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A matter of skills: a mixed-method study on the evaluation and implementation of an SEL program tailored to the skills adolescents need in educational settings and at home

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Citation
Sande, M. C. E. van de. (2024, December 10). *A matter of skills: a mixed-method study on the evaluation and implementation of an SEL program tailored to the skills adolescents need in educational settings and at home*. Retrieved from https://hdl.handle.net/1887/4172036

Version:	Publisher's Version
License:	Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden
Downloaded from:	https://hdl.handle.net/1887/4172036

Note: To cite this publication please use the final published version (if applicable).

Chapter 2

Do universal social and emotional learning programs for secondary school students enhance the competencies they address?

A systematic review

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Psychology in the Schools (2019), 56, 1545-1567.

ABSTRACT

While universal school-based social and emotional learning (SEL) programs claim to target various SEL competencies, earlier reviews have not provided a clear overview of the competencies in question. We therefore wished to identify the competencies targeted in SEL programs for secondary school students. We also aimed to examine the effects of these programs on SEL competencies and psychosocial health oucomes. The specific SEL competencies directly addressed in the programs' primary learning targets were identified based on the Collaborative for Academic, Social, and Emotional Learning (CASEL) framework for SEL.

Five bibliographic databases (Pubmed, PsychInfo, Education Resources Information Centre (ERIC), Applied Science Premier (ASP) and Web of Science were searched for relevant research papers published between 2004 and 2018. We included 40 studies that investigated 32 programs focusing on two or more SEL competencies.

While most programs targeted four or five of the SEL competencies, many of the included studies did not measure the programs' effects on all the competencies targeted. Our results showed that the SEL programs had substantial effects on the SEL competencies they addressed and on psychosocial health. Although the programs focused predominantly on self-management and relationship skills, the largest summary effects were found for self-awareness and social awareness.

INTRODUCTION

Adolescence is a sensitive period for brain maturation and behavioral and affective development (Steinberg et al., 2010). Social and emotional learning competencies are important for preventing or reducing psychosocial problems in adolescents (Elbertson et al., 2010; Lerner & Steinberg, 2009; World Health Organization, 2003b; Zins & Elias, 2007). As adolescents become independent of their parents and make important choices regarding education and work, their social, emotional and cognitive development is challenged (Lerner & Steinberg, 2009; Pokhrel et al., 2013; Steinberg et al., 2010). During adolescence, some psychosocial health problems—such as depression, violence, and substance use—increase or first emerge (Calear & Christensen, 2010; Foxcroft & Tsertsvadze, 2011; Laible et al., 2014; Moffitt, 1993). To cope with the developmental tasks and challenges that are associated with this life stage, young people need to develop advanced and complex cognitive, social and emotional skills (Steinberg et al., 2010; Eccles & Roeser, 2011).

School-based programs to enhance social and emotional competencies

Schools are seen as a natural setting to teach and learn not only cognitive but also social and emotional skills and to promote students' psychosocial health (Davidson et al., 2012; Eccles & Roeser, 2011; Kidger et al., 2012; World Health Organization, 2003a). A safe and supportive school climate is an important condition for reinforcing students' development (Osher et al., 2010; Rutter et al., 1979; Seligman et al., 2009). To improve young people's psychosocial health, many universal school-based programs focusing on SEL have been developed in recent decades (Beelmann & Lösel, 2006; Corrieri et al., 2014; Durlak et al., 2011; Faggiano et al., 2008).

Recent reviews and meta-analyses have shown that such programs produce medium to large positive effects on social, emotional and psychosocial health outcomes (Durlak et al., 2011; Sklad et al., 2012; Taylor et al., 2017). In their meta-analysis, Durlak et al. (2011) found that 213 SEL programs had significant positive effects on social-emotional skills, attitudes, behavior, academic achievement, mental health and conduct problems. A review study by Sklad et al. (2012) showed that 75 programs had significant positive effects on self-image, prosocial behavior, substance use, social-emotional skills, academic achievement, antisocial behavior and mental health outcomes. Although the effect sizes in both of these studies were lower at follow-up than at posttreatment, they remained significant. Taylor et al. (2017) demonstrated significant positive long-term effects on

social-emotional skills, attitudes, behavior, academic achievement and psychosocial health outcomes in 82 programs. All three of these meta-analyses included studies on school-based programs for children and early adolescents. However, insight into the effects of those programs on the full range of secondary school students is limited.

In addition, none of the three meta-analyses focused on the SEL content addressed in the school programs' primary learning targets. Further, they did not investigate whether the included studies examined effects with regard to the programs' SEL targets. Therefore, it is still uncertain whether universal school-based programs contribute effectively to the different SEL targets they address. To gain insight into the content of the SEL targets in the school programs and the outcomes on those targets in the studies reviewed, the SEL framework of the Collaborative for Academic, Social, and Emotional Learning (CASEL) (2003) was used.

Social and emotional learning (SEL)

The Collaborative for Academic, Social, and Emotional Learning (CASEL, 2003) defined a comprehensive set of five key competencies that constitute SEL: 1. self-awareness, i.e., identifying and recognizing one's own emotions and strengths and having a sense of self-efficacy and self-confidence; 2. social awareness, i.e., showing empathy and respect for others and being able to take different perspectives; 3. self-management, i.e., being capable of impulse control, stress management, goal-setting, persistence, and motivation; 4. relationship skills, i.e., being able to cooperate and communicate with others and to seek and provide help when needed; and 5. (responsible) decision-making, i.e., being capable of evaluation and reflection regarding one's behavior and taking personal and ethical responsibility for one's own behavior. In the past decades, these SEL competencies have often been seen as capturing what is essential to young people's positive development and psychosocial health (Brackett et al., 2012; Durlak et al., 2015; Weare & Nind, 2011).

Scientific evidence for the relevance of the five SEL competencies during adolescence has been found in the association between psychosocial health and the specific competencies in question. Thus, for example, a higher level of self-awareness is positively related to psychosocial health (Brackett et al., 2012; Mohammadiary et al., 2012). Similarly, social awareness supports the development of positive relationships and constructive communication with others (Allemand et al., 2015). The enhancement of self-management in youth not only contributes to academic achievement (McClelland et al., 2015) and positive behavior but also protects against psychosocial health problems (Eisenberg et

al., 2010) and aggression (Moffitt et al., 2011; Pokhrel et al., 2013). Relationship skills protect adolescents effectively against violence, psychological stress and substance use (Bierman et al., 2010; Faggiano et al, 2010; LeBlanc et al., 2011). Similarly, responsible decision-making is supposed to protect adolescents against engaging in substance use and sexual risk behavior (Tibbits et al., 2011).

The purpose of the current study

As indicated above, two matters are still unclear with regard to universal school-based SEL programs: which specific SEL competencies are targeted in these programs and whether all the competencies are actually enhanced. We had two reasons for limiting the focus of this study to the SEL targets addressed in school-based programs for secondary school students: 1. the developmental tasks and challenges during adolescence require SEL programs to focus on specific, advanced and complex SEL targets, and 2. as the majority of school programs focus on children and early adolescents, insight into the efficacy of SEL programs for the full range of students in secondary schools is limited.

To our knowledge, this systematic review is the first to provide insight into the specific SEL competencies that school-based programs for secondary school students target and the effects of the programs on these competencies. We aimed to establish the following: 1. the SEL competencies targeted in universal SEL programs for secondary school students and 2. the effects of school SEL programs on students' SEL competencies and psychosocial health outcomes.

METHODS

Data extraction and information synthesis

Using the PICOS strategy (i.e., Population, Intervention, Comparison, Outcome, Study), we selected and reported the outcome measures for relevant studies on adolescents (Population) in school-based programs (Intervention) that included a comparison group exposed to care as usual or a waitlist control group and that had study designs with at least pre- and posttest measures (Higgins & Green, 2011). We electronically searched five databases (PubMed, PsychInfo, Web of Science, Applied Science Premier (ASP), and Education Resources Information Centre (ERIC)) for studies published between 2004 and 2018. The reason for choosing this period was that the use of the term 'SEL competencies' has become common in the field of health promotion (Gresham, 2015; Kimber, 2011) since the publication of *'Safe and Sound. An Educational Leader's Guide to Evidence-Based Social and Emotional (SEL) Programs'* (CASEL, 2003). The

following key terms were used in the search: “randomized controlled trial”, “evaluation studies”, “pre-post-test”, “adolescent”, “school-based”, “education”, “social”, “moral”, “emotional”, “skill”, “behavior”, “mental health” and related terms. The authors can be contacted for more details.

We selected studies that evaluated the effectiveness of universal school-based programs that targeted SEL competencies. Only peer-reviewed studies that were published in scientific journals in English, Dutch or German were eligible for inclusion in our study. RefWorks was used to organize and review the search results and to delete duplicates. The search process produced a total of 2518 unique articles.

To identify potentially relevant citations, two researchers (MF and MS) independently hand searched the titles and abstracts of the selected reviews and studies for inclusion and exclusion. This strategy led to the exclusion of 2397 abstracts, and 121 abstracts remained for full-text screening. After any disagreements about which of the 121 manuscripts to include or exclude were resolved through discussion, a further 83 manuscripts were excluded. A search of the references lists of the remaining 38 manuscripts produced seventeen new manuscripts for consideration, fifteen of which were excluded after full-text screening. Forty manuscripts were ultimately included. The same two reviewers (MF and MS) independently extracted information from the full texts of the included studies. They used a coding scheme to identify the following components: a. program goals; b. theoretical base of the program; c. dosage and length; d. facilitator; e. SEL targets; f. student age; g. outcomes on SEL competencies and psychosocial health; and h. study quality.

To identify the SEL targets addressed in the programs evaluated in the studies reviewed, operationalizations of the CASEL group (2003) definitions of the SEL competencies were used, e.g., “awareness of feelings and thoughts” and “self-efficacy” (self-awareness), “empathy” and “perspective taking” (social awareness), “self-regulation” and “goal-setting” (self-management), “negotiating on conflicts” and “resistance to peer pressure” (relationship skills), and “considering consequences of actions” and “taking responsibility for actions” (responsible decision-making). The concordance between the two researchers in coding the SEL targets addressed in the programs was 84%.

As the focus of our study was to establish the effects of school programs on the students’ SEL competencies, we were interested in the content of the outcome measures used in the studies reviewed. To identify this content information on the items and/or subscale levels of the assessment instruments was determined. Based on this information and the operationalizations of the SEL competencies described above, the same two researchers

(MF and MS) independently identified the outcomes for the different SEL targets measured in the studies. The concordance in coding the outcomes of the SEL targets between the two researchers was 88%. Divergent ratings for both the SEL targets content and outcomes were discussed until definitive ratings were agreed upon. The authors can provide a list of the SEL competencies, and the corresponding outcomes measured based on the subscale- and/or item-level information from the assessment instruments used in the studies reviewed. Appendix 1 including this information is additionally included for this thesis.

To rate the study quality, the Quality Assessment Tool for Quantitative Studies (QATQS) of the Effective Public Health Practice Project was used (Tong et al., 2012). The studies were rated on their quality by the same two researchers (MF and MS), with concordance of almost 90%. Any divergent quality ratings were discussed until a definitive rating was agreed upon (strong, moderate, or weak).

Inclusion and exclusion criteria

In all, there were six inclusion criteria. Any study had to concern a. universal secondary education; b. a school-based program; c. intervention participants who were adolescents aged between 11 and 19; and d. an intervention that was part of a program that targeted two or more SEL competencies. No program that targeted only one SEL competency was identified as an SEL program. A study also had to e. measure effects based on a randomized control trial or a quasi-experimental or pre-posttest design including a control group and f. be published in a scientific journal in English, Dutch or German.

The outcome measures of interest were any type of objective measures that corresponded to the five SEL competencies or measures related to psychosocial health (i.e., depression, anxiety, substance use, or aggression).

The following studies were excluded: studies of a school program that focused on students aged under 11 or above 19 years, focused on targeted or selected populations, included students in primary or tertiary education or an out-of-school setting, and/or concerned only one SEL competency or no SEL competencies, as well as studies with a design rated as weak. We excluded studies that focused only on a single problem, e.g., bullying, substance use, obesities, autism, attention deficit hyperactivity disorders (ADHD) or diseases, such as diabetes or HIV/aids. This process yielded a total of 40 studies on 32 different school programs for inclusion in this review (see Figure 1 for flow chart).

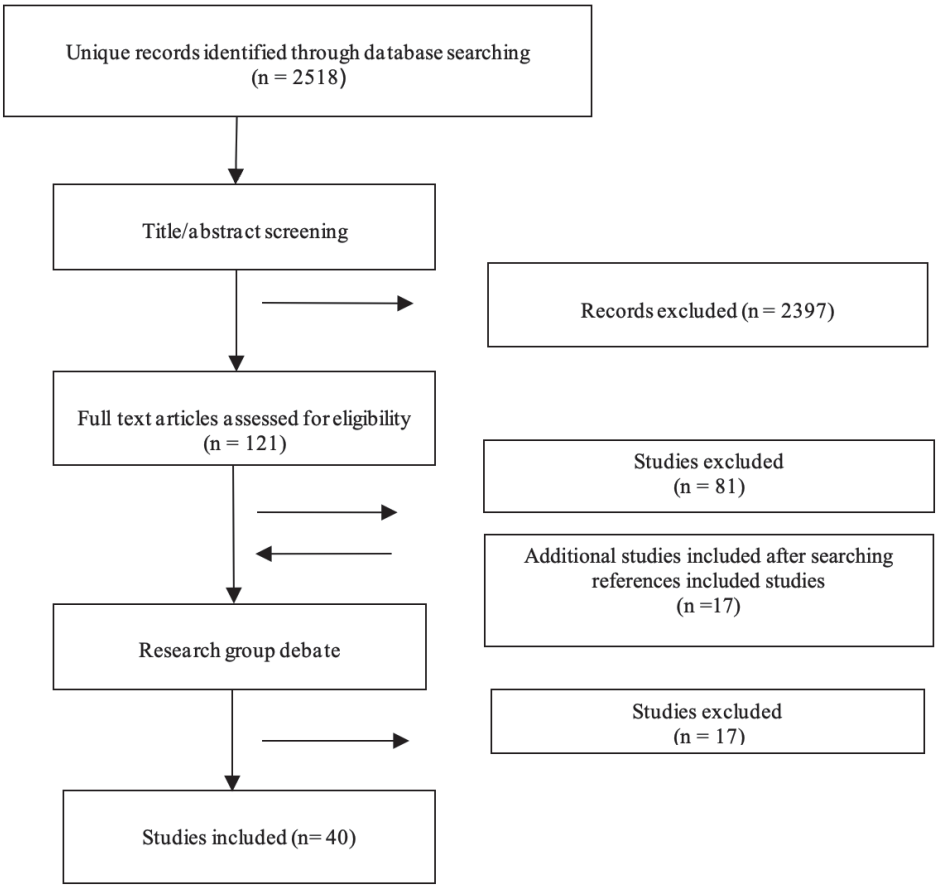

Figure 1 Flow diagram of included references

Calculation of effect sizes and meta-analysis

Cohen's *d* was used to calculate the effect sizes for the posttest measures, either from the means and standard deviations, an independent t-test, or an F-test from an analysis of variance, or univariate *β*s. The effect sizes at follow-up were not included, as a limited number of studies measured long-term effects, and this follow-up period differed substantially, i.e., from a few months to several years. We noted whether the follow-up effects were measured and whether these effects had been significant.

To calculate the summary effect sizes of specific SEL competencies and psychosocial health outcomes identified in the studies, we used analyses performed with Comprehensive Meta-Analysis (CMA) software (Borenstein et al., 2009). The data were analyzed using

a random effects model because this model does not assume a common underlying effect size for all included studies. We used the *Q* test to establish the heterogeneity of the effect sizes, as the significance of the *Q* test results indicates true heterogeneity. To quantify the heterogeneity of the effect sizes, I^2 was calculated, which can be interpreted as the percentage of total variability in effect sizes due to true heterogeneity (Higgins et al., 2003). The Q-statistic was also used to test the significance of some moderators. In the pooled effect sizes, we included posttest effects and no follow-up effects.

RESULTS

The SEL targets addressed in the school programs that were evaluated in the studies reviewed are described. To provide insight into the programs' content, some general characteristics of the programs and studies are reported. Next, the effects provided by the school programs on students' SEL competencies and psychosocial health outcomes are reported. Finally, insight into the summary effects of the outcomes is provided.

Characteristics of the programs and studies

The CASEL framework for SEL was used to identify the SEL competencies targeted by the school programs evaluated in the studies reviewed (CASEL, 2003). The SEL competencies that were targeted in the programs included self-awareness (SeA), social awareness (SoA), self-management (SM), relationship skills (RS), and responsible decision-making (DM) (see Table 1). Most of the programs targeted four or all five SEL competencies. The competencies most addressed in the programs were relationship skills and self-management (see Table 2).

A majority of programs aimed to enhance SEL competencies as a means of protecting students from psychosocial health problems, such as depression, anxiety, aggression and/or substance use. The main objective of ten of the programs was only to enhance students' SEL competencies.

More than half of the programs targeted young adolescents aged eleven to fourteen, and only a few targeted only older adolescents. All programs had an order of activities and promoted students' active participation. A majority of the programs were administered by trained classroom teachers; other facilitators were researchers or master's students. While the program duration ranged between ten lessons to more than 200, most programs consisted of between ten and 21 lessons in a single school year, and the lessons lasted between 45 and 90 minutes.

Table 1 Characteristics of the universal SEL programs for secondary school students examined in the review study

Name of the first author and year and country of publication	Intervention	Objective	Theoretical Basis[1]	Student age	SEL competencies targeted[2]	Duration[3]	Deliverer[4]
Botvin et al. (2006). USA.	Life skills training	Prevention of problem behavior	CBT; TTI	11-12	SM; RS; DM	15; 25w; 45m	T
Burckhardt et al. (2016). Australia.	Strong Minds	Depression prevention	CBT, ACT-mindfulness	11-18	SeA; SM; RS	16; 12w; 60m;	NT
Cardemil et al. (2007); Chaplin et al. (2006); Gillham et al. (2007). USA.	Penn Resilience Program (PRP)	Depression prevention	CBT	10-14	SeA; SM; RS; DM	12; 12w; 90m	T+NT
Cheung & Lee (2010). China.	Character education	Social competence	CE	13-15	SeA; SM; RS; DM	16; 16w; 60m	T
Coelho et al. (2015). Portugal.	Positive Attitude	Enhancement of SEL skills	CBT/SLT	11-16	SeA; SoA; SM; RS; DM	12; 12w; 60m; 3 y	NT
Espada et al. (2012). Spain.	Saluda: Social Skills and Problem Solving	Substance use prevention	CBT	12-15	SeA; SoA; RS; DM	10; 10w; NM	NT
Espelage et al. (2013). USA.	Second Step: Student Success Through Prevention	Violence reduction	NM	11-12	SeA; SoA; SM; RS	15; 40w; 50m	T
Frank et al. (2017). USA.	Transformative Life Skills	Reduction in stress, promotion of psychosocial health and prosocial behavior	Mindfulness	10-14	SeA; SM; RS	48; 20w; 25m	NT
Garaigordobil et al. (2009). Spain.	Society that Builds Peace	Violence prevention	CBT; PYD	15-16	SeA; SoA; SM; RS; DM	10; 12w; 90m	T
Gomes & Marques (2013). Portugal.	Promotion of positive experiences	Learning of life skills in different contexts	NM	11-12	SoA; SM; RS	34; 36w; 90m	NT
Gravesteijn et al. (2004). Netherlands.	Life Skills	Intra- and interpersonal skills training	SLT; RET	13-17	SeA; SoA; SM; RS; DM	16; 16w; 90m	T

Table 1 Continued

Name of the first author and year and country of publication	Intervention	Objective	Theoretical Basis[1]	Student age	SEL competencies targeted[2]	Duration[3]	Deliverer[4]
Griffin et al. (2009). USA.	Building Resiliency and Vocational Excellence	Substance use and violence prevention	SLT	13	SeA; SM; RS; DM	18; 9w; 90m	T
Gueldner et al. (2011). USA.	Strong Teens	Resilience enhancement	CBT	11-13	SeA; SoA; SM; RS	12; 12w; 50m	T
Hanewinkel & Aßhauer (2004). Germany.	Life skills prevention training	Social competencies and smoking prevention	CBT	11-12	SeA; SoA; SM; RS; DM	21; 16w; NM	T
Huang et al. (2012). Taiwan.	Life skills training	Violence and drug prevention	SLT; TPB	11-13	SeA; SoA; SM; RS; DM	10; 16w; 45m	T
Kimber et al. (2008, 2009). Sweden.	Social Emotional Training and Resilience Program	Development of social and emotional skills	CBT	7-14	SeA; SoA; SM; RS; DM	80/40; 40w; 45m; 5 y	T
Kindt et al. (2014). Tak et al. (2016). Netherlands.	Op Volle Kracht (PRP)	Depression prevention	CBT	11-16	SeA; SM; RS; DM	16; 16w; 45m	T
Koglin et al. (2010). Germany.	Job-fit training	Personal development and job preparation	CBT	13-20	SeA; SoA; SM; RS	10; 5w; 70m	NT
Lemberger et al. (2015). USA.	Student Success Skills Program	Enhancement of social skills and academic achievement	CBT	11-12	SeA; SM; RS	8; 40w; 60m	NT
Lewis et al. (2013a). Lewis et al. (2013b). Lewis et al. (2016). USA.	Positive Action Program	SEL and prevention of problem behavior	SET	11-13	SeA; SoA; SM; RS	140/70; 35w; 20m; 3 y	T
Merry et al (2004). Rivet-Duval et al. (2011). New-Zealand.	Resourceful Adolescents Program-Kiwi	Depression prevention	CBT	12-16	SeA; SoA; SM; RS	11;11w; NM	T

Table 1 Continued

Name of the first author and year and country of publication	Intervention	Objective	Theoretical Basis[1]	Student age	SEL competencies targeted[2]	Duration[3]	Deliverer[4]
Metz et al. (2013). USA.	Learning to Breath	Awareness and emotion regulation	Mindfulness	16-18	SeA; SM	18/16w; 20m	NT
Pössel et al. (2011). Germany. Pössel, et al. (2013). USA.	Lars und Lisa	Depression prevention	CBT; SIPM; MT	12-17	SeA; SoA; SM; RS	10; 10w; 90m	NT
Roberts et al. (2010). Australia.	Aussie Optimism Program	Depression and anxiety prevention	CBT	11-13	SeA; SoA; SM; RS; DM	20; 20w; 60m	T
Rose et al. (2014). Australia.	Resourceful Adolescents Program + Peer Interpersonal Relatedness	Depression prevention	CBT	9-14	SeA; SoA; SM; RS	20; 20w; 45m	NT
Sawyer et al. (2010). Australia.	Mind Matters	Depression prevention	CBT	12-13	SeA; SoA; SM; RS	10; 10w; 45m; 3 y	T
Schonert-Reichl & Lawlor (2013). Canada.	Mindfulness education .	Social and emotional skills and optimism	PP; Mindfulness	9-14	SeA; SoA; SM; RS	10; 10w; 45m	T
Simons-Morton et al. (2005). USA.	Going Places	Substance use and violence prevention	SLT; PBT	11-14	SM; RS; DM	18/12/6; 18/12/6w; 3 y	
Sullivan et al. (2017). USA.	Second Step + Bullying prevention	Violence prevention	NM	11-15	SoA; SM; DM	13; 13w; 35m	T
Thompkins et al. (2014). USA.	Violence Prevention Program	Violence prevention	NM	15-16	SoA; SM; RS	12; 12w; 45m	NT
Tomyn et al. (2016). Australia.	Think Health and Well-being	Depression prevention and improvement of change agents	CBT	13-17	SeA; SoA; SM; RS	6; 6w; 45m	NT
Wigelsworth et al. (2013). Great Britain.	Social and Emotional Aspects of Learning	Social and emotional skills training	EI	11-12	SeA; SoA; SM; RS	NM	T

Table 1 Continued

[1] Theoretical basis: CBT=cognitive behavioral theory (Beck, 1979); ACT = acceptance and commitment therapy (Hayes, Luoma, Bond, Masuda, & Lillis, 2006); PBT = problem behavior theory (Jessor & Jessor, 1977); CE = character education (Berkowitz, Battistich & Bier, 2008); SLT = social learning theory (Bandura, 1977); RET = rational emotive therapy, Ellis, 1996); EI = emotional intelligence (Goleman, 1995); TTI = theory of triadic influence (Flay, Snyder & Petraitis, 2009); TPB = theory of planned behavior (Ajzen, 1991); SIPM = social information processing model (Dodge,1986); MT = motivation theory (Kanfer, 1990); PYD = positive youth development (Lerner, Almerigi, Theokas, & Lerner, 2005); PP = positive psychology (Seligman, 2002); Mindfulness (Kabat-Zinn, 1990); TRA = theory of reasoned action (Fishbein & Ajzen, 2011); SET = self-esteem enhancement theory (DuBois, Flay & Fagen, 2009).

[2] Social and emotional learning (SEL) skills focus: SeA = self- awareness; SoA = social awareness; SM = self-management; RS = relationship skills; DM = (responsible) decision-making.

[3] Duration: number of lessons in year 1/number of lessons in year 2-3; w = weeks; m = minutes per lesson; y = years; NM = not mentioned.

[4] Deliverer: T = teacher; NT = not teacher (psychologist, graduate/master students, or school counselor).

The theoretical basis for the majority of the programs was the cognitive behavioral model (Beck, 1979). The theoretical bases for other programs included a range of sources, including social learning theory (Bandura, 1977), the theory of reasoned action (Ajzen, 1991), problem solving theory (Jessor & Jessor, 1977) and mindfulness (Kabat-Zinn, 1990).

The majority of the studies were conducted on programs administered in North America and Europe. The remainder were conducted on programs in Australia or Asia.

Although all the studies suggested that there was a relationship between the enhancement of SEL competencies and psychosocial health outcomes, only three studies of two programs explicitly described a model of change with regard to this relationship (Griffin et al., 2009; Pössel, et al., 2011; Pössel et al., 2013) (not in Table 1).

Outcome measures in studies on SEL competencies and psychosocial health

Although all the programs under study were focused on training for SEL competencies, only five studies described effect measures for all the SEL targets of the program under evaluation (see Table 3). Most studies measured the effects on only a selection of the SEL competencies targeted. Measurements of self-management were included in less than half of the studies (17/39) that evaluated a program targeting this competency. With regard to the other SEL targets, outcome measurements were included for less than a third of the programs that addressed these targets: 12/38 studies of the programs addressing relationship skills, 10/36 studies of programs addressing self-awareness, 5/23 studies of programs addressing social awareness, and 7/26 studies of programs addressing responsible decision-making (Table 3).

Almost all studies (36/40) reported measures for one or more of the psychosocial health outcomes, i.e., depression, anxiety, aggression, and substance use. In the majority of the studies (35/40), the outcomes were measured based only on student self-reports. Five studies included multiple informants to assess outcomes (Coelho et al., 2015; Garaigordobil et al., 2009; Saywer et al., 2010; Schonert-Reichl & Lawlor, 2010; Sullivan et al., 2017; Roberts et al., 2010). Additionally, none of the studies included multiple methods to assess outcomes.

Table 2 Characteristics of the 32 universal SEL programs for secondary-school students

SEL competencies targeted in programs	**N**	**%**
Self-awareness.	27	84
Social awareness.	20	63
Self-management.	31	97
Relationship skills.	30	94
Decision-making.	15	47
Facilitators		
Teachers.	20	63
Others (researchers, master students).	12	37
Participants		
Young adolescents (11-14).	18	56
Older adolescents (14-19).	4	13
Broad age group (11-19).	10	31
Demographic area (one program was implemented in USA and Europe)		
North America.	14	41
Europe.	11	34
Australia/Asia.	8	25

In more than half of the studies (14/26) that measured program effects on SEL competencies, one or more of the effects were medium to large (Cohen, 1988; Lipsey & Wilson, 2001). Only twelve studies measured follow-up effects (3-24 months) on one or more of the SEL competencies. Seven of the studies found significant follow-up effects (see Table 3). Significant effects were reported in more than half (23/37) of the studies that included measures of psychosocial health. The effect sizes remained significant over time in almost half of the studies that measured follow-up effects on these outcomes (Table 3).

Most of the studies (31/40) did not report analysis of any moderating or mediating effects of SEL competencies on psychosocial health outcomes. One study analyzed self-management as a mediator of the effects found for psychosocial health outcomes (Lewis et al., 2013a). Seven studies reported that effects on outcomes were moderated by students' demographics, including gender (Chaplin et al., 2004; Coelho et al., 2015; Pössel et al., 2011a; Simons-Morton 2005; Sullivan et al., 2017), age (Schonert-Reichl & Lawlor, 2010), learning problems (Sullivan et al., 2017) and ethnicity (Cardemil et al., 2007)

Table 3 Design characteristics of studies and effect sizes for the SEL competencies and psychosocial health outcomes of the SEL programs included in review study

					Psychosocial health Outcomes[1]						SEL competencies Outcomes[2]				
Name of the first author, year of publication	**Intervention**	**Design[3]**	**N[4]**	**Q[5]**	**Dep**	**Anx**	**Agg**	**SU**	**Original measure[6]**	**SEL competencies addressed in program[2]**	**SeA**	**SoA**	**SM**	**RS**	**DM**
Botvin et al. (2006).	Life skills training	RCT	4858	1	-	-	**.69**	-	(OR)	SM; RS; DM	-	-	-	-	-
Burckhardt et al. (2016).	Strong Minds	Quasi	296	1	**1.44**	**.54**	-	-	*d*	SeA; SM; RS	-	-	-	-	-
Cardemil et al. (2007).	Penn Resilience Program	RCT, 24 m fu	168	2	**fu**	-	-	-	(t)	SeA; SM; RS; DM	-	-	-	-	-
Chaplin et al. (2006).	Penn Resilience Program	RCT, 12 m fu	273	2	**.55** fu	-	-	-	(M+SD)	SeA; SM; RS; DM			.28 fu		
Gillham et al. (2007).	Penn Resilience Program	RCT, 3 y fu	697	2	.17 **fu**	-	-	-	(F)	SeA; SM; RS; DM	-	-	-	-	-
Cheung & Lee (2010).	Character Education	Quasi	920	2	-	-	-	-	(M+SD)	SeA; SM; RS; DM	-	-	-	**.12**	-
Coelho et al. (2015).	Positive Attitude	Quasi, 6 m fu	1091	1	-	.21			*d*	SeA; SoA; SM; RS; DM	**.32 fu**	**.20 fu**	**.14** fu	**.25 fu**	**.10** fu
Espada et al. (2012).	Saluda: Social Skills and Problem Solving	Quasi, 12 m fu	341	1	-	-	-	**.60** fu	(F)	SeA; SoA; RS; DM	-	-	-	**.41** fu	**.68 fu**
Espelage et al. (2013).	Second Step: Student Success Through Prevention	RCT	3616	1	-	-	**.66**	-	(OR)	SeA; SoA; SM; RS	-	-	-	-	-
Frank et al. (2017).	Transformative Life Skills Programme	RCT	159	2	.04	-	**.29**	-	*d*	SeA; SM; RS	.11	-	**.12**	-	-
Garaigordobil et al. (2009).	Society that Builds Peace	RCT	285	2	-	-	**.24**		(F)	SeA; SoA; SM; RS; DM	-	**.71**	**.27**	-	**.48**
Gomes & Marques (2013).	Promotion of positive experiences	Quasi	84	2	-	-	-	-	(M+SD)	SeA; SM; RS; DM	**.83**	-	**.98**	**.60**	.41

Table 3 Continued

					Psychosocial health Outcomes[1]					SEL competencies Outcomes[2]					
Name of the first author, year of publication	**Intervention**	**Design[3]**	**N[4]**	**Q[5]**	**Dep**	**Anx**	**Agg**	**SU**	**Original measure[6]**	**SEL competencies addressed in program[2]**	**SeA**	**SoA**	**SM**	**RS**	**DM**
Gravesteijn et al. (2004)	Life skills	Quasi, 12 m fu	958	2	-	-	-	-	(M+SD)	SeA; SoA; SM; RS; DM	**.78 fu**	**.54 fu**	**.82 fu**	**.66 fu**	-
Griffin et al. (2009).	Building Resiliency and Vocational Excellence	RCT	179	2	-	-	.17	**.60**	(F)	SeA; SM; RS; DM	-	-	-	-	-
Gueldner & Merrel (2011).	Strong Kids	Quasi	125	2	**.20**	-	-	-	(M+SD)	SeA; SoA; SM; RS	-	-	**.89**	-	-
Hanewinkel & Aßhauer (2004).	Life skills prevention program training	Quasi, 15 m fu	936	1	-	-	-	.06	(OR)	SM; RS; DM	-	-	-	.02	-
Huang et al. (2012).	Life skills training +	RCT	441	1	-	-	-	**.38**	(F)	SeA; SoA; SM; RS; DM			**.62**		
Kimber et al. (2008).	Social Emotional Training and Resilience Program	Quasi	1003	1	**.56**	-	**.42**	-	*d*	SeA; SoA; SM; RS; DM	**.54**		**.36**	.15	
Kimber & Sandell (2009).	Social Emotional Training and Resilience Program	Quasi	1003	1	-	-	-	**.49**	(*β*)	SeA; SoA; SM; RS; DM	-	-	-	-	-
Kindt et al. (2014).	Op Volle Kracht (PRP)	RCT, 6 m fu	1343	1	.02 fu	-	-	-	*d*	SeA; SM; RS; DM	-	-	-	-	-
Tak et al. (2016).	Op Volle Kracht (PRP)	RCT	1390	1	.01 fu	-	-	-	*d*	SeA; SM; RS; DM	-	-	-	-	-
Koglin et al. (2010).	Job-fit training	Quasi, 6 m fu	104:	2	**.58 fu**	-	-	-	(M+SD)	SeA; SoA; SM; RS	-	-	-	-	-
Lemberger et al. (2015).	Student Success Skills Program	Pre-post	193	2	-	-	-	-	*d*	SeA; SM; RS	-	**.42**	**.42**	-	-
Lewis et al. (2013a).	Positive Action Program	RCT, 12 m fu	1040	1	**.14 fu**	**.26 fu**	-	-	(*β*)	SeA; SM; RS; DM	.17	-	**.12 fu**	-	-

Table 3 Continued

					Psychosocial health Outcomes[1]						SEL competencies Outcomes[2]				
Name of the first author, year of publication	**Intervention**	**Design[3]**	**N[4]**	**Q[5]**	**Dep**	**Anx**	**Agg**	**SU**	**Original measure[6]**	**SEL competencies addressed in program[2]**	**SeA**	**SoA**	**SM**	**RS**	**DM**
Lewis et al. (2013b).	Positive Action Program	RCT, 12 m fu	1040	1	-	-	**.39**	-	(*β*)	SeA; SM; RS; DM	-	-	-	-	-
Lewis et al. (2016).	Positive Action Program	RCT, 5 y	1170	1	-	-	-	-	(Cox'd)	SeA; SoA; SM; RS; DM	**.29**	**.26**	**.50**	**.46**	**.40**
Merry et al. (2004).	Resourceful Adolescents Program-Kiwi	RCT, 6 m fu	392	1	**.38** fu	-	-	-	(M+SD)	SeA; SoA; SM; RS	-	-	-	-	-
Metz et al. (2013).	Learning to Breath	Quasi	213	1	-	**.28**	-	-	(M+SD)	SeA; SM	**.62**	-	**.33**	-	-
Pössel et al. (2011).	Lars und Lisa	RCT, 12 m fu	292	1	**.30 fu**	.02	-	-	(M+SD)	SeA; SoA; SM; RS	-	-	**.93 fu**	-	-
Pössel et al. (2013).	Lars und Lisa	RCT, 4 m fu	301	1	**.27 fu**	-	-	-	(M+SD)	SeA; SoA; SM; RS	-	-	-	-	-
Rivet-Duval et al. (2011).	Resourceful Adolescents Program	RCT, 6 m fu	160	2	**.32** fu	-	-	--	(M+SD)	SeA; SoA; SM; RS	-	-	**.32 fu**	-	-
Roberts et al. (2010).	Aussie Optimism Program	RCT, 18 m fu	496	2	.14 fu	.19 fu	-	-	(F)	SeA; SoA; SM; RS; DM	-	-	-	**.17** fu	-
Rose et al. (2014).	Resourceful Adolescents Program + Peer Interpersonal Relatedness	RCT, 12 m fu	210	1	.58 fu	-	-	-	*d*	SeA; SoA; SM; RS	-	-	-	**.33 fu**	-
Sawyer et al. (2010).	Mind Matters	RCT, 24 m fu	3512	1	**.20** fu	-	-	-	(t)	SeA; SoA; SM; RS; DM	-	-	-	.09 fu	.04 fu
Schonert-Reichl & Lawlor (2010).	Mindfulness education	Quasi	246	2	-	-	**.43**	-	(M+SD)	SeA; SoA; SM; RS	**.65**	-	**.34**	-	-

Table 3 Continued

					Psychosocial health Outcomes[1]						SEL competencies Outcomes[2]				
Name of the first author, year of publication	**Intervention**	**Design[3]**	**N[4]**	**Q[5]**	**Dep**	**Anx**	**Agg**	**SU**	**Original measure[6]**	**SEL competencies addressed in program[2]**	**SeA**	**SoA**	**SM**	**RS**	**DM**
Simons-Morton et al. (2005).	Going Places	RCT, 3 y	1328	2	-	-	.02 fu	**.44 fu**	(F)	SM; RS; DM	-	-	-	-	-
Sullivan et al. (2017).	Second Step + Bullying prevention	RCT	237	1	-	-	.04	-	(β)	SoA; SM; DM	-	-	.09	-	-
Thompkins et al. (2014).	Violence Prevention Program	Quasi	1112	1	-	-	.03	-	(M+SD)	SoA; SM; RS	.01	-	-	-	-
Tomyn et al. (2016).	Think Health and Well-being	Quasi	252	2	.05 fu	-	-	-	*d*	SeA; SoA; SM; RS	-	-	.02 fu	-	-
Wigelsworth et al. (2013).	Social and emotional aspects of learning	Quasi	4443	1	.09	-	-	-	(M+SD)	SeA; SoA; SM; RS	-	-	-	-	-

(Continues)

Psychosocial health: Dep = depression; Anx = anxiety; Agg = aggression; SU = substance use
[2] SEL competencies outcomes SeA = self-awareness; SoA = social awareness; SM = self-management; RS = relationship skills; DM = decision-making.
[3] Design of study: RCT = randomized control trial; Quasi = quasi-experimental design; Pre-post = pre-post-test design; Solom = Solomon 4-group design; m = months; y = years; fu = follow-up.
[4] Number of students
[5] Quality of design: 1 = strong design; 2 = moderate design; 3 = weak design.
[6] *d*-scores mentioned in the study or otherwise specified in the column. Original measure: M+SD: *d*-scores calculated from the means and standard deviations; F: *d*-scores calculated from the F measures; t: *d*-scores calculated from the t-test; OR = *d*-scores calculated from the odds ratio; *β:* *d*-scores calculated from univariate regression coefficient; Cox logit **.**XX = Cohen's *d* sign; **fu** = follow-up significant; .XX = Cohen's *d* not significant; fu = follow-up not significant.

Summary effects found for separate SEL competencies and psychosocial health

CMA showed significant summary effect sizes on all five SEL competencies and psychosocial health outcomes (Table 4). The highest pooled *d*-scores were found for social awareness and substance use. The pooled effect sizes were small to medium (Cohen, 1988; Lipsey & Wilson, 2001). Differences in the effectiveness of the programs with regard to their outcome measures were indicated by the large degree of variance in the study effect sizes for all SEL competency outcome measures (which ranged from Q = 143203 and I^2 = 99.99 for self-awareness, to Q = 1545 and I^2 = 99.741 for social awareness) and for all psychosocial health outcome measures (which ranged from Q = 211511 and I^2 = 99.99 for depression to Q = 1441 and I^2 = 99.65 for substance use). The differences in effectiveness found in the studies may be attributable to the systematic effects of the covariates (Higgins et al., 2003). Our analyses of random effects for three covariates—student age, number of lessons and quality of study design—found that none of these covariates significantly affected the outcomes measured.

Table 4 Program efficacy for SEL competencies and psychosocial health outcomes

Outcomes	Number of studies (Number of students)	Effect size *d*[1] (Standard error)	95% Confidence Interval	*Q*[2] (Degrees of freedom)	*I*[2,3]
SEL Competency Outcome Measures					
Self-awareness	9 (7078)	**.424** (.090)	.248 - .600	143203 (8)	99.994
Social awareness	5 (2562)	**.579** (.119)	.345 - .813	1545 (4)	99.741
Self-management	17 (8823)	**.387** (.047)	. 294 - .479	102154 (16)	99.984
Relationship skills	11 (11588)	**.242** (.028)	.188 - .297	21030 (10)	99.952
Decision-making	6 (6316)	**.335** (.088)	.163 - .506	1552 (5)	99.678
Psychosocial Health Outcome Measures					
Depression	19 (19408)	**.310** (0.54)	.205 - .416	211511 (18)	99.991
Anxiety	8 (5808)	**.266** (.041)	.186 - .345	24238 (7)	99.971
Aggression	11 (15315)	**.326** (.049)	.230 - .421	50418 (10)	99.980
Substance use	6 (4061)	**.385** (.124)	.142 - .629	1441 (5)	99.653

d = Cohen's *d*.
[2] Q = measure of the heterogeneity of the studies (all significant).
[3] I^2 = percentage of variation across studies that is due to heterogeneity rather than chance.

DISCUSSION

In this systematic review of universal SEL programs for secondary school students, we wished to 1. identify the specific SEL competencies the programs targeted and 2. examine the effects of the programs on the competencies in question and psychosocial health outcomes. By focusing on SEL programs' effects on social and emotional skills, attitudes, behaviors and psychosocial health outcomes, earlier reviews did not provide information about the content of the programs' SEL targets and the program effects measured on SEL competencies targeted. To identify the SEL targets addressed in these programs and the effects measured in the studies, the SEL competencies defined by the CASEL group (CASEL, 2003) were used, i.e., self-awareness, social awareness, self-management, relationship skills and responsible decision making.

Effects found for SEL competencies and psychosocial health outcomes

Our review included 40 studies that evaluated 32 SEL programs for secondary school students published between 2004 and 2018. The findings of our review study indicate that most of the programs targeted three of the CASEL competencies: self-awareness, self-management and relationship skills. Social awareness was included in more than half of the programs, and responsible decision-making was addressed in fewer than half.

Most of the studies that evaluated these programs did not include measures of the effects on all the SEL competencies that the programs targeted. Fewer than half of the studies on programs that targeted self-management measured the outcomes for self-management. Even fewer studies included outcome measures for any of the other SEL targets. A majority of the studies that measured program effects on SEL competencies targeted found positive effects on the competency in question. The pooled effect analyses showed that significant effect sizes were found for all of the SEL targets addressed in the programs for secondary school students. While the largest summary effects were found for self-awareness and social awareness, the smallest effect was found for relationship skills.

The majority of the studies that measured outcomes for psychosocial health problems found decreases in those problems in students who participated in the evaluated SEL programs. The pooled effect analyses identified significant positive outcome measures for depression, anxiety, aggression and substance use. The highest summary effect was reported for substance use, and the smallest summary effect was found for anxiety.

Although the number of studies that provided data on SEL targets was limited, ranging from five to seventeen programs depending on the SEL target, the number of students included in the studies per outcome measure was quite substantial, ranging from 2562 to 19408 students. These numbers were sufficient to calculate significant summary effect sizes for each of the separate outcome measures.

Mediation and moderation between the SEL targets and psychosocial health were reported to a limited extent in the studies reviewed. The lack of knowledge of the moderating and/or mediating effects of SEL competencies on psychosocial health outcomes that has been noted in former research on SEL programs still remains (Durlak et al., 2011).

Effectiveness of universal secondary school programs on SEL targets

An important result of this review study is that all five SEL competencies, which we used to identify the programs' SEL targets, were effectively enhanced by the SEL programs. Although self-management and relationship skills have been assumed to be the core targets in school programs to promote young people's psychosocial health (Botvin, 1996; Botvin & Griffin, 2014; Greenberg et al., 2015), our analyses showed that the largest summary effect sizes were found for self-awareness and social awareness. SEL programs for secondary school students are able to influence self- and social awareness to a larger extent than more action-focused competencies, i.e., self-management and relationship skills. This finding may indicate that the development of awareness is preconditional for the development of action-focused competencies. Long-term participation might be necessary to improve action-focused competencies.

There are some theoretical indications to explain the effects found for awareness competencies. Self-awareness and social awareness may support the development of self-management and relationship skills (Domitrovich et al., 2007; Gravesteijn, 2010; Rieffe et al., 2008; Silvia & O'Brien, 2004). In the summary effect analyses, we used posttest and not long-term effects. If the development of self-awareness and social awareness indeed precede the development of self-management and relationship skills, effects on the latter two competencies should be measured at a later stage. Support for this recommendation in the current review might be that most of the significant follow-up effects in the studies reviewed were found for self-management and relationship skills. From this perspective, self-awareness and social awareness can be intervening variables that predict the development of other SEL competencies, i.e., self-management and relationship skills.

A remarkable finding of this study is that although most of the included school programs targeted four or five of the SEL competencies, most of the studies evaluating these programs did not measure effects on all of the competencies targeted. Without separate evaluations of different competencies, it is unclear whether a program that aims to enhance these competencies actually improves them. Especially because many of the evaluation studies found positive program effects on psychosocial health outcomes, it would be valuable to know which SEL competencies targeted in the programs led to these positive effects. Such information might indicate which competencies need to be targeted in school programs to improve psychosocial health outcomes.

Strengths and limitations

A methodological strength of this review is its use of standardized protocols for study selection, i.e., PICOS, (Higgins et al., 2011), and its determination of the quality of the study designs, i.e., QATQS (Tong et al., 2012). Another strength is that we developed a protocol for the systematic classification of the programs' primary targets on SEL. The operationalizations used to identify the SEL targets addressed in the programs and to identify the corresponding outcome measures for those targets were based on the CASEL definitions of the SEL competencies (CASEL, 2003). Although these definitions are often referred to in the literature on SEL, problems regarding the clarity and interpretation of those definitions have also been articulated (Denham, 2015; Duckworth and Yeager, 2015). Both the programs' SEL targets identified in our study and the outcomes measured for those targets are not free from those problems, which must be considered a limitation of our study.

Another limitation is that, for reasons of efficiency, we have based our program information not on the program manuals but on the texts of the studies reviewed. Another possible limitation is publication bias, as studies with positive effects are more often accepted for publication (Borenstein et al., 2009). This bias may have caused the number of studies with significant positive effects to have been overrepresented.

The variety in the pooled effect sizes found for the SEL targets may be a consequence of the incongruence between the actual SEL targets of the programs and the outcomes we identified for those targets. As we described above, the operationalizations of the SEL targets we used and the outcomes found for those targets are not free from interpretation and/or validation problems (Bridges et al., 2004; Crowe et al., 2011; Denham, 2015; Humphrey et al., 2011). Future research must validate the examination of

the operationalizations of the SEL targets used in this study. In addition to this, validated assessment instruments corresponding to these targets are needed.

Implications for research and practice

Although the results of our review study do not unravel the relationship between psychosocial health outcomes and the SEL competencies targeted in the programs, they do shed some light on the enhancement of these competencies. Self-management and relationship skills were the competencies measured to the largest extent in the studies reviewed, and the largest summary effect sizes were found for self-awareness and social awareness. Further research is necessary to confirm the possibility raised in earlier studies (Domitrovich et al., 2007; Gravesteijn, 2010; Rieffe al., 2008; Silvia & O'Brien, 2004) that the development of some SEL competencies targeted in school programs—e.g., self-awareness and social awareness—precedes the development of other competencies. Such research might contribute to insights into the optimal sequence in which SEL competencies should be targeted in school-based programs for adolescents (Durlak et al., 2011).

As most of the studies reviewed used self-report measures only, the results of our study are limited to the SEL competencies the students perceived to have. Future research should use various assessment methods, including behavioral observation/skill performance, self-report, and informant-report to gain insight into the performance of secondary students' SEL competencies (Duckworth & Yeager, 2015).

In their meta-analyses on SEL programs, Taylor et al. (2017) identified that an increase in social and emotional skills at posttest predicted the positive effects found for psychosocial health outcomes at follow-up. More insight is still needed to understand the relationship between the different SEL competencies and psychosocial health and between the SEL competencies themselves (Domitrovich et al., 2017; Durlak et al., 2011; Gravesteijn, 2010). Such insights could help to ensure that school programs focus on those targets that are vital for achieving the effects they intend and to reduce students' exposure to programs and program targets that are ineffective (Chorpita et al., 2005b; Embry & Biglan, 2008; Rotheram-Borus et al., 2012).

As the current study was limited to SEL programs for secondary school students, future research is necessary to gain insight into the SEL targets addressed in programs for younger students (in elementary schools, for example) and to examine the efficacy of those programs on the SEL competencies they target.

CONCLUSION

Universal school-based programs for secondary school students contribute both to the effective enhancement of SEL competencies addressed in programs' primary learning targets and to psychosocial health. Although most of the programs evaluated in the studies reviewed focused on various SEL competencies, few studies measured effects on all the specific competencies the program claimed to target. The studies also did not fully investigate whether the enhancement of SEL competencies was associated with positive effects on psychosocial health outcomes. The summary effect sizes show that the largest effects at posttest were found for self-awareness and social awareness. Finally, we recommend that future studies should 1. measure the effects of all the SEL competencies addressed in SEL programs' primary targets, 2. further explore the relationships between the SEL competencies enhanced in school programs and 3. evaluate the extent to which the enhancement of SEL competencies contributes to psychosocial health.

Funding

This work was supported by SIA, the Taskforce for Applied Research in the Netherlands, under Grant number PRO-4-43.

Appendix 1 Measures used in studies included in Review Study on Universal SEL programs for Adolescents (additional appendix added to the thesis)

Name of the first author, year of publication	Intervention	Dependent variables (Psychosocial Health Measures, Acronyms)	Proposed links to SEL competencies	SEL Measures in study*				
				SeA	SoA	SM	RS	DM
Botvin et al. (2006).	Life skills training	Verbal aggression (RC)[1] Delinquency (RC)	SM; RS; DM	-	-	-	-	-
Burckhardt et al. (2016).	Strong Minds	Depression (DASS)[2] Anxiety (DASS)[2]	SeA; SM; RS	-	-	-	-	-
Cardemil et al. (2007).	Penn Resilience Program	Depression (CDI)[3]	SeA; SM; RS; DM	-	-	-	-	-
Chaplin et al. (2006).	Penn Resilience Program	Depression (CDI)[3]	SeA; SM; RS; DM			CASQ[4]		
Cheung & Lee (2010).	Character Education		SeA; SM; RS; DM	-	-	-	TSBI[5]	-
Coelho et al. (2015).	Positive Attitude		SeA; SoA; SM; RS; DM	GSES[6]	RC[1]	RC[1]	RC[1]	RC[1]
Espada et al. (2012).	Saluda: Social Skills and Problem Solving	Substance use (SUQ)[7]	SeA; SoA; RS; DM	-	-	-	IPDQ-A[8]	SPSI-R[9]
Espelage et al. (2013).	Second Step: Student Success Through Prevention	Aggression (ATVS)[10]	SeA; SoA; SM; RS	-	-	-	-	-
Frank et al. (2017).	Transformative Life Skills Programme	Depression (CBCL)[11] Aggression (ATVS)[12]	SeA; SM	PANAS-C[13]	-	RSQ[14]-emotion regulation	-	-
Garaigordobil et al. (2009).	Society that Builds Peace	Aggression concepts and prejudices (RC)[1]	SeA; SoA; SM; RS; DM	-	QUSOA[15]	CT[16]	-	RC[1]
Gillham et al. (2007).	Penn Resilience Program	Depression (CDI)[3]	SeA; SM; RS; DM	-	-	-	-	-
Gomes & Marques, (2013).	Promotion of positive experiences	Life Satisfaction (SWLS)[17]	SeA; SM; RS; DM	LOT-R[18]	-	Yes 2.0[19]	Yes 2.0[19]	Yes 2.0[19]

Appendix 1 Continued

Name of the first author, year of publication	Intervention	Dependent variables (Psychosocial Health Measures, Acronyms)	Proposed links to SEL competencies	SEL Measures in study*				
				SeA	SoA	SM	RS	DM
Gravesteijn et al. (2004)	Life skills		SeA; SoA; SM; RS; DM	GSES[20]	SIG-A[21]	RC[1]	SES[22]	-
Griffin et al. (2009).	Building Resiliency and Vocational Excellence	Alcohol Use (RC)[1] Aggression (RC)[1]	SeA; SM; RS; DM	-	-	-	-	-
Gueldner & Merrel, (2011).	Strong Kids	Depression (CDI)[3]	SeA; SoA; SM; RS	-	-	SKSEC[23]	-	-
Hanewinkel & Aßhauer, (2004).	Life skills prevention program training	Tabaco use (STSM)[24]	SM; RS; DM	-	-	-	RC[1]	-
Huang et al. (2012).	Life skills training +	Substance use (RC)[1]	SeA; SoA; SM; RS; DM	Broad measure (RC)[1]				
Kimber et al. (2008).	Social Emotional Training and Resilience Program	Depression (YSR)[25] Aggression (YSR)[25]	SeA; SoA; SM; RS; DM	ITIA[26]		Mastery [27]	SSRS[28]	
Kimber et al. (2009).	Social Emotional Training and Resilience Program	Substance use[29]	SeA; SoA; SM; RS; DM	-	-	-	-	
Kindt et al. (2014).	Op Volle Kracht (PRP)	Depression (CDI)[3]	SeA; SM; RS; DM	-	-	-	-	-
Tak et al. (2016).	Op Volle Kracht (PRP)	Depression (CDI)[3]	SeA; SM; RS; DM	-	-	-	-	-
Koglin et al. (2010).	Job-fit training	Depression (SDQ)[30]	SeA; SoA; SM; RS	-	-	-	-	-
Lemberger et al. (2015).	Student Success Skills Program		SeA; SM; RS	-	CASSA[31]	BRIEF-SR[32]	-	-
Lewis et al. (2013a).	Positive Action Program	Depression (BASC)[33] Anxiety (BASC)[33]	SeA; SM; RS; DM	PANAS-C[12]	-	SECD[34]	-	-
Lewis et al. (2013b).	Positive Action Program	Aggression (AS)[35]	SeA; SM; RS; DM	-	-	-	-	-
Lewis et al. (2016).	Positive Action Program		SeA; SoA; SM; RS; DM	SECD[34]	CEA[36]	SECD[34]	SSPM[37]	EBMO[38]

Appendix 1 Continued

Name of the first author, year of publication	Intervention	Dependent variables (Psychosocial Health Measures, Acronyms)	Proposed links to SEL competencies	SEL Measures in study*				
				SeA	SoA	SM	RS	DM
Merry et al. (2004).	Resourceful Adolescents Program-Kiwi	Depression (BDI-II)[39]	SeA; SoA; SM; RS	-	-	-	-	-
Metz et al. (2013).	Learning to Breath	Anxiety (CBCL)[10]	SeA; SM	ASRES[40]	-	DERS[41]	-	-
Pössel et al. (2011).	Lars und Lisa, Model of Change	Depression (SBB-DES)[42]	SeA; SoA; SM; RS	-	-	RC[1]	-	-
Pössel et al. (2013).	Lars und Lisa	Depression (CDI)[3]	SeA; SoA; SM; RS	-	-	-	-	-
Rivet-Duval et al. (2011).	Resourceful Adolescents Program	Depression (RADS-2)[43]	SeA; SoA; SM; RS	-	-	YCI[44]	-	-
Roberts et al. (2010).	Aussie Optimism Program	Depression (CDI)[3] Anxiety (RCMAS)[45]	SeA; SoA; SM; RS; DM	-	-	-	MESSY[46]	-
Rose et al. (2014).	Resourceful Adolescents Program + Peer Interpersonal Relatedness	Depression (RADS-2)[43]	SeA; SoA; SM; RS	-	-	-	CAIR[47]	-
Sawyer et al. (2010).	Mind Matters	Depression (CES-D)[48]	SeA; SoA; SM; RS; DM	-	-	-	AICQ[49]	CAS-P[50]
Schonert-Reichl & Lawlor, (2010).	Mindfulness education	Aggression (TRSC)[51]	SeA; SoA; SM; RS	PANAS-C[12]	-	RI[52]	-	-
Simons-Morton et al. (2005).	Going Places	Aggression (RC)[1] Substance Use (RC)[1]	SM; RS; DM	-	-	-	-	-
Sullivan et al. (2017).	Second Step + Bullying prevention	Aggression (PBFS)[53]	SoA; SM; DM	-	-	CAMS[54]	-	-
Thompkins et al. (2014).	Violence Prevention Program	Aggression (IPA-P)[55]	SoA; SM; RS	RC[1]	-	-	-	-
Tomyn et al. (2016).	Think Health and Well-being	Depression (SMFQ)[56]	SeA; SoA; SM; RS	-	-	RS[57]	-	-
Wigelsworth et al. (2013).	Social and emotional aspects of learning	Depression (SDQ)[30]	SeA; SoA; SM; RS	-	-	-	-	-

Appendix 1 Continued

*SEL measures: SeA = self-awareness; SoA = social awareness; SM = self-management; RS = relationship skills; DM = responsible decision-making.

[1] RC = Researcher Created Scale

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