determine whether the ER and BA programs could reduce and prevent anxiety and depression symptomology to ascertain their suitability for preventing disorders in future research. Second, a number of classroom teachers felt that the programs would benefit from more rapport building during the first session. Given the sensitive nature of the topics addressed in the programs, they felt that students may not have been comfortable to be completely open in their survey responses or during certain program activities with instructors whom they were not familiar with. Although it is not known whether this did have an impact upon survey responses, it is nevertheless an important factor to take into consideration in future studies. The teachers also recommended that the programs include more interactive games and activities to motivate the children and maintain their interest. This was particularly important for the BA program, which was found to be quite heavy in theoretical concepts and information which was not always in line with the developmental stage of the children involved. By increasing the interactive games and activities within each program, children may be more focused and interested to learn the

concepts, which may, in turn, facilitate the development of the ER and BA skills taught and potentially lead to an improvement in symptomology.

Third, the sample size fell short of the required number calculated in the power analyses, and attrition rate at 6-month follow-up was high, both of which may limit the reliability of the findings. Moreover, as there were only five schools involved in the study, there was not sufficient diversity within each condition to report school-level effects with any validity. As discussed, the high rates of attrition were primarily due to many students having transitioned into high school prior to the collection of the 6-month follow-up data. Procedures were nevertheless put in place to account for this (i.e., the use of postal surveys). The schools themselves ultimately selected the classes to be involved in the study, which resulted in a large number of students in their final year of primary school participating in the research. The recruitment of further participants and schools was not feasible for this pilot study, and thus a fully powered assessment of the ER and BA programs is warranted. Potential strategies for improving power (i.e., increasing sample size and reducing attrition) in future school-based studies could include the use of an opt-out method of recruitment and the provision of incentives to schools allocated to the control conditions. Fourth, relatedly, there was an uneven number of participants per condition. Throughout the recruitment process it became obvious that schools were less motivated to participate once they were aware that they had been assigned to the control condition. This resulted in the control school offering fewer classes to be involved, and the classroom teachers appeared to be less motivated to encourage students to return their parent/caregiver consent forms, which led to the smaller number of participants in the control condition. The response rate also differed between the ER and BA conditions, with a greater response rate for the ER condition. This may reflect the lower SES of the BA schools involved (BA = 2.56 vs ER = 6.63), as low SES has been linked to lower parental response rates in child-based research (Dent et al., 1993; Henry, Smith, & Hopkins,

2002). Fifth, there were a limited number of measures available to assess resilience and emotion regulation in children. Furthermore, as these constructs are not typically measured in child-based prevention studies, the validity of these measures for use in a repeated measures design could not be assessed. Finally, there was no assessment of adherence to the prevention protocol, although a random selection of sessions was reviewed by the supervisor. Future research should focus on addressing the limitations of the programs outlined above (i.e., inclusion of interactive games/activities, increased rapport building, inclusion of an adherence assessment) and investigating the longer-term efficacy of the programs and documenting the incidence of new diagnoses at such longer-term follow-up.

Strengths of the study

Importantly, the present study also has several strengths. First, schools were randomly assigned to condition, and the study design included a control condition. Schools, rather than classes, were randomised to condition, to prevent contamination between conditions. As a result, data were analysed at a cluster level, rather than an individual level, which has been suggested to produce more valid and reliable outcomes (Ahlen et al., 2015). Second, the inclusion of a measure of resilience is novel in prevention research. Although many prevention programs aim to target resilience, few studies have included resilience as an outcome measure to assess whether the program has been effective in targeting and improving resilience levels (e.g., Bastounis, Callaghan, Banerjee, & Michail, 2016). Third, the present study included schools from varying socio-economic backgrounds, and included a rural school, which increases the generalisability of the findings.

Conclusion

In sum, the present study provided a preliminary investigation for the use of ER- and BA-based universal school-based prevention programs for worry. Although the programs did

not lower symptoms of worry, anxiety and depression, the increase in resilience levels following the BA program provides a promising avenue for further exploration. It is likely that the lack of significant findings could be due to the universal nature of the study, the young age of the participants, and the insufficient improvement in ER and BA skills. A number of limitations were observed, such as the lack of a longer-term follow-up and the inability to effectively increase ER and BA skills. Nevertheless, this initial pilot investigation provides opportunities for future research to further improve the programs to better suit the student population and evaluate the prevention effects to assess the incidence of new disorder diagnoses at longer-term follow-up.

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Appendix

Amendments made to the Behavioural Activation for Depression Scale – Short Form for use with Children

Original BADS-SF	Amended BADS-SF for children
There were certain things I needed to do that I didn't do	There were certain things I needed to do that I didn't do
I am content with the amount and types of things I did	I am happy with the amount and types of things I did
I engaged in many different activities	I did many different activities
I made good decisions about what type of activities and/or situations I put myself in	I made good decisions about what type of activities and/or situations I put myself in
I was an active person and accomplished the goals I set out to do	I was an active person and accomplished the goals I set out to do
Most of what I did was to escape from or avoid something unpleasant	Most of what I did was to escape from or avoid something bad
I spent a long time thinking over and over about my problems	I spent a long time thinking over and over about my problems
I engaged in activities that would distract me from feeling bad	I did activities that would distract me from feeling bad
I did things that were enjoyable	I did things that were enjoyable

Chapter 4: A randomised controlled trial evaluating two universal prevention programs for children: Building resilience to manage worry

Abstract

This randomised controlled trial evaluated the long-term efficacy of an emotion regulation-based program (ER) and a behavioural activation-based (BA) program. Both programs aimed to build resilience to prevent worry, a transdiagnostic feature across anxiety and depression. Participants were 316 primary students (52.2% female; 8-13 years) recruited from six primary schools in Adelaide, South Australia. Schools were randomised to an ER, BA or a usual class control condition. Outcome measures of resilience, worry, anxiety, depression and working memory were administered at pre- and post- program, and at 6- and 12-month follow-up. Additionally, levels of emotion regulation, behavioural activation and resilience were measured as potential mediators of change in anxiety and depression, while anxiety and depression were further examined as potential mediators of change in working memory. There were no significant condition × time interactions for any variables. However, the percentage of children who met the clinical cut-offs for generalised anxiety disorder and major depressive disorder decreased significantly in the BA program at 12-month follow-up compared to baseline, as well as the percentage of children who met the clinical cut-off for obsessive compulsive disorder in the ER condition. In addition, levels of emotion regulation mediated the relationship between condition and worry at post-program for students in the ER condition. Future research should consider evaluating the programs with a larger sample using alternative outcome measures.

Introduction

Mental health disorders are among the largest contributors to the global burden of disease in children, with anxiety and depression two of the most common and disabling diagnoses for this population (Baranne, Falissard, Id, & Baranne, 2018). The average age of anxiety disorder onset is 11 years (Kessler et al., 2005), while the average age for depressive disorder onset is 11-13 years (Merikangas, Nakamura, & Kessler, 2009). These disorders have been shown to have a significant impact on a child's emotional, interpersonal, social and cognitive development, including working memory capacity, which can negatively impact academic achievement and progress (Braet et al., 2014; Kingery, Erdley, Marshall, Whitaker, & Reuter, 2010; Owens, Stevenson, Hadwin, & Norgate, 2012; Suveg & Zeman, 2004; Verboom, Sijtsema, Verhulst, Penninx, & Ormel, 2014). However, despite the prevalence and impact of anxiety and depression, these disorders remain largely undiagnosed and untreated in children (World Health Organisation, 2018). Common barriers to seeking treatment relate to its cost and the low mental health literacy of parents and caregivers (Lawrence et al., 2015). Moreover, the remission rates for children who do seek treatment are relatively low, with approximately 32 – 54% failing to reach full recovery post-treatment (Cox et al., 2012; Ginsburg et al., 2011). This is further complicated by comorbidity rates between anxiety and depression, which have been found to be upwards of 75% in clinical youth samples (Sorensen, Nissen, Mors, & Thomsen, 2005; Weersing et al., 2017). Compared to individuals with a singular condition, those with comorbid anxiety and depression tend to experience greater impairment, longer duration of symptomology, and poorer response to treatment (Feske, Frank, Kupfer, Shear, & Weaver, 1998). If these disorders remain untreated, they can have a significant impact on a child's development, educational attainments, and quality of life (World Health Organisation, 2019). Given these issues, it has been suggested that

preventing the onset of anxiety and depression in early life is the only sustainable method for reducing the impact and prevalence of these disorders (World Health Organisation, 2004).

To implement an effective prevention program, it is necessary to understand the protective factors associated with the development of the disorders being targeted. One factor that has been shown to protect against the development of anxiety and depression is resilience (Hjemdal, Vogel, Solem, Hagen, & Stiles, 2011). Although several definitions of resilience have been proposed, it is often defined as "a process by which individuals manage to use resources to develop and maintain adaptive functioning in the face of adversity" (Daigneault, Dion, Hebert, McDuff, & Collin-Vezina, 2013, p. 161). As such, many prevention programs aim to strengthen resilience to reduce the incidence of developing anxiety and depression, and subsequently decrease the associated burden of disease (World Health Organisation, 2004). However, despite aiming to improve resilience, many studies do not actually measure change in resilience as a result of the program (Barrett & Turner, 2001; Dadds & Roth, 2008; Lowry-Webster, Barrett, & Dadds, 2001; Pophillat et al., 2016), making it difficult to assess whether the programs were successful in improving resilience. This may be due to difficulties in measuring resilience given the limited number of youth resilience measures available, and the multiple different definitions of resilience proposed throughout the literature (Daigneault et al., 2013).

Prevention programs for children that target resilience are often universal in nature, meaning that they target a whole population of children regardless of their risk of developing a disorder. Compared to selective or indicated programs, which target children who are at risk of developing a disorder or already have mild levels of symptomology, universal programs have several advantages. First, they are often delivered in classes or schools, making them available to a greater number of children (Rooney, Hassan, Kane, Roberts, & Nesa, 2013).

Second, compared to selective or indicated programs which are typically delivered by psychologists, universal programs can be delivered by teachers or trained staff, which reduces cost. Third, as children are not screened for inclusion, universal programs are potentially less stigmatising than selective or indicated programs which select children for inclusion based on level of risk (Barrett & Turner, 2001). Moreover, universal programs are especially suited to developing emotional resilience as resilience can be beneficial for all children, regardless of their risk of developing a disorder. Building resilience equips children with the skills necessary to manage challenging situations, particularly as they transition to adolescence, such as peer relationship issues, the transition from primary to high school, and an increased focus on comparing one's academic performance against other students (Eccles et al., 1993; Kuperminc, Leadbeater, & Blatt, 2001).

Many universal prevention programs have been developed and show positive results. However, according to the World Health Organisation (2004), a limitation of these programs is that the vast majority are single-targeted protocols which focus on preventing a singular disorder. Given the high rates of comorbidity between anxiety and depression, the similarities in risk factors between the two disorders, and the negative outcomes associated with comorbidity (Taylor, Abramowitz, & McKay, 2012), the implementation of transdiagnostic prevention programs that target common features/risks underlying multiple disorders is warranted (World Health Organisation, 2004). It has been suggested that transdiagnostic approaches may be more efficient, economical, and effective when compared to single-targeted approaches, as multiple disorders can be targeted simultaneously (Dozois, Seeds, & Collins, 2009; Wilamowska et al., 2010).

There are a limited number of universal prevention programs that aim to prevent both anxiety and depression in children. A recent meta-analysis by Johnstone, Kemps, and Chen

(2018) found that although these programs tended to show small effects for reducing depressive symptoms, the reduction in anxiety symptoms was less consistent. An important consideration when evaluating the effectiveness of universal prevention programs is that these programs include samples from a whole population, most of whom would not be at risk of developing anxiety or depression. Therefore, even small effects do offer clinical and practical significance, as the prevention effects for children who do develop a disorder are likely overshadowed by the majority who were never at risk (Barrett & Turner, 2001). Two limitations were identified which may further explain the small effects found. First, all programs included in the meta-analysis were based on the principles of Cognitive Behavioural Therapy (CBT). CBT is generally more effective when used in adolescent populations compared to children (Durlak, Fuhrman, & Lampman, 1991; Reynolds, Wilson, Austin, & Hooper, 2012). It has been suggested that children may not possess the cognitive and interpersonal functioning required to fully participate in CBT-based therapies (Durlak et al., 1991; Reynolds et al., 2012), which may have negatively impacted on their ability to engage in CBT-based prevention programs. Second, many of the prevention programs were originally designed to prevent either anxiety or depression, and were then used to target both disorders (e.g., the FRIENDS Program; Barrett & Turner, 2001). Although anxiety and depression are highly comorbid and share a number of similarities, they are still discrete disorders and should not be treated interchangeably (Cummings, Caporino, & Kendall, 2014). As such, the development and application of simpler transdiagnostic prevention programs that target common underlying symptoms of both disorders, rather than the disorders themselves, may lead to more beneficial results.

One common symptom across both anxiety and depression that has gained popularity for use as a transdiagnostic feature is excessive worry (Barlow, Allen, & Choate, 2004). Worry is defined as a repetitive thinking process with an emphasis on possible future

negative events (Roemer & Borkovec, 1993). Worry is a core diagnostic feature of Generalised Anxiety Disorder (GAD), as well as a feature of Panic Disorder and Separation Anxiety Disorder (American Psychiatric Association, 2013). In addition, worry often also presents in depression (Hong, 2007; Segerstrom, Tsao, Alden, & Craske, 2000). Barlow et al. (2004) compared the emotional experiences of those with GAD and Major Depressive Disorder (MDD) and suggested that worry is used in both disorders as a strategy to reduce distress and negative affect. For those with GAD, excessive worry serves to prevent the individual from engaging in problem-solving strategies to emotionally process the feared response. In contrast, for individuals with MDD excessive worry leads to withdrawal from or avoidance of the anxiety-inducing situation (Barlow et al., 2004). Several studies have identified similarities in the frequency and intensity of worry in individuals with anxiety and MDD, indicating that worry is a cognitive feature that is related to both anxiety and depression (Hong, 2007; Segerstrom et al., 2000; Starcevic, 1995). Consequently, recent research has focused on targeting worry as a transdiagnostic feature to treat (Chen, Liu, Rapee, & Pillay, 2013) and prevent (Johnstone, Middleton, Kemps, & Chen, 2020) anxiety and depression.

To overcome the challenges and limitations in the delivery and efficacy of CBT-based universal prevention programs, Johnstone et al. (2020) proposed two alternative approaches, namely an emotion regulation and a behavioural activation approach, which aim to build resilience to manage worry. Compared to previous universal CBT-based prevention programs, these programs have several advantages. First, the strategies taught contain fewer components, making them potentially easier for children to understand (Hopko, Lejuez, Ruggiero, & Eifert, 2003). Second, traditional CBT-based programs often consist of 10-15 sessions (e.g., the FRIENDS Program; Barrett & Turner, 2001), which can make implementation in schools difficult given time constraints and budget restrictions. In contrast,

the emotion regulation and behavioural activation programs consist of only 8 weekly sessions. Third, as the programs contain fewer components, they are easier to deliver, and thus could be delivered by teachers, rather than psychologists, making them more cost effective for schools. Furthermore, it was thought that investigating these programs as two individual protocols, rather than combining them into one, would provide further insight into the specific strategy (i.e., emotion regulation or behavioural activation) targeting the potential underlying mechanisms of the change in anxiety and depression via the prevention programs.

The first universal school-based program trialled in Johnstone et al.'s (2020) pilot study was based on the principles of emotion regulation. This program focused on identifying and understanding emotions and encouraging the development of adaptive emotion regulation strategies to manage difficult emotions. Emotion regulation refers to attempts to "influence which emotions we have, when we have them, and how these emotions are experienced or expressed" (Gross, 1998, p. 224). Adaptive emotion regulation is a critical factor in the development of resilience (Kay, 2016). As described in King and Rothstein's (2010) model of resiliency, when an individual experiences a threatening or stressful event, their ability to maintain control over their emotions enables them to make sense of the event, reduce distress, and overcome the situation in an adaptive manner. Children with adaptive emotion regulation abilities display lower levels of anxiety and depression symptomology, compared to those with poor emotion regulation (Kim-Spoon, Cicchetti, & Rogosch, 2013; Loevaas et al., 2018; Schneider, Arch, Landy, & Hankin, 2016). This is thought to be because children who have not developed adaptive emotion regulation tend to engage in unhelpful emotion regulation strategies, such as worry, expressive suppression (inhibiting one's experience or expression of emotion), and avoidance (attempts to avoid unpleasant situations or emotions) in response to adverse events. Unless the individual is exposed to more adaptive methods of managing their emotions, they tend to repeat these maladaptive strategies which serve to maintain

negative thought patterns, thus increasing their risk of developing anxiety and depression (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Conversely, an individual who has developed adaptive emotion regulation strategies, such as cognitive reappraisal (reframing a situation to alter the emotional response), problem-solving (conscious attempts to change a situation) or acceptance (accepting emotions rather than attempting to change them), is generally better able to manage and overcome stressful situations in healthy ways, without becoming overwhelmed by their emotions or resorting to unhelpful strategies (Aldao et al., 2010). As children with anxiety and depression display poorer emotion regulation abilities (Kim-Spoon et al., 2013; Loevaas et al., 2018; Schneider et al., 2016), and adaptive emotion regulation has been linked to greater resilience (Kay, 2016), it was thought that emotion regulation could be a suitable transdiagnostic approach for anxiety and depression.

To the best of our knowledge, only one other study has investigated the efficacy of an emotion regulation program for the prevention of anxiety and depression in children. Specifically, Ehrenreich-May and Bilek (2011) tested the Emotion Detectives Prevention Program (EDPP), a 15-session anxiety and depression prevention program for children aged 7 to 10 years, based on the principles of emotion regulation and CBT. Their pilot study showed a small reduction in anxiety-related symptoms (d = 0.26) at post-program, but no change in depressive symptoms or emotion regulation skills.

The second program trialled in Johnstone et al.'s (2020) pilot study was based on behavioural activation. As discussed previously, worry involves cognitive or behavioural avoidance, which provides short-term relief but results in increased distress in the long-term due to the lack of emotional processing (Borkovec, Ray, & Stober, 1998). Behavioural activation aims to overcome avoidance by encouraging individuals to identify their patterns of avoidance, brainstorm alternative, adaptive behaviours, and set achievable goals consistent

with these adaptive behaviours (Chu, Colognori, Weissman, & Bannon, 2009). The individual's resilience is developed as they become more equipped with helpful skills to manage and overcome situations of adversity. As such, the behavioural activation program helps children to identify patterns of avoidance and to develop alternative behaviours to manage challenging emotions and situations.

Although behavioural activation has been found to be an effective transdiagnostic treatment for reducing worry in adults (Chen et al., 2013), research investigating the efficacy of behavioural activation in youth is only emerging and has focused predominately on depression rather than anxiety. To the best of our knowledge, only one study has investigated behavioural activation as a transdiagnostic treatment for anxiety and depression in youth. In particular, Chu et al. (2016) developed and investigated the application of a group behavioural activation treatment (GBAT) for anxiety and depression in youth aged 12-14 years. The results of their randomised controlled trial found that 57% of participants who received the treatment were in remission from their principle diagnosis, compared to 28% in the control condition ($d = 0.85$). Regarding participants' secondary diagnosis, 70% in the GBAT condition achieved remission, compared to only 10% in the control condition ($d = 1.69$). These results provide support for the use of behavioural activation as a transdiagnostic treatment for anxiety and depression in youth. However, its application as a prevention program for anxiety and depression is lacking.

Given the preliminary evidence of emotion regulation and behavioural activation as transdiagnostic approaches for anxiety and depression, Johnstone et al.'s (2020) pilot study investigated the efficacy of an emotion regulation-based (ER) and a behavioural activation-based (BA) programs as universal prevention protocols for anxiety and depression. They randomly assigned 295 children aged between 8 and 13 years to either the ER or the BA

program, or a usual class control (UCC) condition. Measures of resilience, worry, anxiety and depression, as well as emotion regulation and behavioural activation were collected pre- and post-program, and at 6-month follow-up. Children who completed the BA program displayed increased resilience at 6-month follow-up compared to post-program; however, there were no other significant findings. To improve the programs, it was thought that both programs would benefit from more interactive games and activities, as well as more rapport building to encourage student participation and honest reporting of symptomology. In addition, given that the programs aim to prevent future disorders rather than treat symptomology, the relatively short 6-month follow-up may not have been sufficiently long to observe prevention effects. Therefore, it would be beneficial to investigate the long-term effects of the programs by focusing specifically on differences in symptomology at longer-term follow-up. Furthermore, as the programs aimed to prevent the onset of future anxiety and depression, it would be important to assess the percentage of participants who no longer met the clinical cut-offs of specific disorders at longer-term follow-up, to determine whether the programs were successful in preventing symptomology. In response, the ER and BA programs were modified to include more rapport building and interactive games and activities, and to remove some of the overly theoretical components (see Tables 1 and 2 for an overview of program amendments), and include a 12-month follow-up to assess long-term prevention effects.

The present study, therefore, assessed the efficacy of the revised ER and BA programs to promote resilience to prevent anxiety and depression in school children aged between 8 and 12 years. The primary aim was to investigate the efficacy of the two programs for improving resilience and decreasing worry, anxiety, and depression, compared to a UCC condition. Measures of resilience, worry, anxiety and depression, emotion regulation, and behavioural activation were assessed at baseline, post-program, and at 6- and 12-month follow-up. Change in symptoms of specific disorders (i.e., social phobia, panic disorder,

major depressive disorder, separation anxiety disorder, generalised anxiety disorder, and obsessive-compulsive disorder) were also assessed from baseline to 12-month follow-up to determine the percentage of participants who no longer met clinical cut-offs of specific disorders.

The second aim was to investigate potential mediators of the two programs, to explore how change in symptomology occurs over time. For children in the ER program, it was expected that emotion regulation would mediate change in worry, whereas for those in the BA program, it was anticipated that behavioural activation would mediate change in worry. Furthermore, as the programs aim to increase resilience to protect against the development of anxiety and depression, we also examined whether level of resilience served as a mediator between the conditions and anxiety and depression.

In addition, research has shown that childhood anxiety and depression negatively impacts cognitive functioning, in particular working memory, which can lead to poorer academic performance (Owens et al., 2012). This is particularly concerning as interventions to improve academic performance may be ineffective if the underlying emotional disruptions are not addressed first. Furthermore, impairments in working memory due to anxiety and/or depression may also have negative implications for children participating in CBT-based interventions as researchers have suggested that CBT requires a somewhat advanced level of cognitive functioning (Durlak et al., 1991; Reynolds et al., 2012). As such, it would be important to ascertain any improvements in working memory as a result of improvements in anxiety and depression. To the best of our knowledge, no studies have measured change in cognitive abilities as a result of symptomology improvement, but have tended to focus only on changes in emotional symptomology. As such, working memory was measured in the

present study to determine whether preventing anxiety and depression as a result of the ER or BA programs would result in an increase in working memory performance.

Accordingly, it was hypothesised that: (1) participants in the ER and BA programs would report significantly fewer symptoms of excessive worry, anxiety and depression, and greater levels of resilience at post-program and at 6- and 12-month follow-up, compared to those in the UCC; (2) the percentage of children who met the clinical cut-off scores for specific disorders in the ER and BA programs, but not in the UCC, would decrease at 12-month follow-up; (3) for participants in the ER condition, level of emotion regulation would primarily mediate change in worry, while for those in the BA condition, level of behavioural activation would primarily mediate change in worry; (4) for children in the ER and BA conditions, level of resilience would mediate change in both anxiety and depression scores; and (5) for children in the ER and BA conditions, change in anxiety and depression would mediate change in working memory scores.

Method

Participants

A power analysis showed that to detect a Cohen's d effect size of 0.3, with a power level of 0.80, 330 participants were required, with 110 participants per condition (Hedeker, Gibbons, & Waternaux, 1999). Four-hundred-and-eighty-five students were initially recruited to take part in the study. However, one school subsequently withdrew, resulting in the loss of data from 105 students (see details in Figure 1). Due to time constraints associated with thesis submission, it was not feasible to obtain replacement data. Therefore, the present study consisted of 316 students. These were recruited from six primary schools in metropolitan South Australia. Children between year levels 3 to 6 were eligible to participate. The mean participant age was 10.08 years (SD = 1.21); 11.1% were 8 years old, 22% 9 years, 28.3% 10

years, 25.8% 11 years, 12.1% 12 years, and 0.6% were 13 years old. The sample consisted of 165 girls (52.2%) and 151 boys (47.8%).

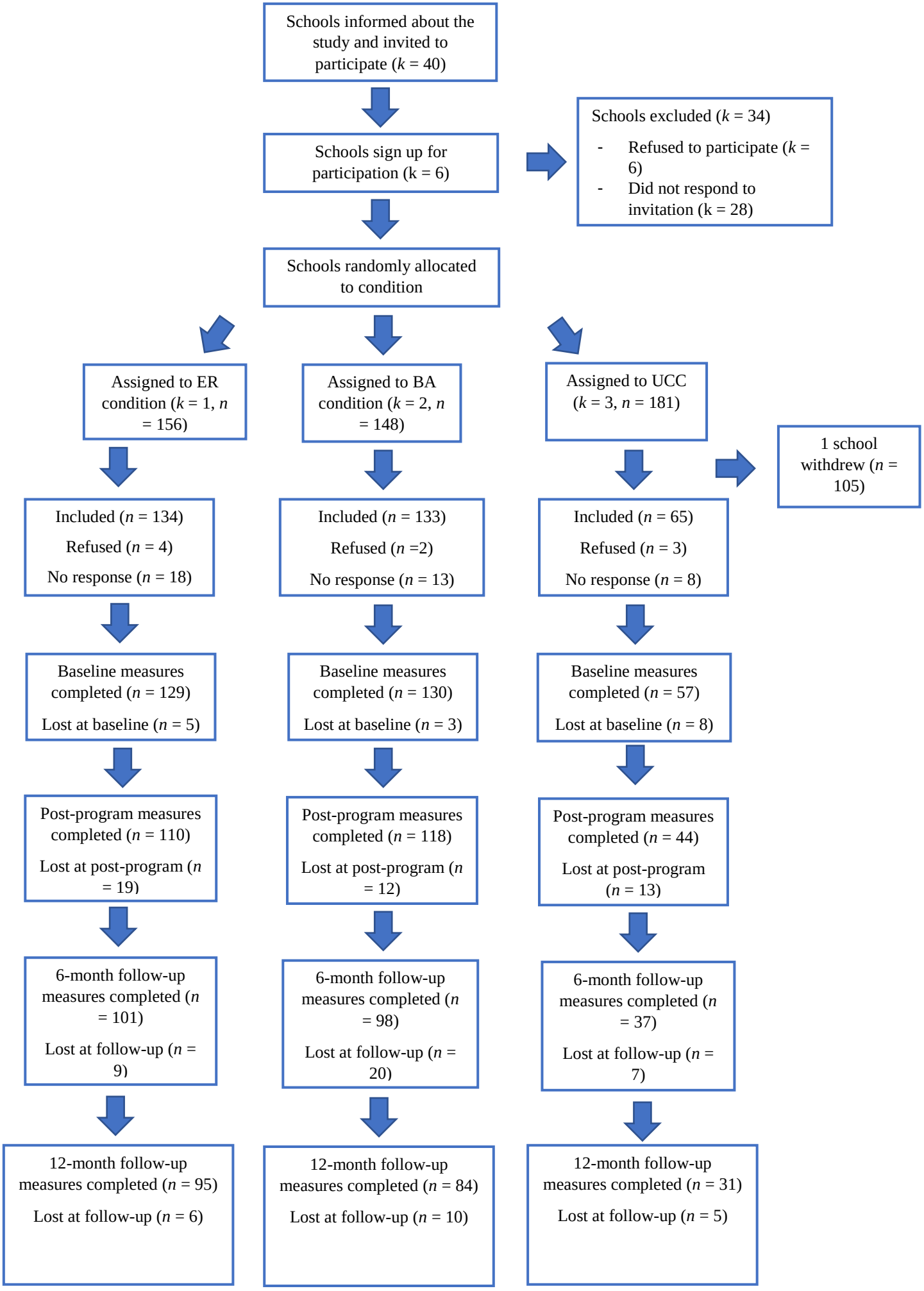

Fig 1. Flowchart of participants through the procedure

Prevention Programs

The ER and BA programs consisted of eight 45-50-minute sessions delivered weekly to classes of approximately 20-30 students. The programs were incorporated into the South Australian teaching curriculum through the area of Personal and Social Capability, and were delivered in a classroom format.

ER Program

The ER program is based on modules included in Emotion Regulation in Children and Adolescents: A Practitioner's Guide, by Southam-Gerow (2013). This guide provides a suitable basis for a transdiagnostic prevention program as the modules target a variety of presenting issues such as anxiety, depression, and conduct disorders, rather than focusing on one specific condition. Relevant modules were adapted for use as a universal prevention for children aged between 8 and 12 years.

As discussed above, the ER program was a modified version of the original Emotion Regulation (ER) program outlined in the pilot study by Johnstone et al. (2020). Accordingly, the ER program consisted of three main components: 1) identifying and understanding one's own emotions and the emotions of others, 2) becoming familiar with the relationships between thoughts, feelings, and behaviours, and how thoughts can affect emotion regulation, and 3) practical prevention strategies, such as the importance of healthy eating and exercise, and their effects on emotion regulation. Furthermore, the ER program included some amendments based on reflections and feedback gathered after pilot delivery of the original ER program. These amendments included the removal of less relevant content and the inclusion of more interactive games and activities to facilitate engagement. See Table 1 for an outline of the amended session content of the ER program.

Table 1

Amendments to Session Contents of the ER Program

Session no.	Original Content	Amendments
Session 1	○ Introduction and group rules. ○ Description of program. ○ Psychoeducation for worry.	○ Reduction of psychoeducation for worry – overview of symptomology and situations which may induce worry were summarised. ○ Inclusion of a 'Bingo-style' rapport building game which required students and facilitators to ask questions of each other.
Session 2	○ Emotion awareness skills – ○ Learn and practice the skills involved in being aware of our own feelings and the feelings of others.	○ Information and skills taught through a 'Charades' style game rather than in workbook format.
Session 3	○ Emotion understanding skills – ○ Learn about emotional triggers, how emotions can be hidden, and how people can experience multiple emotions simultaneously. ○ Develop an understanding of how different emotions can have different effects on people's bodies.	○ No amendments
Session 4	○ Cognitive skills 1 – ○ Develop an understanding of the link between thoughts, feelings, and behaviours. ○ Introduction of some common 'Thinking Traps', i.e., unhelpful ways of thinking.	○ No amendments
Session 5	○ Cognitive skills 2 – ○ Teach and practice skills related to challenging our unhelpful thoughts with more helpful ways of thinking.	○ No amendments
Session 6	○ Cognitive Skills 3 – ○ Learn and practice ways to 'Change the Channel' on Worry, i.e., identify when we are worrying unnecessarily about something, and learn strategies to overcome our worry.	○ Instead of using their workbook to learn material, students created a play and acted out a worry-provoking scenario for the rest of the class. Within the plays, students were instructed to show unhelpful and helpful methods of managing the worry, and the outcomes of both methods.
Session 7	○ Prevention skills – ○ Learn and practice practical strategies that promote adaptive emotion regulation, i.e., healthy eating, engaging in exercise, and developing good sleep hygiene.	○ The class discussion regarding prevention skills was reduced. ○ Students completed a 'word search' containing words relating to healthy eating, exercise, sleep hygiene, and mastery, in order to further solidify the concepts taught in the session.

	○ Practice ways to achieve and sustain a sense of mastery during an activity to increase self-efficacy.	
Session 8	○ Quiz - review of all sessions and accomplishments. ○ Summary: What did you learn?	○ No amendments.

BA Program

The BA program was based on the Behavioural Activation for Worry (BAW) treatment manual developed by Chen et al. (2013). The original BAW manual targeted worry in adults and was subsequently amended for use with adolescents. In the pilot study by Johnstone et al. (2020), the manual was further modified for use with children, in conjunction with the original BAW manual for adults. The BA program was a modified version of the Behaviour Activation (BA) program outlined in that pilot study.

The BA program begins with learning about worry and avoidance, and the consequences of these factors on functioning. Children are then assisted with identifying their own patterns of avoidance behaviours, and encouraged to overcome such avoidance by constructing and practising alternative behaviours. Children are supported in setting short-term and long-term goals that align with positive outcomes, and are encouraged to develop practical behaviours that are in line with these goals. Similar to the ER program, the BA program was amended based on reflections and feedback gained after the pilot delivery of the original BA program by Johnstone et al. (2020). Specifically, the amended program contains less theoretical information and includes more interactive games and activities to facilitate engagement. See Table 2 for an outline of the amended session content of the BA program.

Table 2

Amendments to Session Contents of the BA Program

Session no.	Original Content	Amendments
Session 1	○ Introduction and group rules. ○ Description of program. ○ Psychoeducation for worry.	○ Reduction of psychoeducation for worry – overview of symptomology and situations which may induce worry were summarised. ○ Inclusion of a 'Bingo-style' rapport building game which required students and facilitators to ask questions of each other.
Session 2	○ Discuss avoidance behaviour and its impact on worry. ○ Introduction of the worry cycle and steps to break it. ○ Learn how to monitor worry when it happens.	○ Reduced discussion of avoidance behaviour and the worry cycle. ○ Students completed a group activity to further solidify knowledge of the worry cycle.

Session 3	○ Understand what makes you worry.
	○ Understand the links between worry, behaviours and emotion
	○ How to gain control over worry:
	  ○ Step 1: Recognizing worry when it happens
	  ○ Setting goals for the program.
		○ Reduced discussion of worry.
		○ Workbook activity amended to be more interactive and child-focused.
		○ Students created a play and acted out a worry-provoking scenario for the rest of the class to assist with the recognition of worry and its negative outcomes.
		○ Goal setting was moved to Session 6

Session 4	○ Review & Discuss practice task:
	  ○ Recognizing worry when it happens by using the two-minute rule
	○ How to gain control over worry:
	  ○ Step 2: Looking at the behaviours that make you more worried
	  ○ Step 3: Finding active coping behaviours
		○ Rather than having students complete a workbook activity to evaluate their avoidance patterns, students engaged in a role-play game whereby students portrayed avoidance behaviours and methods to overcome the avoidance were brainstormed.

Session 5	○ Review & Discuss practice task
	  ○ Finding active coping behaviours
	○ Choosing active coping behaviours and creating doable steps
	○ How to gain control over worry:
	  ○ Step 4: Making active coping behaviours regular in your life
	  ○ Long-term and short-term goals: Ensuring your behaviours
		○ Discussion of material and workbook activities regarding avoidance and active coping behaviours was removed. Instead, students engaged in a card game to help solidify concepts relating to avoidance and active coping behaviours.

	are aligned	
Session 6	○ Creating the coping behaviour ladder and practising your steps in your daily life ○ Rewarding effort ○ How to gain control over worry: ○ Step 5: Observe the results ○ Step 6: Now evaluate	○ Workbook activities regarding goal setting were removed. Instead, students brainstormed short- and long-term goals and were assisted in creating posters to hang up in their classroom or home. Students engaged in a card game to help brainstorm achievable steps to achieve their goals.
Session 7	○ Review & Discuss practice task: ○ How to gain control over worry: Step 5: Observe the results Step 6: Evaluate the results ○ Putting it all together	○ Essential elements of this session were included in previous sessions (i.e., Sessions 5 and 6). This session, instead, focused on practical prevention strategies (i.e., same as the amended session 7 of the Emotion Masters Program).
Session 8	○ Quiz - review of all sessions and accomplishments. ○ Summary: What did you learn?	○ No amendments.

Training and Supervision

Both programs were delivered by a provisional psychologist experienced in working with children, supported by a research assistant, who had completed or was completing an undergraduate degree in psychology. Weekly supervision of the provisional psychologist, either in person or via email, was conducted. Adherence to the protocols by the provisional psychologist was monitored through the completion of a program fidelity checklist for a set of randomly selected sessions (see Appendix A for the ER program adherence checklist and Appendix B for the BA program adherence checklist). Adherence to the ER program was 91.66%, and the BA program was 78.93%.

Measures

Penn State Worry Questionnaire – Child version (PSWQ-C; Chorpita, Tracey, Brown, Collica, & Barlow, 1997)

The PSWQ-C is a 14-item, self-rated instrument that measures trait pathological worry (e.g., "Many things make me worry") in children and adolescents using a 4-point Likert scale, ranging from 0 (*not at all true*) to 3 (*always true*). The PSWQ-C has been shown to have excellent internal consistency (α = .91) and test-retest reliability (r =.92; Chorpita et al., 1997; Pestle, Chorpita, & Schiffman, 2008). The internal consistency in the present study ranged from .91 to .93 across the four time points.

The Child and Youth Resilience Measure – Short Version (CYRM-12; Liebenberg, Ungar, & LeBlanc, 2013)

The CYRM-12 is a shortened version of the original 28-item CYRM (Ungar & Liebenberg, 2011). The CYRM-12 is a self-report questionnaire consisting of 12 items that measure resilience in youth aged between 5 and 23 years. This measure uses a 3-point Likert

scale (1 = *no*; 2 = *sometimes*; 3 = *yes*) and includes items such as 'I try to finish activities that I start', and 'I am treated fairly'. The CYRM-12 has been found to show sufficient content validity to be used to screen for resilience in youth (α = .84; Liebenberg et al., 2013). In the present study, the internal consistency ranged from .72 to .84 across time points.

Revised Child Anxiety and Depression Scales (RCDAS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000)

The RCADS is a 47-item self-report questionnaire that measures symptoms of anxiety and depression in children, using a 4-point Likert scale, ranging from 0 (*never*) to 3 (a*lways*). The RCADS provides an overall total score for anxiety and depression which was considered to be appropriate for use in the present study as the programs aimed to prevent anxiety and depression simultaneously. In addition to the total score, the RCADS consists of 6 subscales measuring symptoms of social phobia (9 items), panic disorder (9 items), major depression (10 items), separation anxiety (7 items), generalised anxiety (6 items), and obsessive-compulsive disorder (6 items). Examples of items include 'I worry about what is going to happen', and 'Nothing is much fun anymore'. Clinical cut-off scores were used to classify participants as above or below the clinical threshold for symptomology at long-term follow-up. A score of 11 or above on the major depression items indicates Major Depressive Disorder. Regarding anxiety items, a score of 10 or above on social phobia items indicates social phobia, a score of 12 or above on panic disorder items Panic Disorder, a score of 7 or above on generalised anxiety items Generalised Anxiety Disorder, a score of 5 or above on separation anxiety items Separation Anxiety Disorder, and a score of 5 or above on obsessive-compulsive disorder items Obsessive-Compulsive Disorder (Chorpita, Moffitt, & Gray, 2005). The RCADS has been shown to have good internal consistency (α = .78 - .88), test-retest reliability (r = .65 - .80), and convergent validity (r = .22 - .65; Chorpita, Moffitt,

& Gray, 2005; Chorpita et al., 2000; de Ross, Gullone, & Chorpita, 2002). In the present study, the internal consistency ranged from .96 to .97.

Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012)

The ERQ-CA is a 10-item, self-rated instrument that measures two common emotion regulation strategies: cognitive reappraisal (6 items), and expressive suppression (4 items). As discussed above, cognitive reappraisal is an adaptive strategy linked to increased positive affect, and is measured in the ERQ-CA using items such as 'When I want to feel happier, I think about something different'. Conversely, expressive suppression is a maladaptive strategy related to less positive affect and poorer mood repair, and is measured using items such as 'I control my feelings by not showing them'. Items are measured on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Compared to other measures of emotion regulation, the ERQ-CA allows for the assessment of changes in both adaptive and maladaptive strategies. The two subscales are scored independently (i.e., no items are reversed), with greater subscale scores indicating an increased tendency to use the corresponding ER strategy. The ERQ-CA has demonstrated good internal consistency (α = .75 - .83) and adequate convergent validity (r = 0.2 - 0.37; Gullone & Taffe, 2012). The internal consistency in the present study ranged from .84 to .89 for the cognitive reappraisal subscale, and .58 to .67 for the expressive suppression subscale.

Behavioral Activation for Depression Scale – Short Form (BADS-SF; Kanter, Mulick, Busch, Berlin & Martell, 2007)

The 9-item BADS-SF is a self-report questionnaire that measures behavior activation (e.g., 'I did many different activities') and avoidance (e.g., 'I did activities that would distract

me from feeling bad') behavior in adults. Consistent with Johnstone et al.'s (2020) pilot study, the present study employed a modified version of the BADS-SF which was suitable for use with children between 8 and 12 years. Children were asked to rate the extent to which each statement applied to them during the past week on a 7-point Likert scale, ranging from 0 (*not at all*) to 6 (*completely*). The Avoidance items are reversed scored, with a higher total BADS-SF score indicating greater activation. The BADS has been shown to have good internal consistency (= .87) and test-retest reliability (=.74). The BADS has been shown to negatively correlate with the Beck Depression Inventory (r = -.67) and other measures of experiential (r = -.51) and cognitive (r = -.37) avoidance, indicating appropriate construct validity (Kanter et al., 2007). The internal consistency in the present study ranged from .56 to .66.

Digit Span Backward (DSB; Wechsler, 2005)

Working memory was measured using the DSB subtest of the Wechsler Intelligence Scale for Children – version 5 (WISC – V). Traditionally, the DSB subtest involves a series of numbers of increasing length read aloud to a child at a rate of 1 digit per second. The child is then required to repeat the numbers back to the instructor in reverse order. The DSB measures working memory as it requires children to manipulate verbal information while in temporary storage. The sequence of numbers systematically increases by one digit, with the first trial consisting of two digits and the last trial consisting of eight digits, with a total of 16 items (two trials for each sequence length). Total scores range from 0 to 16, with a greater score indicating greater working memory capacity. In the present study, students completed this task in a classroom format. Therefore, the task was modified by asking participants to write their responses on a piece of paper, rather than repeating their responses aloud. To protect the reliability and validity of this test, students were instructed to only start writing

once the whole number sequence had been read, to write from left to right, and to avoid looking at their classmates' responses. To avoid the risk of practice effects by students completing this task across multiple time points, alternative forms of the test were created by a Development Engineer using Microsoft Excel generating software. These alternative forms were identical except for the use of different digits in the number sequences. Rather than using students' raw scores for the analyses, scaled scores were calculated to control for age differences among children and over time. Specifically, raw scores were converted to scaled scores using the methods outlined in the WISC-V Administration and Scoring Manual (Wechsler, 2005). The DSB subtest has been shown to have good validity (r = .77), internal consistency (r = .80) and test-retest reliability (r =.74).

Socio-Economic Status of Schools

The Department for Education and Child Development's Index for Educational Disadvantage by School was used to calculate SES status (Department for Education and Child Development, 2017). According to this index, the SES of schools is measured on a scale ranging from 1 (*low SES*) to 7 (*high SES*).

Procedure

Randomly selected public and private primary schools in metropolitan South Australia were invited to participate. Invitation letters including details of the study were emailed or posted to school principals and/or student wellbeing coordinators. For schools that indicated interest in participating, the principal researcher attended a meeting with the school principal and/or student wellbeing coordinator to provide further details about the study and to obtain written consent from the principal confirming the school's participation.

Following this, whole schools were randomly allocated to one of the three conditions (i.e., ER, BA, UCC). Classes were selected for participation by the schools themselves. Information sheets and parent/guardian consent forms were sent home with students from participating classes. In adherence with the ethics approval gained for this research, the participation of students in public schools required signed consent from parents/guardians (i.e., opt-in), while parents/guardians of students from private schools were required to sign a form if they did not wish for their child to participate (i.e., opt-out). Given the duration of the study, parents/guardians were asked to provide their postal address so follow-up questionnaires could be posted to their child if they moved school during the study. All data collection and the delivery of programs took place on school grounds, within school hours.

Baseline assessment measures (PSWQ-C, CYRM-12, RCADS, ERQ-CA, BADS-SF, and DSB) were administered by the principal researcher and a research assistant, who visited the schools, to all students prior to commencement of the programs (Time 1). Students were made aware that their identifying information and responses would be kept confidential, and that they could refuse to answer any questions without penalty. Each question was read aloud by the principal researcher, and students responded using pens/pencils and paper. For classes in the active conditions, the programs were then delivered on a weekly basis for 8 weeks, with classroom teachers present at all times to ensure duty of care was maintained for the students. Students in the UCC condition received Health and Physical Education in accordance with the South Australian teaching curriculum, delivered by their usual classroom teacher.

Upon completion of the programs, the researchers returned to the schools to administer the post-program measures to students (Time 2). The same procedure was repeated at approximately 6- and 12-months after completion of the final session (Time 3 and

Time 4, respectively). Hard copies of the questionnaire booklets (with exception of the DSB task which necessitates in-person delivery) and reply-paid envelopes were mailed to students who had moved school or transitioned into high school prior to the follow-up data collections. Figure 1 shows a flowchart of the procedure.

Statistical Analysis

Baseline differences between the three conditions were assessed using one-way analysis of variance (ANOVA) for each outcome variable. Change in symptomology for each outcome variable was assessed using Linear Mixed Models (LMM). LMMs are the recommended technique for analysing repeated measures designs as they can accurately account for correlation between repeated measures of the same participant, and are able to handle missing data and unequal groups (Gueorguieva & Krystal, 2004).

The mediating roles of resilience, level of emotion regulation, level of behavioural activation, and anxiety and depression were explored using the bootstrap method via the PROCESS macro for SPSS (Hayes, 2013). Compared to traditional regression analyses, which require a significant interaction between variables in order to run a valid analysis, the PROCESS macro is able to conduct a reliable analysis of mediation effects without this prerequisite (Hayes, 2013).

Results

Sample Characteristics

Figure 1 shows the flow of participants through the study. Of the 40 schools invited, six public schools agreed to participate, located in the metropolitan area. A total of 68.45% of parents consented to their child's participation, 1.86% actively requested that their child did

not participate, and 8.04% failed to return the consent form. One of the schools allocated to the Control condition withdrew from participation after allocation.

The mean SES of participating schools was 4.43 and ranged from 2 to 7. On a participant level, 46.2% attended a level 2 school, 13% a level 5 school and 40.8% a level 7 school. Of the 316 participating students, 86.08% of participants completed post-program measures,74.68% completed 6-month follow-up measures, and 63.92% completed 12-month follow-up measures.

Preliminary Analyses

Data for resilience (CYRM-12) were significantly negatively skewed at Time 3 (skewness = -1.151) and Time 4 (skewness = -1.453). These data were normalised after logarithm transformations with reflections. ANOVAs were conducted to examine baseline differences between conditions. Results showed significant differences between groups for baseline scores on the RCADS, F (2, 263) = 8.83, p < .001, PSWQ-C, F (2, 286) = 8.87, p < .001, CYRM, F (2, 924) = 24.43, p < .001, BADS-SF, F (2, 292) = 5.62, p = .004, and DSB, F (2, 109.63) = 6.81, p = .001 (see Table 3 for descriptive statistics). Of note, participants in the BA condition displayed considerably higher scores on the RCADS at baseline compared to those in the ER and Control conditions. This could be due to the majority of participants in the BA condition completing baseline scores at the start of a new year at school, which would likely be a time of increased stress due to factors associated with commencing a new school year (e.g., meeting new teachers and peers, increased academic expectations, familiarising oneself with new classroom, etc.). Thus, baseline scores for these five measures were included as covariates in subsequent analyses to control for these group differences.

Table 3

Descriptive Statistics and Within-Group Effect Sizes for the Emotion Regulation, Behavioural Activation, and Control Conditions at Baseline (T1), Post-Program (T2), 6-Month Follow-Up (T3), and 12-Month Follow-Up (T4)

Variable		Emotion Regulation				Behavioural Activation				Control			
		Mean	*SD*	Within-group ES		Mean	*SD*	Within-group ES		Mean	*SD*	Within-group ES	
Worry	T1	14.60	8.26	T1 vs T2	0.08	19.48	9.97	T1 vs T2	0.22	16.09	8.18	T1 vs T2	0.09
	T2	14.08	8.01	T1 vs T3	0.05	17.71	9.86	T1 vs T3	0.24	16.56	9.86	T1 vs T3	0.06
	T3	14.20	8.85	T1 vs T4	0.18	17.60	10.66	T1 vs T4	0.31	16.46	9.13	T1 vs T4	0.01
	T4	13.34	8.40	T2 vs T3	0.02	16.65	8.54	T2 vs T3	0.02	16.03	9.47	T2 vs T3	0.01
				T2 vs T4	0.09			T2 vs T4	0.12			T2 vs T4	0.05
				T3 vs T4	0.16			T3 vs T4	0.13			T3 vs T4	0.07
Resilience	T1	18.79	3.85	T1 vs T2	0.03	17.38	3.66	T1 vs T2	0.13	18.98	3.26	T1 vs T2	0.49
	T2	18.88	3.95	T1 vs T3	0.07	16.83	4.31	T1 vs T3	0.19	20.14	3.07	T1 vs T3	0.29
	T3	18.53	4.25	T1 vs T4	0.07	16.51	4.76	T1 vs T4	0.12	17.79	4.53	T1 vs T4	0.11
	T4	18.52	4.98	T2 vs T3	0.09	17.90	3.81	T2 vs T3	0.07	18.59	4.21	T2 vs T3	0.59
				T2 vs T4	0.08			T2 vs T4	0.22			T2 vs T4	0.55
				T3 vs T4	0.00			T3 vs T4	0.38			T3 vs T4	0.25
Anxiety and Depression	T1	34.58	22.38	T1 vs T2	0.42	47.75	25.44	T1 vs T2	0.28	42.92	18.58	T1 vs T2	0.27
	T2	29.28	18.93	T1 vs T3	0.26	42.32	26.68	T1 vs T3	0.43	40.14	22.20	T1 vs T3	0.16

	T3	30.27	20.40	T1 vs T4	0.40	39.94	23.43	T1 vs T4	0.41	40.69	22.52	T1 vs T4	0.44
	T4	27.18	20.12	T2 vs T3	0.06	38.19	24.58	T2 vs T3	0.12	36.94	20.15	T2 vs T3	0.03
				T2 vs T4	0.10			T2 vs T4	0.21			T2 vs T4	0.16
				T3 vs T4	0.19			T3 vs T4	0.11			T3 vs T4	0.24
Emotion Regulation - *Cognitive Reappraisal*	T1	20.96	4.77	T1 vs T2	0.11	20.03	4.06	T1 vs T2	0.14	20.37	4.49	T1 vs T2	0.19
	T2	21.55	4.68	T1 vs T3	0.01	19.23	4.78	T1 vs T3	0.30	19.77	4.29	T1 vs T3	0.27
	T3	21.01	4.96	T1 vs T4	0.01	18.29	5.36	T1 vs T4	0.12	19.31	4.76	T1 vs T4	0.25
	T4	20.88	4.86	T2 vs T3	0.13	19.40	4.73	T2 vs T3	0.17	19.11	4.14	T2 vs T3	0.10
				T2 vs T4	0.13			T2 vs T4	0.03			T2 vs T4	0.17
				T3 vs T4	0.03			T3 vs T4	0.24			T3 vs T4	0.06
Emotion Regulation - *Expressive Suppression*	T1	11.76	2.65	T1 vs T2	0.03	12.11	3.11	T1 vs T2	0.10	11.95	3.06	T1 vs T2	0.18
	T2	11.66	2.60	T1 vs T3	0.05	11.72	3.26	T1 vs T3	0.04	11.28	3.13	T1 vs T3	0.11
	T3	11.61	2.60	T1 vs T4	0.12	11.95	3.46	T1 vs T4	0.08	11.49	2.77	T1 vs T4	0.21
	T4	11.37	2.80	T2 vs T3	0.02	11.80	2.80	T2 vs T3	0.06	11.12	3.15	T2 vs T3	0.06
				T2 vs T4	0.10			T2 vs T4	0.03			T2 vs T4	0.04
				T3 vs T4	0.08			T3 vs T4	0.04			T3 vs T4	0.11
Behavioural Activation	T1	36.17	7.89	T1 vs T2	0.03	32.85	7.61	T1 vs T2	0.04	34.40	7.13	T1 vs T2	0.18
	T2	36.35	7.17	T1 vs T3	0.03	33.16	8.71	T1 vs T3	0.09	35.72	9.35	T1 vs T3	0.41

	T3	36.41	7.84	T1 vs T4	0.06	33.59	7.78	T1 vs T4	0.13	31.71	6.53	T1 vs T4	0.13
	T4	36.75	8.60	T2 vs T3	0.01	34.01	8.19	T2 vs T3	0.05	33.35	6.93	T2 vs T3	0.41
				T2 vs T4	0.05			T2 vs T4	0.09			T2 vs T4	0.27
				T3 vs T4	0.05			T3 vs T4	0.06			T3 vs T4	0.26
Digit Span Backwards	T1	12.42	3.78	T1 vs T2	0.42	10.34	4.12	T1 vs T2	0.57	11.00	4.33	T1 vs T2	0.50
	T2	14.15	3.79	T1 vs T3	0.09	13.06	4.04	T1 vs T3	0.41	12.55	4.20	T1 vs T3	0.34
	T3	12.72	3.63	T1 vs T4	0.25	12.27	4.13	T1 vs T4	0.55	12.15	4.06	T1 vs T4	0.20
	T4	13.42	4.07	T2 vs T3	0.38	12.65	3.73	T2 vs T3	0.18	11.72	4.12	T2 vs T3	0.10
				T2 vs T4	0.17			T2 vs T4	0.09			T2 vs T4	0.27
				T3 vs T4	0.19			T3 vs T4	0.08			T3 vs T4	0.09

Note. ES = effect size (Cohen's *d*); At T1, *N* = 129 (Emotion Regulation) *N* = 130 (Behavioural Activation) *N* = 57 (Control); T2, *N* = 110 (Emotion Regulation) *N* = 118 (Behavioural Activation) *N* = 44 (Control); T3, *N* = 101 (Emotion Regulation) *N* = 99 (Behavioural Activation) *N* = 37 (Control); T4, *N* = 95 (Emotion Regulation) *N* = 78 (Behavioural Activation) *N* = 36 (Control). Measures: Worry = Penn State Worry Questionnaire – Child Version; Resilience = The Child and Youth Resilience Measure – Short Version; Anxiety and Depression = Revised Children's Anxiety and Depression Scale; Emotion Regulation – Cognitive Reappraisal and Expressive Suppression subscales = Emotion Regulation Questionnaire for Children and Adolescents; Behavioural Activation = Behavioural Activation for Depression Scale – Short Form.

Primary Analyses

Change in Symptomology Over Time

Descriptive statistics (means and standard deviations) and within-group effect sizes for each condition across the four time points are presented in Table 3. Results from the mixed model analyses and between group effect sizes are presented in Table 4. Between group effect sizes (Hedges' *g*) were calculated by comparing differences in standardised change scores by using the pooled standard deviation at baseline as the variance estimate, and including a bias correction factor to estimate population effect (Morris, 2008).

Table 4

Mixed Model Analyses with Between-Group Effect Sizes

	Condition	Time	Condition x Time	Random Intercept		Post-program (T2)			6-month follow-up (T3)			12-month follow-up (T4)		
Outcome Measures						Adjusted mean difference (*95% CI*)		ES	Adjusted mean difference (*95% CI*)		ES	Adjusted mean difference (*95% CI*)		ES
Worry	*F* (2, 288.87) = 7.91, *p* < .001	*F* (3, 227.59) = 1.62, *p* = .186	*F* (6, 230.55) = 0.62, *p* = .713	41.70	ER v BA	-4.59**	*(-7.64 – -1.55)*	0.06	-3.66*	*(-6.90 - -0.42)*	0.16	-3.56*	*(-6.69 – -0.43)*	0.17
					ER v CT	-1.60	*(-5.48 – 2.28)*	0.12	-2.12	*(-6.25 – 2.01)*	0.09	-2.10	*(-6.87 – 1.05)*	0.15
					BA v CT	2.99	*(-0.84 – 6.83)*	0.24	-1.54	*(-2.58 – 5.66)*	0.24	0.65	*(-3.32 – 4.63)*	0.29
Resilience	*F* (2, 285.29) = 9.60, *p* < .001	*F* (3, 236.09) = 3.55, *p* = .015	*F* (6, 238.10) = 1.99, *p* = .068	0.04	ER v BA	-0.17***	*(-0.27 – -0.07)*	0.17	-0.11*	*(-0.21 – -0.02)*	0.16	-0.12	*(-0.22 – -0.01)*	0.21
					ER v CT	0.07	*(-0.06 – 0.20)*	0.29	-0.04	*(-0.17 – 0.09)*	0.25	-0.04	*(-0.18 – 0.10)*	0.03
					BA v CT	0.24***	*(0.11 – 0.37)*	0.48	0.07	*(-0.06 – 0.20)*	0.09	0.07	*(-0.08 – 0.22)*	0.26
Anxiety and Depression	*F* (2, 256.13) = 9.09, *p* < .001	*F* (3, 181.48) = 9.51, *p* < .001	*F* (6, 182.86) = 0.52, *p* = .796	261.22	ER v BA	-11.86**	*(-20.20 – -3.52)*	0.01	-9.62*	*(-18.02 – -1.22)*	0.15	-12.74**	*(-21.18 – --4.31)*	0.09
					ER v CT	-9.42	*(-19.88 – 1.04)*	0.12	-9.12	*(-19.94 – 1.70)*	0.10	-10.51	*(-21.00 – -0.01)*	0.07
					BA v CT	2.44	*(-7.83 – 12.71)*	0.11	0.50	*(-10.22 – 11.22)*	0.24	2.24	*(-8.25 – 12.72)*	0.15
Emotion Regulation - *Cognitive Reappraisal*	*F* (2, 300.29) = 7.91, *p* < .001	*F* (3, 237.91) = 2.45, *p* = .064	*F* (6, 238.28) = 1.41, *p* =.210	10.21	ER v BA	2.30**	*(0.79 – 3.81)*	0.31	2.60**	*(0.92 – 4.28)*	0.40	1.36	*(-0.34 – 3.07)*	0.12
					ER v CT	1.96	*(-0.01 – 3.92)*	0.25	1.91	*(-0.35 – 4.17)*	0.24	1.66	*(-0.48 – 3.80)*	0.25
					BA v CT	-0.34	*(-2.28 – 1.60)*	0.05	-0.68	*(-2.94 – 1.58)*	0.16	-0.30	*(-1.87 – 2.48)*	0.15
Emotion Regulation - *Expressive Suppression*	*F* (2, 300.06) = 1.16, *p* = .316	*F* (3, 248.68) = 1.80, *p* =.148	*F* (6, 273.14) = 0.24, *p* = .963	1.72	ER v BA	-0.07	*(-1.04 – 0.90)*	0.10	-0.45	*(-1.46 – 0.55)*	0.00	-0.48	*(-1.54 – 0.58)*	0.03
					ER v CT	0.24	*(-1.04 – 1.52)*	0.20	0.14	*(-1.20 – 1.47)*	0.11	0.17	*(-1.18 – 1.52)*	0.16
					BA v CT	0.31	*(-0.95 – 1.56)*	0.09	0.59	*(-0.75 – 1.92)*	0.10	0.65	*(-0.75 – 2.04)*	0.17

Behavioural Activation	*F* (2, 283.56) = 6.11, *p* = .003	*F* (3, 232.32) = 1.76, *p* = .156	*F* (6, 232.77) = 1.40, *p* = .215	30.81	ER v BA	2.99*	*(0.20 – 5.78)*	0.20	2.19	*(-0.52 – 4.89)*	0.06	2.98*	*(0.04 – 5.93)*	0.08
					ER v CT	0.17	*(-3.40 – 3.74)*	0.15	3.78*	*(0.33 – 7.22)*	0.38	3.27	*(-0.42 – 6.97)*	0.21
					BA v CT	-2.82	*(-6.33 – 0.69)*	0.14	1.59	*(-1.80 – 4.97)*	0.46	0.29	*(-3.40 – 3.99)*	0.30

Note. ES = effect size (Hedges' *g*); At T1, *N* = 129 (Emotion Regulation) *N* = 130 (Behavioural Activation) *N* = 57 (Control); T2, *N* = 110 (Emotion Regulation) *N* = 118 (Behavioural Activation) *N* = 44 (Control); T3, *N* = 101 (Emotion Regulation) *N* = 98 (Behavioural Activation) *N* = 37 (Control); T4, *N* = 95 (Emotion Regulation) *N* = 78 (Behavioural Activation) *N* = 36 (Control). Measures: Worry = Penn State Worry Questionnaire – Child Version; Resilience = The Child and Youth Resilience Measure – Short Version; Anxiety and Depression = Revised Children's Anxiety and Depression Scale; Emotion Regulation – Cognitive Reappraisal and Expressive Suppression subscales = Emotion Regulation Questionnaire for Children and Adolescents; Behavioural Activation = Behavioural Activation for Depression Scale – Short Form.
*$p < .05$. **$p < .01$. ***$p < .001$

Penn State Worry Questionnaire – Child version. The Condition x Time interaction was non-significant. The main effect of Time was also non-significant. However, there was a significant main effect of Condition, whereby participants in the ER condition reported significantly lower scores on the PSWQ-C compared to those in the BA condition ($p < .001$); however, there were no differences between the BA and control condition ($p = .31$) nor between the ER and control condition ($p = .38$). A comparison of the between-group effect sizes revealed small effect sizes for the differences between the ER, BA and the Control conditions at post-treatment, 6- and 12-month follow-up periods.

The Child and Youth Resilience Measure – Short version. The Condition x Time interaction was non-significant. However, there were significant main effects of both Condition and Time. Participants in the BA condition reported significantly higher scores on the CYRM compared to those in the ER condition ($p < .001$), and the control condition ($p = .01$), whereas no difference was observed between the ER and the control conditions ($p = 1.00$). Regarding the main effect of Time, participants reported significantly lower scores at Time 2 compared to Time 3 ($p = .01$), but there were no differences in scores between Times 1 and 2 ($p = .57$), Times 1 and 3 ($p = .35$), Times 1 and 4 ($p = 1.00$), Times 2 and 4 ($p = 1.00$), or Times 3 and 4 ($p = .28$).

The between-group effect sizes revealed that there was a medium effect size for the difference between the BA and Control condition at post-program and small effect sizes at both 6- and 12- month follow-up periods. In comparing the ER and the Control conditions, the effect size was small at post-program, 6- and 12- month follow-up periods.

Revised Child Anxiety and Depression Scales. The interaction between Condition x Time was non-significant. However, there were significant main effects of Condition and Time. Participants in the ER condition reported significantly lower scores on the RCADS

compared to those in the BA condition ($p < .001$) and the Control condition ($p = .03$), with no differences between the BA and control condition ($p = 1.00$). Regarding the main effect of Time, participants reported significantly lower scores at both Times 2 and 4 compared to Time 1 (p's = .02 and <.001 respectively), and significantly lower scores at Time 4 compared to Time 3 ($p = .04$). There were no differences in scores between Times 1 and 3 ($p = .06$), Times 2 and 3 ($p = 1.00$), or Times 2 and 4 ($p = .10$).

The between-group effect size for the ER and the Control group comparison was small across all time points. Likewise, for the BA and Control group comparison, the effect size was small at post-treatment, and at 6- and 12- month follow-ups.

Emotion Regulation Questionnaire for Children and Adolescents. The ERQ-CA is separated into two emotion regulation strategies: an adaptive strategy (cognitive reappraisal) and a maladaptive strategy (expressive suppression). Regarding cognitive reappraisal, there was no significant Condition x Time interaction. The main effect of Time was also non-significant. However, there was a significant main effect of Condition. Participants in the ER condition reported significantly higher scores on the cognitive reappraisal component of the ERQ compared to those in the BA condition ($p = .001$) and those in the control condition ($p = .03$), with no differences between the BA and control condition ($p = 1.00$).

The between-group effect sizes for the comparisons between the ER and the Control conditions were medium at post-treatment and at 6-month follow-up periods, but was small at 12-month follow-up. Regarding the BA and Control group comparison, the effect size was also small across all time points.

In terms of expressive suppression, the Condition x Time interaction was non-significant, as were the main effects of Condition and Time. Regarding between-group effect

sizes comparisons, the difference between the ER and the Control group comparison was small at post-treatment and at 6-and 12-month follow-up periods. Similarly, for the BA and Control group comparison, the effect size was small across all time points.

Behavioral Activation for Depression Scale – Short Form. The interaction between Condition x Time was non-significant, as was the main effect of Time. However, there was a significant main effect of Condition. Pairwise comparisons showed that participants in the ER condition reported significantly higher scores on the BADS-SF compared to those in the BA condition (p = .002), with no differences between the ER and the Control condition (p = .12) or between the BA and the Control condition (p = 1.00).

A comparison of the between-group effect sizes showed small effect sizes between the ER and Control conditions at post-program and at 12- month follow-up periods, and a medium effect size at 6-month follow-up. The effect size of the comparison of the BA and the Control conditions was medium at 6-month follow-up but small at both post-program and at 12-month follow-up.

Subscales of the RCADS

A series of exact McNemar's tests were conducted to determine the differences between the percentage of participants who met the clinical cut-off scores for anxiety disorders (i.e., Obsessive-Compulsive Disorder (OCD), GAD, Separation Anxiety, Social Phobia, and Panic Disorder) and Major Depressive Disorder at baseline compared to 12-month follow-up. The use of clinical RCADS cut-off scores is well-documented in clinical research when assessing symptoms of anxiety and depression (Carpentier, Elkin, & Starnes, 2009; Wolpert, Cheng, & Deighton, 2014). An assessment of any change in cut-off scores in the present sample would provide valuable information regarding the clinical significance of

the programs (Jacobson & Truax, 1991). The percentages of individuals who met these cut-off scores over time are presented in Table 5.

Table 5

Percentages and Significance of the RCADS Subscales by Condition Over Time

	Emotion Regulation			Behavioural Activation			Control		
Disorder	Baseline	12-month	*p*	Baseline	12-month	*p*	Baseline	12-month	*p*
Obsessive Compulsive Disorder	47.3%	23.3%	.002	61.5%	33.1%	.10	52.6%	36.8%	.73
Generalised Anxiety	35.7%	19.4%	.10	59.2%	28.5%	.04	43.9%	29.8%	1.00
Separation Anxiety	32.6%	17.8%	.21	57.7%	25.4%	.001	50.9%	22.8%	.04
Social Phobia	32.6%	23.3%	1.00	46.9%	24.6%	.65	50.9%	28.1%	1.00
Panic Disorder	6.2%	7.0%	.22	23.80%	12.30%	.79	10.5%	3.5%	.13
Major Depressive Disorder	20.9%	14.0%	1.00	45.4%	18.5%	.03	26.3%	14.0%	.63

In the BA condition, the percentage of participants who met the cut-off scores for the subscales of generalised anxiety disorder and major depression reduced significantly from baseline to 12-month follow-up, while no significant change was observed for those in the Control condition. The percentage of participants who met the cut-off for separation anxiety also significantly reduced from baseline to 12-month follow-up; however, so too did the percentage in the Control condition. Regarding the ER condition, the percentage of participants who met the cut-off for obsessive compulsive disorder reduced significantly from baseline to 12-month follow-up, while no such significant change was observed for those in the Control condition. Finally, symptoms for the subscales of social phobia and panic disorder did not change over time for any of the conditions.

Mediation Analyses

To test the hypothesis that level of emotion regulation and level of behavioural activation would mediate the relationship between condition and worry, a series of mediation analyses were conducted to investigate mediation effects at Times 2, 3 and 4. Results of the bootstrapping analyses are shown in Table 6. As expected, level of emotion regulation (cognitive reappraisal subdomain) was found to mediate the relationship between condition and worry at post-program for those in the ER condition while controlling for participants' levels of behavioural activation, however this was not maintained at 6- nor 12-month follow-up periods. Participants in the ER condition displayed greater levels of cognitive reappraisal (M = 21.55, SD = 4.68) compared to those in the Control condition (M = 19.77, SD = 4.29), and lower levels of worry (ER: M = 14.08, SD = 8.01; Control: M = 16.56, SD = 8.59). Level of BA was also found to mediate the relationship between condition and worry at post-program for those in the BA condition while controlling for participants' emotion regulation scores. However, this was not in the anticipated direction. Participants in the BA condition

displayed lower levels of behavioural activation at post-program (*M* = 33.16, *SD* = 8.71) compared to those in the Control condition (*M* = 35.72, *SD* = 9.35), whilst also showing greater levels of worry at post-program (*M* = 17.71, *SD* = 9.86) compared to Control (*M* = 16.56, *SD* = 9.86). There were no other indirect effects for level of emotion regulation nor behavioural activation across any time point.

Further mediation analyses were conducted to determine whether resilience would mediate the relationship between condition and anxiety and depression scores (i.e., RCADS scores), and whether RCADS scores would mediate the relationship between condition and DSB scores. Results of these bootstrapping analyses are also shown in Table 6. Level of resilience was found to mediate the relationship between condition and level of anxiety and depression at post-program for those in the BA condition; however, this was not in the anticipated direction. Participants in the BA condition displayed lower levels of resilience (*M* = 16.83, *SD* = 4.31) and greater levels of anxiety and depression (*M* = 42.32, *SD* = 26.68) compared to those in the Control condition (*M* = 20.14, *SD* = 3.07 and *M* = 40.14, *SD* = 22.03 respectively). There were no indirect effects for either level of resilience or RCADS scores at any time point. Nor did anxiety and depression mediate the relationship between condition and working memory at any time point.

Table 6

Results of Bootstrapping Mediation Analysis for ERQ-CR, ERQ-ES, BADS-SF, CYRM and RCADS as Mediators

Variable	Emotion Regulation compared to Control				Behavioural Activation compared to Control			
	Coeff.	*SE*	*CI lower*	*CI upper*	*Coeff.*	*SE*	*CI lower*	*CI upper*
ERQ-CR - Time 2	-0.62	0.39	-1.52	-0.03	-	-	-	-
ERQ-CR - Time 3	-0.11	0.21	-0.64	0.24	-	-	-	-
ERQ-CR - Time 4	-0.12	0.26	-0.79	0.26	-	-	-	-
ERQ-ES - Time 2	0.16	0.30	-0.36	0.83	-	-	-	-
ERQ-ES - Time 3	0.01	0.29	-0.59	0.65	-	-	-	-
ERQ-ES - Time 4	0.31	0.42	-0.47	1.25	-	-	-	-
BADS-SF - Time 2	-	-	-	-	1.31	0.69	0.04	2.74
BADS-SF - Time 3	-	-	-	-	-1.25	0.83	-3.03	0.32
BADS-SF - Time 4	-	-	-	-	-0.25	0.74	-1.70	1.27
CYRM – Time 2	2.95	1.42	0.57	6.16	6.32	1.92	3.01	10.62
CYRM – Time 3	-0.75	1.51	-3.74	2.20	2.21	1.50	-0.65	5.36
CYRM – Time 4	-0.58	1.42	-3.42	2.34	1.07	1.41	-1.64	4.03

RCADS – Time 2	0.07	0.10	-0.11	0.44	-0.03	0.10	-0.27	0.16
RCADS – Time 3	0.05	0.18	-0.34	0.41	-0.01	0.10	-0.26	0.17
RCADS – Time 4	0.14	0.22	-0.29	0.59	-0.26	0.27	-0.85	0.23

Note. ERQ-CR = Emotion Regulation Questionnaire for Children and Adolescents – Cognitive Reappraisal subscale; ERQ-ES = Emotion Regulation Questionnaire for Children and Adolescents – Expressive Suppression subscale; BADS-SF = Behavioural Activation for Depression Scale – Short Form; RCADS = Revised Children's Anxiety and Depression Scale.

Discussion

This study is the first randomised controlled trial to evaluate the long-term efficacy of the ER and the BA programs in building resilience and preventing worry, anxiety and depression in children. Neither program significantly increased resilience, nor significantly reduced symptoms of worry, anxiety or depression. However, the percentage of participants in the BA condition who were identified as meeting the clinical cut-offs for generalised anxiety disorder and major depressive disorder decreased significantly from baseline to 12-month follow-up, while no significant change was observed for those in the Control condition. Regarding the ER condition, the percentage of participants who met the clinical cut-off for obsessive compulsive disorder also decreased from baseline to 12-month follow-up, while no significant change was found for those in the Control condition.

Reductions in Worry, Anxiety and Depression Symptomology

Contrary to prediction, participants in the two active conditions did not report significantly fewer symptoms of excessive worry, anxiety, or depression at post-program or at either 6-month or 12-month follow-up compared to those in the control condition. These findings are, however, in line with those of Johnstone et al.'s (2020) pilot study, but only partially consistent with those of Ehrenreich-May and Bilek (2011) who found significant improvements in symptoms of anxiety, but not depression, at post-program as a result of their ER-based transdiagnostic prevention program for anxiety and depression. However, as they did not include a control comparison group or a follow-up period, direct comparisons may not be appropriate. To the best of our knowledge, no other BA-based prevention programs have been investigated. However, Chu et al. (2016) trialled a BA-based transdiagnostic treatment for anxiety and depression in adolescents, with results also showing significant improvements in symptoms of anxiety, but not depression. The difference in findings

between the present study and those observed by Chu et al. (2016) likely reflect the differential focus of the present study on prevention rather than a treatment, in that participants here were not required to be experiencing symptomology to participate in the programs, which would have reduced their capacity for improvement over time. It is well-documented that universal prevention programs often show null findings, as the majority of participants are not at risk of developing a mental health disorder and tend to show low levels of clinical symptomology at baseline, therefore masking any potential effects (Barrett & Turner, 2001). As such, it has been suggested that observing effect sizes, rather than significance, may be a more appropriate method of assessing the efficacy of universal prevention programs, as even small effects may indicate clinical and practical significance(Ahlen, Lenhard, & Ghaderi, 2015). The calculation of between-group effect sizes in the present study revealed small effects for reductions in some symptomology in both active conditions, indicating their potential use as preventative programs for childhood anxiety and depression.

Improvement in Resilience

The lack of significant change in resilience scores over time was unexpected, and as such, it was not surprising that resilience did not mediate the relationship between condition and anxiety and depression in the anticipated direction. These findings are partially in line with those observed in Johnstone et al.'s (2020) pilot study which also found no significant change in resilience over time for those in the ER condition, although they did find an increase from baseline to 6-month follow-up in the BA condition. However, as noted by Johnstone et al. (2020) their improvement should be interpreted with caution as a large number of participants did not complete the 6-month follow-up assessment, which may have resulted in a biased sample of responses. In contrast, Pluess, Boniwell, Hefferon, and Tunariu (2017) found that resilience levels did improve significantly as a result of their 12-week

SPARK Resilience Programme in a sample of high-risk, low SES schools. As suggested by Johnstone et al. (2020), it may be the case that resilience is more easily able to be developed in participants who have had a greater exposure to hardship, as resilience is only developed through experiencing adversity. In the present sample, the lack of significant improvement in resilience scores could be due to the overall high SES of the sample (mean sample SES = 4.43). Given that low SES is highly correlated with a number of adverse situations (Pearlman, Zierler, Gjelsvik, & Verhoek-Oftedahl, 2003), it would be important to investigate the efficacy of the two programs in a sample of low SES schools as this may allow for greater development of resilience skills.

Change in Clinical Cut-off Scores

As an extension of Johnstone et al.'s (2020) pilot study, the present study sought to further evaluate the clinical benefits of the prevention programs by examining whether the percentage of the participants who met the clinical cut-off criteria for specific disorders would reduce over time. Partially supporting the hypothesis, the number of participants who met the clinical cut-off scores of generalised anxiety disorder and major depressive disorder in the BA condition reduced from baseline to 12-month follow-up, with no change observed for those in the Control condition. The number of participants who met the clinical cut-off score for separation anxiety disorder also decreased over time, but so did the number of participants in the Control condition. Regarding the ER condition, participants who met the clinical cut-off score for obsessive compulsive disorder reduced from baseline to 12-month follow-up, while no change was observed for participants in the Control condition. These findings are partially consistent with those of Stallard et al. (2014) who found that the CBT-based FRIENDS programme reduced symptoms of generalised anxiety disorder at 12-month follow-up compared to control. In contrast, Rooney et al. (2013) found that the CBT-based Aussie Optimism: Positive Thinking Skills Program (AOP-PTS) had no effect on symptoms

of depression or anxiety in 9 to 10-year-old students. However, their finding cannot be directly compared to that of the present study as they used a general measure of anxiety, which unlike the RCADS, does not provide scores for individual anxiety disorders.

The BA program showed a reduction in the number of participants who met the clinical cut-off for symptoms of generalised anxiety disorder. The core feature of generalised anxiety disorder is an excessive, uncontrollable or unrealistic worry about a variety of events or situations, such as future events, peer interactions, and school performance (Layne, Bernat, Victor, & Bernstein, 2009). Such worry often leads to an avoidance of the feared situations, which serves to reduce anxiety in the short-term but does not allow for the habituation and extinction of the fear in the long-term, so the anxiety remains (Borkovec et al., 1998). A main component of the BA program focused on teaching students the detrimental impact of avoidance and the importance of engaging in alternative behaviours that serve to overcome their avoidance. It is possible that by identifying their own patterns of avoidance, and then engaging in alternative behaviours, students learned skills to overcome their avoidance, thus decreasing their susceptibility to GAD. It is surprising, however, that there was no reduction in the percentage of participants who met the cut-off for generalised anxiety disorder in the ER condition. This may indicate that children with symptoms of generalised anxiety disorder require a behavioural component to adequately target their worries. However, it should be noted that the percentage of participants who met the clinical cut-off for generalised anxiety disorder in the BA condition at baseline was far greater than that in the ER condition (59.2% and 35.7% respectively), which would allow for a greater reduction in scores over time.

The BA program also led to a reduction in the percentage of participants who met the clinical cut-off criteria for major depressive disorder at 12-month follow-up. This is not surprising as behavioural activation has long been utilised as an effective treatment for major

depressive disorder in adults, with recent research showing promising results for the treatment of depression in youth (Chu et al., 2016; Martin & Oliver, 2019). This finding is in line with that of Essau, Conradt, Sasagawa, and Ollendick (2012) who also found a reduction in symptoms of depression at 12-month follow-up after implementation of the Friends prevention program. Moreover, the results from Johnstone et al.'s (2018) meta-analysis showed school-based prevention programs to be effective in reducing symptoms of depression at long-term follow-up. Despite the non-significant interaction effects in the present study, the reduction in the number of participants who met the clinical cut-off score for major depressive disorder suggests that the use of a behavioural activation framework may show clinical benefits for children who already experienced symptoms of major depressive disorder. As previously stated, the aim of behaviour activation is to reduce the avoidance associated with symptoms of depression, which, in turn, serves to reduce symptomology as the individual receives positive reinforcement from re-engaging in daily tasks and previously enjoyed activities (Chu et al., 2009). Therefore, it makes sense that children who already experienced symptoms of depression, and thus possibly engaged in avoidance behaviours, would have benefited from the skills taught in the BA program. In contrast, in the ER program there was no reduction in the percentage of participants who met the clinical cut-off for major depressive disorder. Given that behavioural activation has been shown to be a highly effective treatment for depression, it could be the case that a purely cognitive-based program is not sufficient to effectively target symptoms of depression in children, and a behavioural component is needed to produce clinical benefits.

The ER program led to a decrease in the number of participants who met the cut-off for obsessive compulsive symptoms. Obsessive compulsive disorder is characterised by the experience of obsessions (i.e., repetitive thoughts, images, or urges) and/or compulsions (i.e., repetitive behaviours; American Psychiatric Association, 2013). Common obsessions include

thoughts about bad things happening to oneself or loved ones. To reduce the anxiety associated with such obsessive thoughts, children may engage in compulsive behaviours or rituals, such as repetitive checking, hand washing or counting, which they believe have the power to stop the thought and any subsequent adverse outcome (American Psychiatric Association, 2013). It is possible that the ER program is effective in targeting the anxiety-related thought processes of obsessive compulsive disorder. For instance, in the ER program, students learn to identify and overcome some common "thinking traps", such as jumping to conclusions and catastrophising. This may have allowed them to recognise and manage their obsessive thinking patterns, which may subsequently have reduced their need to engage in compulsions. By decreasing their reliance on compulsions, these individuals may also have learned that the compulsions are not required to prevent their feared outcome from becoming a reality. In contrast, the BA condition did not show a reduction in the number of participants who met the cut-off for obsessive compulsive symptoms. It could be the case that the generic nature of the skills taught in the BA program were not sufficient to adequately target and reduce symptoms of obsessive compulsive disorder.

Finally, both the BA and Control conditions led to a decrease in the number of participants who met the clinical cut-off score for separation anxiety. As this finding was observed in both the active and the control conditions this improvement may be a result of participants maturing over time and possibly being exposed to situations that may have assisted them to overcome their anxiety relating to separating from their primary caregiver, such as attending school camps or sleepovers. Participants in the ER condition did not show any improvement in symptoms of separation anxiety; however, they displayed lower baseline scores for separation anxiety when compared to those in the BA and Control conditions, which may have reduced their ability for further improvement.

Finally, neither prevention program nor the Control condition were found to reduce the percentage of participants who met the clinical cut-off scores for social phobia or panic disorder. This is not overly surprising, given that both social phobia and panic disorder require disorder specific interventions which rely heavily on exposure techniques tailored to suit the difficulties experienced by the individual (Fentz, Arendt, O'Toole, Hoffart, & Hougaard, 2014; Mohatt, Bennett, & Walkup, 2014), the inclusion of which was outside the scope of a universal prevention program. As such, it may be the case that a disorder-specific prevention program may be required to provide benefits for these presentations.

Mediation Relationships

Level of emotion regulation mediated the relationship between condition and worry at post-program for participants in the ER condition. This suggests that the ER program led to an increase in emotion regulation skills which subsequently resulted in decreased worry. However, this mediation was not observed at 6- or 12-month follow-up. This suggests that the program was effective in improving emotion regulation skills initially; however, it appears that these gains could not be maintained over time, which is likely as a result of a lack of continued practice. No other mediation relationships were observed. These findings are partially in line with those observed in Johnstone et al.'s (2020) pilot study whereby levels of emotion regulation and behavioural activation did not mediate the relationship between condition and worry at any time point. In addressing the limitation of the pilot study, the present study made substantial amendments to both programs to increase their ability to build emotion regulation and behavioural activation skills, including a reduction in overly theoretical and less relevant content and the inclusion of interactive games and activities to facilitate engagement, which may have led to the improvement in level of emotion regulation at post-program for the ER condition. Nevertheless, the largely non-significant changes in the levels of emotion regulation and behavioural activation may necessitate further amendments

to the programs to effectively target and improve these two skills so they are able to be maintained after completion of the programs.

It is possible, however, that the largely non-significant findings observed here and by Johnstone et al. (2020) may be a function of the measures used and the age of the samples. To the best of our knowledge, measures of behavioural activation have not yet been standardised for use with children. In the current study, the adult version of the BADS-SF was modified for use in a child sample. As such, this may not be a reliable measure of behavioural activation in children. Regarding measures of emotion regulation, research investigating the types of emotion regulation strategies that children engage in is lacking. In addition, it has been suggested that a limitation of such measures is that children may not yet have developed the meta-cognition required to effectively reflect on and report their use of emotion regulation strategies (Braet et al., 2014; Eisenberg, Spinrad, & Eggum, 2010). In fact, the BADS-SF and the expressive suppression subscale of the ERQ-CA showed poor internal consistency. This suggests that the available measures may not adequately target and measure the types of strategies that children actually engage in, and therefore did not allow for an accurate reporting of emotion regulation and behavioural activation skills, leading to non-significant findings.

Contrary to prediction, neither anxiety nor depression mediated the relationship between condition and working memory. It was anticipated that working memory would improve as a result of an improvement in anxiety and depressive symptoms, as anxiety and depression interfere with cognitive functioning, particularly working memory (Owens et al., 2012). However, given that the majority of participants were not experiencing high levels of anxiety or depression it is likely that they were also not experiencing any deficits in working memory that could be improved upon as a result of the programs. In support, the average

scaled score for the digit span backwards task in the present sample was above average (mean scaled score of 12.39). However, there were also a number of issues with the implementation of this task that may have impacted upon the reliability and validity of the students' responses. Namely, despite providing students with rules and scaffolding regarding the appropriate manner in which to complete the task, students were often observed to use strategies that were not permitted (e.g., recording the number on another piece of paper to refer to it when providing their response instead of remembering the sequence), which may have affected the validity of their responses. Although every effort was made to prevent students from engaging in these strategies, given the large number of students in each class it was impossible to observe each student's response to each item of the task, so these results should be interpreted with caution.

Limitations and Directions for Future Research

As with all research, the present study carries a number of limitations. First, the control condition had significantly fewer participants than the active conditions, leading to uneven group sizes and insufficient power. Although an adequate number of participants were initially recruited, the withdrawal of a school from the control condition resulted in a loss of a large number of participants, and the continuation of data collection was not possible due to time constraints associated with thesis submission. Furthermore, as was the case in Johnstone et al. (2020) it was clear that schools and teachers were less motivated to encourage students and parents/guardians to return the consent forms once they were made aware that they had been assigned to the control condition, leading to fewer classes and participants in the control condition, which limits the representativeness of the sample. Second, relatedly, the present study would have benefited from including a larger number of schools per condition. This would have increased the generalisability of the findings and allowed for the clustering of schools per condition. Due to the small number of schools

(approximately 1-2 schools per condition), the latter was not undertaken as it posed a risk of confounding schools and conditions within analyses because the two variables shared a significant amount of overlap. Third, the present findings were based predominately on child self-report, the accuracy of which has been questioned as children may not yet have the cognitive capacity to accurately reflect upon concepts such as emotions (Braet et al., 2014), potentially resulting in inaccurate responses. Nevertheless, child self-report measures are widely used in universal school-based studies to assess large numbers of children within a short timeframe. Although time consuming, future research could consider including interview-based assessments. Finally, in light of the present non-significant interactions, it is possible that the programs do not provide effects in their current format, and further amendments may be required to yield greater outcomes. For instance, it may be beneficial to incorporate parent sessions into the programs so that participants may receive added encouragement to engage in skills in the home environment. It may also be interesting to assess the effect of the programs when presented to different populations of youth, such as adolescents or children who are already deemed to be 'at risk' of developing anxiety or depression, as these may produce added benefits not observed in the present study.

Strengths of the study

In addition to these limitations, the present study has several notable strengths. First, the programs aimed to prevent anxiety and depression simultaneously. Given the high rates of comorbidity between anxiety and depression, and the negative impact of such comorbidity on the severity, duration and chronicity of disorders (Feske et al., 1998), the development and investigation of effective transdiagnostic prevention programs is important. A second major strength of this trial is that it provided an exploration into the use of novel and simpler techniques, other than traditional CBT-based programs, to prevent anxiety and depression in children. Importantly, the ER and BA programs showed promising results for certain anxiety

disorders not otherwise observed in universal school-based studies. Third, the present study included a 12-month follow-up period, which allowed for an investigation into the long-term preventative effects of the programs. Fourth, the study included an assessment of the change in the percentage of participants who met the clinical cut-off scores for several anxiety disorders and major depressive disorder over time. This is not overly common in prevention research, but adds valuable information regarding the clinical significance of the programs' efficacy, as well as their suitability to prevent symptoms of specific disorders. Fifth, the inclusion of an assessment of working memory is a novel concept in prevention research, and its inclusion allowed for a more comprehensive investigation into the benefits of disorder prevention. Future research should consider including more suitable group-based measures of working memory as well as executive functioning more generally to further investigate these effects. Finally, the study randomised schools to condition, rather than to classes, which prevented contamination between conditions.

Conclusion

In conclusion, the present study provides an evaluation of two novel ER- and BA-based transdiagnostic universal prevention programs for anxiety disorders in children. The programs did not show statistically significant changes in worry, depression or resilience. However, the percentage of participants who met the clinical cut-off scores for generalised anxiety disorder and major depressive disorder in the BA condition significantly reduced from baseline to 12-month follow-up, while no significant change was observed for those in the Control condition. Moreover, the percentage of participants in the ER condition who met the clinical cut-off score for obsessive compulsive disorder also reduced from baseline to 12-month follow-up, while no significant change was observed for participants in the Control condition. Finally, the level of emotion regulation mediated the relationship between condition and worry at post-program in the ER condition. Future research should carry out

larger trials using interview-based assessments to further investigate the efficacy of the programs.

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Appendix A

Adherence Checklist – Emotion Masters

Session 1

Agenda	Introduction and outline of session contents	
Formal Introduction	Facilitators introduce themselves, explain program details	
'Classroom Bingo' game	Complete the 'Classroom Bingo' game	
Group Rules	Work through 'group rules' with class	
Psychoeducation	Work through the 'What is Worry?' handout	
Introduction to Emotions	Introduce 'hot' vs 'cool' emotions - complete brainstorming activity	
Review of Session	Review session contents	

Session 2

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	
'Emotion Charades' game	Have students complete the 'Emotion Charades' game	
Review of Session	Review session contents	

Session 3

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	
Triggers for Emotions	Introduction to triggers and why they're useful	
Handout – 'Triggers that cause Emotions'	Work through the 'Triggers that cause Emotions' handout	
Handout – 'Match the Emotion to the Bodily Feeling'	Work through the 'Match the Emotion to the Body Feeling' handout	
'Body Signals' game	Have students complete the 'Body Signals' game	
Review of Session	Review session contents	

Session 4

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	

The Cognitive Triangle	Introduce the Cognitive Triangle to students and work through example	
Handout – 'Thinking Traps'	Work through the 'Thinking Traps' handout	
'Caught in a Thinking Trap' game	Have students complete the 'Caught in a Thinking Trap' game	
Review of Session	Review session contents	

Session 5

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'Thinking Traps vs Helpful Thoughts'	Work through the 'Thinking Traps vs Helpful Thoughts' handout	
Handout – 'Personal Worry'	Work through the 'Personal Worry' handout	
Review of Session	Review session contents	

Session 6

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'Change the Worry Channel'	Work through the 'Change the Worry Channel' handout	
'Worry Sort' game	Have students complete the 'Worry Sort' game	
Review of Session	Review session contents	

Session 7

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'Strategies for Preventing Worry'	Work through the 'Strategies for Preventing Worry' handout	
Handout – 'Healthy Brain Word Search'	Work through the 'Healthy Brain Word Search' handout	
Handout - 'Healthy Brain'	Work through the 'Healthy Brain' handout	
Review of Session	Review session contents	

Session 8

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'Emotion Masters Quiz'	Work through the 'Emotion Masters Quiz' handout	
Handout – 'Preparing for Upcoming Worries'	Work through the 'Preparing for Upcoming Worries' handout	
Handout – 'List of People to Chat to'	Work through the 'List of People to Chat to' handout	
Goodbye	Goodbye to students and thank them for participating	

Appendix B

Adherence Checklist – Wipe Out Worry

Session 1

Agenda	Introduction and outline of session contents	
Formal Introduction	Facilitators introduce themselves, explain program details	
'Classroom Bingo' game	Complete the 'Classroom Bingo' game	
Group Rules	Work through 'group rules' with class	
Psychoeducation	Work through the 'What is Worry?' handout	
Handout - 'Sally's Story'	Work through the 'Sally's Story' handout	
'White Bear' activity	Complete the 'White Bear' activity	
Review of Session	Review session contents	

Session 2

Agenda	Introduction and outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'Avoidance Behaviours'	Work through 'Avoidance Behaviours' handout	
'Pair and Share' activity	Complete the 'Pair and Share' activity	
Handout - 'Worry Cycle'	Work through the 'Worry Cycle' handout	
Handout - 'Jimmy's Story'	Work through the 'Jimmy's Story' handout	
Handout – 'Personal Worry'	Complete the 'Personal Worry' handout	
'Two Minute Rule' activity	Complete the 'Two Minute Rule' activity	
Review of Session	Review session contents	

Session 3

Agenda	Introduction and outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'What Emotions do you feel when you Worry?'	Work through the 'What Emotions do you feel when you Worry?' handout	
Psychoeducation	Psychoeducation - Reasons why worry is not helpful	
'Worrying Will' game	Complete the 'Worrying Will' game	
Review of Session	Review session contents	

Session 4

Agenda	Introduction and outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'Matt's Story'	Work through the 'Matt's Story' handout	
Introduction to TRAP	Introduction to TRAP	
'Avoidance' scenario game	Complete the 'Avoidance' scenario game	
Review of Session	Review session contents	

Session 5

Agenda	Introduction and outline of session contents	
Review of Last Session	Review contents of last session	
Psychoeducation	Psychoeducation – Active Coping	
Getting back on TRAC	Introduction to Getting back on TRAC	
Handout – 'Stephanie's Story'	Work through the 'Stephanie's Story' handout	
'Getting back on TRAC' roleplay game	Complete the 'Getting back on TRAC' roleplay game	
Review of Session	Review session contents	

Session 6

Agenda	Introduction and outline of session contents	
Review of Last Session	Review contents of last session	
Psychoeducation	Psychoeducation – Making Active Coping part of everyday life	
SMART Goals activity	Complete the SMART goals activity	
Review of Session	Review session contents	

Session 7

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'Strategies for Preventing Worry'	Work through the 'Strategies for Preventing Worry' handout	
Handout – 'Healthy Brain Word Search'	Work through the 'Healthy Brain Word Search' handout	

Handout - 'Healthy Brain'	Work through the 'Healthy Brain' handout	
Review of Session	Review session contents	

Session 8

Agenda	Outline of session contents	
Review of Last Session	Review contents of last session	
Handout – 'Emotion Masters Quiz'	Work through the 'Wipe out Worry Quiz' handout	
Handout – 'Preparing for Upcoming Worries'	Work through the 'Preparing for Upcoming Worries' handout	
Handout – 'List of People to Chat to'	Work through the 'List of People to Chat to' handout	
Goodbye	Goodbye to students and thank them for participating	

Chapter 5: General Discussion

Overview

This thesis aimed to develop and investigate the efficacy of two novel universal school-based prevention programs for children by building resilience to manage worry, a transdiagnostic feature across anxiety and depression. This was achieved through a series of three studies. First, a meta-analysis was conducted to investigate the strengths and weaknesses of previous universal childhood anxiety and depression prevention programs (Chapter 2). Second, based on the findings from this meta-analysis, two novel programs were developed with the aim of targeting the transdiagnostic feature of worry to prevent anxiety and depression in children. In particular, a preliminary investigation was conducted to determine the efficacy of an emotion regulation and a behavioural activation-based program in a randomised controlled pilot study (Chapter 3). In response, several modifications were made to both programs. A larger scale randomised controlled trial was subsequently conducted to investigate the efficacy of the two programs with the inclusion of a 12-month follow-up period (Chapter 4). The present chapter will begin by providing a summary of the findings from the aforementioned studies followed by a discussion of the theoretical and practical implications of the study findings. The limitations and strengths of the thesis studies will then be discussed, before concluding with recommendations for future research.

Summary of findings

The research project began with a rigorous evaluation of the current universal anxiety and depression prevention literature in the form of a meta-analysis. The analysis showed that the majority of previous prevention programs for children were based on the principles of Cognitive Behavioural Therapy (CBT). In addition, it identified two main limitations of these programs. First, previous prevention programs often showed small or null effects. Second, they typically did not demonstrate benefits in reducing or preventing both anxiety and

depression together. Given that comorbidity between anxiety and depression has been shown to negatively impact the duration and chronicity of symptoms, as well as response to treatment (Feske, Frank, Kupfer, Shear, & Weaver, 1998), prevention programs that effectively target both disorders are warranted.

Based on the findings from the meta-analysis, two novel 8-week prevention programs were developed with the aim of building resilience to target the transdiagnostic feature of both anxiety and depression, namely worry. In particular, the ER program was based on the principles of emotion regulation, while the BA program was based on behavioural activation therapy. Unlike most traditional prevention programs, these programs aimed to prevent both anxiety and depression simultaneously by targeting worry. A further benefit of the programs is that compared to traditional CBT-based prevention programs, they are shorter in length and contain simpler techniques, making them potentially easier to deliver and for children to engage in.

The first experimental study conducted in the course of this thesis was a randomised controlled pilot trial investigating the efficacy of the two programs in a sample of primary school children (N = 295; aged 8-13 years) compared against a usual class control condition. The programs did not significantly reduce symptoms of worry, anxiety, and depression, and no mediation relationships were found. However, participants in the BA condition showed significantly greater resilience scores at 6-month follow-up compared to control (d = 1.11). Furthermore, compared to the control condition, the ER condition demonstrated moderate between-groups effect sizes at post-program for anxiety and depression (d = 0.44) and at 6-month follow-up for reductions in worry (d = 0.34). These preliminary findings indicated the potential of the programs for building resilience, and reducing anxiety, depression and worry, and thus provided a promising avenue for further exploration.

The outcomes of the pilot study revealed a number of limitations which led to revisions of both programs. A larger randomised controlled trial (N = 316; aged 8-13 years) was then conducted to evaluate the efficacy of the revised programs, with the inclusion of a 12-month follow-up, and an assessment of working memory to assess potential improvement in cognition as a result of symptom reduction. There were no changes in resilience, worry or anxiety and depression; however, level of emotion regulation mediated the relationship between condition and worry for participants in the ER condition at post-program. This suggests that the ER program was effective in developing level of emotion regulation skill, which led to decreased worry, however this effect was not observed at either follow-up, which may reflect a lack of continued practice of emotion regulation skills upon completion of the program. In contrast to the pilot study, the between-group effect sizes of the improvements in resilience and reductions in worry, anxiety and depression observed over time for participants in the active conditions were small (*d*'s = 0.07 – 0.25). However, the number of participants in the BA condition who met the clinical cut-off scores for generalised anxiety disorder and major depressive disorder at baseline significantly reduced at 12-month follow-up, while no significant change was observed for those in the Control condition. Similarly, those in the ER condition who met the clinical cut-off score for obsessive compulsive disorder also reduced from baseline to 12-month follow-up, with no significant change for participants in the Control condition.

These findings were broadly in line with previous meta-analyses and systematic reviews investigating the efficacy of prevention programs for children, which tend to show small effects for reductions in symptomology. Most recently, the meta-analysis conducted as part of this thesis found that transdiagnostic prevention programs for children show small benefits for reducing symptoms of depression at post-program (g = 0.17) and at long-term follow-up (g = 0.18), but no benefit for anxiety. An earlier review conducted by Werner-

Seidler, Perry, Calear, Newby, and Christensen (2017) found that prevention programs for students (aged 5 to 19 years) showed small reductions in anxiety and depression at post-program (*g*'s = 0.20 and 0.23 respectively) and at 12-month follow-up (*g*'s = 0.13 and 0.11 respectively). Similarly, Stockings et al. (2016) found reduced symptoms of depression at post-program (*d* = -0.11) and at 12-month follow-up (*d* = -0.09); however, no significant reductions were observed at 18-month follow-up. Stockings et al. (2016) also found a reduction in anxiety symptoms at post-program (*d* = -0.16), and at 6- to 9-month follow-up (*d* = -0.12), but no significant effects beyond 9-months. Likewise, Ahlen, Lenhard, and Ghaderi (2015) found small but significant reductions in anxiety (*g* = 0.13) and depression (*g* = 0.11) post-program. Although they also found significant reductions in depression (*g* = 0.10) at follow-up (which ranged from 3 to 48 months), they found no further significant reductions in anxiety. By comparison, although the findings from the randomised controlled trial outlined in Chapter 4 observed no statistically significant reductions in symptomology, the effect sizes reported in Chapter 4 are comparable to those of the aforementioned studies. Moreover, the active conditions showed a reduction in the percentage of participants who met the clinical cut-off scores for generalised anxiety disorder, major depressive disorder, and obsessive compulsive disorder, which indicates the clinical significance of the programs (Jacobson & Truax, 1991). Although further improvement of the programs used in the current research is required, these findings are promising and present an interesting avenue for further exploration in the area of transdiagnostic prevention programs.

Theoretical implications

The thesis findings have important theoretical implications for advancing the existing knowledge base of transdiagnostic prevention programs for children. Transdiagnostic approaches to mental health have risen in popularity in recent years. Theoretical models of anxiety propose that anxiety disorders share common psychological vulnerability (e.g.,

negative affectivity) or personality (e.g., neuroticism) factors, and it has been proposed that these underlying factors, rather than symptoms, may actually serve to maintain anxiety disorders (Barlow, Allen, & Choate, 2016). Thus, transdiagnostic models aim to challenge traditional disorder-specific treatments and target the underlying psychopathology in individuals who meet diagnostic criteria for one or multiple disorders. From the perspective of a prevention framework, given the high rates of anxiety and depression, and taking into account the overlap in risk factors and symptomology between the two disorders, transdiagnostic approaches that can prevent their onset are more efficient and economical (Farchione et al., 2012). However, the results of the present meta-analysis (Chapter 2) showed that among the few prevention programs which aimed to prevent both anxiety and depression simultaneously, only small effects were observed for reducing and preventing depressive symptoms, and no benefit for the prevention of anxiety symptoms (Johnstone et al., 2018).

In contrast to the traditional CBT-based programs included in the meta-analysis, the ER and BA programs did show moderate effect sizes for reductions in symptoms of anxiety and depression (Chapters 3), and also demonstrated the clinical significance of the programs (Chapter 4). Several possible explanations have been presented to account for the lack of statistically significant interactions found in Chapters 3 and 4, which include relatively small sample sizes and some less than ideal methods of data collection. However, because of the lack of statistically significant findings, brief ER- and BA-based prevention programs may not provide adequate benefits for the prevention of both anxiety and depression in children. This could be due to the single component of the programs (i.e., either the BA or the ER) and fewer practice sessions involved in both programs compared to traditional CBT-based programs. Alternatively, it may be that a combined cognitive and behavioural approach is more favourable for preventing both anxiety and depression. Nevertheless, it is unlikely that

the true benefits of a prevention program could be observed within a 12-month follow-up period, as done here the present study, and further assessment should be undertaken before ER- and BA-based prevention programs can be discounted as effective prevention programs.

Practical implications

Despite the lack of statistically significant results, this thesis does have important practical implications. In particular, the small to moderate effects for reductions in anxiety and depression as a result of the ER and BA programs, as well as the reductions in percentage of participants who met the clinical cut-off scores for generalised anxiety disorder, major depressive disorder, and obsessive compulsive disorder, indicate that the programs can produce clinical and practical benefits to students in as little as 8 weeks. Furthermore, both programs have the advantage over traditional CBT-based programs in that they contain less complex components, and thus are better tailored to the developmental capacity of young children. Consequently, the programs would not only be easier for children to comprehend, but because they contain simpler components, could possibly be delivered by trained school staff, rather than mental health workers, making the delivery more cost-effective for the schools involved. Moreover, by aligning the program content with the elements of the Personal and Social Capability component of the South Australian teaching curriculum, the delivery of the programs can easily be incorporated into a teaching schedule without having to forgo other subjects. Accordingly, the programs are particularly suitable for implementation as universal prevention programs in Australian primary schools. Training teachers to deliver the programs would enable them to be disseminated to a large number of schools and potentially benefit a greater number of students at little cost, time and inconvenience to the schools involved.

Limitations and Strengths

This thesis has several limitations that should be considered. A common challenge when conducting universal school-based prevention programs is that active consent from a parent/guardian (i.e., opt-in) is often required for the child to participate in the program. Research has shown that children whose parents do not return the consent form tend to have lower SES, experience greater disadvantage (e.g., parental separation), display poorer academic achievement and have lower self-esteem compared to children whose parents do return the consent form (Dent et al., 1993; Henry, Smith, & Hopkins, 2002). Rooney et al. (2013) suggested that students whose parents do not give consent may be at greater risk of experiencing mental health problems, and their non-inclusion in research may, therefore, affect the representativeness of the sample. Nevertheless, due to requirements from ethical bodies, the use of passive consent is not always possible in prevention research, as was also the case for the present study. To mitigate this, contact details of the researchers were provided to all parents/guardians to discuss any concerns relating to their child's participation. In addition, teachers in the present study were encouraged to discuss the program with parents/guardians and remind students to return the consent forms. These efforts had a positive effect on response rates.

Another common limitation of prevention studies, as identified in the current meta-analysis (Chapter 2), is a lack of long-term follow-up assessments, which makes it difficult to ascertain whether prevention effects are sustained over time. The present study (Chapter 4) therefore included a 12-month follow-up period, the importance of which should not be overlooked as the majority of universal prevention programs fail to measure any long-term effects at all (Stockings et al., 2016; Werner-Seidler et al., 2017). However, given the young age of the current sample (approximately 10 years), and taking into account that anxiety and depression often do not emerge until 11-13 years of age (Lawrence et al., 2015), the inclusion

of an even longer follow-up period would have allowed for a greater assessment of true prevention effects. Furthermore, as suggested by Stallard et al. (2014), it may take several years for the full extent of preventative effects to develop. To address this, the collection of 24-month follow-up data for this study will take place in 2020; however, given the time constraints associated with thesis submission, it was not possible to include these results.

Notably, the present thesis also has several strengths. Importantly, the research provided a novel investigation into the use of emotion regulation and behavioural activation as transdiagnostic universal prevention protocols for anxiety and depression in children. As discussed above, previous prevention programs are limited in their efficacy and are typically based on the principles of CBT for specific disorders, such as for a particular anxiety disorder (Ahlen et al., 2015; Stockings et al., 2016; Werner-Seidler et al., 2017). In developing the ER and BA programs, not only were we able to provide an evaluation of different approaches for preventing anxiety and depression, but by developing separate programs we were able to investigate the active ingredients (i.e., cognitive or behavioural techniques) associated with symptom reduction and prevention. The BA program showed significantly greater resilience scores at 6-month follow-up compared to control (d = 1.11). It also showed a reduction in the percentage of participants who met the clinical cut-off scores for generalised anxiety disorder and major depressive disorder, whereas the ER program reduced only the percentage of participants who met the cut-off for obsessive compulsive disorder. This suggests that for children, prevention programs that primarily focus on behavioural components, as outlined in the BA program, may be more effective than the use of emotion regulation strategies in reducing and preventing anxiety and depression. This could be due to the fact that children may not have developed adequate cognition to reflect upon their own emotional experiences (Braet et al., 2014), and consequently may experience difficulty using emotion-based techniques, which require some level of understanding and reflecting upon their own

emotions. This observation provides an important development in the application of prevention programs for children, and yields exciting avenues for the further exploration of programs such as behavioural activation for the prevention of anxiety and depression.

Furthermore, to the best of our knowledge, this is the first universal prevention study to include an assessment of cognitive functioning. The negative impact of anxiety and depression on cognitive functioning, particularly working memory, is well documented, and can lead to decreased academic performance in children (Owens, Stevenson, Hadwin, & Norgate, 2012). However, improvements in working memory as a result of reductions in anxiety and depression have not previously been measured in universal prevention research. Although the improvement in anxiety and depression did not affect working memory scores in the present thesis, the inclusion of alternative measures of working memory (e.g., computerised working memory tasks that better protect the fidelity of the task) should be considered in future prevention research. Moreover, given that anxiety and depression have been shown to negatively impact other areas of executive functioning, such as visual attention, perceptual reasoning and visual spatial skills (Emerson, Mollet, & Harrison, 2005; Lundy, Silva, Kaemingk, Goodwin, & Quan, 2010), future research could usefully investigate whether the programs could improve other areas of executive functioning in children.

Lastly, the present thesis began with a thorough review of anxiety and depression prevention programs. The resulting meta-analysis identified a gap in the literature, namely the limited number of prevention programs that target both anxiety and depression in children aged 13 years or below. In contrast, previous reviews have either combined samples of children and adolescents, or have focused on either anxiety or depression. Thus, determining whether universal prevention programs were effective in targeting both disorders in either children or adolescents is warranted. The systematic review and meta-analysis in the current

thesis addressed these limitations by assessing the efficacy of transdiagnostic prevention programs for children, taking into account the high rates of comorbidity between anxiety and depression, and the developmental differences between children and adolescents.

Directions for Future Research

The findings of this thesis yield several valuable avenues for future research. Throughout the thesis it was posited that programs based on emotion regulation and behavioural activation may provide benefits not otherwise observed in traditional CBT-based programs, such as the ability to prevent the onset of multiple anxiety disorders. However, direct comparisons between the ER and the BA programs against CBT-based programs were beyond the scope of the present thesis. Nevertheless, future research could usefully compare the efficacy of these programs against traditional CBT-based programs, such as the FRIENDS program (Barrett & Turner, 2001), to determine potential benefits or differences in efficacy resulting from the various programs.

Another avenue worth exploring would be to determine whether the ER and BA programs can provide the same benefits when delivered by trained school staff rather than psychologists. As previously stated, program delivery by school staff would provide a more feasible and streamlined delivery within schools as teachers could easily incorporate the program sessions into the curriculum rather than organising delivery through external facilitators. However, previous research has found that CBT-based universal programs are less effective when delivered by school staff compared to mental health facilitators (Calear & Christensen, 2010; Fisak Jr, Richard, & Mann, 2011; Werner-Seidler et al., 2017). Nevertheless, a key distinction of both the ER and BA programs is that they are shorter in length and contain simpler components compared to most traditional CBT-based programs. Therefore, it is thought that trained school staff may be more easily able to disseminate these

programs, without necessarily having qualifications in mental health, to produce comparable results to those observed when delivered by psychologists. Future research could provide empirical evidence by conducting a randomised controlled trial to determine whether this is the case.

Delivery by school staff may also allow for the inclusion of homework activities to facilitate further engagement and practice of strategies taught. Unlike external facilitators who may only work with the students once per week, school staff could more easily monitor and encourage homework completion. It has been suggested that sustained repetitive practice of activities taught in prevention programs may encourage the development and strengthening of neural pathways, resulting in the ability to use the learned behaviours relatively effortlessly (Greenberg & Harris, 2012). Consequently, the inclusion of homework may promote skill development in the present programs.

Finally, the ER and BA programs should be investigated in older age groups, in addition to continuing research in primary school-aged children. Although it has been suggested that universal prevention programs may be more effective if delivered in childhood than in adolescence (Werner-Seidler et al., 2017), research investigating the ideal age of implementation is lacking. Given that depression has a later onset than anxiety (Lawrence et al., 2015), it is possible that program implementation in early adolescence (e.g., ages 12 to 15) may produce greater benefits in the prevention of depression. Moreover, early adolescence has been shown to be a particularly stressful developmental period due to factors such as entering high school, peer issues, and academic stressors (Eccles et al., 1993; Kuperminc, Leadbeater, & Blatt, 2001). These stressors may provide students with real-world scenarios for applying the strategies taught within the programs. This would not only facilitate program engagement but also provide opportunities to practise techniques taught in

the programs and strengthen neural pathways associated with positive change. As such, delivering the prevention programs in early adolescence may be worth exploring in future research.

Conclusions

Transdiagnostic universal prevention programs for anxiety and depression in children are limited, and tend to show small effects. Two novel transdiagnostic prevention programs were developed with the aim of targeting excessive worry to prevent the onset of anxiety and depression. Although no statistically significant interactions were found for reductions in worry, anxiety or depression over time as a result of the implementation of the ER and BA programs, small to moderate effect sizes were observed which is consistent with previous prevention studies. Furthermore, the programs showed reductions in the percentage of participants who met the clinical cut-off scores for generalised anxiety disorder, major depressive disorder and obsessive compulsive disorder at 12-month follow-up, while no significant change was observed over time for those in the Control condition. This research provides a basis for the further exploration of ER- and BA-based frameworks in the prevention of anxiety and depression. Research should continue to explore the efficacy of the programs by comparing them to traditional CBT-based prevention programs and focusing also on adolescents. Research should further assess whether the programs can be delivered by trained teachers and thus provide benefits to a vast number of students at little cost to the schools involved.

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