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Refining and Expanding the Effective Use of 4S: An Evidence-Based Program to Increase Adolescents' Ability to Self-Manage their School Success

Absolute Priorities

This project addresses **Absolute Priority 1—Moderate Evidence**—by refining and expanding the use of practices identified as having strong evidence of impact on student staying in school outcomes in the IES Practice Guide *Preventing Dropout in Secondary Schools* (see Evidence Form). Specifically, its third recommendation calls on schools to “**engage students by offering curricula and programs that connect schoolwork with college and career success and that improve students’ capacity to manage challenges in and out of school**” (Rumberger et al., 2017, p. 3). This project seeks to organize these practices into a Skills for Secondary School Success (4S) course that better prepares 8th graders to navigate the often perilous transition from the middle school to high school and increases students’ capacity to self-manage their school and life success. As such, the project also addresses **Absolute Priority 3—Field-Initiated Innovations —Fostering Knowledge and Promoting the Development of Skills That Prepare Students To Be Informed, Thoughtful, and Productive Individuals and Citizens** – by validating through a rigorous efficacy study the impact of the 4S course on 8th graders’ social-emotional skills and mindsets identified in existing literature (Aspen Institute, 2019) as most closely associated with students’ ability to self-manage their school success (Claro & Loeb, 2019) and the academic outcomes most predictive of success in high school and beyond, attendance and course grades (GPA) (e.g., Allensworth, 2013; Neild et al., 2008). We will do this in schools serving different populations of historically underserved students in different locales throughout three states. In addition, through a second efficacy study focused on identifying effective but lower cost means of providing teachers the professional development

and support needed for successful implementation and expert-like use of the intervention, we aim to address identified barriers to wide scale use.

A. Significance. This project addresses the critical national issue of improving the likelihood of college- and career-ready high school graduation for historically underserved youth, given the importance of a high school diploma and post-secondary schooling or training for adult success (Orfield, 2004). Although graduation rates have risen substantially over the past couple of decades, from 74% in 2003 (where rates had plateaued since 1975) to 85% in 2017 (Princiotta, 2019), rates remain much lower for historically underserved students (those who are Black, Hispanic, low income, recipients of special education services, or homeless) (Atwell, et al., 2019). Raising school success rates for historically underserved students is a national priority.

Research has shown that the student success in high school courses needed for high school graduation and college enrollment is linked to behaviors like regular attendance (e.g., Allensworth, 2013; Mac Iver & Messel, 2013) and non-cognitive skills associated with self-management (Claro & Loeb, 2019) like self-regulation, goal-directed behavior, and personal responsibility (e.g., Farrington et al., 2012). Similarly, workplace success relies on these skills as well as social awareness and relationship skills (e.g., Belfield et al., 2015; Heckman et al., 2006; Lindqvist & Vestman, 2011). Multiple studies have identified the critical importance of student performance in ninth grade for later high school outcomes, as well as significant declines in student academic success between 8th and 9th grade (e.g., Allensworth & Easton, 2007; Mac Iver & Messel, 2013; Neild et al., 2008). This suggests the need for better approaches in eighth grade to help prepare students for the challenges of the high school environment where students typically have more independence and personal responsibility and receive less teacher support (e.g., Allensworth et al., 2014). Moreover, recent research has shown that two important

dimensions of social and emotional learning – self-management and self-efficacy – tend to decline during middle school (West et al., 2020), and so it is particularly important to bolster these orientations before students get to high school.

There is growing evidence that providing interventions that build students’ social and emotional learning (SEL) and other non-cognitive skills results in positive growth not only in behavior and attitudes, but also in academic performance (Balfanz & Byrnes, 2020; Farrington et al., 2012; Farrington et al., in press; Yeager & Walton, 2011; Yeager et al., 2019). The recent Aspen Commission on Social, Emotional, and Academic Development has made the case for an integrated approach to student development in which social-emotional and cognitive development are intertwined to propel student success in school and out (Aspen Institute, 2019; Immordino-Yang et al., 2018). The WWC practice guide, *Preventing Dropout in Secondary Schools*, characterized the evidence as “strong” (e.g., Dynarski et al., 1998; Heller et al., 2013; Johnson et al., 2014) for its recommendation that schools “**engage students by offering curricula and programs that connect schoolwork with college and career success and that improve students’ capacity to manage challenges in and out of school**” (Rumberger et al., 2017, p. 3).

While the WWC Practice Guide encourages providing more students with such curricula and learning experiences, there is a dearth of existing curricula for middle grade students with strong evidence of impact on social emotional development and academic outcomes. Although meta-analyses have included more than 200 school-based SEL interventions (e.g., Durlak et al., 2011), with more than 80 studies of follow-up outcomes (Taylor et al., 2017), the majority of studies were conducted among elementary students and few included outcome measures of academic performance. More than 50 classroom SEL programs serving students in grades 8-12

have been reviewed by CASEL (CASEL, 2015), and RAND (Grant et al., 2017). Most of the evidence for these programs is based on small samples of students and schools or on studies that were not conducted with an RCT design. There are only four SEL programs identified in the RAND report as serving grades 7-12 with positive effects on academic outcomes (including attendance) and only two of them (Building Assets-Reducing Risks and Positive Action) have also met WWC standards.¹ Building Assets-Reducing Risk is primarily a 9th grade intervention and requires substantial shifts in school practice (Bos et al., 2019). The evidence of impact for Positive Action is for students in grades 1-5 (Grant et al., 2017). Finally, while there is a growing number of social-psychological mindset interventions with rigorous evidence of positive impact (e.g., Williams et al., 2020; Yeager & Bundick, 2009) and, in the case of growth mindsets, evidence of academic impacts from a scalable intervention tested in a rigorous, national study (Yeager et al., 2019), these social-psychological efforts target just one particular mindset or skill rather than developing the full integrated set of social-emotional orientations and skills needed to make a game-changing impact on academic success (Balfanz & Byrnes, 2020).

Thus, there is both a *clear area of need – better preparing 8th graders for the transition to high school by enhancing their social emotional development* (particularly in the domains of self-management, goal setting, problem solving, belonging, interpersonal skills, and perseverance) – and a *lack of evidence-based curricular interventions for middle grades students that meet this need comprehensively, in a manner that can be widely implemented by schools*, particularly those schools that serve high concentrations of high-needs students. In short, *classroom curricula that integrate multiple high impact SEL skills together and in so doing improve 8th grade students’ ability to better self-manage their school success are needed.*

¹ The other programs, Student Success Skills, and Mindfulness/Yoga interventions, have been studied in RCTs with small samples and not yet successfully completed WWC review.

To make a difference on a wide scale, these curricula – and the teacher training and implementation supports that accompany them – need to be designed to work within existing school structures and to not require large and sustained investment of school resources nor heroic amounts of teacher time and effort. This project aims to contribute to the knowledge base of how to address this important goal by refining, working to remove barriers to scale, and validating the impact among diverse groups of students in varied locales of an 8th grade *Skills for Secondary School Success (4S)* course designed to increase adolescents’ ability to self-manage their school success and leave 8th grade on-track to high school graduation.

B. Quality of Project Design. Like the interventions in the research evidence cited by the WWC Practice Guide, our proposed project intervention involves a supplementary “Skills for Secondary School Success” course for 8th graders. It contains 40 instructional days of classroom learning activities designed for a 45-60 minute period to be given over the course of nine weeks (scheduled as one of several electives offered in different quarters of the year). The 4S course links the learning activities to career exploration and success in high school to provide a meaningful context and motivation for the course (Yeager, 2017). Its learning activities are designed to follow the conceptual model developed by Chicago Consortium for School Research (CCSR) (Farrington et al., 2012, p. 12) based on an extensive literature review of the relationship between social-emotional and school success skills and students’ academic outcomes. Their model (see Appendix I.1) specifies that academic mindsets, social skills, academic perseverance, and learning strategies all have independent impacts on the academic behaviors that drive academic performance. The learning activities will also incorporate and integrate together social-psychological mindsets with recent evidence of positive impact on success in 9th grade, including growth mindset (Yeager et al., 2016), social belonging (Williams et al., 2020), and purpose in

learning (Yeager, 2017). Thus, the 4S course learning activities aim to build students' self-management skills and their relationship and collaboration skills (particularly in conflict avoidance and resolution), as well as their academic mindsets, perceptions, and approaches to learning (e.g., goal setting, productive persistence, growth mindset, learning science-based study skills).

The 40 learning activities will be culled from a three-year middle grades advisory curriculum already created by the research and development team (see Appendix I.2), with selection guided by existing research literature and the CCSR conceptual model described above to create the highest-impact set of lessons possible. The proposed intervention aligns with practices outlined in supporting evidence cited by the WWC Practice Guide, including integration into the school day and intensity of dosage equivalent to a nine-week quarter (Johnson et al., 2014), building of academic and SEL skills (Dynarski et al., 1998), and development of self-regulation and relationship skills (Heller et al., 2013; Heller et al., 2015). It is also congruent with important SEL program characteristics emphasized by Osher et al. (2016): developmentally appropriate, culturally relevant, and evidence-based. The intervention focuses on grade 8 because of the need to better prepare students to transition successfully to and through ninth grade (Allensworth & Easton, 2007), as well as the finding that as adolescents reach high school age program-based interventions may be less effective (Yeager, 2017).

B.1. Clearly Specified and Measurable Goals, Objectives, and Outcomes. The primary outcome of the proposed project is refinement and validation across diverse student populations and locales of a scalable 8th grade curricular/instructional intervention with related professional development supports for teachers, honed for cost-effectiveness. The project will provide middle grade schools serving high-needs populations with an implementable and sustainable means of

developing key social-emotional and school success skills in students, leading to improvements in attendance and course grades. Existing evidence indicates this will better prepare 8th graders to self-manage their school success during the critical 9th grade year and beyond. This project outcome is to be achieved through the realization of four inter-connected goals, each with their own objectives and outcomes (see Table 1 below).

Goal 1 is the refinement and establishment of an evidence-based, quarter long, 8th grade Skills for Success in Secondary School course. The 40 school days of learning activities for this course will be drawn from those created for a three-year advisory *Mastering the Middle Grades (MMG)* curriculum designed to develop social emotional and study skills, developed by the JHU research and development team as part of the Talent Development Middle School reform model. The activities were based upon the same research findings and studies that provided the strong evidence base for the WWC Dropout Prevention practice guide recommendation and organized along the lines of the CCSR conceptual model as detailed above. As detailed in section C below, the MMG curricular intervention, while evidence-based, did not scale because under accountability pressures to raise test scores, high-needs middle schools came to view MMG (and advisory programs in which most core faculty are assigned to teach an advisory section) as too demanding of school and teacher time in light of this competing need. They were also deterred by the constant need to train multiple new teachers in MMG due to high rates of teacher turnover in middle schools serving high-needs populations. Thus, in line with the findings from other efforts to alter adolescent behavior, in which shorter versions of interventions had larger impacts and fewer barriers that prevented widespread use (Yeager, 2017), we aim to compress the intervention from a three-year advisory curriculum into a single quarter elective replacement course. We will select lessons that current research indicates are likely to have the highest

impact, while dramatically reducing the amount of time, resources, and teacher training that schools need to invest to successfully implement the course.

To accomplish Goal 1 we have three objectives. First, we will assemble the 40 days of learning activities for the course as described above to create a 9-week, 45-60 minute a day Skills for Secondary School Success course, including a teacher guide and student materials. All materials will be produced in a digital format to facilitate online or blended learning when it is needed or desired. Second, during the evaluations and pilot studies detailed in Goals 2-4, through surveys, logs, focus groups and interviews we will collect feedback from teachers and students on the 4S course materials regarding ease of use, clarity, perceived relevance, and engagement. In total, this will involve gathering feedback to further refine the course materials over a four-year period from at least 80 middle schools in diverse settings (urban, suburban, and rural) and 150 teachers, serving an estimated total of 8000 grade 8 students. Third, based on teacher and student feedback described above, the 4S course materials will be revised, refined, and prepared for wide-spread dissemination during years 3 to 5 of the project. Establishing the impact of the 4S course on student outcomes will be achieved through Goal 2.

Goal 2 is the execution by an external evaluator of a randomized control trial efficacy study of the impact of the 4S course, involving approximately 1000 students of diverse ethnicities from 10 different schools from diverse contexts (rural, urban, suburban) in three states. Through this study we will determine for which students and in which locales the course has the greatest impact. The evaluation will examine the extent of implementation, the impact of the course on students' social-emotional development, and the impact of the course and any gains in social-emotional development on students' attendance and grades, as well as on an overarching "on-track to high school success" measure.

Table 1. Goals, Objectives, and Outcomes

Goals	Objectives	Outcomes
GOAL 1 – Refine and prepare for widespread use a Skills for Secondary School Success Course designed to increase 8 th graders’ SEL skills and improve academic outcomes (attendance and grades), better preparing them to self-manage their school success in 9 th grade and beyond	1.1 Revise existing advisory curriculum to leverage highest impact activities in a shorter, more scalable intervention, a quarter long 8 th grade Skills for Secondary School Success Course	Measure 1.1. Completed course materials (40 days of learning activities), including teacher guide and class/student materials for dissemination in digital format and use in RCT Goal 2
	1.2 Collect teacher and student feedback on course materials and learning activities after RCT Goal 2, PD Pilot Study Goal 3, and Efficacy and Cost Effectiveness Test of Alternative PD model, Goal 4	Measure 1.2. Teacher logs/interviews/focus groups and student survey findings provide end user perspective on ease of use, clarity, engagement of the course materials.
	1.3 Revise course materials based on teacher and student feedback from RCT Goal 2 and Professional Development Pilot Study Goal 3	Measure 1.3. Revised course materials (40 days of learning activities) ready for widespread use
GOAL 2 – Conduct RCT to measure impact of intervention on student outcomes.	2.1 Recruit 10 middle grade schools with diverse student populations in diverse regions of three states as location for randomization at student level	Measure 2.1 Signed MOUs will be successfully obtained from at least 10 eligible middle schools during Y1 and Y2.
	2.2 Establish school and district data agreements	Measure 2.2 Signed data agreements will be successfully obtained from at least 10 eligible middle schools during Y1 and Y2.
	2.3 Randomly assign students at each school to treatment and control groups (n=1000)	Measure 2.3.1 Baseline data will be collected from the 10 participating schools. Measure 2.3.2 Students will be randomly assigned to treatment and control groups and Measure 2.3.3 Analyses will verify baseline equivalence of treatment and control groups of students.
	2.4 Collect and analyze data on fidelity of implementation	Measure 2.4 One implementation fidelity report will be completed for each year of the program, for a total of 2 reports.
	2.5 Collect and analyze data on SEL outcomes	Measure 2.5 Pre and post DESSA assessments will be collected and analyzed on study students, using WWC recommended procedures to measure treatment impact on SEL outcomes.

	2.6 Collect and analyze data on academic outcomes	Measure 2.6 Analyses of pre and post administrative student data from at least 800 students will be conducted using WWC recommended procedures to measure treatment impact on academic outcomes.
	2.7 Collect and analyze cost data	Measure 2.7 Per-pupil cost analysis using data collected from schools, as well as cost effectiveness analysis for treatment effects will be written by the end of the Year 3.
	2.8 Complete final report	Measure 2.8 A final RCT Impact Report will be submitted and disseminated after peer review by invited panel of scholars.
GOAL 3 – Develop and pilot alternative means to provide teacher professional development to reduce costs and support large scale dissemination	3.1 Produce PD materials and tools for: 1) micro-credentialing, 2) distance learning using medical model (ECHO), and 3) peer coaching with learning communities	Measure 3.1.1 One complete set of PD materials in digital/online format for the micro-credentialing. Measure 3.1.2 One complete set of PD materials in digital/online format for the distance learning. Measure 3.1.3 One complete set of PD materials in digital/online format for the peer coaching with learning communities.
	3.2 Test PD modalities in 10 or more middle schools-30 or more teachers (Y3)	Measure 3.2 Successful implementation of the PD modalities in each of the 10 additional schools.
	3.3 Collect and analyze data on implementation of PD and course	Measure 3.3 One report of implementation of PD modalities and course implementation will be written by the end of year 4.
GOAL 4 – Test alternative professional development models while scaling intervention to 60 schools to establish costs and benefits of different PD modalities under typical conditions	4.1 Recruit a national sample of 60 middle schools	Measure 4.1 Signed MOU from 60 additional middle schools
	4.2 Implement course and randomly assigned alternative forms of PD in 60 middle schools in Y4	Measure 4.2.1 Baseline data will be collected from the 60 additional middle schools. Measure 4.2.2 Analyses will verify baseline equivalence of treatment and control schools Measure 4.2.3 Implementation completed at 60 schools as evidenced by teacher logs.
	4.3 Collect and analyze implementation data and student SEL data from all schools	Measure 4.3 A report on the impact of PD Modality on 4S Implementation and Students' Social-Emotional Learning will be completed by the end of year 5.
	4.4 Compare implementation levels and implementation costs for alternative forms of PD	Measure 4.4.1 A cost analysis report on alternative forms of PD will be completed by the end of year 5. Measure 4.4.2 The team will submit at least one conference proposal, one manuscript submission to a journal, and the team will present findings in at least one webinar.

Details on the objectives and outcomes of the external evaluation can be found in Section E. Teachers participating in the evaluation will receive two days of training and two in-classroom coaching visits from the R and D team's implementation support partner, Talent Development Secondary (see Appendix C for letter of support). This will help ensure that teachers receive sufficient training and support to be able to achieve moderate to high implementation of the course, and also establish a baseline of PD effectiveness and cost, to which we can compare the alternative means of professional development being developed and piloted in Goal 3 and tested in Goal 4.

Goal 3 of this project is to assemble and pilot test alternative means of providing teacher professional development (PD) and implementation support for the 4S course, which may remove barriers to scaling. In section C (below) we present details on how the time and costs involved in an instructional coaching approach to professional development in schools with significant amounts of teacher turnover were identified as a barrier to scale. Thus, our first objective under Goal 3 is to assemble materials and tools for alternative PD delivery methods aimed at making the professional development and supports teachers need to successfully implement the 4S course more cost-effective and sustainable. In order to find a PD approach that is effective, affordable, and sustainable by schools under typical conditions, it is necessary to test several approaches. We will assemble three with which the R and D team has prior experience in other projects. The first approach is a web-based course through which a teacher can earn a micro-credential based on demonstrating their understanding of the content and purpose of the course, effective instructional delivery methods, and video evidence of their successful application. Micro-credentials are becoming an increasingly popular means of PD and provide teachers with a self-initiated, personally controlled, and tailored means of competency-based PD

(Berry, 2017). The second approach is a video-based, synchronous (live) distance-learning module derived from the Project ECHO medical model (Komaromy et al., 2016). This approach enables wide-scale, guided collective learning, by combining expert advice with case-based problems of practice identified by participants in an organized course of study delivered through video technology that enables a single trainer to continually interact with teachers from as many as 30 schools, reducing costs considerably (Arora et al., 2016). The third approach involves local learning communities engaging together within an asynchronous online learning or video platform supporting lesson study and peer coaching. It provides an element of in-classroom instructional coaching delivered by peers and allows local teams of teachers to set their own training schedule, while at the same time enabling the local learning community to interact with an expert-developed body of implementation knowledge (Liljengren et. al., 2017). A plausible case for obtaining strong implementation while reducing professional development cost can be made for each of these approaches, as none involve the personal costs of instructional coaching or the travel/meeting costs of bringing teachers to a central location for training. But we need to establish if this is true for the 4S course, or if the approaches work better or worse in different settings. Thus, our objectives for this goal are to: 1) develop these PD modalities during the second year of the project, and 2) pilot test them in 10 different schools (not included in the externally conducted RCT impact study) during Year 3 of the project. We will collect and analyze implementation data on the alternative PD models and course delivery for pilot study schools, and based on those results will: 3) further refine the PD modalities and select which ones have promising enough initial evidence to be rigorously tested in Goal 4.

Goal 4 is to scale the 4S course to 60 middle grade schools across the nation, and formally test through an RCT the efficacy and establish the cost-effectiveness of the different professional

development modalities in producing high implementation. We will also explore impacts of the different PD modalities on students' self-reported SEL outcomes post-intervention. This will let us examine the trade-offs in impact versus cost for these different professional development approaches, compared to the more established and costly instructional coaching approach. To accomplish this goal our objectives are: 1) recruit 60 diverse middle schools from diverse settings and multiple regions of the U.S.; 2) randomly assign schools to implement different PD modalities and the same grade 8 4S course; 3) collect and analyze implementation fidelity and pre- and post-course student SEL data in all 60 schools; and 4) prepare a cost analysis report comparing implementation levels, implementation costs, and students' self-reported exploratory SEL outcomes for varied forms of PD employed in the project to support effective implementation of the 4S course.

B.2. How Project Design Will Meet the Needs of Target Population.

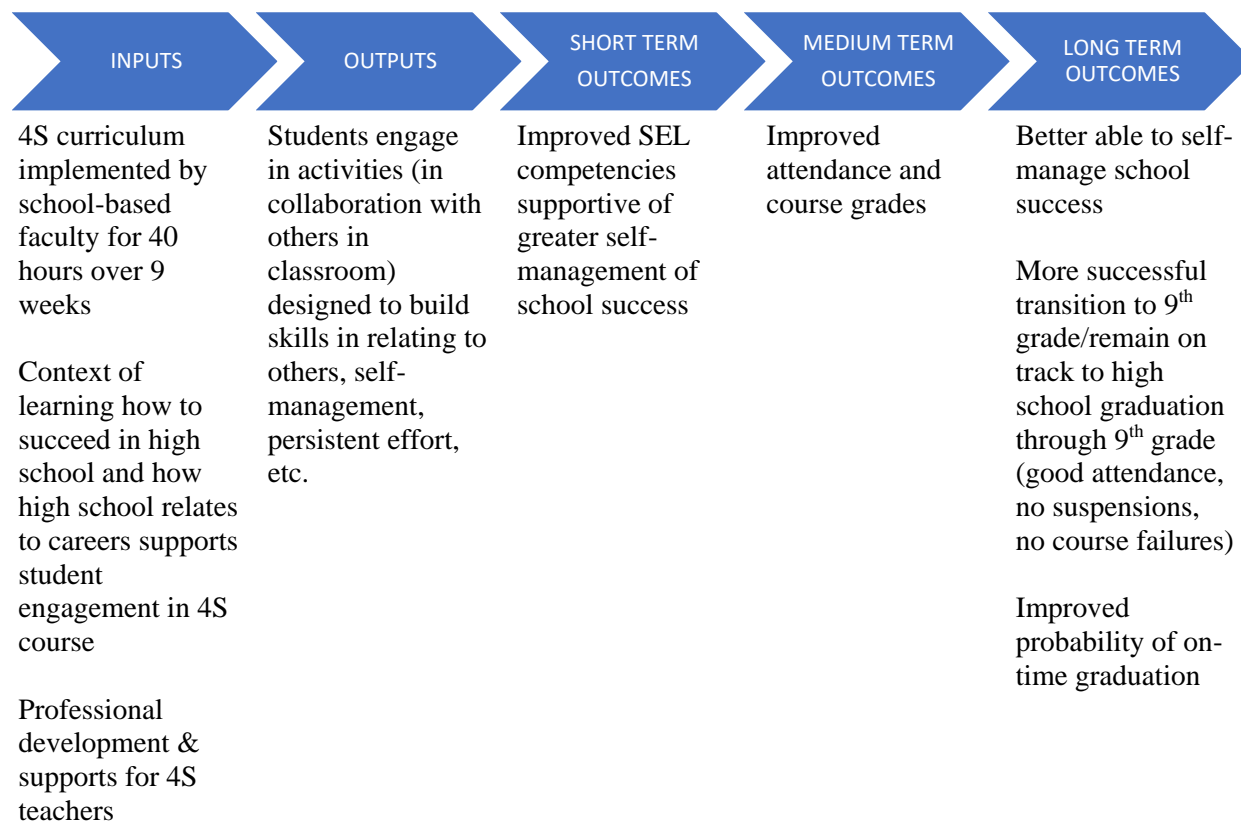
In Section A we outlined the need to develop 8th graders' capacity to self-manage their school success, to prepare them to successfully navigate the transition to high school. We also described the set of social-emotional and school success skills and mindsets our intervention aims to develop. Social-psychological research has shown that educational experiences that shift mindsets can have long lasting effects, so that impacts achieved in grade 8 will carry forward to future school years. Yeager et. al (2016) state:

...psychological interventions can initiate lasting improvements in student achievement... by addressing students' subjective construals of themselves and school—how students view their abilities, their experiences in school, their relationships with peers and teachers, and their learning tasks ... Such subjective construals—and interventions or teacher practices that affect them—can affect behavior over time because they can become self-confirming... By changing initial construals and behaviors, psychological interventions can set in motion recursive processes that alter students' achievement into the future (p. 2.)

The logic model in Figure 1 summarizes how the intervention is expected to influence the outcomes of our target population (grade 8 students in schools with a large concentration of

students from low-income homes, including schools in urban, rural, small city or suburban settings with different racial/ethnic student populations).

Figure 1. Theory of Action: How Curricular Intervention Improves Student Outcomes



Participation in the course activities is expected to build SEL skills as well as career awareness and understanding of the relevance of academic learning to future life goals. Because the course focuses on learning how to succeed in high school and how schooling relates to careers, we predict adolescents will view it as more authentic and engaging than a class formally focused on developing social-emotional skills (Yeager, 2017). Thus, course participation is expected to result in improvement in the SEL skills of self-awareness, self-management, social awareness, relationship skills, goal-directed behavior, personal responsibility, decision making, and optimistic thinking. Based on previous research cited in Section A above, we expect this increase

in SEL skills to be associated with improved academic outcomes in attendance and course grades, which are themselves predictive of a successful transition to and through the ninth grade and ultimately high school graduation outcomes. Prior research also indicates that the largest gains may be achieved by students who have lower grades and attendance prior to the intervention, and by students with lower initial levels of social-emotional development (Balfanz & Byrnes, 2020). This in turn suggests that the intervention should be more impactful in schools with greater percentages of high-needs students (e.g. low income, students with disabilities etc.).

B.3. How Proposed Activities Constitute a Coherent, Sustained Program of R & D.

The core work of our research and development center, the Center for Social Organization of School (CSOS) at Johns Hopkins University, is providing educators with evidence-based and practice-validated tools, strategies, approaches, and curricula they can effectively use to improve student outcomes in schools that serve high poverty populations. One fundamental challenge of this work, which we aim to help address in the current project, is how schools that serve high needs populations can find the time, capacity, and resources to implement the comprehensive improvements that evidence suggests are required. It is necessary to develop effective interventions that have high returns for amount of capacity required to implement them. Our proposed activities speak directly to that need. We will conduct a series of linked development and evaluation activities designed to improve middle grade students' social emotional and school success skills – and through them their attendance and course grades – in a shorter concentrated intervention, with the involvement of a smaller number of teachers and more cost-effective means of professional development and coaching.

Our proposed activities also represent a coherent sustained program of research and development within the SEL field. The Aspen Institute (2019) calls for research and

development that build upon and seek to further strengthen the integration of social, emotional, and academic development. We seek to advance this by establishing the impact of a curricular intervention – that develops a selected set of key SEL skills and mindsets – on school outcomes (attendance, grades, and on-track rates) during the transition from the middle grades to high school. As noted earlier in Section A, much of the prior SEL research has focused on the impact of either *individual* social-psychological mindsets (i.e., growth mindset and social belonging – usually at the high school or college level) or *comprehensive* social emotional development programs focused on a broad range of student outcomes and elementary students. Both of these leave the *middle ground* and middle grades less explored. Our proposed activities will address that gap, examining how a selected set of SEL skills and mindsets, developed in the authentic context of preparing for success in high school, can improve academic outcomes for 8th graders.

B.4. How Proposed Project Will Increase Efficiency. As detailed in the barriers to scale section C.1, the proposed project is focused on taking an existing evidence-based intervention – a three-year middle grades advisory curriculum – and re-constructing it into a quarter-long course while also establishing more cost-effective means of delivering effective professional development and support for the course. This will increase efficiency in the use of time, staff, money and other resources as it transforms an evidence-based approach that previously took three years and could involve up to 10 teachers per middle school into a similar approach that takes one-third the time, and could involve one-tenth the number of teachers, while potentially using a more efficient and lower-cost means of professional development. Moreover, we aim to further improve the results of the course and increase its productivity by focusing on the sub-set of social emotional and school success activities that research indicates will have the greatest impact on academic outcomes and school success.

C.1. Strategies to Address Barriers to Scale. Over the past 25 years, our R and D team has been working to develop, validate, and disseminate interventions, strategies, and tools to build the capacity of educators to substantially improve the outcomes of middle and high schools that serve high poverty populations. One specific example of this is the whole child advisory curriculum called *Mastering the Middle Grades (MMG)*, which provides the foundational material for the intervention to be refined in this project. *MMG* arose from a need expressed by high poverty middle grades schools that were implementing our center’s Talent Development Middle School (TDMS) whole school improvement model. To complement the TDMS focus on teaching and learning in core subjects and school-wide climate improvements, TDMS schools expressed interest in an advisory-based curriculum that would help develop students’ non-cognitive skills. TDMS schools also voiced the need for an organized set of teacher and student materials that would enable a degree of consistency across advisory periods and over time.

A multi-year research and development effort resulted in the *Mastering the Middle Grades (MMG)* advisory curriculum for grades 6-8, designed to build students’ social skills, study skills, and SEL skills over time, while also exposing them to college and career readiness experiences (see Appendix I.2 for three-year scope and sequence). The *MMG* materials built upon and were shaped by the same evidence base that supports recommendation 3 of the WWC *Dropout Prevention Practice Guide* and the Chicago Consortium conceptual model of how social emotional skills impact academic outcomes. During its development phase, TDMS facilitators who worked with schools to implement the *MMG* materials reported they were well-received by teachers who used them and schools were happy with the outcomes witnessed. But significant numbers of other schools found it difficult to implement and sustain the use of *MMG*,

even as they valued and saw the need for the skills and outlooks it developed. The reported challenges to scaling and sustaining the *MMG* curriculum were three-fold.

Barrier 1. School leaders believed a three-year advisory SEL skill development curriculum with 45 minutes of activities per week over the entire school year represented too large a commitment of school time, resources, and faculty given competing needs.

Barrier 2. Implementing schools' sense of time and resource scarcity was intensified by the fact most middle schools serving high poverty populations faced short term accountability pressures and metrics which, through 2017, seldom if ever included student SEL outcomes. Nor, until very recently, was there strong evidence that improvements in SEL skills among adolescents could be linked to academic improvements.

Barrier 3. Many schools found the continued training needs for using the *MMG* materials daunting. This challenge was heightened by high rates of teacher turnover in schools that serve high poverty populations. Many schools believed a permanent PD infrastructure built around instructional coaching was necessary to do *MMG* well. This further increased the sense that its time and dollar costs were too high, compared to the desired but difficult to quantify outcomes it could produce.

In this project we aim to develop, refine, and validate several strategies to address these identified barriers to widespread, multi-state scale.

Strategy 1 is to repackage the *MMG* materials and transform it from a three-year, once a week advisory curriculum to a quarter-long *Skills for Secondary School Success* course that can be delivered by one to two teachers in a single grade, rather than up to 10 across three grades.

Strategy 2 - As part of the re-packaging we will select the set of lessons and experiences from the three-year curriculum that have been shown in current research to have the greatest

impact on student academic outcomes. This will increase schools' ability to make the case that there is a good ratio of academic return to the time and resources invested.

Strategy 3 - We will build into the new version of the instructional materials validated pre- and post-tests of social emotional skills (that were not available when the curriculum was initially developed), which will enable schools to have quantifiable student outcomes.

Strategy 4 - We will test and validate alternative and cost-effective means of teacher PD, which could provide schools with a more affordable means to maintain the course through inevitable teacher turnover and also support district-wide scale up.

C.2. Mechanisms to Support Wide-Scale Dissemination. The Center for Social Organization of Schools (CSOS) at the Johns Hopkins University School of Education has a more than 50-year track record of impactful research, development, and dissemination work. Multiple research and development efforts led by the PI and Co-PIs have been widely disseminated, resulting in further development and replication. These include: 1) Early Warning and Intervention Systems to increase high school graduation rates (involving multiple district and SEA partnerships to help scale them); 2) the Diplomas Now whole school improvement model (funded by i3 and multiple private funders over a ten-year period); and 3) partnerships with school districts and states, through the National Student Attendance, Engagement, and Success Center, to spread Center learnings and approaches on reducing chronic absenteeism.

Existing CSOS mechanisms, many developed through the efforts described above, will be used to widely disseminate findings and materials from the project to support further development and replication. These include distributing the findings and materials through our existing networks, including a secondary school redesign network (<https://www.hsredesign.org/>) working with six states (NY, OH, MA, LA, MS, NM), and the Pathways to Adult Success

network (<http://www.pathwaystoadultsuccess.org/>) focused on the transition from middle grades to high school and then high school to post-secondary, which involves over 150 school districts, state departments of education, and non-profits and schools working to better support students through these transitions. In addition, the Everyone Graduates Center website (primary dissemination vehicle for CSOS) and on-going webinar series have a wide following and will be used to showcase our findings. We have existing in-house communications, social media, and graphics teams who will help us spread learnings from the project and build support for additional development and replication through webinars, podcasts, and media outreach, as well as the more traditional means of conference presentations and journal articles. Our prior and on-going research, development and dissemination efforts have also enabled us to build a web of relationships among school districts, state departments of education, and funders (prior and on-going work has been funded by the Gates, Arnold, Ford, Schusterman, and Mott Foundations among others) which we will activate to support and enable the replication of this project. Lastly, the PI is currently engaged in an inter-connected set of activities within the SEL field, including serving as a Distinguished Scientist on the Aspen Social, Emotional and Academic Development Commission, which will enable further spread of the project's findings.

D. Adequacy of Resources and Quality of the Management Plan

D.1. Capacity to Bring the Project to Scale. The JHU research team has extensive experience in leading and successfully completing other projects of similar scale over the past 15 years (see CVs in Appendix B), including recruiting more than 200 different schools for randomized control trials and dozens of other schools for other studies. All the investigators have been PIs or co-PIs on multiple IES and i3-funded studies, including RCT studies of Diplomas Now, a 9th grade early warning system study, and a high school mathematics curriculum (see Appendix I.3

for full list of studies of similar scope, and D.4 below for specific responsibilities). Many of these previous projects included program development, implementation support, and teacher training components, as well as multiple forms of qualitative and quantitative data collection and analysis across multiple school sites, districts, and locales. We have successfully worked with third-party evaluators and raised required matching funds on multiple projects. We also have experience in conducting cost-effectiveness analyses (see Mac Iver et al., 2019). The Alabama State Department of Education has agreed to help recruit schools from diverse regions of the state for the study (see letter of support in Appendix C) and we have a long track record of successfully recruiting schools from multiple states and districts for RCTs. Currently, there is widespread interest among school leaders in finding effective SEL interventions that build school success (Atwell & Bridgeland, 2019), and this is likely to further heighten by the impact of Covid-19 and its aftermath.

The independent evaluation will be led by a well-experienced team from SRI International, including a principal researcher who served as Project Director and Co-Principal Investigator for the What Works Clearinghouse (WWC) from 2014–18. The team includes members with previous experience conducting RCTs and fidelity of implementation analyses for previous EIR and i3 evaluations and substantial expertise in rigorous econometric methods, as well as content expertise in both social-emotional learning and secondary school reform. Details on their specific experience can be found in their CVs (Appendix B). Their roles and responsibilities are outlined in D.4 below.

D.2. Reasonable Project Costs. For Goal 1 and 3 objectives, we have budgeted for teams of researchers and staff practitioners to work together. Time commitments are based on our prior experience with the research and development projects of similar scale and potential impact. For

Goals 1 and 3 we have budgeted sufficient time to not only assemble the initial versions of 4S curriculum and PD supports, but to continue to improve and refine them based on feedback from end users and the findings of the RCTs. This ensures the final versions will incorporate the full learning of the project. For Goal 2, we are providing the independent third-party evaluator with the funds needed to complete the proposed evaluation. They are in line with industry standards. For Goal 4, we have budgeted appropriate funds for researcher and staff time to develop the instruments needed to establish the impact of the alternative professional development modules on implementation levels, and then to collect and analyze the data and conduct a cost analysis. We have also budgeted funds in the final year for the CSOS communication teams to disseminate project learnings. In addition, we have budgeted for teacher training costs for SRI International's efficacy study of the intervention, funds to off-set data collection costs incurred by the participating districts, and teacher stipends to cover the time they spend keeping implementation logs. Finally, we put in costs for project management and required staff travel. The budget includes the federally approved indirect cost rate. See budget narrative for details.

D.3. Potential for Continued Project Support. The potential for continued support for the project is two-fold. On the R and D side, CSOS has a long track record of supporting and extending federal grant awards with private foundation support, which we will continue to do in this case. For our i3 validation award, we were able to raise over 25 million dollars in support from the PepsiCo Foundation, Schusterman Foundation, Carnegie Foundation, Edna McConnell Clark Foundation and Atlantic Philanthropies. Currently we are receiving funding from the Bill and Melinda Gates Foundation for work on middle grades and ninth graders' social-emotional development. We anticipate that the widespread use of the 4S course and PD refined in this project can be supported through fee-for-service arrangements with schools and school districts.

One key aim of this project is to dramatically reduce the cost of both the intervention and the professional development to support it, thus making it much more affordable to schools and school districts. Through our partnership with our implementation partner, Talent Development Secondary, an independent organization spun off from our R and D unit to focus on distributing our interventions and supporting their use in schools, we have a ready-made distribution channel to scale 4S course and professional development supports to schools nationwide.

D.4. Adequacy of Management Plan. Our management plan outlines a timeline and the key personnel responsible to ensure successful completion of each of our defined objectives. Table 2 outlines roles and responsibilities for all key personnel, and Table 3 includes a timeline and personnel responsible for accomplishing each key project objective. Each Co-PI leads a specific part of the work related to a set of objectives, and they and their teams will meet monthly to ensure coordination among team members and that the objectives are realized, on time and within budget. The PI will hold monthly meetings with all the Co-PI's to insure overall project coordination and address any challenges or issues that arise. The PI will also be responsible for all aspects of project management, including working with the University business office to manage the project budget and agreements with consultants, interfacing with the University IRB office for human subjects approvals, being the point of contact for the U.S. Department of Education for grant administration and reporting, and raising the matching funds required by the grant. CSOS at Johns Hopkins University also has its own dedicated finance and grant management staff, with deep experience successfully managing multi-year, multi-partner, federal research and development grants. These are supported by the university-wide offices of research administration and finance. CSOS also has a dedicated communications staff that will broadly disseminate the project's findings.

Table 2. Key Personnel, Roles and Responsibilities

Key Personnel and Functional Responsibilities Chart	
Position	Function
Principal Investigator	
Robert Balfanz, Ph.D. Professor, JHU School of Education	<ul style="list-style-type: none"> • Project director with overall responsibility for and contributing to all parts of the project, project management, and writing of reports • Lead contact for U.S. Dept. of Education
Senior Leadership Team	
Douglas Mac Iver, Ph.D. Professor, JHU School of Education	<ul style="list-style-type: none"> • Lead for assembly and iterative refinement of intervention curriculum and associated PD variations • Lead for Cost Analysis of Alternative Forms of PD
Marcia Davis, Ph.D. Associate Professor, JHU School of Education	<ul style="list-style-type: none"> • Lead for recruitment of sites and school/district relations • Lead for development of implementation measures • Lead for Year 4 Implementation of Alternative Forms of PD for RCT
Martha Mac Iver, Ph.D. Associate Professor, JHU School of Education	<ul style="list-style-type: none"> • Lead liaison to Evaluation Team • Lead for Year 3 PD types pilot study • Lead for Year 4 RCT data collection and analysis
Richard Lofton, Ph.D. Assistant Professor, JHU School of Education	<ul style="list-style-type: none"> • Lead for qualitative data collection and analysis to inform revisions of course materials and PD supports
External Evaluation Team	
Daniel Princiotta, Ph.D. Senior Education Researcher at SRI International; Independent Evaluation Co-Principal Investigator	<ul style="list-style-type: none"> • Lead impact evaluation execution and cost analysis • Liaison to JHU research team • Produce final report with Dr. Park
C.J. Park, M.P.P. Senior Education Researcher at SRI International; Independent Evaluation Co-Principal Investigator.	<ul style="list-style-type: none"> • Lead evaluation project management • Lead implementation evaluation execution and cost analysis • Produce final report with Dr. Princiotta
Neil Seftor, Ph.D. Principal Researcher at SRI International Independent Evaluation Senior Advisor.	<ul style="list-style-type: none"> • Provide overall guidance on study design, implementation and reporting

Table 3. Timeline and Management Chart for Accomplishing Project Milestones

			SY1	SY2	SY3	SY4	
Milestone	Responsible	1/21- 6/21 6 mos	7/21- 6/22	7/22- 6/23	7/23- 6/24	7/24 - 6/25	7/25- 12/25 6 mos
Goal 1. Assemble and refine the Skills for Secondary School Success 9 week course, including teacher guide and student materials for 40 days of learning activities designed to develop key SEL skills among 8 th graders aligned with the WWC Dropout Prevention Practice Guide Recommendation 3							
1.1	JHU (D MacIver & team)	X	X	X	X	X	X
1.2	JHU (R Lofton & team)		X	X	X	X	
1.3	JHU (D MacIver & team)		X	X	X		
Goal 2. Conduct RCT to measure impact of 4S Course on student SEL and Academic outcomes.							
2.1	JHU (M Davis & team)	X	X	X			
2.2	SRI (Princiotta & Park)	X	X	X			
2.3	SRI (Princiotta & Park)	X	X	X			
2.4	SRI (Princiotta & Park)	X	X	X			
2.5	SRI (Princiotta & Park)		X	X			
2.6	SRI (Princiotta & Park)		X	X	X		
2.7	SRI (Princiotta & Park)		X	X	X		
2.8	SRI (Princiotta & Park)				X		
Goal 3. Develop and pilot alternative means to provide teacher professional development to reduce costs and support large scale dissemination							
3.1	JHU (D MacIver & team)		X	X	X	X	X
3.2	JHU (M Davis & team)			X	X		
3.3	JHU (M MacIver & team)			X	X		
Goal 4. Test alternative PD models while scaling intervention to 60 schools to establish costs and benefits of different PD modalities under typical conditions							
4.1	JHU (M Davis & team)				X	X	
4.2	JHU (M Davis & team)					X	
4.3	JHU (M MacIver & team)					X	X
4.4	JHU (D MacIver & team)					X	X

E. Quality of the Project Evaluation

SRI International (SRI) will conduct an **independent evaluation** of the impact, implementation fidelity, and cost of 4S. The evaluation will address seven confirmatory and four exploratory research questions (RQs and ERQs) aligned with the 4S Theory of Action (Table 4). RQs 1-4 focus on program impact and align with short- and medium-term outcomes. RQs 5-7 align with program inputs and outputs and address implementation and cost. ERQs 1-2 investigate potential moderation effects, and ERQs 3-4 explore the impact of 4S on individual SEL skills and on an On-Track for 9th Grade indicator.

Table 4. Research Questions by 4S Theory of Action Component

Research question	4S Theory of Action component
Impact: Short-term outcomes	
RQ1. What is the impact of 4S on grade 8 students' overall social-emotional competence (SEC) as rated by teachers?	Improved SEL skills
Impact: Medium-term outcomes	
RQ2. What is the impact of 4S on grade 8 students' academic performance as measured by semester 2 core GPA and by no Ds/Fs in any semester 2 core course?	Improved grades
RQ3. What is the impact of 4S on grade 8 students' engagement in school as measured by semester 2 attendance rate and by 90% or better semester 2 attendance?	Improved attendance
RQ4. What is the impact of 4S on grade 8 students' behavior in school as measured by semester 2 number of suspensions and by any suspension receipt in semester 2?	Improved behavior
Implementation and cost: Inputs and outputs	
RQ5. To what extent was the 4S intervention implemented with fidelity?	Curriculum and PD
RQ6. What were the barriers and facilitators to successful 4S implementation?	Implementation context
RQ7. What were the costs of implementing 4S overall and per student by school?	Curriculum, PD, & context
Exploratory research questions: Moderation effects	
ERQ1. How does the effect of 4S on students' overall SEC vary by students' baseline SEC, baseline semester 2 core GPA, and demographic characteristics?	Improved SEL skills, implementation context
ERQ2. How does the effect of 4S on students' semester 2 core GPA vary by students' baseline SEC, baseline semester 2 core GPA, and demographics?	Improved grades, implementation context
Exploratory research questions: Additional outcomes	
ERQ3. What is the impact of 4S on grade 8 students' growth mindset, self-efficacy, self-management, and social awareness, as measured by CORE student survey scales?	Improved SEL skills
ERQ4. What is the impact of 4S on semester 2 On-Track for 9th Grade composite indicator (no Ds/Fs, 90 percent or better attendance, and no suspensions)?	Improved grades, attendance, and behavior

E.1. The Evaluation Will Meet What Works Clearinghouse Standards Without

Reservations

SRI will execute a multi-site, individual-level randomized controlled trial (RCT) where **8th graders will be randomly assigned to treatment and control conditions** within 10 schools across 2 waves (5 schools implementing in 2021/22 and the other 5 in 2022/23). Prior to random assignment, each student will have a 50 percent chance of being assigned to either condition. Treatment students will be enrolled in the 4S course in quarter 2, while control students will receive a “business as usual” elective course. To provide sufficient treatment-control contrast,

middle schools with preexisting SEL courses will be excluded from the recruitment pool.

SRI will perform an Intent-to-Treat (ITT) analysis to ensure that random assignment is not compromised. Estimates of the effects of 4S on outcomes of interest will be based on students' original assignment to treatment or control groups, regardless of intervention receipt. SRI will seek to minimize student crossover between treatment and control groups, but the ITT analysis will maintain the integrity of random assignment regardless. Further, any sample exclusions will apply equally to treatment and control students and be based on criteria related to student characteristics identified prior to random assignment.

The 4S evaluation design and SRI's approach to study implementation will lead to **low overall and low differential participant attrition** for four reasons. First, each study wave will occur within a single school year, with student randomization occurring at the start of quarter 1, the intervention occurring in quarter 2, and all study outcomes being collected in quarter 4, giving students little time to leave the district. Second, we will obtain needed parental consent and student assent prior to randomization so that those who opt out do not count towards attrition. Third, the study's academic and behavioral outcomes are based on commonly collected district administrative data with low missing rates. Fourth, we will provide teachers incentives and schedule SEL data collections such that respondents have multiple completion opportunities.

Ensuring Equivalence at Baseline. We will collect prior-year measures of outcomes of interest (second semester core GPA, attendance rate, and number of suspensions) and compare preliminary treatment and control groups at the time of random assignment. In the event of differences of 0.25 standard deviations or larger within schools between treatment and control groups, we will perform rerandomization to improve covariate balance and decrease bias due to random imbalances (Morgan & Rubin, 2012). We will also perform analyses of baseline

equivalence for the final analytic sample following any sample attrition.

The evaluation is sufficiently powered to detect practically meaningful effects of treatment on students' SEL, academic, and behavioral outcomes. Across two waves, we expect to recruit 1,000 grade 8 students in total: an average of 100 grade 8 students per school per wave from 5 schools per year (10 schools total). This estimate is reasonable given that the number of grade 8 students per U.S. middle school averages nearly 200 (Keaton, 2012). Our power analyses estimate the Minimum Detectable Effect Size to be 0.17 standard deviations for teacher ratings of student socioemotional competence, 0.14 for SEL outcomes based on student surveys, 0.14 for student attendance rate, 0.15 for student suspensions, and 0.11 for core GPA. See Appendix I.5 for power analysis assumptions and estimates for dichotomous outcomes.

To estimate the impact of 4S on students' teacher-reported social-emotional competence, student-reported social-emotional learning skills, academic performance, student engagement, and student behavior, we will fit a series of models (Ordinary Least Squares models for continuous outcomes and Logit models for dichotomous outcomes) where the outcomes of interest are the function of treatment group status, pre-intervention measures of the outcome, a vector of demographic control variables (age, disability status, economic disadvantage, English learner status, gender, and race and ethnicity variables), and fixed school and year effects. Although random assignment within schools will ensure that there are no systematic differences between treatment and control students, **accounting for pre-intervention measures of the outcomes of interest and student demographic characteristics in our models will increase the precision of our treatment effect estimates** while accounting for any chance imbalance between treatment and control groups at baseline. **Our models will account for the nesting of students within schools** through the use of cluster-robust standard errors appropriate for the

number of schools in the study (Pustejovsky & Tipton, 2018).

In addition, **we will examine whether treatment effects vary across students and schools** by including interaction terms between treatment status and moderators in our models. We will investigate several student-level moderators: economic disadvantage, race/ethnicity, English Learner status, disability status, prior socioemotional competence, and prior-year 2nd semester core-course GPA. Prior research has shown that SEL interventions have shown greater effects among those with relatively low initial grades (c.f., Paunesku et al., 2015; Yeager et al., 2016). We will also investigate whether treatment effects vary by site by including school-by-treatment status interaction effects. By identifying whether the intervention's effectiveness varies across groups of students or in different implementation contexts, **the evaluation will be able to inform efforts to further develop and scale the 4S initiative.**

E.2. Key Components, Mediators, Outcomes, Implementation Thresholds, and Cost

The proposed evaluation will examine implementation of 4S's key components, and its relationship with students' short- and long-term outcomes as described in section B2 and the theory of action. The 4S approach posits that to impact student outcomes, teachers need training and coaching in 4S and must implement 4S daily lessons with sufficient frequency and quality. Consequently, we will measure two key program components: (1) professional development, and (2) 4S curriculum implementation. To be implemented with fidelity, 4S must meet the program-level threshold for both components as specified in Table 5. **All teachers implementing the 4S course in the 10-school RCT will be included in the implementation fidelity sample.**

SRI will use a mix of program records and primary data to measure fidelity of implementation (FOI). After each training session, 4S program staff will share training attendance records with SRI. SRI will also collect 4S program coaches' teacher coaching records

(teacher visited, date, and focus of the visit). Coaches will also provide a summative teacher rating (rubric to be developed in summer 2022) that SRI will use to measure curriculum implementation quality. Further, SRI will administer a weekly teacher instructional log (developed in summer 2021) to capture the number of unique daily lessons delivered by teachers over the course of the 9-week 4S class to measure quantity of curriculum implementation.

Table 5. Fidelity of Implementation

Components & Indicators	Data Source & Timing	Metric
Component 1: Professional Development		
<i>Component-Level Threshold: Receive a rating of “2” or higher on both indicators</i>		
1.1 Teacher participates in training prior to course	Training attendance records Fall 2021 & Fall 2022	3 = Received more than 6 hours of training 2 = Received 6 hours of training 1 = Received less than 6 hours of training
1.2 Implementation support	Coaching records Winter 2022 & Winter 2023	3 = Received 2 in-person visits 2 = Received 1 in-person visit 1 = Received no in-person visits
Component 2: 4S Curriculum Implementation		
<i>Component-Level Threshold: Receive a rating of “2” or higher on both indicators</i>		
2.1 Quantity of curriculum implementation	Teacher log Fall 2021 & Fall 2022	3 = Delivered at least 35 daily lessons 2 = Delivered 30-34 daily lessons 1 = Delivered less than 30 daily lessons
2.2 Quality of curriculum implementation	Summative rating by coach (rubric to be developed) Winter 2022 & Winter 2023	3 = Above expectations 2 = Meets expectations 1 = Does not meet expectations
<i>Adequate teacher-level implementation: Meet fidelity threshold for Components 1 & 2</i>		
<i>Adequate program-level implementation: 75% of teachers meet teacher-level fidelity threshold.</i>		

SRI will also collect qualitative data on barriers and supports to implementation.

Teacher interviews and student focus groups will be conducted for each wave of 4S schools during the implementation school year. Interviews with teachers will provide information on contextual factors related to implementation and perceptions of the quality and efficacy of the professional development and 4S curriculum. Student focus groups will provide insight into students’ engagement with the curriculum. SRI will share interview, focus group, and FOI findings with JHU annually to support program refinement and scaling.

Short- and medium-term evaluation outcome measures as shown in the 4S Theory of Action are listed in Table 6, along with associated measures, timing of baseline and outcome

measure collection, and data source. 4S program outputs are expected to mediate 4S's impact on students' social-emotional learning skills (short-term outcomes), which, in turn, are expected to mediate 4S's impact on student attendance, behavior, and grades (medium-term outcomes).

These outcomes are expected to, themselves, mediate students' long-term academic achievement and eventual high school graduation (which are beyond the scope of the present evaluation).

Table 6. Outcomes by Domain, Measure, Baseline Measure, Timing, and Data Source

Student outcome by domain	Outcome measure	Baseline measure	Data source
Social-emotional learning and behavior			
Overall socioemotional competence	Social-Emotional Total (SET) score (Quarter 4 [Q4])	Social-Emotional Total (SET) score (Quarter 1)	Devereux Student Strengths Assessment-mini (teacher respondent)
Growth mindset	Growth mindset scale (Q4)		CORE SEL Skill items included on survey (student respondent)
Self-efficacy	Self-efficacy scale (Q4)		
Self-management	Self-management scale (Q4)		
Social awareness	Social awareness scale (Q4)		
Academic achievement			
Grades	Semester 2 core GPA (A-F, 4-0) and dichotomous measure (No Ds/Fs in core courses) (Q3 & Q4)	Semester 2 core GPA (A-F, 4-0) (Prior year Q3 & Q4)	Administrative data (district)
Engagement in school			
Attendance	Proportion of school days attended and dichotomous measure (Attended at least 90%) (Q3 & Q4)	Proportion of school days attended (Prior year Q3 & Q4)	Administrative data (district)
Suspension	Received at least one suspension (Q3 & Q4)	Received at least one suspension (Prior year Q3 & Q4)	Administrative data (district)

Note: Data collection by quarter will be the same for schools implementing in the 2021/22 and 2022/23 school year.

SRI will perform a cost analysis, documenting the costs of implementing 4S overall and per student by school. SRI will collect cost information using the ingredients method, price the ingredients, generate cost estimates, and create cost-effectiveness ratios of program costs to estimated impacts on student outcomes (Levin et al., 2017). To do so, SRI will draw on the *CostOut* tool kit (Hollands et al., 2015) and the IES cost analysis tool kit (IES, 2020a). The timeline for implementation, cost, and outcomes data collection is in Appendix I.6.

E.3. Evaluation Methods Will Provide Valid and Reliable Performance Data on Outcomes

The evaluation's outcome measures meet WWC standards without reservations as they: (1) **demonstrate validity**, (2) **show reliability**, (3) are not overly aligned with the intervention, and (4) will be collected in the same way for treatment and control students. The WWC assumes that **student behavior outcomes** measured using administrative data, such as attendance, suspensions, and Grade Point Average (with formula detailed), are **reliable** because they are easy to measure (IES, 2020b). These measures also demonstrate **face and predictive validity**, as these measures of students' participation in school are associated with other key outcomes (e.g., promotion, persistence in school, and eventual high school graduation [Allensworth & Easton, 2005; Balfanz et al. 2007; Bowers et al., 2013]). The present study uses 2nd semester (quarter 3 and 4) core GPA (and associated dichotomous measure of no Ds/Fs) to ensure that students' grades in the quarter 2 4S intervention course do not directly influence the outcome measure.

The evaluation's SEL outcomes measures are both reliable and valid. The Devereux Student Strengths Assessment-mini (DESSA-mini) behavior rating scale measures overall student socioemotional competence (Naglieri et al., 2011).² It has demonstrated very high internal reliability when given by teacher raters, with Cronbach's alphas of 0.90 for grade 8 students ranging across the DESSA-mini's four alternate forms (Naglieri et al., 2011). Critically, and in accordance with the WWC Supportive Learning Environments protocol (IES, 2019b), **the teachers rating students on the DESSA-mini will not be the teachers providing the 4S intervention.** Rather, they will be teachers from a core course, such as English. The DESSA-mini's socioemotional total score has shown predictive validity for student disciplinary

² It is based on eight items, covering personal responsibility, optimistic thinking, goal-directed behavior, social awareness, decision making, relationship skills, self-awareness, and self-management (Naglieri et al., 2011).

infractions (Shapiro et al., 2017) and academic course performance (Balfanz & Byrnes, 2020), as well as concurrent validity, showing 86 to 98 percent agreement with the full 72-item DESSA across forms (Naglieri, et al., 2011). The CORE Survey's SEL constructs are reliable, having demonstrated internal consistency with Cronbach's alpha ranging from 0.74 to 0.89 for eighth graders (Meyer, Wang, & Rice, 2018), and test-retest reliability from students in grade 7 to grade 8 ranging from 0.44 to 0.52 (West et al., 2018). CORE SEL scores have been positively correlated with GPA, assessment scores, and attendance rates and negatively correlated with suspension receipt (West et al., 2018). Reliable and valid measures of social-emotional learning outcomes, such as the DESSA-mini and the CORE Districts SEL survey scales, are eligible for WWC review under IES' (2019a) Individual Studies and (2019b) Supportive Learning Environments review protocols. Further, the DESSA-mini and CORE survey scales have been widely used in schools, can be rapidly administered by teachers (under 1 minute per student for the DESSA-mini and under 20 minutes for CORE), and complement one another by drawing on teacher and student perspectives (Gehlbach & Hough, 2018).

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