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Evaluating the Effectiveness of KooLKIDS: An Interactive Social Emotional Learning Program for Australian Primary School Children

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Abstract

The effectiveness of universal social emotional learning (SEL) programs are dependent on the incorporation of best practice principles, including an evaluative component. In the present study, the effects of a best practice, teacher-led SEL program was examined with 854 children aged 8 to 12 years. KooLKIDS uses an interactive multimedia format and animated character to help children develop their emotion regulation capacities, social and friendship skills, empathy and compassion for others, and self-esteem. A quasi-experimental waitlist-control design was used to examine the impact of KooLKIDS on social and emotional competence, behavioral and emotional problems, academic achievement and effort. Hierarchical linear modelling demonstrated significant increases in social and emotional competence, and reductions in internalizing and externalizing problems in children post KooLKIDS program in the intervention group. The findings suggest that KooLKIDS has strong potential as a teacher-led, classroom-based, structured program for enhancing children's social and emotional learning.

Keywords: social emotional learning; school intervention; social emotional competence; emotional and behavioral problems.

Social emotional learning (SEL) is the process of acquiring and effectively applying the knowledge, attitudes and skills necessary to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, make responsible decisions, and handle interpersonal

situations effectively (Durlak et al., 2011; Taylor et al., 2017). The goals of SEL focus on the development of five interrelated sets of cognitive, affective, and behavioral competencies, namely self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (Taylor et al., 2017). These are essential for becoming a good student, a good citizen, and a good worker.

According to Durlak and Weisberg (2011) "fostering young people's personal and social development should be a fundamental focus of our educational institutions" (p. 3). This is particularly salient given that many of the challenges arising in adolescence (e.g., adverse mental health, social relationship difficulties, poor motivation, and academic underachievement; Hafekost et al., 2016) have their onset during childhood or early adolescence. However, it is early adolescence that traverses the age range of onset for most mental health disorders, especially those that persist into adulthood (see Dray et al., 2017; Patton et al., 2016).

Evidence-based universal SEL programs (i.e., offered to all students) have been embraced by many schools worldwide (see Green et al., 2019). Such programs have frequently led to significant reductions in students' emotional distress, conduct problems, and mental health issues (Durlak & Weissberg, 2011; Durlak et al., 2011) and significant improvements in social and emotional competencies, social and classroom behavior, peer relationships and social engagement, and academic achievement (Durlak et al., 2011; Taylor et al., 2017). Improvements have also been found in students' school attendance and in their motivation to learn (Durlak & Weissberg, 2011; Durlak et al., 2011). Moreover, these outcomes have been sustainable on average for between one to three years (Taylor et al., 2017).

Internationally, evidence suggests a number of school-based SEL programs are highly beneficial and cost-effective in fostering personal and social development in children and youth (e.g., Incredible Years, Second Steps, Responsive Classrooms, Social and Emotional Training, Providing Alternative Thinking Strategies program; for full details see Belfield et al., 2015). Nevertheless, as highlighted by Durlak and colleagues (2011), if the effectiveness of SEL programs is to be enhanced, certain key features must be incorporated. Firstly, Durlak and colleagues (2011) argue that teachers should be trained as program facilitators as they generally know their students well and are able to tailor program content to meet the needs of individual students. Secondly, teachers should also use relevant, "real life" examples to explain concepts to their students, meaning greater opportunity for follow-up and skills practice. Thirdly, program content should be delivered via a sequenced step-by-step approach informed by evidence-based practices, along with a combination of active forms of learning, with sufficient time to focus on skill development and explicit learning goals. Finally, quality in program implementation should also be monitored if positive outcomes are to be achieved. This means that when delivering school-based SEL programs, sufficient time must be allowed to counter the competing priorities of teachers especially in relation to workload, teacher buy-in, support, and training (Durlak et al., 2011).

The KooLKIDS Program

Incorporating these key features highlighted by Durlak et al. (2011) into SEL programs facilitates flexible delivery tailored within a naturalistic school environment and as such, increases the accessibility of the programs to students. In addition, it is important that SEL programs are highly engaging and interactive in nature, incorporate coaching and role playing, and employ a set of structured activities to guide children towards achieving specific

goals (Carroll et al., 2017; Houghton et al., 2017). In an attempt to address these key operational program features, KooLKIDS was developed. This is a teacher-led, structured, interactive, multimedia, SEL program that builds children's emotion regulation capacities, social and friendship skills, empathy and compassion for others, and self-esteem.

A number of features sets KooLKIDS apart from other quality SEL programs. Firstly, it aligns with the Australian Curriculum and Reporting Authority's personal and social capabilities component of the national Australian curriculum; teachers can incorporate the program into their normal teaching day without having to find additional time within an already crowded curriculum. Another of KooLKIDS' features is an interactive multimedia format, which includes a series of engaging visual social stories. Based on social learning theory (Bandura, 1997) whereby skills are learnt through observation and vicarious reinforcement, video modelling has been shown to be an effective means of teaching social skills (see Elias, 2016 and Ramdoss et al., 2012 for reviews). In KooLKIDS, the visual social stories involve a character (Okki the Octopus) who portrays many of the social and emotional behaviors of children in the 8 to 12 year age range. When viewing the visual animated sequences, children see themselves through Okki's eyes (first-person perspective), but this is also interspliced with other person perspectives (second and third) at various times throughout the social stories. Through watching and supporting Okki to make positive changes, children learn to articulate their own opinions and to interact and collaborate with their peers. In this way, children evaluate a range of personal and social behaviors and perspectives with the aim of developing empathy for Okki and in turn, reviewing their own situations.

KooLKIDS was originally developed as an intensive targeted intervention for children at risk of suspension from school for severe antisocial and challenging behavior, utilising a combination of individual and whole-of-class sessions. A formal evaluation of KooLKIDS (Intensive) delivered across a school term (10-12 week period) revealed significant reductions in levels of children's aggression and antisocial behavior and increases in peer acceptance (Carroll et al., 2017). A second evaluation (Houghton et al., 2017) found significant increases in positive emotions and significant reductions in physical and verbal proactive and reactive aggression. When individual participant's performances were examined, all achieved changes were in the desired direction from pre- to post-intervention for all social and emotional behaviors assessed (see Houghton et al., 2017).

Feedback from teachers and facilitators following both of these trials strongly recommended that KooLKIDS be offered as a universal, whole-of-class program, as well as an intensive program for children with antisocial and challenging behaviors. Teachers and facilitators communicated that the social stories modelled by Okki and the associated social and emotional learning activities were highly relevant to all children in educational contexts. In response to this feedback, the whole-of-class version of KooLKIDS (Carroll & Houghton, 2018) was developed. In the new version, the core program content and structure remained the same, however, program materials, activities and examples were rewritten and adapted to suit a whole-of-class delivery and a broader audience.

The Current Study

The present research reports the first empirical evaluation of this whole-of-class, universal KooLKIDS program with Australian mainstream primary school students.

Aligning with the personal and social capabilities component of the Australian national curriculum, KooLKIDS provides educators with strategies for explicitly teaching students social emotional learning skills within an engaging format. With research consistently showing that a large proportion of Australian children (approximately 1 in 7) are experiencing a mental health problem which can lead to poorer academic, social and health outcomes (Hafekost et al., 2016; Lawrence et al., 2019), universal school-based SEL interventions, such as KooLKIDS, may represent important, non-stigmatising and inclusive means to assist all children build stronger emotion regulation capacities, reduced internalising and externalising problems and better mental health and resilience generally. KooLKIDS holds the potential to provide schools with an important resource as they try to address the increasing number of the students requiring assistance with limited resources (e.g., school psychologists, special education assistants, and evidence-based programs).

Using a wait-list control design, the KooLKIDS evaluation sought to determine the effectiveness of KooLKIDS in improving children's social and emotional competence, prosocial behavior, and academic achievement and effort, and reducing emotional and behavioral problems. The following hypotheses were tested.

1. There will be significant improvements in the intervention group's social and emotional competence following the KooLKIDS program compared to those in the wait-list control condition.
2. There will be significant reductions in total difficulties, internalizing and externalizing problems, and significant increases in prosocial behaviors following the KooLKIDS program compared to those in the wait-list control condition.

3. There will be significant improvements in the intervention group's academic achievement and effort following the KooLKIDS program compared to those in the wait-list control condition.

Method

Participants

The present study was undertaken in eight culturally diverse primary schools located in Brisbane, Queensland, a state in the northeast of Australia. All participating schools were Catholic Education Schools. Currently, 20.2% of primary school-aged children in Australia attend Catholic schools (Australian Bureau of Statistics, 2017). A total of 854 students participated and of these 468 were in grade 4 (age 8-9 years), 271 in grade 5 (age 10-11 years), and 115 in grade 6 (age 11-12 years). These declining Ns across the grade levels reflect the trend in Australian Catholic Schools for students to transition to their senior schools from grade 5 and increasingly grade 6. The overall mean age was 9.64 years (*SD* = .79), while for the intervention sample the mean age was 9.71 years (*SD* = .84) and for the control sample 9.51 years (*SD* = .67). The distribution of participant mean ages were significantly different across the intervention and control schools ($t(852) = -3.488$, $p = .001$). In real-time this age difference equates to approximately 2 months, which is unlikely to result in any major developmental or maturation effects. Nevertheless, age was included as a control variable in all analyses. Of the total sample, 57.1% were female, with no significant differences in gender distribution across the intervention and control groups (*ns*; $p = .55$). The demographic characteristics of the students in the intervention and control samples are shown in Table 1.

The socio-economic status of the sample was estimated by applying the Index of Relative Socio-economic Disadvantage (IRSD) (ABS, 2013) to students' postcodes (16 students had missing postcodes). The IRSD uses a range of indicators from Census data to estimate the level of concentrated disadvantage in an area. Areas are then ranked and organized into deciles or quintiles to reflect the relative level of disadvantage (ABS, 2013). Students differed significantly across the conditions on socio-economic status, with the intervention group residing in significantly more disadvantaged suburbs than the control group on this measure ($\chi^2(4, N=838) = 57.14$ $p < .001$).

<<Table 1 here>>

Research Design

A quasi-experimental, independent groups wait-list control design was employed, whereby the six schools were assigned to one of two conditions. Four schools with 25 teachers and 562 students who received the KooLKIDS program (intervention condition) were compared to a control group of two schools, with 12 teachers and 292 students (the waitlist-control condition). Logistical considerations (e.g., timing, availability of teachers, and curriculum requirements), determined the allocation of schools to conditions in the present study as random assignment was not feasible. The intervention condition was assessed before and after completing the KooLKIDS program over a period of 14 weeks. The control condition was assessed before and after the 14-week waiting period (of no intervention), after which time they received the KooLKIDS program. Teachers in both conditions completed questionnaire measures at two time points, 14 weeks apart.

Measures

Teachers completed three separate measures of student behavior covering social and emotional competence, behavioral and emotional problems, and academic achievement and effort.

Social and Emotional Competence Questionnaire (SEC)

The SEC was developed by the Collaborative for Academic, Social and Emotional Learning (CASEL) and the American Institute of Research (AIR), and is designed to measure the core components of social and emotional competence: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL & AIR, 2013). The teacher-completed measure has 20-items to which participants respond using four options (rarely, occasionally, frequently, almost always). Higher scores on the SEC indicate higher levels of social and emotional competence. Reliability estimates for each of the SEC subscales for the present sample were: $\alpha = 0.91$ for Self-Management; $\alpha = 0.91$ for Social Awareness; $\alpha = 0.90$ for Self-Awareness; $\alpha = 0.93$ for Relationship Skills and $\alpha = 0.93$ for Responsible Decision Making, indicating strong internal consistency in the scales.

Strengths and Difficulties Questionnaire (SDQ)

The SDQ (Goodman, 1997) is a frequently used clinical and research screening tool for identifying behavior or emotional problems in children and adolescents. The teacher version of the SDQ for 4 to 12 year olds used for the present study has strong psychometric properties includingwell-established reliability and validity (Stone et al., 2010). The SDQ includes 25 items across 5 subscales – emotional problems, conduct problems, hyperactivity, peer relationship problems, and prosocial behavior – along with a total difficulties score

which is comprised of the first four subscales. In non-clinical populations it is suggested that a three-subscale division of the SDQ is used, comprising an internalizing subscale (emotional problems and peer problems summed), and externalizing subscale (conduct problems and hyperactivity summed), and a prosocial scale (Goodman et al., 2010). Higher scores on the SDQ subscales indicate higher levels of problematic behavior, with the exception of the prosocial subscale on which higher scores equal greater prosocial functioning. Internal consistency for each of the SDQ subscales in the present sample were: $\alpha = 0.90$ for Externalizing; $\alpha = 0.85$ for Internalizing; $\alpha = 0.89$ for Prosocial; and $\alpha = 0.90$ for Total Difficulties.

Academic Achievement and Effort

Teachers were asked to rate students from 'A' to 'E' at pre- and post- intervention on five items related to academic outcomes: English, Maths, achievement, effort, and behavior. This A to E academic rating system is a common reporting metric used by Australian teachers, whereby A = very high; B = high; C = sound; D = low; E = very low. Teachers were asked to rate the students as they normally did in a report card. Ratings of an 'A' were accorded a score of 5 while ratings of an 'E' were scored a 1.

Intervention

The KooLKIDS Whole-of-Class program is a 13-session teacher-delivered, school-based program. It supports 8 – 12 year old children to develop a better sense of self-worth and self-awareness, understand how to manage their emotions, develop empathy for others, along with friendship skills and prosocial behaviours. The program is divided into four modules, each comprising three sessions, organised around the acronym KOOL: 'Know

yourself' which focusses on strengths and self-esteem; 'Understanding Our needs and emotions' which focusses on emotion regulation; 'Understanding Others needs and emotions' which focusses on empathy; and 'Live well with others' which focusses on friendship and social skills. A final review and celebration session conclude the program. A more detailed description of each module is available from the first author on request.

Of the 13 program sessions, eight are structured around a series of sequentially-linked animated stories featuring 'Okki the Octopus' who although very likeable, frequently engages in challenging behavior at school, has difficulty managing his emotions and has many conflicts with his peers and teachers. The format of these animated stories is presented in first-person perspective (i.e., participant becomes Okki and fully embodies his traits) and second-person perspective (i.e., Okki's actions are shown with Okki in full view) and these perspectives switch throughout the animated sequences. The animated stories are designed to increase student engagement, reinforce the core concepts and skills taught in the program and provide a stimulus for students to explore similar themes in their own lives. The format of the KooLKIDS sessions include a varied range of tasks and activities, comprising group collaboration, individual self-reflection, games, written tasks, artistic activities, role plays, story-telling, life mapping, breathing and relaxation, physical games, reflective listening, and behavioral challenges. The emotion-regulation, behavioral-regulation and social skills taught in the program are based on cognitive-behavioral, strength-based, and solution-focused therapy models.

Procedure

After receiving approval for the study from the Human Research Ethics Committee at The University of Queensland and Brisbane Catholic Education, an invitation to participate in

the study was presented to principals whose schools had earlier expressed an interest in the KooLKIDS program. Teachers of students in Grades 4 to 6 of interested schools were then invited to participate, and parent information and consent forms were distributed. Only students with informed written parental- and self-consent participated in the study. Teacher participants in the study were blind to study hypotheses and had no conflict of interest or incentive relating to the study's findings.

A standardised one-day training session was conducted by the research team with teachers and school psychologists from the participating classes to learn how to deliver the program. All attendees received a KooLKIDS package containing the materials needed to facilitate the program including: a fully scripted Facilitator Manual, children's workbooks, web-based animated stories, and a range of resources for the 13 sessions. The facilitator training was well-received by participating staff, as indicated by a mean overall facilitator satisfaction with training score of 4.4 (SD .66) out of 5. Following training, teachers delivered the program to their classes across a 13-week period.

Teachers completed a set of questionnaire measures relating to the behavior and performance of the students in their classes, before and after the administration of the KooLKIDS intervention program. The same measures were completed by teachers of participants in the control condition (no KooLKIDS program) at the same times, after which time, they received the KooLKIDS program.

Intervention Integrity

Intervention integrity was maintained in a number of ways. Facilitators followed a fully scripted intervention manual with detailed session plans to guide them in program

delivery. They received ongoing support from the research team from The University of Queensland (UQ) in the form of weekly check-ins about how the sessions were progressing, coaching or problem-solving if needed, and provision of the subsequent weekly session materials. Intervention integrity was maintained through the use of a checklist whereby facilitators marked off each of the steps completed within each session. Students who were absent from any KooLKIDS sessions were provided with an abbreviated catch-up session on the main session concepts and were asked to complete any relevant sections of the workbook as homework.

Data Analysis

Hierarchical linear modelling, (HLM), specifically a multilevel generalised linear model, was used to examine changes in students' emotional and behavioral outcomes over time. Multilevel models are particularly useful for handling clustered or nested data, such as data from students who are also nested in classes and schools. Multilevel modelling can capture the dependencies and common variance that exists within clustered or nested observations and has the ability to capture both the fixed and random (observed and unobserved) effects of this group membership (e.g., exposure to particular teaching styles for students within classes; Gelman & Hill, 2007).

Multilevel modelling has the advantage of not requiring listwise deletion of cases, i.e., it does not exclude a case from the analysis because it has missing data on any value. Hence, the analysis can draw on the available information from cases irrespective of whether they have complete measures for each variable or across each time point. Data are organised into long form for repeated measures in multilevel modelling, so that each row reflects a single observation for a case at a given time point. A total of 1,701 student observations were

included in the multilevel modelling analysis. Students (*N*=854) and class (*N*=35) were entered as random effects; school was not included as a random effect due to the low number of groups (*N*=8). Time (pre- and post- intervention), intervention (intervention and control group), and an interaction between time and intervention were entered as fixed effects. Additionally, due to differences in students' mean age and socio-economic status across the intervention and control groups, age and the IRSD quintile for the suburb that students resided in were also entered as an additional fixed effect to control for the potential impact of age and socio-economic differences on any changes over time in social and emotional competence outcomes between the groups. For each of the subscales, an initial null model was run, followed by a full model examining changes in each of the key outcomes, to determine whether the key explanatory factors provided a better fit for the data than the null model.

In addition to testing the statistical significance of differences between control and intervention students on changes in social and emotional regulation, emotional and behavioral difficulties and academic achievement, the magnitude of the differences was also examined in terms of effect sizes. Cohens F^2 was used, which constitutes a measure of the local effect size of a predictor in a multiple regression model, but in this case it has been adapted for measuring the magnitude of explained variance in a multilevel model (Selya, Rose, Dierker, Hedeker & Mermelstein, 2012). This effect size measure essentially captures the magnitude of the effect of an identified predictor in a multilevel model, by comparing explained variance in the full model to explained variance in a reduced model without the predictor (Selya et al., 2012).

Results

The pre- and post- intervention means for the control and intervention group on each of the measures are shown in Table 2. The mean differences indicate that overall the intervention group displayed greater mean increases across the SEC subscales, greater mean decreases on the SDQ subscales, and somewhat greater mean increases in academic achievement and effort than the control group.

Social and Emotional Competence (SEC)

The results of the null and full multilevel generalized linear model for each of the SEC subscales are shown in Table 3. The random effect coefficients and the intraclass correlation (ICC) indicate that most of the variation in the model was within student observations over time, rather than between student observations across classes. Across the total SEC score and on each of the five subscales (self-awareness, self-management, social awareness, relationship skills, and responsible decision-making) there was a statistically significant interaction effect for time and intervention. These interactions indicated that students in the intervention group displayed greater increases across all five SEC subscales over time, compared to the control group who declined in their scores from pre- to post- over the same period. The effect sizes for these statistically significant interactions would be considered in the low range (> = 0.2; Cohen, 1998) with effect sizes of .04, .04, .03, .04, .02 for changes on the total SEC scale, self-awareness subscale, self-management subscale, social awareness subscale, relationship skills subscale and responsible decision-making subscale, respectively. There were also main effects for the intervention, namely total SEC score, and the self-awareness and social awareness subscales. These findings indicate that the intervention group had significantly lower mean ratings on these social and emotional

competence measures overall (when time is not considered), compared to the control students. However, as the interaction effects indicate, despite lower overall ratings on some of the social and emotional competence measures, the intervention group showed significantly greater improvement on these scales than the control group from time 1 to time 2. The Akaike information criterion (AIC) and Bayesian information criterion (BIC), both estimates of the quality or goodness of fit of statistical models, indicate that in each case the full model was a better fit for the data than the null model. Therefore, our first hypothesis, that there would be significant improvements in the intervention group's social and emotional competence following the KooLKIDS program compared to those in the wait-list control condition, is supported.

<<Tables 2 and 3 here>>

Emotional and Behavioral Problems

Table 4 shows the results of the null and full multilevel generalized linear model for each of the SDQ subscales. Across all of the subscales, the random effect coefficients and the ICC suggest that the majority of the variation in the model was within student observations over time rather than in between student differences across classes. In line with our second hypothesis, the interactions between time and intervention indicated a significantly greater reduction in total difficulties, internalizing and externalizing problems for the intervention group compared to the control group. However, contrary to predictions, there was no significant difference in changes in prosocial behaviors for the intervention group compared to the control group from pre- to post-intervention (though the interaction effect was just above the threshold for significance; $p = .058$). In terms of the magnitude of these statistically significant differences, two of the differences constitute a small effect size with both the total

difficulties subscale and the internalizing subscale having an effect size of .02; the externalizing scale effect size was .01. There was also a significant main effect for time for the total difficulties and the internalizing subscales. This indicates that overall students as a total group demonstrated significant increases in emotional and behavioral problems over time (though examination of mean differences show mean reductions across all of the measures for the intervention group from time 1 to time 2). The AIC and BIC for each of the null and full models indicate that in each case the full model was a better fit for the data than the null model.

<<Table 4 here>>

Academic Achievement and Effort

Table 5 displays the results of the null and full multilevel generalized linear model for each of the academic achievement and effort. The random effect coefficients and the ICC indicate again that the majority of variation in the model was within student observations over time, rather than between student differences across classes. None of the academic achievement and effort outcomes demonstrated significant change associated with participation in the intervention, indicating no detectable impact of the intervention on academic achievement and effort, though the coefficients for the interaction of intervention and time were in the hypothesized direction. Main effects for intervention on effort and behavior suggest that the students in the intervention group had lower ratings for effort and behavior overall (not considering differences over time), compared to the control group. There was also a main effect for socio-economic status (IRSD quintiles), which suggested that students who resided in suburbs of higher socio-economic status were, in general, rated as performing better in English and Maths. Therefore, our third hypothesis, predicting

significant improvements in the KooLKIDS group's academic achievement and effort compared to those in the wait-list control condition, was not supported.

<<Table 5 here>>

Discussion

Social Emotional Competence

Social emotional competencies are integral to young people's continuing development and everyday adaptive functioning. Although a number of quality SEL programs exist, few align directly with school curriculum requirements, and few have incorporated interactive, multimedia animations with a range of person perspectives (e.g., first and second person) and role-playing within stories. KooLKIDS is an engaging school-based SEL intervention, which supports the broad positive impacts that a best practice, evidence-based, teacher-led SEL program can have, in terms of increasing social and emotional competencies among primary school-aged children, and reducing internalizing and externalizing symptomatology. Thus, the present findings build on and extend the current research base pertaining to KooLKIDS (Carroll et al., 2017; Houghton et al., 2017) as well as school-based SEL programs more generally.

The results of this study suggest that the KooLKIDS program led to statistically significant improvements in all key measured aspects of social and emotional competencies in the sample of primary school students. Students exposed to the program demonstrated greater increases in self-awareness, self-management, social awareness, relationship skills and responsible decision-making following the program, compared to students who did not participate in the program. However, it should be noted that these improvements were

relatively modest in magnitude when effect sizes were considered. This is not necessarily surprising given that this was a whole-of-class program delivered to a general population of primary school children in a classroom setting. Nonetheless, these modest increases in social and emotional capabilities, if sustained, may translate into a range of cascading effects across a range of life domains for children, including reduced mental health issues, improved peer relationships (Cybele Raver & Knitze, 2002) and family relationships (Macklem, 2008), improving learning capabilities (Agostin & Bain, 1997) and increased resilience (Shapiro, 2000). While the positive impacts found from participating in the KooLKIDS program may have the potential to extend beyond the direct social and emotional competencies measured in this study the longer-term outcomes from this particular program require further study.

Internalizing and Externalizing Problems

The greater reductions in total difficulties and internalizing and externalizing problems evidenced by the KooLKIDS participants as compared to the waitlist control group is consistent with previous research that has found that universal SEL programs can reduce symptoms of depression and anxiety and conduct problems in school students (Durlak et al., 2011). The magnitude of these changes in emotional and behavioral problems for the intervention group were considered to be in the low range, which might be expected given that this program was not targeted to children with clinical levels of internalizing or externalizing symptomatology, but rather was offered to a general population of primary school children. With emotional dysregulation posited as an underlying mechanism of both internalizing and externalizing problems (Macklem, 2008) it is perhaps not surprising that improving students' ability to regulate their emotions and to manage their social relationships should result in some degree of reduction in internalizing and externalizing problems.

The reductions achieved via KooLKIDS is important for all young people's mental health and its promotion in general. In 2001, the World Health Organisation (WHO) predicted that childhood and adolescent mental health problems would become one of the leading causes of morbidity, mortality and disability worldwide by 2020. Some three years later in 2004 the Global Burden of Disease study reported that neuropsychiatric disorders were responsible for 21.8% of total burden of disease among 0- to 14-year-olds in high-income countries, as measured by disability-adjusted life years (Gore et al., 2011). By 2012, ~20% of children and adolescents experienced a mental health problem in any given year (WHO, 2014). In Australia, the Young Minds Matter: second Australian Child and Adolescent Survey of Mental Health and Wellbeing (Hafekost et al., 2016) revealed that one in seven (or 560,000) Australian children aged 4–17 years met diagnostic criteria for a mental disorder in the past 12 months. A program such as KooLKIDS that aligns with the personal and social capabilities component of the Australian national curriculum, can be incorporated into a school program without the need for additional time. Building children's emotion regulation capacities on a regular basis from within the regular school curriculum is significant given its potential to prevent the onset of mental health problems.

Academic Achievement

Although the interaction coefficients for academic achievement were not statistically significant in the present study, the direction of change indicated greater gains in the intervention group compared to the control group, which might suggest that the improved social and emotional competencies achieved by this program may have only very small to negligible effects on academic achievement. Nevertheless, this is important because one in seven Australian school students who have a mental health disorder are on average 1.5 years

behind their peers in reading, 2 years behind in numeracy and 3 years behind in writing in Year 9 national testing (Hafekost et al., 2016). By building children's emotion regulation capacities to prevent the development of adverse mental health, KooLKIDS may also indirectly affect any associated negative academic achievement outcomes over time. This, however, requires further empirical testing.

Impacts for Educational Practice

Emotional dysregulation has been identified as a risk factor for the development of chronic behavioral disorders later in life (Cole et al., 1994; Dodge & Garber, 1991), hence improving students' abilities to regulate emotions has also potentially longer-term significance. This is particularly pertinent for externalizing behaviors such as aggression that have the potential to develop into persistent, life-long antisocial behavior (Moffitt, 1993). While sustained impacts into adolescence and adulthood are not yet clear, recent research has found that SEL programs can lead to significant positive impacts on conduct problems, drug use and emotional distress for children and adolescents up to one to three years following participation (Taylor et al., 2017). Multiple exposures to SEL programs over the school years may strengthen and lengthen these effects, particularly on aggressive behaviors and depressive symptoms that are particularly problematic in school settings (Carroll et al., 2018). An additional benefit of teacher-led SEL programs is that regular purposeful and incidental emphasis of key concepts and reinforcement of positive behaviors by both teachers and peers can occur throughout the school year, even without additional exposure to the formal program modules or sessions. This regular informal reinforcement of concepts and behaviors in the classroom may lead to consolidation and strengthening of social and emotional competencies and reductions in internalizing and externalizing problems. The specific

impacts of teacher-led SEL programs on outcomes over the longer-term, as well as any dose-response effects, warrants further research.

Limitations and Considerations for Future Research

Results of this study must be tempered by a recognition of its limitations. First, only Catholic Education Schools participated in the study. Future research should seek to recruit a range of state government and private schools from various socio-demographic areas to increase the breadth of the sample and thus, the generalizability of the findings. Second, in terms of study design, true randomization to condition with follow-up assessment was not feasible in this study. Although challenging in school-based research, randomized-control designs are the most rigorous for determining causation; and follow-up assessment highlights the sustainability of effects. Further evaluations of KooLKIDS should endeavor to employ both randomization and follow-up. Third, all of the measures used in this study were completed by teachers, and it is possible that participation in the program will have positively influenced teacher perceptions of student behaviors post program. Although this appears unlikely, as in general the intervention group were rated relatively lower both before and after the intervention on most outcome measures compared to the control group, future research should utilize data from multiple sources (e.g., students, parents). Future research should also endeavor to include more objective measures of students' academic performance (e.g., standardized test results or report cards) as opposed to teacher perception of academic skills. Finally, although intervention integrity was maintained in a number of ways, no formal program fidelity data were collected, an issue that should be rectified in future trials of KooLKIDS.

Implications and Conclusion

Children's capacity for emotion regulation is a multi-determined developmental process and the findings of this present study support previous research demonstrating that SEL programs can teach social and emotional competencies to children, both effectively and explicitly. Promoting social and emotional regulation and well-being has great potential to reduce the economic and social burden of mental health disorders and its catastrophic outcomes during adolescence and later in life. It is unsurprising therefore that this has become an important goal of educators. School-based SEL programs represent an important approach to achieving this, and KooLKIDS provides an engaging way for children to become immersed in the processes involved in the development of social and emotional competencies.

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Tables

Table 1

Means and distributions of demographic characteristics across students in the control and intervention condition schools

Characteristics	Total sample	Control	Intervention
	% (N)	% (N)	% (N)
Gender			
Male	42.9% (366)	41.4% (121)	43.6% (245)
Female	57.1% (488)	58.6% (171)	56.4% (317)

Grade			
Grade 4 (8-9 years)	54.8% (468)	59.6% (174)	52.3% (294)
Grade 5 (10-11 years)	31.7% (271)	40.4% (118)	27.2% (153)
Grade 6 (11-12 years)	13.5% (115)	0.0% (0)	20.5% (115)
Age M (SD)	9.64 (.79)	9.51 (.67)	9.71 (.84)
IRSD quintiles			
Quintile 1 (most disadvantaged)	10.8% (84)	6.2% (18)	13.2% (66)
Quintile 2	4.7% (40)	0.3% (1)	6.9% (39)
Quintile 3	2.9% (24)	1.4% (4)	3.6% (20)
Quintile 4	25.3% (211)	18.3% (53)	28.8% (158)
Quintile 5 (least disadvantaged)	56.3% (479)	73.8% (213)	47.5% (266)

Table 2

Means and differences in SEC, SDQ and academic achievement and effort

Measures	Condition	Pre-intervention Mean (SD)	Post-intervention Mean (SD)	Difference (Time 2-Time 1)	n
SEC					
Total SEC	Control	67.83 (13.15)	67.67 (13.51)	-0.16	290
	Intervention	62.54 (15.64)	65.12 (14.44)	2.58	548
Self-awareness subscale	Control	13.52 (2.83)	13.45 (2.89)	-0.07	290
	Intervention	12.12 (3.33)	12.78 (3.08)	0.66	548
Self-management subscale	Control	13.25 (2.98)	13.24 (2.96)	-0.01	290
	Intervention	12.30 (3.42)	12.76 (3.25)	0.46	548
Social awareness subscale	Control	13.83 (2.69)	13.80 (2.75)	-0.03	290

	Intervention	12.75 (3.15)	13.18 (2.90)	0.43	548
Relationship skills subscale	Control	13.59 (2.72)	13.49 (2.77)	-0.10	290
	Intervention	12.62 (3.26)	13.18 (2.95)	0.56	548
Responsible decision-making	Control	13.63 (2.70)	13.70 (2.73)	0.07	290
	Intervention	12.75 (3.30)	13.22 (3.04)	0.47	548
SDQ					
Total difficulties	Control	5.46 (5.76)	6.14 (6.24)	0.68	292
	Intervention	6.54 (6.79)	6.36 (6.45)	-0.18	557
Externalizing subscale	Control	3.19 (3.79)	3.39 (3.96)	0.20	292
	Intervention	3.93 (4.42)	3.84 (4.34)	-0.09	557
Internalizing subscale	Control	2.27 (2.85)	2.75 (3.25)	0.48	292
	Intervention	2.61 (3.57)	2.51 (3.28)	-0.10	557

Prosocial subscale	Control	8.56 (2.01)	8.48 (2.15)	-0.08	292
	Intervention	7.90 (2.52)	7.94 (2.33)	0.04	557
Academic achievement and effort					
English	Control	3.45 (.91)	3.45 (.91)	0.00	292
	Intervention	3.31 (.94)	3.43 (.92)	0.12	441
Maths	Control	3.54 (.86)	3.52 (.91)	-0.02	292
	Intervention	3.33 (.98)	3.45 (.96)	0.12	441
Achievement	Control	3.55 (.84)	3.54 (.87)	0.01	292
	Intervention	3.36 (.89)	3.44 (.82)	0.08	441
Effort	Control	4.23 (.86)	4.24 (.88)	0.01	292
	Intervention	3.71 (.98)	3.77 (1.03)	0.06	441
Behavior	Control	4.34 (.87)	4.32 (.92)	-0.02	292

Intervention	3.95 (1.09)	3.97 (1.02)	0.02	441

Table 3

Results of multilevel generalised linear model predicting changes in SEC associated with the KooLKIDS program

	Total SEC		Self-aware subscale		Self-manage subscale		Social awareness subscale		Relationship skills subscale		Responsible decision-making subscale	
	Null model	Full model	Null model	Full model	Null model	Full model	Null model	Full model	Null model	Full model	Null model	Full model
Parameter	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Interc	65.3	71.48	12.8	14.6	12.8	13.8	13.28*	14.88*	13.1	14.8	13.2	13.4

ept	3*** (1.16)	*** (9.26)	3*** (.26)	5*** (1.96)	1*** (.24)	9*** (2.03)	**(.23)	**(1.84)	4*** (.23)	0*** (1.88)	5*** (.24)	2*** (1.91)
Fixed effects												
Time		-.20 (.52)		-.09 (.12)		-.01 (.12)		-.04 (.12)		-.11 (.12)		.05 (.12)
Intervention		-4.78* (2.43)		-1.24* (.54)		-.88 (.52)		-1.01* (.47)		-.88 (.48)		-.78 (.50)
Time by intervention (interactio		3.49*** (.65)		.87*** (.16)		.65*** (.15)		.62*** (.15)		.81*** (.15)		.55*** (.15)

n)												
Age	.13 (84)		.03 (.08)		.04 (.19)		.01 (.17)		-.04 (.17)		.09 (.17)	
IRSD quintile	-.00 (.37)		.03 (.08)		-.03 (.08)		-.02 (.07)		.01 (.08)		.01 (.08)	
Random effects												
Individual	133.78 (7.68)	132.23 (7.71)	5.40 (.33)	5.30 (.33)	6.61 (.38)	6.54 (.38)	5.18 (.31)	5.09 (.31)	5.50 (.33)	5.47 (.33)	5.60 (.33)	5.56 (.33)
Class	40.70 (11.16)	38.99 (10.83)	2.11 (.57)	1.95 (.53)	1.77 (.49)	1.73 (.49)	1.58 (.43)	1.46 (.41)	1.53 (.43)	1.49 (.42)	1.70 (.47)	1.65 (.46)
Residual	41.24	37.52 (1.93	2.46 (.12	2.17 (.11	2.09 (.10	1.96 (.10	2.07 (.10)	1.98 (.10)	2.14 (.11	1.96 (.10	2.02 (.10	1.88 (.09

	(2.06)	)	)	)	)	)			)	)	)	)
Model Fit												
ICC (within)	.81 (.01)	.82 (.01)	.75 (.02)	.77 (.02)	.80 (.01)	.81 (.01)	.76 (.02)	.77 (.02)	.76 (.02)	.78 (.02)	.78 (.02)	.79 (.02)
ICC (class)	.18 (.04)	.19 (.04)	.21 (.05)	.21 (.05)	.16 (.04)	.17 (.04)	.18 (.04)	.17 (.04)	.16 (.04)	.17 (.04)	.18 (.04)	.18 (.04)
AIC	12873.59	12108.09	7844.77	7312.67	7829.92	7359.51	7638.05	7192.15	7714.59	7230.58	7674.83	7213.05
BIC	12895.31	12156.47	7866.50	7361.06	7851.65	7407.90	7659.78	7240.54	7736.32	7278.98	7696.56	7261.45

*<.05; **<.01; ***<.001. Note: ICC = Intraclass correlation; AIC = Akaike information criterion; BIC = Bayesian information criterion.

Table 4

Results of multilevel generalised linear model predicting changes in SDQ associated with the KooLKIDS program

	Total difficulties		Externalising subscale		Internalising subscale		Prosocial subscale	
	Null model	Full model	Null model	Full model	Null model	Full model	Null model	Full model
Parameter	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Intercept	6.14*** (.44)	6.26 (3.95)	3.61*** (.24)	3.64 (2.49)	2.54*** (.22)	2.65 (1.99)	8.17*** (.16)	10.29*** (1.39)
Fixed effects								
Time		.67** (.24)		.19 (.15)		.47** (.15)		-.07 (.11)

Intervention		.90 (.93)		.60 (.53)		.30 (.47)		-.54 (.33)
Time by intervention (interaction)		-1.21*** (.30)		-.49** (.18)		-.72*** (.18)		.25 (.13)
Age		-.16 (.37)		-.09 (0.23)		-.06 (.18)		-.13 (.13)
IRSD quintiles		-.05 (.17)		-.03 (.11)		-.02 (.08)		.01 (.06)
Random effects								
Individual	28.07 (1.58)	27.20 (1.58)	12.99 (.72)	12.96 (.73)	6.85 (.42)	6.31 (.40)	2.96 (.19)	2.94 (.19)
Class	5.36	5.29	1.49	1.47	1.40	1.35	.78 (.23)	.68

	(1.58)	(1.57)	(.49)	(.49)	(.42)	(.40)		(.20)
Residual	8.31 (.41)	7.95 (.40)	3.23 (.16)	3.05 (.16)	3.07 (.15)	3.02 (.15)	1.68 (.08)	1.63 (.08)
Model Fit								
ICC (within)	.80 (.03)	.80 (.01)	.82 (.01)	.83 (.02)	.73 (.02)	.72 (.02)	.69 (.02)	.69 (.02)
ICC (class)	.13 (.01)	.13 (.03)	.08 (.03)	.08 (.03)	.12 (.03)	.13 (.03)	.14 (.04)	.13 (.03)
AIC	10266.57	9674.72	8780.03	8278.01	8264.81	7770.30	7085.87	6684.14
BIC	10288.33	9723.18	8801.79	8326.48	8286.57	7818.76	7107.62	6732.60

*<.05; **<.01; ***<.001. Note: ICC = Intraclass correlation; AIC = Akaike information criterion; BIC = Bayesian information criterion.

Table 5: *Results of multilevel generalised linear model predicting changes in academic achievement and effort associated with the KooLKIDS program*

	English		Maths		Achievement		Effort		Behaviour	
	Null model	Full model	Null model	Full model	Null model	Full model	Null model	Full model	Null model	Full model
Parameter	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Intercept	3.41*** (.06)	3.13*** (.56)	3.46*** (.06)	3.44*** (.57)	3.47*** (.06)	3.49*** (.54)	3.96*** (.08)	4.53*** (.62)	4.13*** (.08)	4.90*** (.64)
Fixed effects										
Time		.03 (.04)		.02 (.04)		.02 (.04)		.05 (.04)		.00 (.04)
Intervention		-.04 (.12)		-.12 (.12)		-.14 (.12)		-.44** (.16)		-.33 (.16)*

Time by intervention (interaction)		.05 (.05)		.09 (.05)		.08 (.03)		.01 (.06)		.06 (.06)
Age		.01 (.05)		-.00 (.05)		.01 (.05)		.02 (.06)		-.02 (.06)
IRSD quintiles		.06 (.02)**		.05 (.03)*		.03 (.02)		.00 (.03)		-.01 (.03)
Random effects										
Individual	.57 (.03)	.52 (.04)	.60 (.04)	.58 (.04)	.46 (.03)	.45 (.03)	.50 (.03)	.48 (.04)	.57 (.04)	.57 (.04)
Class	.08 (.03)	.07 (.02)	.08 (.03)	.07 (.03)	.08 (.03)	.08 (.03)	.20 (.06)	.16 (.05)	.18 (.05)	.15 (.04)

Residual	.20 (.01)	.20 (.01)	.20 (.01)	.19 (.01)	.20 (.01)	.19 (.01)	.26 (.01)	.26 (.02)	.26 (.01)	.27 (.02)
Model Fit										
ICC (within)	.76 (.02)	.76 (.02)	.77 (.02)	.77 (.02)	.73 (.02)	.73 (.02)	.73 (.02)	.71 (.02)	.73 (.02)	.73 (.02)
ICC (class)	.09 (.03)	.08 (.03)	.09 (.03)	.08 (.03)	.11 (.03)	.11 (.03)	.21 (.05)	.17 (.04)	.17 (.04)	.15 (.04)
AIC	3387.18	3180.49	3396.46	3215.29	3130.87	2961.38	3429.64	3230.20	3541.26	3359.05
BIC	3408.39	3227.76	3417.67	3262.56	3151.95	3008.38	3450.72	3277.20	3562.34	3406.04

*<.05; **<.01; ***<.001. Note: ICC = Intraclass correlation; AIC = Akaike information criterion; BIC = Bayesian information criterion.