

The impact of enhancing students' social and emotional learning: a meta-analysis of school-based universal interventions

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Purpose of the Study

Lack of emotional competencies



Disconnection from school

Given the time constraints in school and the limited resources, what is the most effective approach to address all these concerns?



Research Questions

What are the effects of school-based Social-Emotional Learning (SEL) programming on children's behaviors and academic performance?

- What are the outcomes achieved by interventions to enhance social emotional skills?
- Can interventions promote positive outcomes and prevent future problems?
- Can programs be conducted in school setting with school personnel?
- What are the moderating variables that impact SEL programs?



Literature Review

- General consensus that school-based approaches are effective (1997 -)
- Differ in instructional strategies, student populations, and behavioral outcomes
- As of 2011, no research on the effect of SEL programs on diverse student populations.



Key Terms and Their Definitions

- **Social Emotional Learning** - “Programs that reduce risk factors and foster protective factors for positive adjustment”
- **Competent People in SEL** - Those who have the abilities to “generate and coordinate flexible, adaptive responses to demands and to generate and capitalize on opportunities in the environment” (Waters & Sroufe)
- **Social Emotional Learning Program Goals** - Contain five interrelated sets of competencies: self-awareness, self-management, social awareness, relationship skills, and decision making
- **SEL Educational Strategies** - Instruction in processing, integrating, and applying SE skills in contextually positive manners. Establishing a safe, caring learning environment through peer and family involvement, and whole child community activities.



Hypothesis #1

School-based SEL programs would yield significant positive mean effects in attitude, behaviors, and academics.

Hypothesis #2

Programs conducted by classroom teachers and other school staff would produce significant outcomes.

Hypothesis #3

School-wide implemented programs would yield stronger effects over classroom-wide programs.

Hypothesis #4

Staff using the SAFE (sequenced, active, focused, and explicit goals) programs would be more successful than those that did not.

Hypothesis #5

Programs that encountered problems during implementation would be less successful than those that did not report problems.



Data Collection

- Meta-analysis of prior studies
 - search of published and unpublished studies
 - via computer with 18 specified terms
 - examined reference lists of each search
- Manual search of 11 journals 1970-2007
- Examination of youth development and SEL organization's website and contacted researchers of national and community conferences



Inclusion Criteria

- written in English
- published before 12.1.2007
- developed 1 or more SEL skills
- included students aged 5-18 years of age with no pre-existing issues
- use of a control group
- reported sufficient info (reliable)
- reported info to calculate effect size
- collected follow-up data within 6 months of end of program

Exclusion Criteria

- students with pre-existing behavioral, emotional, academic problems
- outcomes related only to physical health
- small programs in physical education, study hall, or after school programs
- those studies whose participants volunteered



Independent Variables

- **Intervention Format**
 - class by teacher
 - class by non-school personnel
 - multiple component programs (T & P or S)
- **Potential Moderator of Outcome**
 - SAFE (yes or no for each component)
 - Implementation (yes or no for monitored and reported problems)



Dependent Variables

- **Social and emotional skills**
- **Attitudes toward self and others**
- **Positive social behaviors**
- **Conduct problems**
- **Emotional distress**
- **Academic performance**

- **Provided definition of term**
- **How the data was collected**



Social and emotional skills

- *Definition*
 - identifying emotions, goal setting, perspective taking, interpersonal problem solving, conflict resolution, and decision making
- *Data Collection*
 - reports by teachers, parent, or independent rater
 - using interviews, role plays, or questionnaires
 - in test situations, structured tasks, or daily situations



Attitudes toward self and others

- *Definition*
 - self-esteem, self-concept, self-efficacy
 - attitudes toward school & teachers
 - pro-social beliefs about violence, helping others, social justice, and drug use
- *Data Collection*
 - student self-reports
 - combined all three to avoid small sizes



Positive social behaviors

- *Definition*
 - disruptive class behavior, noncompliance, aggression, bullying, school suspensions, and delinquent acts
- *Data Collection*
 - student, teacher, parent report
 - teacher ratings using Elliot & Greshams Social Skills Rating Scale (1988)



Conduct problems

- *Definition*
 - disruptive class behavior, noncompliance, aggression, bullying, school suspensions, and delinquent acts
- *Data Collection*
 - student self-reports, teacher or parent ratings, or independent observers (using Allenbach's Child Behavior Checklist of 1991)
 - some records such as school suspensions



Emotional Distress

- *Definition*
 - anxiety, depression, stress, social withdrawal
- *Data Collection*
 - students, teachers, or parents using measures such as Kitano's 1960 Children's Manifest Anxiety Scale



Academic Performance

- *Definition*
 - standardized reading or math achievement tests, school grades as GPA or overall grades in specific subjects
- *Data Collection*
 - school records data
 - did NOT include teacher developed tests, teacher ratings of academic competence, or IQ measures



Descriptive Data

- 213 school-based, universal SEL programs
- 270,034 students K-12
- 75% published in last 20 years
- 47% had randomized designs; 53% did not
- 43% did not monitor problems; 35% no problems, 22% problems
- 53% student data; 47% teacher or parent data
- 83% SAFE; 17% not SAFE
- 56% Elem; 31% MS; 13% HS
- 1/3 had no SES or race / ethnicity info
- 35% had mixed student race / ethnicity
- 25% had mixed SES status
- 47% urban; 16% suburban; 15 % rural
- 53% teachers; 21% nonschool; 26% multi-component
- Mean # of sessions = 40.8
- 77% < 1 year; 11% = 1-2 years; 12% > 2 years



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#1, 2, 4, & 5 - SUPPORTED
#3 - NOT SUPPORTED

Future Implications

- Separating out social and emotional skills
- Aligning specific interventions with skills
- More research could be done in the high school and in rural areas
- Other potential moderators besides SAFE and implementation
- Educational programs to assist with mental health policy



Reliability

- **Trained research assistants to code data**
 - working in pairs
 - at different time periods
 - on different aspects of coding
 - compared rates on 25%
 - resolved issues through discussion
 - Kappa statistic (inter-rater reliability) $\geq .80$
 - Alpha statistic was $\geq .70$

Validity

- **Cited data to confirm measure's construct, concurrent, or predictive validity**
- **Coded attrition**



Calculating Effect Size

- **Effect Size (ES)**
 - **Magnitude of the effect**
 - **Difference between statistical and practice significance**
- **Used Hedge's g to determine difference between intervention and control groups**
 - **Positive values indicated favorable results of program students over control students**
 - **If data wasn't available and couldn't reach authors, set g conservatively at zero**



Calculating Effect Size

- One ES per study for each outcome category
- Adjusted each ES to account for small sample bias
- Calculated 95% CI intervals around each mean
- Set statistical significance at $\alpha = .05$
- Mean ES was significantly different from zero when its CI did not include zero
- Looked at overlapping CI to determine if mean ES from different groups differed significantly
- Utilized a random effects model for analyses



Measuring Heterogeneity

- Calculated heterogeneity of a group of ESs through Q statistic
 - Reports on presence of absence of homogeneity not the extent or degree
 - If Q was significant = studies were not drawn from a common population
 - If Q was not significant = studies were drawn from a diverse population
- Calculated the I^2 statistic
 - Reflects the degree of heterogeneity among a set of studies along a 0% - 100% scale



Outcomes Results

- μ of 213 interventions = 0.30 (CI = 0.26 – 0.33), which was statistically significant from zero
- Q value of 2,453 groups ($p \leq .001$) was statistically significant indicating that the studies were not drawn from the same population.
- $I^2 = 91\%$ indicating substantial heterogeneity among studies and suggesting the existence of one or more variables that might moderate outcomes.



Table 3
Findings for Moderator Analyses at Post by Outcome Category for Total Sample

		Outcomes					
		Skills	Attitudes	Social behavior	Conduct problems	Emotional distress	Academic performance
Moderators							
Recommended training practices (SAFE)							
Met SAFE criteria	ES	0.69*	0.24*	0.28*	0.24*	0.28*	0.28*
	CI	0.52 to 0.86	0.18 to 0.29	0.18 to 0.38	0.18 to 0.31	0.14 to 0.42	0.17 to 0.38
	N	63	80	73	88	33	24
Did not meet SAFE criteria	ES	0.01	0.16*	0.02	0.16*	0.18	0.26*
	CI	-0.57 to 0.60	0.07 to 0.25	-0.21 to 0.26	0.04 to 0.28	-0.02 to 0.37	0.11 to 0.40
	N	5	26	13	24	16	11
Implementation							
Not mentioned	ES	0.58*	0.17*	0.32*	0.24*	0.21*	0.31*
	CI	0.33 to 0.83	0.09 to 0.24	0.17 to 0.47	0.13 to 0.34	0.04 to 0.38	0.18 to 0.45
	N	29	46	33	35	22	13
No problems	ES	0.86*	0.29 _a *	0.31*	0.27*	0.35*	0.33*
	CI	0.59 to 1.12	0.21 to 0.37	0.17 to 0.45	0.18 to 0.36	0.16 to 0.54	0.20 to 0.46
	N	26	36	34	45	16	13
Implementation problems	ES	0.35	0.19 _a *	0.01	0.15*	0.15	0.14
	CI	-0.01 to 0.71	0.10 to 0.28	-0.18 to 0.19	0.05 to 0.25	-0.08 to 0.38	-0.01 to 0.28
	N	13	24	19	32	11	9

Note. Means with subscript a differ significantly from each other at the .05 level.
* $p \leq .05$.

“The data in Table 4 support the notion that both SAFE and implementation problems moderate SEL outcomes.”



Table 2

Mean Effects and .05 Confidence Intervals at Post for Total Sample and Each Intervention Format

		Outcomes					
		SEL skills	Attitudes	Positive social behavior	Conduct problems	Emotional distress	Academic performance
Group Total sample	ES	0.57*	0.23*	0.24*	0.22*	0.24*	0.27*
	CI	0.48 to 0.67	0.16 to 0.30	0.16 to 0.32	0.16 to 0.29	0.14 to 0.35	0.15 to 0.39
	N	68	106	86	112	49	35
Class by Teacher	ES	0.62*	0.23*	0.26*	0.20*	0.25*	0.34*
	CI	0.41 to 0.82	0.17 to 0.29	0.15 to 0.38	0.12 to 0.29	0.08 to 0.43	0.16 to 0.52
	N	40	59	59	53	20	10
Class by Nonschool Personnel	ES	0.87*	0.14*	0.23	0.17*	0.21	0.12
	CI	0.58 to 1.16	0.02 to 0.25	-0.04 to 0.50	0.02 to 0.33	-0.01 to 0.43	-0.19 to 0.43
	N	21	18	11	16	14	3
Multicomponent	ES	0.12	0.23*	0.19	0.26*	0.27*	0.26*
	CI	-0.35 to 0.60	0.15 to 0.31	-0.02 to 0.39	0.17 to 0.34	0.07 to 0.47	0.16 to 0.36
	N	7	26	16	43	15	22

* $p \leq .05$.

“Results (based on 35–112 interventions depending on the outcome category) indicated that, compared to controls, students demonstrated enhanced SEL skills, attitudes, and positive social behaviors following intervention, and also demonstrated fewer conduct problems and had lower levels of emotional distress. Especially noteworthy from an educational policy perspective, academic performance was significantly improved.”



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	N	63	80	73	88	33	24
Did not meet SAFE criteria	ES	0.01	0.16*	0.02	0.16*	0.18	0.26*
	CI	-0.57 to 0.60	0.07 to 0.25	-0.21 to 0.26	0.04 to 0.28	-0.02 to 0.37	0.11 to 0.40
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Other Analyses

- Discovered a confound in that multi-component programs didn't have all SAFE components and more likely to experience problems which may have resulted in their reduced success.
- Ruled out rival hypotheses - other possible reasons for the results
 - Outcome data from non-students yielded higher effects
 - Students mean age and duration of program were statistically and negatively correlated
- Nested designs increasing likelihood of Type 1 error
- “Trim and Fill Method” to account for publication bias - regarding what academic research is likely to be published to estimate the number of missing studies



Discussion

- “Current findings document that SEL programs yielded significant positive effects on targeted social-emotional competencies and attitudes about self, others, and school. They also enhanced students’ behavioral adjustment in the form of increased prosocial behaviors and reduced conduct and internalizing problems, and improved academic performance on achievement tests and grades.”
- Effects remained statistically significant for a minimum of 6 months after the intervention.
- Largest ES = emotions recognition, stress management, empathy, problem solving, or decision making skills.
- SEL programs are effective at all levels and geographic areas
- 11 percentile gain in academic achievement on standardized tests
- Tie between social emotional factors and academic success
- Cost – benefit analysis of implementing an SEL program



Other Analyses

Table 5
Comparing Current Effect Sizes to Previous Meta-Analytic Findings
for School-Age Populations

Outcomes	Mean posteffects	
	Current review	Other reviews
Skills	0.57	0.40 ^a
Attitudes	0.23	0.09 ^b
Positive social behaviors	0.24	0.39 ^a , 0.37 ^c , 0.15 ^d
Conduct problems	0.22	0.26 ^a , 0.28 ^c , 0.21 ^d , 0.17 ^e , 0.30 ^f
Emotional distress	0.24	0.21 ^b , 0.24 ^c , 0.17 ^g
Academic performance	0.27	0.29 ^b , 0.11 ^d , 0.30 ^f , 0.24 ^h

Note. Results from other meta-analyses are from outcome categories most comparable to those in the current review, and values are drawn from weighted random effects analyses whenever possible.

^aLösel and Beelman (2003). ^bHaney and Durlak (1998). ^cWilson and Lipsey (2007). ^dDuBois et al. (2002). ^eWilson et al. (2001). ^fDurlak and Wells (1997). ^gHorowitz and Garber (2007). ^hHill et al. (2007).

“Table 5 indicated that SEL programs yield results that are similar to or higher than those achieved by other types of universal interventions in each outcome category. In particular, the postmean ES for academic achievement tests (0.27) is comparable to the results of 76 meta-analyses of strictly educational interventions (Hill et al., 2007)”

