

Cost Analysis for Two Interventions Targeting the Achievement of Low-Income Students: Considering the Costs of an Early Childhood Intervention Alongside an Adolescent Mindset Intervention

Maya Escueta¹ and Tyler W. Watts²

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1. Duke University, Center for Child and Family
Policy (919) 660-6368
maya.escueta@duke.edu
2. Teachers College, Columbia University (212) 678-
3095 tww2108@tc.columbia.edu

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Socioeconomic status continues to be a major driver of inequalities in educational opportunity in the United States (Reardon, 2013). Indeed, measures of educational achievement and attainment remain robust predictors of economic and physiological health during adulthood in correlational research (Carroll et al., 2017; Watts, 2020). The enduring value of educational success, coupled with the alarming inequality in educational opportunity, have led many to call for robust interventions in educational programs that promote child well-being during both early childhood (Heckman, 2006) and adolescence (Patton et al., 2016). However, few studies to date have evaluated whether educational interventions administered during these two critical periods of development can have complementary effects. Moreover, the costs associated with educational interventions are often given short shrift in evaluation work, leaving policy makers with little necessary information to help assess the feasibility of implementing programs at scale, adopting similar programs in other contexts (even at small scale), or assessing whether a program can be sustained on an ongoing basis.

The current paper reports on the costs associated with two interventions tested on the same sample of children growing up in high poverty neighborhoods in Chicago. The first intervention, referred to as the Chicago School Readiness Project (CSRP), was tested during preschool beginning in 2004-2005 (see Raver et al., 2009). This early childhood educational (ECE) intervention attempted to foster the development of self-regulation of children attending high poverty Head Start centers, and it involved an extensive program of services targeted to teachers and children. Approximately ten years later, the same population of children were recruited again as part of a follow-up study. During adolescence, the participants in the original CSRP evaluation were re-randomized to a growth mindset intervention, which attempted to

change students' internalized beliefs about their own educational trajectories (see Gandhi, Watts, Masucci, & Raver, 2020).

The outcomes of both interventions have been extensively reported in other work (for the preschool intervention, see: Raver et al., 2008; 2009; 2011; Watts et al., 2018; for the mindset intervention, see: Gandhi et al., 2020), and work is currently underway to estimate impacts of both programs on end-of-high-school measures of self-regulation and attainment. The current cost analysis was undertaken to address a specific aim of the Institute of Educational Sciences (IES) grant that funded the follow-up work and re-randomization to the mindset intervention (award # R305A190521). As part of this grant-funded work, we sought to estimate the economic costs of the resources required to implement each intervention separately in a school district today to provide education decision-makers, practitioners, and researchers with useful information about the costs associated with implementation.

We elected to generate a cost analysis for today's contexts, rather than a cost-effectiveness or cost-benefit analysis, for several reasons. First, the original intervention was run nearly 20 years ago, and no comprehensive cost analysis was pursued at the time (to our knowledge). This made it nearly impossible to accurately collect costs on the counterfactual condition, which would have been necessary to conduct a robust cost-effectiveness analysis. Further, we lacked reliable measures of key outcomes, like grade retention and special education placement, that would allow us to estimate intervention impacts on educational outcomes that would be necessary for calculating a complete cost-benefit analysis. Thus, we would be forced to rely solely on impacts on cognitive and behavioral outcomes that have no clear cost association, and would require the use of correlational methods to project likely impacts on adult measures of attainment. Finally, given that it is unlikely that either intervention would be implemented in the same way that they were originally implemented for research purposes, we develop a likely

present-day implementation scenario informed by the historical information we collected from original implementation in order to provide more useful cost estimates to decision-makers who may now consider implementing these or similar interventions in current contexts.

Certainly, the results presented in the current analysis are informative as cost estimates that accompany impact estimates on behavioral and cognitive outcomes reported in previous work (e.g., Gandhi et al., 2020; Raver et al., 2011; Watts et al., 2018), and these estimates are informed by implementation details from these impact evaluations. However, because we were interested in projecting the costs of implementing these interventions in generalizable settings today, the estimates presented here do not directly reflect the costs associated with the impacts measured by previous evaluation studies.

In the analyses that follow, we present total cost and average costs per student of these two interventions above and beyond regular everyday classroom activities. We estimate costs from a public perspective including costs incurred by Head Start Centers and school districts (i.e., entities funding/implementing the interventions). Although we expect that there may have also been costs borne by families, we did not have sufficient data on this and therefore did not include them in our analysis. For the purposes of this analysis, we use national prices to allow for comparison to national averages with future cost analyses of similar interventions that also estimate costs using national prices. In the following sections, we briefly detail the important features of both interventions, before presenting our estimates of the projected costs.

Overview of Program Details

CSRP Preschool Intervention

The CSRP intervention was designed to address children's behavioral problems in ECE centers serving high-poverty areas. The intervention model was based on the presupposition that teachers working in ECE settings often lacked the behavioral training necessary to effectively

manage classroom behavioral issues (Raver et al., 2009), and this issue may be especially problematic for under-trained teachers working in areas that serve children from high-poverty communities. Indeed, previous work has shown that children growing up in high-poverty homes and neighborhoods are at high risk for developing behavioral and emotional difficulties during childhood (e.g., Evans & English, 2002), and ratings of early behavioral problems have been shown to correlate with a host of adult outcomes (Moffitt et al., 2011). Thus, the CSRP intervention had the goal of giving teachers specific strategies to encourage better behavioral management in the classroom, while attempting to help teachers manage their own stress, and ultimately improve the quality of children's Head Start experiences as a result.

The CSRP intervention was evaluated in 18 Head Start centers (9 centers randomized to treatment and 9 to control) serving some of the most disadvantaged neighborhoods in Chicago, Illinois. Two classrooms from each site participated in the study, and children ($n = 602$) and teachers ($n = 90$) from these classrooms were recruited for study participation. The evaluation was implemented with a cohort design, with the first cohort of sites participating in 2004-2005, and the second participating in 2005-2006. Over the course of the intervention, the treatment sites served approximately 300 children total across 18 classes (2 classrooms per center in 9 centers) with approximately 48 teachers.

The intervention itself has been described at length in previous reports (see Raver et al., 2009; 2011). Here, we describe the key components that we used to guide our cost analysis. First, the intervention involved Mental Health Consultants (MHCs), who acted as the liaisons between the intervention developers and the teachers and children in the Head Start Sites. The MHCs held master's degrees in social work, and they received 2 days of training, as well as clinical and administrative supervision during the intervention. These MHCs were involved in

almost all aspects of implementing the intervention, as they worked with teachers and children throughout the preschool year.

Each teacher participating in the intervention was offered 30 hours of professional development centered on the Incredible Years Teaching Program (see Webster-Stratton et al., 2004). This program is designed to help teachers apply “behavioral principles” to “reducing children’s challenging behaviors” (Raver et al., 2009). These professional development sessions were spread across 5 Saturdays between October and January, and the sessions were led by an experienced teacher trainer, who was also a licensed clinical social worker. The MHCs also attended these sessions, which helped them learn the techniques teachers were trained to implement during the school year. These sessions included on-site childcare for teachers, and teachers were originally paid \$15 per hour for attending the Saturday sessions (i.e., a comparable rate to the hourly pay for preschool teachers excluding benefits).

During the school year, MHCs made weekly visits to the intervention classrooms. While in the classrooms, MHCs were directed to provide “coaching” to help extend the behavioral management principles learned during the professional development (PD) sessions. These specific coaching steps involved “establishing shared goals with teachers, observing teacher-child interactions, sharing and discussing feedback, engaging in collaborative problem solving, and supporting the use of specific techniques” (Raver et al., 2009). The MHCs also held one-day stress reduction workshops for teachers at each Head Start site, and these workshops were further reinforced by regular discussion between MHCs and teachers about stress reduction strategies that could be employed during class.

Finally, during the latter part of the school year, MHCs provided direct services to children who had been identified as having particularly difficult behavioral and emotional problems. These direct services involved approximately 3 to 4 children per class, and children

were given the opportunity to participate in individual or group sessions with the MHCs.

As with most large-scale educational intervention projects, the intervention involved a project coordinator who oversaw the operations of the intervention across the participating Head Start sites. The project coordinator served in an organizational capacity, and also regularly interfaced with teachers to encourage them to attend the PD sessions. A licensed clinical social worker checked in with the MHCs every two weeks during the intervention, and the entire project was overseen by a Developmental Psychologist who held a Ph.D.

For the following cost analysis, we focused on several key resources required to implement the CSRP preschool intervention. First, we estimated costs for paying MHCs to visit classrooms for teacher coaching, and we estimated the costs of MHCs attending the behavioral training and conducting the stress reduction workshops. We also included costs for the licensed clinical social worker who trained the MHCs and ran the behavioral trainings for teachers, and we factored in the time of the classroom teachers to attend the training sessions. We also considered the costs associated with additional administrative support roles: a project coordinator to oversee implementation of the program at the various sites; a clinical supervisor to provide additional support to MHCs and teachers; and an administrative supervisor to oversee all activities. Training materials, equipment and facilities were also included, as well as other costs, such as incentives for teachers to attend and complete trainings. These incentives included on-site childcare and catered lunches during the behavioral trainings, and a \$1500 incentive per teacher for completing the program. These incentives were important for ensuring teacher buy-in and fidelity of implementation, and thus were included in the costs. However, these incentives may take a different form, and therefore cost, if the program were to be implemented more regularly in a preschool context.

Mindset Interventions

“Light touch” mindset interventions have received considerable attention in recent years, largely due to their apparent benefits coupled with their relatively low cost (see Dweck & Yeager, 2019). These interventions attempt to help students change the way they see their own educational pursuits, targeting their beliefs about intelligence and one’s capacity to grow intellectually through persistent effort (Yeager et al., 2019).

The two mindset interventions considered in our project were adapted from publicly available materials that were posted online at the time of our study (<http://www.perts.net>), and these modules had been shown to be effective at supporting academic achievement in previous work (see Paunesku et al., 2015). In our evaluation (described in detail in Gandhi et al., 2020), the mindset intervention modules were presented on laptop computers during follow-up assessments conducted approximately 11 and 12 years after the original preschool intervention for “cohort 1,” and approximately 10 and 11 years after original intervention for “cohort 2.” Thus, the re-randomization to the mindset intervention happened concurrently with follow-up assessments collected for the original preschool intervention. These two follow-up interventions occurred approximately 1 year apart, with the first re-randomization utilizing the Purpose for Learning module, while the second included the Growth Mindset module (both described further below).

Upon beginning the follow-up assessment, students were linked back to their original Head Start site, and re-randomized *within* their Head Start site to ensure complete randomization across original treatment conditions. The intervention was designed to be administered on laptops in quiet areas of student’s schools, though approximately 1/3 of the students participating could not be easily located in school and the intervention was instead administered in their homes (or other quiet areas of the student’s choice). Both mindset interventions involved only one session

that lasted approximately 20 to 40 minutes, and assessors sat with students during the intervention to ensure that they had no difficulty interacting with the module and to provide technological support. For students who could not complete the assessment in the presence of an assessor, the assessor was available over the phone. The modules had optional audio recordings for students with reading or visual difficulties.

The first intervention module, called Purpose for Learning, broadly attempted to change how students understand the purpose behind their educational pursuits. The intervention asked students to write about issues in their community they might want to solve, and they then read about how some students work hard in school because they want to “make a positive impact on the world” or “be a good example to other people” (Gandhi et al., 2020). Finally, students wrote about their educational goals, and they were asked to think about how applying effort in school could help them achieve these goals.

The second intervention module, administered one year later and called “Growth Mindset,” was adapted from Yeager, Romero et al. (2016). For this module, students were first asked to think about issues in the world that “matter to them personally” (Gandhi et al., 2020). They then read about the “learning mindset,” which explained how one’s cognitive ability can change through effort applied to learning new skills and knowledge. Finally, students wrote about how they might use a learning mindset in their classes and they answered an open-ended question about self-improvement (Gandhi et al., 2020).

As with the preschool intervention, these interventions were also implemented with the assistance of a project coordinator, who oversaw the administration of the follow-up assessments (for the preschool intervention) and included mindset interventions. The assessors also received training in study procedures, though much of this training involved issues involving follow-up

assessments that did not directly relate to the intervention modules. Finally, IT support was necessary to program the intervention modules as part of the follow-up assessment.

For the purposes of the following cost analysis, we made several assumptions that diverged from the procedures used in the actual evaluation. Because the intervention implementation was coupled with the follow-up assessments for the preschool program, the intervention evaluated by Gandhi et al. (2020) was sometimes implemented outside of the school setting alongside other research activities (i.e., for students who could not be assessed or located in their schools). For the current analysis, we estimated the costs of implementing these two interventions in a school setting overseen by teachers. We also assumed both modules were implemented during the same school year, which better aligns with other work on mindset interventions (e.g., Yaeger et al., 2019), and we believed this implementation pattern would be more informative for education decision-makers who may consider implementing similar interventions in their school context.

Under this scenario, we estimate costs of the two mindset interventions implemented as supplemental programs to ongoing school-based activities, each conducted as one-time interventions for approximately 30 minutes during the school day. We assume a population of 1200 ninth graders across two high schools in a medium-sized school district in the Chicago area. We assumed that all math teachers in the district (approximately 9 teachers who teach 5 math sections each) for this population of students were trained to implement the interventions in their classroom. We also assumed that an IT consultant would be utilized to set up the program software on laptops for the students, and to conduct a 1-day training with the teachers. In our model, a project coordinator is utilized to help with the training and oversee implementation across high schools. We assumed that laptops and other equipment would already be available in

classrooms and would be utilized during the time the interventions are implemented (i.e., on the day of the intervention for a given student in a given school).

The primary ingredients required to implement these interventions are the personnel (teachers, IT consultant, and project coordinator), training time and materials, and the technological materials and equipment used during implementation.

Data and Methods

This cost analysis, conducted by researchers from Teachers College, Columbia University, estimates the costs of replicating the CSRP preschool intervention and the two light touch mindset interventions (Purpose for Learning and Growth Mindset) if they were to be implemented by a school district in the Chicago area today. This analysis focuses on estimating the total costs of each intervention (compared to business-as-usual classroom activities in either Head Start centers or high schools) and the average costs per student. Consequently, this study will provide an understanding of the resources required to implement each program should an education decision-maker become interested in implementing either of these interventions in their school district.

This cost analysis is meant to provide education practitioners and decision-makers with two key insights about these interventions. First, it provides a careful account of the resources required to implement each intervention with fidelity based on historical data collected during impact evaluations already conducted on each of these interventions (e.g., Gandhi et al., 2020; Raver et al., 2009). Second, this cost analysis provides useful information to education practitioners and decisionmakers who might consider implementing such interventions in their own context in the present day. To provide this information, we used the data obtained on the resources required to implement each intervention at the time of each evaluation and made reasonable assumptions about the resources required to implement each intervention in a present

day “non-study” implementation. To value these resources, we then used national prices expressed in 2018 dollars, the closest year to present day that avoids possible disruption in prices from the COVID-19 pandemic.

Research Questions

The primary research questions addressed in this cost analysis are:

1. What are the total costs required to implement the CSRP preschool intervention for 300 students? What are the average costs per student to implement this intervention?
2. What are the total costs required to implement the Purpose for Learning and Growth Mindset interventions together for a ninth-grade population of 1200 students in a medium size school district in the Chicago area? What are the average costs per student to implement these interventions?

Measuring Costs in Education: The Ingredients Method

A cost analysis of this nature involves identifying and accounting for all of the resources required to implement activities to produce intended outputs, regardless of how they are budgeted or financed (Levin, McEwan, Belfield, Bowden, Shand, 2018). In this study, we refer to the costs of a program as the value of the resources that are required to implement and/ or replicate an intervention or program.

To estimate costs, we use the ingredients method, a cost accounting approach first developed by Henry Levin (Levin, 1975, 1983; Levin et al, 2018). This method has been widely used across various fields including economics and accounting, and aims to allow for comparison across programs and interventions by basing estimates on the economic principles of opportunity cost (Levin et al, 2018). The ingredients method of cost analysis involves identifying all of the resources, or ingredients, that are required and used to implement the program being evaluated. Under the ingredients method framework, ingredients or resources that are required and used to

implement each program are identified and valued according to their market prices or equivalents. Once the ingredients were identified, we established each ingredient's economic costs using market prices to establish the true economic value of each ingredient as the economic opportunity cost.

Data Sources

The costs estimated here are intended to reflect the total cost of implementing each program, above and beyond the resources already being utilized in a standard classroom setting in each context ("business as usual"). It should be noted that the evaluation of the CSRP preschool program placed Teacher's Aides in the control classrooms in order to estimate the impact of the MHCs above and beyond placing an additional resource in the classroom (see explanation in Raver et al., 2009). Here, we do not calculate the incremental cost of the MHCs above and beyond this additional resource, and we instead focus on estimating the total cost of the CSRP preschool intervention.

Identifying Ingredients and Quantities

Information on ingredients was obtained from existing project documents, including email communication with key personnel on time and costs required for various components of the intervention, planning documents with inventory and agendas for materials and training, and project budgets. When details on ingredients and quantities were missing, we interviewed project staff who oversaw implementation of the interventions, including the principal investigator and research coordinator who oversaw original implementation of the preschool intervention, and the administrative support and IT consultant for the mindset interventions. These staff remembered details of the implementation well, and when there were questions, referred to detailed documentation from additional sources of resources utilized. The implementation of the CSRP preschool intervention and the follow-up implementation of the two light touch mindset

interventions was overseen by researchers conducting the impact evaluations of each program, and these research teams kept detailed project documents and budget forms that recorded information about the resources required to implement the interventions. When details about quantities or ingredients were unclear in the project documents, we interviewed project staff to determine basic information such as time spent by a particular role on an activity or the nature of the role and qualifications required to assess how best to price the ingredient.

Initial training for the MHCs for CSRP and for the teachers for the mindset interventions were also included in the cost estimates. These costs are primarily composed of the time required for personnel to attend and/or provide the training, and any facilities and equipment used during training, including manuals and other training materials.

Prices

We utilized national average prices in 2018 US dollars for both the CSRP preschool intervention and the mindset interventions as the closest approximation to prices were this intervention to be implemented today (we did not use 2019 and 2020 prices due to variation in prices during the COVID-19 pandemic that do not reflect common/ usual circumstances).

A majority of the national prices used in this analysis were obtained from the E\$imator Database of Educational Resource prices available through the cost tool E\$imator (Hollands et al., 2015-22). Some prices were also obtained from original project budgets for consultant fees and other costs that were taken to reflect national prices where appropriate (see, for example, prices for the CSRP trainer or the CSRP Clinical supervisor). Where appropriate, fringe benefits were added for the full-time personnel (such as preschool teachers and school administrators). All prices were inflation-adjusted to 2018 using a CPI inflation calculator.¹

¹ https://www.bls.gov/data/inflation_calculator.htm

Facilities and equipment costs were amortized to reflect the lifetime value of each resource to provide annualized measures. The prices were estimated using construction costs amortized over 30 years for facilities and 5 years for laptops and other technology equipment, using a 3.5% interest rate.

Estimation of Total Costs and Average Cost Per Student

After collecting the quantity and price data for each ingredient, cost estimates were produced by multiplying each corresponding pair of quantity and price, totaling estimates within all categories and across all categories. The average cost per student was calculated by aggregating total costs across categories and dividing by the total number of students served in each intervention.

Results

Table 1 presents the total cost of the CSRP preschool intervention (assumed to be implemented for 300 students across 9 centers with 18 classes and 48 teachers), and the average cost per student. This table also includes information about how costs were distributed across the main categories of ingredients: personnel, training, facilities, materials and equipment, and other (which includes ingredients such as teacher incentives to participate and complete trainings and travel). All costs are in 2018 US dollars and rounded to the nearest \$10.

Table 1
Total and average costs of Chicago School Readiness Project Preschool Intervention

Ingredients Category	Total Cost		Cost per Student	
Personnel	\$	291,520	\$	980
Facilities	\$	1,800	\$	10
Materials and Equipment	\$	4,630	\$	20
Other	\$	107,530	\$	350
TOTAL	\$	405,480	\$	1,360

Notes: Total costs estimated for 300 students across 9 sites and 18 classrooms. Dollars are reported in 2018 US\$ and rounded to the nearest \$10. Costs shown are total costs and average costs per student.

The total cost of the Chicago School Readiness Project, serving 300 children, is \$405,480 per academic year. On average the cost per student is \$1,360. With 9 sites and 18 classrooms, this amounts to approximately \$45,050 per site and \$22,530 per classroom.

As Table 1 reflects, we also show the distribution of costs across the categories of ingredients. As is the case typically in education interventions programming, most of the costs to deliver the program are in the personnel category which includes training time. Additionally, approximately 27% of the costs are in the “Other” category, which includes important components to ensure teacher buy-in and participation, such as the incentives for teachers to attend and complete the behavioral and stress reduction trainings, and travel. Together, these two categories constitute 98.5% of the costs of the intervention.

Table 2 presents the total costs of the two light-touch mindset interventions, Purpose for Learning and Growth Mindset. This table also includes information about how costs were distributed across the main categories of ingredients: personnel, training, and materials and equipment. All costs are in 2018 US dollars and rounded to the nearest \$10 dollars.

Table 2
Total and average costs of Purpose for Learning and Growth Mindset

Ingredients Category	Total Cost		Cost per Student	
Personnel	\$	31,590	\$	30
Facilities	\$	90	\$	<1
Other	\$	410	\$	<1
Materials and Equipment	\$	9,310	\$	10
TOTAL	\$	41,400	\$	40

Notes: Dollars are reported in 2018 US\$ and rounded to the nearest \$10. Costs shown are total costs and average costs per student for 1200 high school students across two high schools. Costs were estimated assuming both light touch interventions were implemented in the same year, but the interventions could also be implemented over two consecutive school years.

The total cost of implementing the two 30-minute light touch mindset interventions for 1200 students in a medium sized school district in the Chicago area is \$41,400. On average, the cost per student is \$40.

As with the preschool intervention, we also show the distribution of costs across categories of ingredients. For these interventions, personnel costs are 76% of total costs (in line with the standard proportion for educational interventions, which is typically 70%-80% of total costs according to Levin, 1975), and materials and equipment are about 20% of total costs. For more detailed descriptions of ingredients by category, see Appendix A and Appendix B.

Discussion

This cost analysis examines the resources required to provide the CSRP preschool intervention (see Raver et al., 2009; Watts et al., 2018) and two light-touch mindset interventions (Gandhi et al., 2020) if these interventions were implemented in a school district in the Chicago area today. It contributes to the literature on behavioral interventions for economically disadvantaged populations by providing a prospective analysis of the resources required to implement two separate types of behavioral interventions at different stages of development, a

classroom-based multi-component intervention meant to reduce behavioral problems for preschoolers, and two light touch, technology based mindset interventions meant to improve academic and psychological outcomes for high school students. Not surprisingly, we found that the preschool intervention, which was much more intensive and ambitious in its goals, was over 30 times more expensive to implement per student than the light-tough Mindset interventions (i.e., \$1360 per student versus \$40 per student).

The initial impact evaluations of CSRP preschool intervention found meaningful impacts of the classroom-based intervention in reducing children's internalizing and externalizing behavior problems in pre-school (Raver et al, 2009), and other work also found that the intervention boosted key cognitive skills known to support school readiness (Raver et al., 2011). Follow-up work has found some evidence that the preschool intervention may have produced long-lasting effects on cognitive skills (Watts et al., 2018), though work on end-of-high school outcomes has found less evidence for sustained impacts (Watts et al., in progress).

Somewhat surprisingly, the impact evaluation of the two light touch mindset interventions did not find meaningful effects on behavioral outcomes for students in high school (Gandhi, Watts, Masucci, & Raver, 2020), though other recent large-scale evaluations of similar programs have found modest positive effects on student achievement (Yaeger et al., 2019). While this cost analysis indicates that the interventions are relatively low-cost to implement in a school/ classroom setting, the lack of efficacy shown in the CSRP sample should be considered if pursuing further implementation of mindset interventions.

It should be noted that the CSRP preschool intervention has also been implemented in other contexts, and its costs and impact have been evaluated in these contexts as well (Morris et al., 2013). MDRC conducted an evaluation of the Foundations of Learning intervention (an attempt to replicate key components of the CSRP preschool intervention) implemented in sites in

Newark, NJ and Chicago, and also conducted a cost analysis to accompany the impacts measured. Their analysis found impacts on some student outcomes, and an average cost of \$1750/ student in 2010 dollars (with some variation across sites). When inflation adjusted to 2018 prices, this is approximately \$2020 per student. These estimates are comparable to our findings; however, some differences in costs may be due to two issues. First, training and clinical consultation costs as implemented in the MDRC evaluation were higher than they were when implemented in the CSRP intervention. For example, the clinical consultations in the MDRC evaluation, which included the cost of training the MHCs and all of the support services provided to teachers and students in the classroom were approximately \$1300 per student in 2010 dollars, whereas our analysis included these same resources at less than \$500 per student in 2018 dollars. Second, we used national prices wherever possible for many of the personnel, rather than local prices or inflation adjusted prices from the original budget. For example, we used the national price for a social worker to reflect the price of the MHCs (the costs per student for MHCs in the MDRC analysis was \$646, but only \$430 in our analysis). While the MDRC study does not report the price used to estimate costs of the MHCs, they do report total costs of MHCs in their Chicago site (which they note is higher than the Newark site because of higher prices in the Chicago area). The MDRC study also noted the different classroom sizes in Newark and Chicago as a reason for similar per student costs in Newark and Chicago in their study (Morris et al., 2013), which may also produce differences in costs per student in our study if teacher-student and MHC-student ratios were higher when implemented in the CSRP.

These differences in costs per student may also reflect potential savings in implementation that may occur if replicating the CSRP preschool intervention in a manner that is more fully integrated into a preschool setting (as suggested by Morris et al., 2010), rather than added on top of existing infrastructures, including training, development and use of facilities. For

example, our costs for facilities were also lower than in the MDRC study, likely because we estimated construction costs of using already existing facilities in a pre-school setting (i.e., using a cafeteria or medium sized classroom for trainings and workshops rather than paying a high external rental fee for these activities).

Conclusion

Given previous literature on the importance of early childhood interventions, identifying the costs and impacts of behavioral interventions can be important for informing decision making around program design and implementation. Although the mindset interventions were found to have null effects, and therefore would not likely be implemented in a similar fashion by school districts today, enumerating the resources and associated costs may help decision-makers aiming to improve program design of similar interventions by better understanding cost implications. Similarly, enumerating the costs associated with the preschool intervention, especially in comparison with the MDRC evaluation, may help decision-makers think through the merits of implementing a similar intervention in a manner that is more fully integrated into the preschool setting.

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APPENDIX

Appendix A. Detailed Ingredients and Costs for Chicago School Readiness Project

Ingredients by Category	Total Cost	Cost per Student
<i>Personnel</i>	\$ 291,520	\$ 980
Teacher training in behavior management	\$ 71,540	\$ 240
Stress reduction workshops	\$ 2,120	\$ 10
Mental Health Coordinators	\$ 127,730	\$ 430
Support Staff	\$ 81,380	\$ 270
Training	\$ 8,750	\$ 30
<i>Facilities</i>	\$ 1,800	\$ 10
Stress reduction workshops	\$ 970	\$ < 10
Teacher training in behavior management	\$ 440	\$ < 10
Training	\$ 390	\$ < 10
<i>Materials and Equipment</i>	\$ 4,630	\$ 20
Incredible Years Book	\$ 1,530	\$ 10
Training Materials for Teachers	\$ 310	\$ < 10
Canvas totes	\$ 110	\$ < 1
Logo	\$ 2,650	\$ 10
Training Materials for MHCs	\$ 30	\$ < 1
<i>Other</i>	\$ 107,530	\$ 350
Catered lunches	\$ 3,970	\$ 10
Childcare	\$ 3,970	\$ 10
Teacher completion incentives	\$ 95,310	\$ 320
Teacher travel	\$ 4,280	\$ 10
TOTAL	\$ 405,480	\$ 1,360

Notes: Total costs estimated for 300 students across 9 sites and 18 classrooms. Dollars are reported in 2018 US\$ and rounded to the nearest \$10. Costs shown are total costs and average costs per student.

Appendix B. Detailed Ingredients and Costs for Purpose for Learning and Growth Mindset

Ingredients by Category	Total Cost	Cost per Student
<i>Personnel</i>	\$ 31,590	\$ 30
Teachers	\$ 2,910	\$ <10
Teacher - training	\$ 4,650	\$ <10
IT Consultant	\$ 620	\$ <1
Trainers - training	\$ 1,650	\$ <10
Support Staff	\$ 21,760	\$ 20
<i>Facilities</i>	\$ 90	\$ <1
Training Facilities	\$ 90	\$ <1
<i>Other</i>	\$ 410	\$ <1
Catering	\$ 160	\$ <1
Travel	\$ 250	\$ <1
<i>Materials and Equipment</i>	\$ 9,310	\$ 10
Laptops	\$ 120	\$ <1
Headphones	\$ <10	\$ <1
Laptop Sleeves	\$ <10	\$ <1
Laptop Chargers	\$ 10	\$ <1
Extension chords	\$ <10	\$ <1
Antibacterial wipes	\$ 60	\$ <1
Mouse	\$ <10	\$ <1
Internet Access	\$ <1	\$ <1
Adobe Flash Licenses	\$ 9,090	\$ 10
Training materials	\$ 20	\$ <1
TOTAL	\$ 41,400	\$ 40

Notes: Dollars are reported in 2018 US\$ and rounded to the nearest \$10. Costs shown are total costs and average costs per student for 1200 high school students across 2 high schools. Costs were estimated assuming both light touch interventions were implemented in the same year, but the interventions could also be implemented over two consecutive school years.