School Psychology Quarterly
2018, Vol. 33, No. 1, 147–154

1045-3830/18/$12.00 http://dx.doi.org/10.1037/spq0000232

At What Cost? Examining the Cost Effectiveness of a Universal Social–Emotional Learning Program

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Although implementation of universal social–emotional learning programs is becoming more common in schools, few studies have examined the cost-effectiveness of such programs. As such, the purpose of this article is two fold. First, we provide an overview of cost-effectiveness methods for school-based programs, and second, we share results of a cost-effectiveness analysis (CEA) of a universal social–emotional learning (SEL) program, the Social Skills Improvement System—Classwide Intervention Program (SSIS-CIP; Elliott & Gresham, 2007). Specifically, we compared the cost-effectiveness of SSIS-CIP implementation across first- and second-grade classrooms, and results indicated that second grade is the more cost-effective option for implementing the SSIS-CIP. Several considerations are discussed regarding cost-effectiveness analysis of universal SEL programs as well as the importance of using CEA results to inform programming decisions.

Impact and Implications

In an era of limited resources, schools must be concerned not only with a program's effectiveness but also the costs necessary to obtain those effects. Results from a cost-effectiveness analysis of one universal social-emotional learning (SEL) program, the Social Skills Improvement System—Classwide Intervention Program, show that implementation in second grade was more cost-effective than implementation in first grade. School psychologists, administrators, and policymakers can benefit from using results of cost-effectiveness analyses to optimize available resources for SEL programs in schools.

Keywords: cost-effectiveness, program evaluation, social–emotional learning, SSIS-CIP

Over the past two decades, universal social–emotional learning (SEL) programs have been increasingly implemented by schools to promote students' prosocial behaviors such as social skills. The Social Skills Improvement System—Classwide Intervention Program (SSIS-CIP; Elliott & Gresham, 2007) is a universal program intended to positively impact social skills and reduce problem behavior in the classroom. Results from an efficacy trial of the SSIS-CIP in the primary grades showed positive effects on students' social and learning-related behavior outcomes (DiPerna, Lei, Bellinger, & Cheng, 2015, 2016; DiPerna, Lei, Cheng, Hart, & Bellinger, 2018). Given the SSIS-CIP's emerging evidence base and format that is easy to use without training, school-based practitioners and administrators may be interested in adopting it as a universal SEL program within their schools.

Although effectiveness and ease of implementation are important considerations when selecting and adopting SEL programs, another concern with significant practical implications is cost. In an era of increased demand for accountability and evidence-based practice, resources in schools continue to be strained (Levin & Belfield, 2015). Thus, even if a prevention or intervention program is deemed to be evidence based through a rigorous review such as those completed by What Works Clearinghouse, a program may not be a feasible option if acquisition, training, and implementation costs are high. As White and colleagues (2004) have suggested, schools should be concerned not only with what works, but also with what works at what cost.

Over four decades ago, Levin and colleagues began to encourage the field of education to use cost-effectiveness analysis (CEA) to examine the way finances are used in schools. Yet, research applying CEA in education and psychology continues to be limited (Levin & Belfield, 2015). In an effort to increase awareness about CEA and identify implications for school-based SEL intervention research, the purpose of this article is twofold. First, we provide an overview of methods for conducting CEA with school-based universal programs. Second, we apply these methods to the SSIS-CIP to not only share an example of CEA but also provide potential

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The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through grant R305A090438 and grant R305B090007 to Pennsylvania State University. The opinions expressed are those of the authors and do not represent the views of the institute or the U.S. Department of Education.

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SSIS-CIP adopters with additional information regarding costs relative to outcomes across two primary grades.

Cost Analysis Approaches in Education

Levin and McEwan (2001) identified several methods for comparing initiatives based on their costs; each method has a different goal. A *basic cost analysis* is used to establish the cost of implementing a given initiative. Costs are delineated under different categories, or ingredients. Building on basic cost analysis, CEA uses an estimate of effectiveness (e.g., Cohen's *d*) from a single, short-term outcome (e.g., reading achievement) compared to the cost of implementing the intervention. As a result, outcomes such as decreases in problem behavior or increases in academic achievement are transformed into monetary units and can be compared across studies or interventions. Similarly, a *cost utility analysis* compares costs and effects, but unlike CEA, the effects are weighted according to their perceived importance. Finally, *benefit-cost analysis* attempts to quantify and compare the effectiveness of initiatives, even those having very different goals, in terms of later societal impact (e.g., the impact of a social skills program or teacher salary increases on reducing incarceration rates).

In this article, we provide an example of CEA applied to a universal SEL program. CEA is useful for informing intervention decisions, as it places emphasis on those programs or practices demonstrating effectiveness compared to their costs. The approach allows for informed choices among alternative intervention options with the same goals (e.g., improving social behavior). Historically, CEA has been more widely used within health care, such as comparing cost-effective options for different treatments when limits on health care budgets are prevalent (Weinstein & Stason, 1977). Although less applied in education, CEAs have been used to evaluate instructional initiatives, such as reducing class size or increasing teacher salaries (e.g., Crowley, Jones, Coffman, & Greenberg, 2014; Hollands et al., 2014; Levin, Glass, & Meister, 1987). However, we found no published CEA work pertaining to SEL interventions in the school setting.

Given ongoing debate about the best use of limited education funding, and federal agencies such as the Institute of Education Sciences requiring delineation of costs in their funded intervention projects, CEAs are vital for school-based programs. Specifically, they are relevant for education stakeholders such as school-based administrators, school psychologists, and policymakers charged with making informed decisions about intervention options (Levin & Belfield, 2015). Benefit–cost analysis has been applied to SEL (Belfield et al., 2015), and while establishing the economic value of SEL is vital, longitudinal data take time and resources to collect, and many stakeholders need to make initial programmatic decisions before such data become available. CEA, however, is a relatively simple, feasible, and highly useful technique for program evaluation that does not require longitudinal data.

Phases in Conducting School-Based CEA

CEA involves three phases: first, calculating costs through a cost analysis; second, calculating effects; and third, comparing costs to a metric of intervention effectiveness.[1]

Phase 1: Calculating Costs

A *cost* refers to any resource used to implement an intervention (White et al., 2004). Costs may have a dollar value, such as purchases of tangible supplies, but they also may take the form of *opportunity costs,* or resources used in the intervention that could have potentially been used in another capacity if the intervention was not in place (e.g., teachers' time). Levin and McEwan (2001) discouraged retroactively using a project's budget for the purpose of listing costs of an intervention, as budgets often do not take into account all costs required to achieve the intervention's effects, and thus lead to invalid cost calculations.

The "ingredients method" (Levin & McEwan, 2001) is a commonly used approach to specify costs of an intervention in four categories: (a) personnel, usually making up the majority of costs; (b) facilities; (c) materials and equipment; and (d) other program inputs. The Center for Benefit–Cost Studies of Education (Center for Benefit-Cost Studies of Education [CBCSE], 2017) has created an online tool, *CostOut*, to assist with calculating the costs of commonly used ingredients in educational programs. Market prices, such as salaries for educational personnel, are kept up-to-date within the CostOut database, providing a comprehensive and practical resource for assessing costs. When market prices are not available or applicable (such as for volunteers), shadow prices can be used (Levin & McEwan, 2001). For example, to estimate the shadow cost of a classroom volunteer, one might use the cost for a paraprofessional's hourly wage, or the salary of a professional with comparable experience.

Personnel refers to human resources required to implement an intervention, such as trainers, school staff, consultants, and volunteers. Qualifications and time commitments of intervention personnel must be documented thoroughly to accurately assess the potential cost of replicating the intervention (Levin & McEwan, 2001). *Facilities* refers to the physical space required for implementing an intervention, such as classroom space, lighting, central air, and storage facilities. White et al. (2004), however, suggested only including facility costs for school-based interventions when those costs are incremental, or in addition to, those typically incurred during school day. *Materials and equipment* are tangible items required for program implementation such as program manuals, office supplies, and technological resources. Finally, *other program inputs* represent costs not falling within the other categories, such as professional development activities necessary to ensure fidelity of intervention implementation (Odden, Archibald, Fermanich, & Gallagher, 2002). The average cost across implementation periods can be calculated to more accurately represent the true costs of implementation given costs for the first implementation period (start-up) tend to be higher than subsequent implementation periods (maintenance). Taking the average of these costs better reflects the cost of the SSIS-CIP when delivered across multiple cohorts (i.e., steady state cost) and is recommended best practice for cost-effectiveness analyses (Sanders et al., 2016; Steuerle & Jackson, 2016).

Because assumptions must be made in calculating costs, some uncertainty is present in any estimate of cost effectiveness. Even if

[1] This article provides an overview of CEA. For detailed guidance regarding CEA and other cost-analysis methods in education, readers are encouraged to consult Levin and McEwan (2001).

resources are well documented during a research trial, costs may still vary if a school's implementation of the intervention is different than that of the research trial used to calculate cost effectiveness. Thus, sensitivity analyses are used in CEA to represent an acceptable range of cost estimates. A common approach to sensitivity analyses is providing confidence intervals around estimates (Jain, Grabner, & Onukwugha, 2011).

Phase 2: Calculating Effects

Examining effects is relatively straightforward when data are available from a high-quality efficacy or effectiveness trial of a school-based intervention. Most CEAs feature standardized effect-size metrics that are commonly applied in psychological research, such as Cohen's *d* (see Durlak, 2009, for a review of effect sizes in psychological research). However, Levin and McEwan (2001) suggested that it is not necessary to adhere strictly to this precedent and that other effect-size metrics, such as differences in pre- and posttest scores, can be used.

Phase 3: Examining Cost Effectiveness

After cost and effectiveness values are collected, the values can then be used to create a cost-effectiveness ratio. An incremental cost-effectiveness ratio (ICER) is simply the cost (*C*) of a given program alternative divided by its effectiveness (*E*): ICER = *C*/*E*. The numerator of an ICER shows the difference in costs between treatment options (e.g., intervention program vs. control condition). The denominator of an ICER is the effect size reflecting the difference between the two conditions. The ICER is thus interpreted as the estimated cost to achieve a hypothetical 1-unit change in the outcome. When ICERs are calculated for each alternative, they may be rank ordered, ranging from those with the smallest ICERs (most cost effective) to those with the largest ICERs (least cost effective), representing a common metric to compare alternatives.

Applying CEA to Universal SEL

The SSIS-CIP (Elliott & Gresham, 2007) is an SEL program designed for universal implementation in prekindergarten through eighth grade. The program is intended to help students learn the prosocial skills and learning-related behaviors that teachers identify as critical to classroom success. These goals are achieved through the implementation of a 10-unit structured general education curriculum that includes 30 brief lesson plans (approximately 20 min each), video vignettes, student workbook activities, progress monitoring, and parent communications.

The early elementary version of the SSIS-CIP program is intended for implementation in the primary grades (kindergarten [K] through Grade 2). Although the program demonstrated significant effects on elementary social skills and learning-related behaviors in a randomized control trial (DiPerna et al., 2015, 2016, 2018), practical questions remain regarding the cost of implementation in the primary grades. In addition, the SSIS-CIP materials (lessons, student booklets, video examples) are the same for all primary grades. As such, prospective adopters may be interested in understanding the relative cost effectiveness of delivering SSIS-CIP in different grades in order to optimize implementation. Given no published CEAs of school-based SEL programs to date, the purpose of this study was to provide an example of the application of CEA for school psychology researchers and practitioners and examine the cost effectiveness of the SSIS-CIP in the primary grades.

Method

Data for the current study were drawn from a multiyear efficacy study of the SSIS-CIP (see DiPerna et al., 2015, 2016, 2018, for a full description of the sample, measures, and procedures). First-grade ($N = 60$) and second-grade ($N = 38$) classrooms participated across seven Pennsylvania elementary schools. Two of these elementary schools were located in a rural district, and the remaining five schools were from a small urban district.

Participating classrooms enrolled 20–25 students, and all students were invited to participate in the data collection associated with the efficacy study. Approximately 95% of all first- and second-grade classrooms participated, and 55% of students in each classroom received active parental consent to participate in data collection for the trial (first $N = 696$, second $N = 426$; Table 1). Almost all of the participating teachers (96%) were white, and 87% were female. Most teachers reported significant classroom experience ($M = 16.9$ years of experience, $SD = 8.8$). Teachers in the intervention condition were provided with all curricular materials and, if necessary, technology (i.e., DVD players) prior to program implementation.

Table 1
Student Demographic Characteristics for Initial SSIS-CIP Efficacy Study

Variable	First grade		Second grade	
	Control ($N = 355$)	SSIS ($N = 341$)	Control ($N = 204$)	SSIS ($N = 222$)
Age	6.3 (0.4)	6.3 (0.4)	7.3 (0.4)	7.4 (0.4)
Male	54.9	51.6	44.6	46.5
White	67.9	72.4	79.4	66.7
Special education	7.9	4.4	6.4	11.4
Supplementary services	28.5	27.0	27.0	21.5
Repeating grade (retained at prior year)	2.3	1.5	3.4	6.1

Note. Age is reported in mean (*SD*) years. Percentages are reported for all other variables. SSIS-CIP = Social Skills Improvement System—Classwide Intervention Program.

Although the SSIS-CIP was developed so it could be implemented without formal training, intervention teachers participated in a 4-hr training led by research team members to support implementation fidelity. Within 2 weeks of completing this training, intervention teachers began implementing the SSIS-CIP in their classrooms. Teachers were encouraged to complete one SSIS-CIP unit per week for 10 weeks, though many classrooms required 1–2 additional weeks to complete the program due to scheduled breaks in the district calendar for conferences, professional development, parent conferences, and so forth. Two methods were used to monitor fidelity of implementation of the SSIS-CIP lessons: weekly self-report ratings by implementing teachers and observations of approximately 20% of the lessons by research staff. Implementation fidelity was high across all lessons, units, and implementing classrooms based on summative ratings by both teachers and independent observers (range of 97% to 98% for both grades).

Measures were administered before and after treatment implementation to assess changes in students' classroom behavior. The Social Skills Improvement System Rating Scale—Teacher Form (Gresham & Elliott, 2008) was used to assess participants' behavior in the classroom setting and is the primary source of data for the current study. The Social Skills scale includes 46 items that are rated using a 4-point format ranging from *Never* to *Almost Always.* The Social Skills Scale yields seven subscales (communication, cooperation, assertion, responsibility, empathy, engagement, and self-control) in addition to a total composite. Test–retest stability (r = .65–.82) and internal consistency (α = .85–.97) are adequate for the composite and subscales. The scales also demonstrate adequate criterion, convergent, and discriminant validity (Gresham & Elliott, 2008).

Although the trial evaluated the effectiveness of the SSIS-CIP with respect to several outcome domains (e.g., classroom social behavior, approaches to learning, and academic achievement), in this CEA we focused on student social skills (as measured by the SSIS Teacher Rating Scale composite score) because it was the most proximal outcome domain. After selecting the outcome, cost data from the SSIS-CIP efficacy trial were collected and categorized using the ingredients method (Levin & McEwan, 2001). First, costs were summed and averaged across the two intervention periods (i.e., start-up and maintenance). Start-up refers to the initial implementation of the program; maintenance refers to any subsequent implementation by the same teacher with different classes of students. Start-up and maintenance costs were averaged to provide a more accurate representation of typical implementation costs for a given teacher who may implement the program with multiple cohorts of students over time. Second, effect sizes were calculated for the outcome of interest from the SSIS-CIP efficacy trial. Third, ICERs were calculated by dividing the program cost at both grades by the effect size of the outcome. Finally, sensitivity analyses were conducted to create confidence intervals around ICERs using upper and lower bounds of the confidence intervals around the obtained effect size estimates, accounting for uncertainty in the estimates.

Results

Phase 1: Estimates of Program Cost

We estimated the cost for replicating implementation of the SSIS-CIP from those incurred during the SSIS-CIP efficacy trial. Cost estimates exclude all costs associated with research activities. Training costs are based on average national rather than local estimates drawn from the CostOut database (CBCSE, 2017). Materials and equipment costs are based on 2016 estimates. Table 2 displays the total costs of implementing the SSIS-CIP per class-

Table 2
SSIS-CIP Implementation Costs by Implementation Period

Item	Start-up	Maintenance	Average
Training (4-hr training for 12 teachers)			
Facilitator ($36.44/hr × 4 hr)	$145.76	$0	$72.88
Substitute teachers ($24.88/hr × 4 hr × 12 teachers)	$1,338.00	$0	$669.00
Subtotal	$1,483.76	$0	$741.88
Materials and equipment (12 classes)			
SSIS-CIP early elementary starter kit (Manual + 25 student booklets; $422.80 × 12 classes)	$5,073.60	$0	$2,536.80
Student booklets ($333.00 for 25 booklets × 12 classes)	$0	$3,996.00	$1,998.00
DVD player ($50 × 12 classes)	$600.00	$0	$300.00
Photocopies ($10 × 12 classes)	$120.00	$120.00	$120.00
Subtotal	$5,793.60	$4,116.00	$4,954.80
Total costs			
Costs of training, materials, and equipment	$7,277.36	$4,116.00	$5,696.68
Costs per classroom	$606.45	$343.00	$474.72
Costs per student	$24.26	$13.72	$18.99

Note. Hourly wages for facilitator (school psychologist) and substitute teachers based on the most recent rates available from the *CostOut* database; all other costs represent 2016 dollars. Costs are reported separately to highlight the differences between start-up (initial implementation) and maintenance (subsequent implementations). Per-classroom costs assume 12 teachers in training, and per-student costs assume 25 students in a class. SSIS-CIP = Social Skills Improvement System—Classwide Intervention Program.

room for two periods of implementation (start-up and maintenance). Teachers in the efficacy trial were not paid extra wages for implementing the SSIS-CIP as it was implemented during typical school hours. Thus, although the SSIS-CIP requires a relatively small amount of teacher time for implementation (approximately 10 hr), we chose not to include a cost for teachers' instructional time in the estimate of implementation costs.[2]

Conversely, although the SSIS-CIP is a manualized intervention designed for easy implementation without formal training, participating teachers attended a 4-hr training that occurred during the school day and was facilitated by the research team. As such, we included training as an expense in order to not underestimate the effect it may have demonstrated on fidelity of implementation and observed outcomes. We used the value of a school psychologist's hourly wage to estimate costs for a trainer, given that the implementation of SEL programs is well aligned with school psychologists' professional expertise and represents an ideal opportunity for practitioners to facilitate systems-level change. Cost estimates for a school psychologist trainer and substitute teacher compensation (because training took place during the school day and required class coverage) were calculated using salary index pricing from the CostOut software package using 2013 prices, which were the most up-to-date data available (CBCSE, 2017).

The total cost per student to provide the SSIS-CIP is $24.26 at start-up. For maintenance, the per-student cost decreases to $13.72; and the average cost for implementing the program per student across both periods is $18.99 (see Table 2). For all cost-effectiveness calculations, this average cost ($18.99) was used to accurately reflect program costs across multiple periods of implementation per CEA best-practice recommendations (Sanders et al., 2016; Steuerle & Jackson, 2016).

Phase 2: Estimates of SSIS-CIP Effects

As part of the SSIS-CIP efficacy trial, effect sizes (Hedges' g) were calculated to determine the magnitude of outcomes associated with student exposure to the SSIS-CIP relative to students in a business-as-usual control condition. Hedges' g is a standardized mean difference calculated by dividing the adjusted (by pretest scores and other student- and class-level covariates) group mean difference by the unadjusted within-group student-level standard deviation of the pretest outcome measure, following What Works Clearinghouse guidelines for effect sizes in hierarchical linear models (U.S. Department of Education, 2016). Results from the efficacy trial (DiPerna et al., 2018) indicated that first-grade students in the SSIS-CIP treatment group demonstrated improvement in teacher-rated social skills relative to students in the business-as-usual group (g = 0.18, 95% confidence interval [CI] [0.03, 0.33]). Improvement for second graders (DiPerna et al., 2016) also was positive and larger in magnitude (g = 0.36, 95% CI [0.17, 0.55]). What Works Clearinghouse (2017) guidelines also recommend reporting effects as an "improvement index" representing expected percentile rank improvement for a control group participant had they received the intervention. According to this metric, on average, students in first grade would demonstrate social skills improvements of 7.14 percentile points and 14.06 percentile points in second grade after exposure to the SSIS-CIP.

Phase 3: Analysis of Cost Effectiveness

Table 3 reports effect sizes and ICERs (the cost per student required to obtain a single standardized unit of effectiveness) for social skills in both first and second grades. In order to obtain the cost effectiveness per student, we divided the overall ICER value by 25. This number was used because every student in a class completes their own booklet, and the SSIS-CIP student booklets are sold in packs of 25. For a cost per student of $18.99, a small main effect of teacher-reported social skills (g = 0.18) was demonstrated for first-grade students in the SSIS-CIP condition. The resulting ICER ($105.50, 95% CI [$57.55, $633.00]) can be interpreted as the cost per first-grade student to achieve a hypothetical 1-unit change (i.e., Hedges' g = 1.0) in teacher-rated social skills (see Table 3). It is important to keep in mind that an ICER is a standardized metric intended to facilitate direct comparisons that inform programming decisions across alternative approaches. An ICER value does not indicate that a 1-unit outcome change will be obtained if a school or district increases their investment in a particular program to that amount. In terms of the improvement index, the ICER for first grade, $2.66, represents the cost to improve an average student's social skills by 1 percentile point as measured on the SSIS-TRF (see Table 3).

For a cost per student of $18.99, a larger main effect on teacher-reported social skills (g = 0.36) was demonstrated for second-grade students in the SSIS-CIP condition, and the resulting ICER was $52.75, 95% CI [$34.53, $111.71]. Again, this amount represents the estimated cost per student exposed to the SSIS-CIP in second grade for a hypothetical 1-unit change (Hedges' g = 1.0) in teacher-reported social skills. The second-grade improvement index ICER was $1.35, representing the cost required to yield 1 percentile point increase in an average second-grade student's social skills.

Discussion

Despite increasing interest in evidence-based practices and decreasing educational budgets, CEA has rarely been applied to school-based interventions. In this CEA of a universal, school-based SEL program, results showed that the average cost to implement the SSIS-CIP is about $18.99 per student. Comparing across grades, the overall ICER value for social skills is about half the amount when implemented in second grade compared to first grade, suggesting that implementation of the SSIS-CIP in second grade potentially provides twice the effect relative to first-grade implementation for the same cost. One potential explanation for this finding is that the format, structure, and activities of the SSIS-CIP Early Elementary version are perhaps more developmentally appropriate for older students within the primary grades. Although others (e.g., Jones & Doolittle, 2017) also have noted that there may be important developmental considerations relative to SEL program development and implementation, such developmental hypotheses require further study. Regardless, present findings suggest that choices about timing of SEL program implemen-

[2] Further consideration about instructional time as an incremental cost—especially as it relates to displaced academic instruction for SEL programming—is addressed in the Discussion section.

Table 3
SSIS-CIP Effect Sizes, Cost-Effectiveness Ratios, and Improvement Indexes for Social Skills

Grade	Hedges' *g*	Improvement index (%)	ICER
First	.18		$105.50
Second	.36		$52.75
First		7.14	$2.66
Second		14.06	$1.35

Note. ICER = incremental cost-effectiveness ratio; hypothetical cost per standardized unit change in outcome per student. The average cost per student for the SSIS-CIP ($18.99) was used as the numerator to calculate ICERs. SSIS-CIP = Social Skills Improvement System—Classwide Intervention Program.

tation can have important implications from both educational and economic standpoints.

This information is valuable for school-based decision makers charged with allocating money in schools. Our results suggest that students in schools implementing the SSIS-CIP in second grade could demonstrate twice the increase in social skills relative to students exposed to the SSIS-CIP in first grade, despite the same cost of implementation in both grades. Still, there are limitations concerning ICERs and their practical interpretation. As previously noted, ICERs are a ratio of cost to effect size, representing a hypothetical cost per unit change in the outcome. It is important to stress that simply paying the ICER amount does not result in a 1-*SD* effect size increase in the outcome for two reasons. First, the costs for SSIS-CIP program implementation are fixed according to the cost of materials, personnel, and so forth. Second, there is a ceiling on the effect achievable by implementing any program that has a fixed duration or number of instructional units.

Had CEA studies for other universal SEL programs been available in peer-reviewed outlets, we may have been able to compare ICER results for the SSIS-CIP to those of other programs, allowing a richer interpretation of relative cost effectiveness. Durlak et al.'s (2011) meta-analysis of universal SEL interventions yielded an average effect of 0.24 for positive social behavior, which aligns with our findings in terms of the size of the effect for social skills. Without cost data, though, it is impossible to compare the relative cost effectiveness of the programs in the Durlak et al. meta-analysis to the current findings regarding the SSIS-CIP.

Future Considerations and Lessons Learned

When completing the SSIS-CIP CEA, some issues specific to evaluating universal school-based SEL programs arose, which required careful consideration (see Figure 1). In their benefit–cost analysis of several SEL programs, Belfield et al. (2015) discussed displaced instructional time for teachers as an area for consideration in CEA and noted that it is the burden of the evaluator to prove that time spent on an intervention (universal SEL in the current context) has not detracted from the school's other goal areas. In the current era of high-stakes assessment, schools have understandably focused on improving academic skills as their top priority; and thus, universal SEL interventions may seem less attractive if time spent teaching SEL inhibits academic teaching. In our CEA, we chose to exclude teachers' time implementing the SSIS-CIP from cost estimates, as the cost of implementing the SSIS-CIP was not incremental (additional) to the cost of the school's operations as it would have been for a before- or after-school program.

Similarly, teachers and administrators may be concerned with potential lost instructional opportunity costs for students, resulting from the displacement of academic instruction to provide SEL instruction. These lost-opportunity costs for students are different than costs attributed to teacher time only. For the SSIS-CIP, the efficacy trial showed no significant differences in postintervention academic skills between students in the treatment and control conditions, indicating that the instructional time replaced with SEL-only instruction did not negatively impact academic skills while yielding positive change on SEL outcomes. Specifically, effects in the areas of reading and math were small (and statistically nonsignificant) in both first and second grades (*g*s = <.07; DiPerna et al., 2016, 2018).

Given that universal SEL programs are typically implemented during the school day, lost instructional opportunity costs for students are critical considerations for stakeholders, and intervention intensity (time required of students) can vary significantly across SEL programs. For example, the SSIS-CIP requires about 600–750 min (20–25 min per lesson × 30 lessons), whereas other SEL programs advertise different amounts of time required for implementation (e.g., Promoting Alternative THinking Strategies [PATHS] = 1,080–1,560 min, Kusché & Greenberg, 1994; Second Step = 840–1,140 min, Committee for Children, 1992). Potential adopters are cautioned against comparing ICERs directly across CEA studies without fully understanding all variables involved in the analysis, with careful attention paid to amount of time required of participants. For example, if two studies calculated costs differently (i.e., with and without including instructional time), ICERs would not be directly comparable unless costs were recalculated to adjust for the difference in ingredients included.

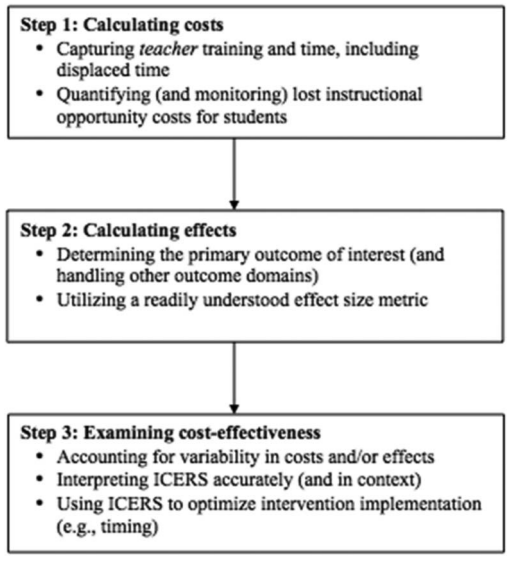

Figure 1. Practical considerations for school-based intervention researchers conducting cost-effectiveness analysis. ICER = incremental cost-effectiveness ratio.

Another significant challenge in evaluating cost effectiveness of universal programs is incorporating multiple program outcomes. As previously mentioned, data for the current study were drawn from a larger multiyear efficacy study of the SSIS-CIP, through which proximal (social behavior), medial (engagement in learning), and distal (academic skills) student outcomes were evaluated. Generally, effects across outcome domains followed the same pattern, and thus the program's cost effectiveness between grade levels would not differ, depending on the outcome we chose. If costs or effects were more variable, though, the cost effectiveness of the program would depend on the domain of most interest to the school.

The Collaborative for Academic, Social, and Emotional Learning's (2016) model of SEL outcomes specifies social and emotional skills as proximal outcomes and academic skills as distal outcomes that are less likely to show growth until other changes have occurred. As noted previously, one of the challenges with CEA of SEL programs is that all outcomes must be examined independently (or weighted equally if ICERs are averaged across domains). Cost utility analysis (Levin & McEwan, 2001), however, has the potential to address this limitation by assigning weights to program outcomes according to their importance to key stakeholders for the program. Unfortunately, there are currently no widely used or established weighting methods for SEL program outcomes. Developing weights or weighting methods for universal SEL programs is a critical direction for future research that may help stakeholders make decisions informed by all program outcomes.

Finally, researchers interested in CEA should be concerned with the transferability of the results, or their applicability across sectors. Levin and colleagues (2015) noted that CEA methodology, in its current form, has not been widely disseminated to key educational stakeholders (i.e., policymakers, administrators, teachers, parents). One suggestion to improve dissemination of CEAs is to utilize metrics that are more readily understood by stakeholders. For example, effect sizes (such as Hedges' *g*) are a common method for demonstrating the magnitude of a program's outcomes within scientific journals, but they may hold little practical meaning for decision makers responsible for allocating resources for interventions within schools (Greenberg & Abenavoli, 2017). Instead, researchers should consider calculating and reporting effects using other metrics such as the improvement index. These adjustments may help researchers communicate the results of CEA more effectively and make more meaningful contributions to programming and policy decisions in K–12 education.

Limitations

There were several limitations to the current study. First, although we followed recommendations for conducting our CEA from what is considered best practice (Levin & McEwan, 2001), our analysis is relatively simple and does not compare the SSIS-CIP to other programs, merely because CEA data (ICERs) for comparison to other programs were unavailable. Second, the trial on which CEA analyses was based provided multiple outcomes, but for the sake of parsimony, we focused on the main outcome, social skills, and added the between–grade levels component in our analysis so that optimization could be examined. Current recommendations are to conduct sensitivity analyses across all calculations to account for any possible variability (Jain et al., 2011). Given that the costs for this trial were fixed across participants and thus did not vary, we chose to provide confidence intervals only for ICERs, not for cost estimates. Finally, as previously mentioned, the effect size metric available from the research trial is utilized primarily for research purposes and may be difficult to translate to school-based administrators or policymakers. For this reason, we have suggested that future CEA studies consider effect sizes that are more practically meaningful (e.g., improvement indexes).

Conclusions

Given both constrained resources and precedence for empirically based interventions in schools, CEA is a potentially useful tool for wading through the waters of effective interventions to find economically valid options to meet schools' needs. While SEL interventions are being adopted at a high rate, research on their cost effectiveness lags behind. This article attempts to disseminate methodological information about CEA and an example CEA using a popular SEL intervention, the SSIS-CIP. It advances the field of school-based SEL interventions with a particular focus on optimizing the developmental level most appropriate for social skills training. While limitations exist, the analysis met its overall goal in describing costs and cost effectiveness for the intervention. Preliminary results suggest that SSIS-CIP implementation in second grade is more cost effective than in first grade. We recommend that researchers carefully consider issues of validity and practical applicability in CEA with the hope that dissemination of CEA for school-based interventions will expand, and in turn, impact the efficiency of school-based SEL interventions.

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Received June 15, 2017
Revision received September 18, 2017
Accepted September 19, 2017 ■