Evidence for the Effectiveness of a National School-Based Mental Health Program in Chile

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Evidence for the Effectiveness of a National School-Based Mental Health Program in Chile

RH: Effectiveness of a School-Based Mental Health Intervention

Javier Guzmán, BA; Ronald C. Kessler, PhD; Ana Maria Squicciarini, BA; Myriam George, BA; Lee Baer, PhD; Katia Canenguez, PhD; Madelaine R. Abel, BA; Alyssa McCarthy, BA; Michael J. Jellinek, MD; J. Michael Murphy, EdD

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Supplemental material cited in this article is available online.

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Abstract

Objective: Skills for Life (SFL) is the largest school-based mental health program in the world, screening and providing services to more than 1,000,000 students in Chile over the past decade. This is the first external evaluation of the program.

Method: Of the 8,372 primary schools in Chile in 2010 that received public funding, one-fifth (1,637) elected to participate in SFL. Each year all first and third grade students in these schools are screened with validated teacher- and parent-completed measures of psychosocial functioning (the Teacher Observation of Classroom Adaptation–Re-Revised [TOCA-RR] and the Pediatric Symptom Checklist–Chile [PSC-CL]). Students identified as being at-risk on the TOCA-RR in first grade are referred to a standardized 10-session preventive intervention in second grade. This paper explores the relationships between workshop participation and changes in TOCA-RR and PSC-CL scores, attendance, and promotion from third to fourth grades.

Results: 16.4% of students were identified as being at-risk on the TOCA-RR. Statistically significant relationships were found between number of workshop sessions attended and improvements in behavioral and academic outcomes after controlling for nonrandom selection into exposure and loss to follow-up. Effect sizes for the difference between attending most (7-10) versus fewer (0-6) sessions ranged from .08-.16 standard deviations.

Conclusion: This study provides empirical evidence that a large-scale mental health intervention early in schooling is significantly associated with improved behavioral and academic outcomes. Future research is needed to implement more rigorous experimental evaluation of the program, examine longer-term effects, and investigate possible predictors of heterogeneity of treatment response.

Keywords: Children’s mental health, school-based interventions, behavior problems, academic achievement
INTRODUCTION

A small but growing body of research documents an association between school-based mental health interventions for at-risk children and improved psychosocial outcomes.\(^1\) Interventions have been shown to improve overall psychosocial functioning\(^2-5\) and conflict resolution skills\(^6\) and to decrease violent behaviors\(^7\) and posttraumatic stress symptoms\(^2,8,9\). These positive effects have been demonstrated in school-based studies in both lower/middle income\(^10\) and higher income\(^11\) countries. In light of such findings, the American Academy of Pediatrics and the World Health Organization (WHO) support the implementation of mental health screening and treatment programs in primary healthcare environments and in schools\(^12-15\).

The magnitude of the impacts reported in previous studies has varied. In their meta-analysis, Durlak et al.\(^1\) concluded that school-based social–emotional development programs demonstrate an overall positive impact on outcomes with small but significant \((d = .12 \text{ to } .34)\) effect sizes. Other studies have shown that effect sizes are influenced by both measurement interval and problem severity. For example, Stein et al. explored the impact of a school-based 10-session cognitive–behavioral-based intervention for anxiety and depression among elementary students traumatized by violence and found effect sizes of .65 SD for the intervention versus delayed intervention control group on changes in behavioral scores over 3 months.\(^2\) Another school-based intervention, the Good Behavior Game,\(^5\) was shown to have the largest effect among at-risk students with high levels of aggressive and disruptive behavior. Notably, intervention effects appeared to persist into young adulthood.\(^16\)

A number of recent studies have documented an association between student mental health and educational outcomes,\(^17,18\) as well as between improving mental health and improved academic outcomes.\(^1,18,22\) For example, two studies demonstrated that children whose attention-
deficit/hyperactivity disorder (ADHD) symptoms decreased over time were more likely to remain in the classroom, receive fewer detentions, and graduate from high school compared to children whose ADHD symptoms remained severe. Additionally, a large longitudinal study in Chile showed that students whose mental health risk remitted from first to third grade had significantly better academic outcomes than students who remained at mental health risk over that time period.

The belief that improving mental health can improve psychosocial and academic outcomes is the conceptual basis for the mandatory mental health components in large national programs like Head Start in the United States and Habilidades para la Vida (Skills for Life) in Chile. However, empirical evidence supporting the effectiveness of these components is limited. To our knowledge, there have been no published studies on the relationship between large-scale mental health programs and academic outcomes. Therefore, the current study used validated behavioral and academic measures to examine the effects of a preventive intervention for at-risk elementary school students participating in the national Skills for Life (SFL) program in Chile.

SFL is run by a division (the Junta Nacional de Auxilio Escolar y Becas [JUNAEB; National Association of School Assistance and Scholarship]) of the national department of education in Chile, which is charged with improving access and outcomes for students with disabilities. In 1998, JUNAEB decided to add emotional and behavioral problems to the list of eligible conditions. Over the next three years, members of that department collaborated with psychologists from Chile and other countries to review the screening measures and intervention programs available at that time and adapt them for use in Chile. The intervention they developed is based on the three-tiered model recommended by the WHO (mental health promotion for all
students, parents, and teachers; preventive interventions for children at risk; and referrals to community professionals for children who are seriously impaired).

All public and subsidized private primary schools in Chile can apply to participate in the SFL program, and in 2010, of the 8,372 eligible primary schools, 1,637 (20%) elected to participate in SFL, and 1,606 of them (98%) participated in the evaluation. SFL has been running on a national scale since 2001, with priority given to schools that meet criteria for high risk based on a formula that takes school-level indicators such as family income and maternal education into account. According to program officials, 10% of schools in the country are at the highest of five risk levels, and 55% of them participate in the program; 37% are in the top two risk levels, and 44% of them participate in the program.

All first grade students are screened using brief parent and teacher surveys in the beginning and middle of the school year (for the Pediatric Symptom Checklist–Chile [PSC-CL] starting in March, and for the Teacher Observation of Classroom Adaptation–Re-Revised [TOCA-RR] starting in June). Students whose scores indicate psychosocial risk are referred to the SFL workshops, which are given at the start of second grade. All students are post-tested on the PSC-CL and TOCA-RR starting in March and June (respectively) of third grade. SFL has elicited increasing attention nationally (within Chile) and internationally because of its use of validated outcome measures as well as its size: more than one million students have received mental health promotion and/or preventive intervention services through SFL thus far.

The content of the SFL workshop sessions is outlined in Supplement 1 (available online). Briefly, the intervention consists of 15 sessions: 10 for the student, 3 for the parent, and 2 for the teacher. Student workshop sessions, which are the sole focus of the current paper, are led by psychologists from the program. Sessions take place during the school day, include 6-10
students, and last 1.5-2 hours each. At the start of the school year, the parents of all first grade students in each SFL school are asked to give verbal consent for screening and intervention. Participation is voluntary, but most parents do consent. Further details about the intervention are provided in a series of manuals (available in Spanish)\textsuperscript{28} that are used to train the psychologists who run the workshops. In Chile, a college degree with a specialization and certificate in psychology is considered sufficient for conducting interventions like those provided by SFL. Trainings for new staff are provided each year, and supervisors regularly monitor the quality of the interventions at all sites. Although developed by Chilean psychologists and educators specifically for this program, the program’s overall approach is skill-based and generally consistent with a cognitive-behavioral approach.

In the current study, we examined the outcomes for children who were referred to SFL preventive workshops in second grade based on screens indicating risk in first grade. We hypothesized that: (1) there would be a positive association between the number of workshop sessions attended by students and the magnitude of improvement in measures of behavior and academic achievement after controlling for confounding factors; and (2) this relationship would occur even in the absence of referral to outside mental health care (the third tier in the WHO model that has a service component for some of the students participating in SFL).

**METHOD**

**Sample and Procedures**

All students who attended an SFL-participating school in first grade in 2010 were eligible for inclusion in this study. Because only de-identified data were used, the study was approved as exempt by the Partners Healthcare Institutional Review Board, which serves Massachusetts General and affiliated hospitals.
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Measures

Behavioral outcomes. Behavioral outcomes and mental health risk were assessed in first and third grades using two validated measures. The two measures were chosen for their brevity, ease of administration, published validation studies, and because they were in the public domain and could be used without cost. Both measures were developed originally in the United States and adapted for use in Chile. The first measure (the TOCA-RR) is a revised version of the TOCA-R (Teacher Observation of Classroom Adaptation–Revised). The TOCA-RR is a valid and reliable measure with Cronbach alpha values ranging from .74-.95 on all subscales. The TOCA-RR was administered to the primary classroom teacher by a member of the SFL staff in the middle of first grade. The measure has 31 items clustered into 6 subscales that measure acceptance of authority, social contact, cognition, emotional maturity, attention, and activity. Items are coded on a 6-point Likert scale (1=almost never to 6=almost always). Positive items (e.g., “plays with others,” “self-reliant,” “completes assignments,” and “pays attention”) were reverse-coded so that, for all items, 1 reflects adaptation and 6 reflects maladaptation. Each subscale produces a total score and a cutoff score indicating high risk based on national Chilean norms. A total score reflecting the sum of all items was also calculated.

For each student, the SFL National Leadership Team uses standardized algorithms to ascertain whether the pattern of at-risk scores on the six TOCA-RR subscales fits one of three “profiles” (which can be roughly characterized as aggressive, inattentive, or withdrawn), any of which is considered indicative of overall high risk. The algorithms are described in the program’s scoring manual. In this study we used overall high risk/not risk score as the sole indicator of teacher-rated risk in the categorical analyses and overall total score on the TOCA-RR as the primary variable for analyses requiring a continuous score on this measure.
The second measure of behavioral outcomes and mental health used in the program is the Chilean version of The Pediatric Symptom Checklist (PSC), a 35-item questionnaire completed by the parent that assesses overall emotional and behavioral problems. The PSC is one of the most widely-used measures for psychosocial screening in children and has been validated in samples from the US and many other countries. The US version of the PSC has good internal consistency (Cronbach alpha of .91), a test-retest reliability of $r=.84-.91$, and a specificity of .68 and sensitivity of .95 for detecting psychosocial impairment. The measure was adapted for use with Chilean students by the same group of academic and governmental investigators who adapted the TOCA-R for use in Chile. Several changes were made as a result of translation and back-translation, and the final version is a 33-item measure with each item rated on a 3-point scale of 1=never, 2=sometimes, and 3=always. As with the US version, a total score is computed by summing all weighted items, with higher scores indicating more mental health problems. The Chilean version has a Cronbach alpha of .85. Total scores are also re-coded dichotomously based on a predetermined cutoff score; for the PSC-CL, scores of 65 or higher indicate mental health risk. In most instances, first and third grade PSC-CLs were administered near the beginning of the school year.

**Academic outcomes.** Academic outcomes were assessed in first and third grades using the following variables: (1) annual school attendance; and (2) promotion from third to fourth grade. Annual attendance is the percentage of days present in school for the entire 180-day school year. The relationship between the number of workshop sessions attended and exact percentage of school days attended is reported in Table 2. In order to be able to present the data in a format that would be more useful for program officials and educators, for the secondary analyses (Table 3), we created a categorical variable to reflect low annual percent school attendance, arbitrarily
selecting less than 85% as a cutoff that would identify students in the lowest twenty percent of
the sample so that the impact of workshop attendance on overall school attendance could be
examined categorically.

**Intervention**

As noted earlier, all students who were screened as being at risk on the TOCA-RR in first
grade were referred to standardized 10-session group-administered, school-based preventive
intervention (“workshops”) in second grade. The psychologists who ran the workshops took
attendance each week, recording how many sessions each student attended. For each student, the
number (0-10) of sessions attended was analyzed in linear regression analyses. Prior to this
cohort and since the beginning of the program, the data collection sheets and coding manuals had
measured program participation with only a single categorical variable that contrasted students
who participated in most versus fewer of the ten workshop sessions. To keep the current paper
consistent with prior reports from the program and to be able to compare these results with those
from previous studies, we conducted a secondary analysis of the impact of workshop attendance
using categorical data contrasting outcomes for students who attended most (7-10) versus fewer
(0-6) workshop sessions.

**Analytic method**

*Controlling for background factors.* In order to adjust for the nonrandom assignment of
high-risk students to workshop sessions, we tested the associations of 15 baseline control
variables with extent of participation in the intervention using a Poisson regression model and
then entered the variables that were found to be related to workshop participation in the
regression equations used to estimate intervention effects.
Primary analyses. We conducted our main analyses in several steps. We ran linear regressions to assess whether rate of workshop participation (number of sessions attended from 0-10) predicted changes from first to third grade in TOCA-RR and PSC-CL scores and in attendance percent, for students who had been screened at risk in first grade on the TOCA-RR. We did this first without accounting for covariates and then with the significant predictors added into the regression models. To test the association between the continuous measure of workshop participation and the categorical variables of promotion versus retention from third to fourth grade and continued or decreased low school attendance verses improved from first to third grade, we ran logistic regressions, first without and then with covariates in the equation. To account for the fact that there may have been school or classroom effects, we included a variable specifying which of the 2,231 specific classrooms in the 1,636 participating schools each student belonged to and included it in the adjusted regression models shown in Tables 2 and 3. Finally, because the program provides referrals to local mental health services for children exhibiting the most serious problems, we also controlled for referral to and/or attendance at mental health services in additional regression analyses.

Secondary analyses. As noted earlier, in order to be able to provide information on changes in mean scores, Cohen’s \( d \), and odds ratio (OR) statistics that would be meaningful for program officials and educators, we used a categorical version of the workshop participation variable that contrasted students who attended most (7-10) sessions with those who attended few (0-6) sessions. All analyses were conducted using SPSS V. 22 or Stata 14.

RESULTS

Participant Characteristics
Figure 1 and Table 1 present data on the samples used in the analyses that follow. Of the 67,795 students who were in first grade in SFL schools in 2010, 55,061 (81%) had first grade data on the TOCA-RR. In data cleaning, we removed individuals with first grade data indicating age less than 5 years (n = 3,217) and older than 8 years (n = 361) and individuals who were reported to have failed first grade, withdrawn from school, or otherwise left the cohort (n = 3,944) prior to reassessment in third grade. We then removed students with baseline missing data on demographic covariates such as gender and family on welfare (n = 4,516). The remaining 43,023 students were considered the valid and complete first year sample. Of these students, 7,051 (16.4%) scored at-risk on the TOCA-RR, and 35,972 (83.6%) did not. For 18,457 of these students, there was no longitudinal match for third grade data, so the final sample was 26,429 students who had complete data from first and third grade (61% of the students with valid and complete first year data).

Adjusting for nonrandom participation in the intervention and loss to follow-up. In order to test the impact of covariates on the largest possible sample, the subsample of 7,051 students who were identified as being at risk on the TOCA-RR in first grade and who had valid and complete first grade data was used to identify the predictors of workshop attendance. As noted above, for all variables, we used Poisson regression models to identify any variables that were significantly associated with students’ workshop attendance. We identified 9 variables: advanced or failed school after kindergarten; same/different teacher for first and second grades (a proxy for urban/rural location since rural schools are often smaller and may have multiple grades per teacher); region of the country; male gender; percent school attendance in first grade; age at the beginning of first grade; school type (public versus subsidized private); family receipt of welfare benefits (Chile Solidario); and family participation in a governmental social support program.
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(Sename Servicio Nacional de Menores, or Sename). All analyses reported in the adjusted model controlled for these variables.

*Adjusting for non-random loss to follow-up.* Since the fact that a substantial number of students (18,457, representing 42.9% of the 43,023 otherwise eligible first graders) were lost to follow-up (e.g., could not be matched with third grade data) could impact the analysis (see Discussion for a consideration of reasons for loss to follow up), we used the same 15 baseline demographic variables to identify predictors of not being present in the follow-up assessment in third grade.

Data were not missing at random: again using Poisson regression, we found significant associations with many of the workshop attendance correlates. Students who went to workshop sessions but were missing third grade follow-up data were more likely to be male, fail/withdraw from kindergarten, not participate in Sename or Chile Solidario, have a different teacher in first and second grades, a lower school attendance rate, attend public schools, and be older in first grade. Since an additional variable “first grade grade-point average (GPA)” was associated with being lost to follow-up after attending the workshops, it was added to the 9 variables that were related to workshop attendance. All ten were included as covariates in the analyses presented in Tables 2 and 3.

*Assessing the impact of workshop participation.* The sample with the greatest relevance for assessing the impact of workshop participation on outcomes was the students who were at risk on the TOCA-RR in first grade (and thus referred for the workshops) and who had complete data from first and third grade (n=3,935). Only the subset of these students (2,504; 64%) who had longitudinal data on the parent-reported PSC-CL were included in the analyses that used this measure. For comparative purposes, demographic data for the students who had longitudinal data
but who were not at risk and in the full baseline sample are also presented in Table 1. As shown in the table, just over half (55.9%) of the students in the at-risk subsample were male. Students in the at-risk subsample attended an average of 7.68 of the 10 possible student workshop sessions. As noted earlier, we created categorical variables for some of the analyses so that we could contrast individuals who attended most versus few workshop sessions: three-quarters of the students (3,040; 77%) participated in 7-10 sessions, and 895 (23%) attended 0-6 sessions.

**Workshop participation as a continuous variable predictor of outcomes**

Table 2 summarizes the results of the linear regressions that examined the relationships between the number of workshop sessions attended and changes in scores on the behavioral health measures and attendance from first to third grade. As shown for the unadjusted analyses reported in the first four columns, among the students classified as being at risk on the TOCA-RR in first grade, there was a significant positive association between number of workshop sessions in which the student participated and the magnitude of improvements in both teacher- and parent-rated behavior from first to third grade. The improvement in annual school attendance failed to reach statistical significance. In the adjusted model (second four columns in Table 2), workshop attendance by students continued to predict improvements in teacher-rated behavior when controlling for all covariates and clustering by classroom ($B= -.26, r^2=.03, p < .05$). The adjusted model also demonstrated that workshop participation continued to be a strong linear predictor of improved parent-rated behavior and improved percent school attendance in third grade while accounting for all covariates and classroom clustering ($B= -.17, r^2=.02, p<.01$ and $B=.10, r^2=.16, p<.05$, respectively). Additionally, to check for possible nonlinearity, we tested associations of the squared continuous workshop attendance term with all outcomes. All associations using the squared term were non-significant and thus linear (TOCA-RR: $B = .16$, $p=.20$; PSC-CL: $B = -.07$, $p=.11$; percent school attendance: $B = .001$, $p=.99$).
ORS and effect sizes for categorical measure of workshop participation and behavior and academic outcomes

In order to allow comparisons with the studies cited in the first section of the paper and to provide examples of the possible real-world impact of the relatively small effects presented in Table 2, Table 3 used the categorical measure of student workshop participation to provide statistics on effect sizes, risk reduction, and differences in mean scores.

The first half of Table 3 uses the same continuous measures of mental health and school attendance reported earlier to provide effect size estimates for the two categories of student workshop participation (most versus fewer). The first column in row 3 shows that TOCA-RR scores decreased by 16.12 points from first to third grade for students who attended fewer sessions compared to a decrease of 18.49 points (column 2) among students who participated in most of the sessions, a significant net difference of 2.37 points ($d=.09; p < .05$). The first column in row 6 shows that students who attended fewer sessions increased (showed poorer functioning) by 0.77 points between first and third grade on the PSC-CL compared to a decrease of 0.6 points (improved functioning) among students who attended most of the sessions, a significant net difference of 1.41 points ($d = .16, p < .01$). When changes in annual school attendance rates were examined (as shown in row 9), among students who participated in fewer workshop sessions, annual school attendance decreased by about one percentage point (equal to about two full days per 180-day school year) compared to the students who participated in most of the workshop sessions, whose school attendance decreased less (.18%; or about 1/3 of a school day). The net difference between the two workshop participation groups therefore was .82%, or about 1.48 days per year ($d = .08, p < .05$).
The second half of Table 3 reports on the categorical versions of the outcome variables to demonstrate the relationships between workshop participation and reduction of risk. Compared to students who attended fewer workshop sessions, students who attended most sessions were 16% less likely to remain at risk on the TOCA-RR in third grade (OR=.84, $p=.06$), 27% less likely to remain at risk on the PSC-CL in third grade (OR=.7369, $p<.05$), 32% less likely to stay back in school after third grade (OR=.68, $p<.01$), and 34% less likely to have low school attendance in third grade (OR=.66, $p<.001$).

Controlling for referral to/engagement with outside mental health services

As noted at the outset of this paper, the third tier of the SFL program involved referral of the most highly at-risk students to mental health specialists in the community. Such referrals did not preclude those students from attending the workshops at school. Overall, 1,007 students were referred to specialists, and 784 were reported by their parents to have engaged in regular treatment with them. About half of those students also attended student workshops. Conversely, about 12% of the students who attended workshops were referred to mental health services, and about 8% were reported to have engaged in treatment with mental health specialists. None of the relationships reported in this paper lost significance when referral to and/or engagement with outside mental health specialists were entered into the regression equations.

DISCUSSION

The goal of the current study was to evaluate the effects of the student workshop sessions of the Skills for Life program on behavioral and academic outcomes. Among the 3,935 students who were screened as being high-risk on the TOCA-RR in first grade, we found a significant linear relationship between number of workshop sessions attended and improvements in behavioral and academic outcomes after controlling for nonrandom loss to follow-up,
A categorical approach to coding workshop participation that contrasted students who attended most versus fewer sessions showed that the magnitude of the effect of the intervention on PSC-CL score was .16 SD, .09 SD on the TOCA-RR, and about .08 SD on school attendance. Although interventions with a Cohen’s $d$ of less than .20 are considered small, the effects reported in this study are only slightly smaller than the effects of a similar school-based intervention (Cognitive Behavioral Intervention for Trauma in Schools; CBITS) that also used the PSC as an outcome measure. In the CBITS study, an effect size of .25 SD was reported for the impact of the intervention on a randomly assigned group of students who were compared to students in a delayed start control group over a six-month interval, while in the current study the time interval between pre- and post-test was about two years. The smaller impact of the workshop intervention on teacher-rated TOCA-RR scores in this study also follows to some extent the findings from the CBITS study, where the impact of the intervention on the Teacher Child Rating Scale failed to reach statistical significance. The fact that a different teacher completed the TOCA-RR in first and third grades for almost three quarters of the students may also have contributed to greater difficulty detecting school effects.

One major limitation of the current study is the loss to follow-up both before and after the intervention of nearly half of the original sample. Although it is impossible to know whether these losses introduced systematic errors that may have biased our conclusions, after adjusting for all variables that had been found to be associated with workshop participation and/or with loss to follow-up after the workshops, the association between workshop attendance and improved behavioral and academic functioning remained statistically significant.
Another limitation of our study is that the SFL intervention program did not randomly assign students to the school-based intervention or a control group, and thus it is not possible to conclude that the observed improvements in outcomes were due solely to the intervention. Additionally, when follow-up surveys were completed in third grade, most parents and teachers were probably not blind to students’ participation in the workshops, and thus their ratings in the third grade may have been biased in some way. A third limitation of this study is that about 10% of the students originally assigned to the intervention group were lost to follow-up after first grade and another 30% failed to complete the follow-up measures in third grade. As in the US, where the rates of student turnover are high in schools in low-income communities, program officials from Chile report that 15%-20% of the students in these low-income, high-risk schools change schools each year and are thus lost to follow-up given that data collection occurs only in participating schools. This attrition rate is the primary reason for the loss of longitudinally matched data. Although it is not possible to be sure that missing data on 40% of the sample did not bias our analyses in some way, the regression analyses did control for all variables that were associated with missing data on workshop attendance and/or reassessment in third grade and still showed that the relationships between workshop attendance and improved outcomes were significant.

A final limitation is that we do not know which community-based mental health services these students received over and above the workshop interventions at school. The psychologists at each school recorded which students they referred to outside specialists for the most serious problems but had to rely on parent reports of whether children had received treatment by third grade. In any event, neither of these two variables changed the results reported here when they were included in the analyses.
Despite these limitations, there are a number of strengths in this naturalistic longitudinal design. The data were collected as part of routine implementation of the program and not for research purposes and therefore confer a kind of real-world validity. Further, the significant impact of the program on school record-based variables such as end-of-year promotion and school attendance speaks directly to the relevance of the intervention—and of mental health—to academic outcomes.

These observational results cannot prove an association between participation in mental health workshops and improved outcomes for students. However, based on these and other positive reports about the program, the government of Chile has decided to go ahead with a major expansion of the program, adding several hundred new schools beginning in 2015. The expanded program includes a follow-up evaluation using a waitlist-controlled randomized clinical trial design that will permit an experimental test of the program’s impact. Additionally, analyses exploring the impact of the parent and teacher workshop participation (the other interventions provided by this program) are well underway in another paper by our group.

Previous studies of the SFL program\textsuperscript{16,17} had shown the powerful negative association between psychosocial dysfunction and achievement test scores, grades, and attendance. This study is the first to provide empirical evidence that a large-scale preventive intervention for mental health has a significant positive association with improved student behavioral and academic outcomes. This in turn suggests that this kind of intervention may be a viable way to obtain improvements in outcomes for students and should be considered by educators as well as mental health professionals a standard component of school programs in low-income areas. By making a national commitment to improving the educational achievement of its most vulnerable students through an innovative mental health program employing comprehensive and continuing
evaluation, the government of Chile has set an international standard of excellence that should inspire other countries.
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Figure 1. Inclusion and exclusion criteria for the 3,935 student analytic subsample. Note: TOCA-RR = Teacher Observation of Classroom Adaptation-Revised. * Before completing any analyses, we cleaned the original dataset of 55,061 cases with first year data and removed all irrelevant cases. We removed all students younger than 5 years (n = 3,217) and older than 8 years (n = 361) and all students who were reported as having failed 1st grade, withdrawn from school, or otherwise left the cohort (n=3,944), leaving a valid first year sample of 47,539. ** All covariate analyses were conducted on the 7,051 at-risk subsample referenced here.
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Table 1. Demographic Information at Baseline

<table>
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<th>Full Baseline Sample&lt;sup&gt;a&lt;/sup&gt; (n=43,023)</th>
<th>Not At Risk Subsample&lt;sup&gt;b&lt;/sup&gt; (n=22,481)</th>
<th>At Risk Subsample&lt;sup&gt;c&lt;/sup&gt; (n=3,935)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOCA-RR Risk, n(%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Grade</td>
<td>7,051 (16.4)</td>
<td>0 (0.0)</td>
<td>3,925 (100)</td>
</tr>
<tr>
<td>Gender, n(%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>21,815 (50.7)</td>
<td>11,012 (48.9)</td>
<td>2,200 (55.9)</td>
</tr>
<tr>
<td>TOCA-RR Score, M(SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Grade</td>
<td>80.21 (27.63)</td>
<td>71.88 (21.89)</td>
<td>118.57 (17.68)</td>
</tr>
<tr>
<td>PSC-CL Score&lt;sup&gt;c&lt;/sup&gt;, M(SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Grade</td>
<td>54.12 (8.63)</td>
<td>53.04 (8.16)</td>
<td>58.58 (8.76)</td>
</tr>
<tr>
<td>Percent School Attendance, M(SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Grade</td>
<td>91.91 (6.99)</td>
<td>92.57 (6.33)</td>
<td>91.11 (7.46)</td>
</tr>
<tr>
<td>Average No. Workshop Sessions, M(SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Workshop Sessions (0-10)</td>
<td>1.13 (3.14)</td>
<td>--</td>
<td>7.68 (4.08)</td>
</tr>
</tbody>
</table>

Note: PSC-CL = the Pediatric Symptom Checklist–Chile; TOCA-RR = the Teacher Observation of Classroom Adaptation–Revised.

<sup>a</sup> Students with (1) complete TOCA-RR screen; and (2) complete data on all first grade demographic variables.

<sup>b</sup> Students in this subsample form the primary analytic subsample. These students were (1) screened at-risk on the TOCA-RR in first grade; (2) had complete data on all first grade demographic variables; and (3) had longitudinally matched TOCA-RR data.

<sup>c</sup> PSC data was available for 35,606 students in the full baseline sample, 19,223 students in the not at-risk subsample, and 2,504 students in the at-risk subsample.
Table 2. Continuous Students’ Workshop Attendance Predicting Changes in Continuous and Categorical Behavior and Academic Outcomes From First to Third Grade With Classroom Level Clustering

<table>
<thead>
<tr>
<th>Outcomes Assessed With Continuous Variable</th>
<th>Unadjusted Model</th>
<th>Adjusted Model&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( B )</td>
<td>( r^2 )</td>
</tr>
<tr>
<td>Change TOCA-RR total score ( (n = 3,935) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sessions student attended</td>
<td>-0.25</td>
<td>0.002</td>
</tr>
<tr>
<td>Change in PSC-CL total score ( (n = 2,504) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sessions student attended</td>
<td>-0.14</td>
<td>0.004</td>
</tr>
<tr>
<td>Change in Percent School Attendance ( (n = 3,935) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sessions student attended</td>
<td>0.07</td>
<td>0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcomes Assessed With Categorical Outcomes</th>
<th>Unadjusted Model</th>
<th>Adjusted Model&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( B )</td>
<td>Wald (df)</td>
</tr>
<tr>
<td>Remained At-Risk on the TOCA-RR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sessions student attended</td>
<td>-0.02</td>
<td>8.11 (1)</td>
</tr>
<tr>
<td>Remained At-Risk on the PSC-CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sessions student attended</td>
<td>-0.05</td>
<td>15.66 (1)</td>
</tr>
<tr>
<td>Stayed Back After 3&lt;sup&gt;rd&lt;/sup&gt; Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sessions student attended</td>
<td>-0.05</td>
<td>16.92 (1)</td>
</tr>
<tr>
<td>Low (&lt;85%) School Attendance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sessions student attended</td>
<td>-0.05</td>
<td>28.51 (1)</td>
</tr>
</tbody>
</table>

Note: OR = odds ratio; PSC-CL = the Pediatric Symptom Checklist–Chile; TOCA-RR = the Teacher Observation of Classroom Adaptation–Re-Revised.

<sup>a</sup> Linear regressions for continuous number of workshop sessions participated in predicting changes in TOCA-RR and PSC-CL controlled for significant predictors of workshop participation (advanced or failed school after kindergarten, same/different teacher in first and second grades, region, gender, percent school attendance in first grade, age at the beginning of first grade, participation in Sename Servicio Nacional de Menores (Sename), Chile Solidario, grade point average in first grade, and school type). All analyses also controlled for specific classroom through classroom level clustering.

<sup>b</sup> Logistic regressions for continuous number of workshop sessions participated in predicting changes in TOCA-RR and PSC-CL controlled for significant predictors of workshop participation (advanced or failed school after kindergarten, same/different teacher in first and second grades, region, gender, percent school attendance in first grade, age at the beginning of first grade, participation in Sename, Chile Solidario, grade point average in first grade, and school type). All analyses also controlled for specific classroom through classroom level clustering.

*p<.05, **p<.01, ***p<.001
Table 3. Categorical Workshop Participation Predicting Changes in Behavioral and Academic Outcomes From First to Third Grade

<table>
<thead>
<tr>
<th>Continuous Outcome Measure Scores&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Student participated in fewer (0-6) sessions (n = 895) Mean (SD)</th>
<th>Student participated most (7-10) sessions (n = 3,040) Mean (SD)</th>
<th>Overall difference (Cohen’s d)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOCA-RR score</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Grade</td>
<td>119.56 (17.82)</td>
<td>118.28 (17.64)</td>
<td>--</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Grade</td>
<td>103.44 (26.05)</td>
<td>99.79 (26.11)</td>
<td>--</td>
</tr>
<tr>
<td>Change from 1&lt;sup&gt;st&lt;/sup&gt; to 3&lt;sup&gt;rd&lt;/sup&gt; Grade</td>
<td>-16.12 (26.20)</td>
<td>-18.49 (25.80)&lt;sup&gt;*&lt;/sup&gt;</td>
<td>2.37 (.09)&lt;sup&gt;o&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>PSC-CL score</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Grade</td>
<td>59.02 (9.03)</td>
<td>58.23 (8.66)</td>
<td>--</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Grade</td>
<td>59.79 (9.23)</td>
<td>57.59 (8.98)</td>
<td>--</td>
</tr>
<tr>
<td>Change from 1&lt;sup&gt;st&lt;/sup&gt; to 3&lt;sup&gt;rd&lt;/sup&gt; Grade</td>
<td>0.77 (8.66)</td>
<td>-0.64 (9.05)&lt;sup&gt;*&lt;/sup&gt;</td>
<td>1.41 (.16)&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>School attendance percentage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Grade</td>
<td>90.28 (8.26)</td>
<td>91.36 (7.20)</td>
<td>--</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Grade</td>
<td>89.28 (11.26)</td>
<td>91.18 (9.74)</td>
<td>--</td>
</tr>
<tr>
<td>Change from 1&lt;sup&gt;st&lt;/sup&gt; to 3&lt;sup&gt;rd&lt;/sup&gt; Grade</td>
<td>-1.00 (11.48)</td>
<td>-0.18 (9.64)&lt;sup&gt;*&lt;/sup&gt;</td>
<td>0.82 (.08)&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Categorical Outcome Measure Scores&lt;sup&gt;e&lt;/sup&gt;</th>
<th>Student participated in fewer (0-6) sessions, n(%)</th>
<th>Student participated most (7-10) sessions, n(%)</th>
<th>OR&lt;sup&gt;f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remained at risk on TOCA-RR (n=3,935)&lt;sup&gt;g&lt;/sup&gt;</td>
<td>372 (41.6)</td>
<td>1,098 (36.1)</td>
<td>.84&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>Remained at risk on PSC (n = 2,504)&lt;sup&gt;h&lt;/sup&gt;</td>
<td>149 (31.0)</td>
<td>405 (22.2)</td>
<td>.73*</td>
</tr>
<tr>
<td>Stayed Back After 3&lt;sup&gt;rd&lt;/sup&gt; Grade (n = 3,935)&lt;sup&gt;i&lt;/sup&gt;</td>
<td>112 (12.5)</td>
<td>240 (7.9)</td>
<td>.68**</td>
</tr>
<tr>
<td>Low (&lt;85%) School Attendance (n=3,935)&lt;sup&gt;j&lt;/sup&gt;</td>
<td>231 (25.8)</td>
<td>507 (16.6)</td>
<td>.66***</td>
</tr>
</tbody>
</table>

Note: OR = odds ratio; PSC-CL = the Pediatric Symptom Checklist–Chile; TOCA-RR = the Teacher Observation of Classroom Adaptation–Re-Revised.

<sup>a</sup> One-way, analysis of variance.

<sup>b</sup> Difference between change scores for the two attendance groups = 2.37, Cohen’s d = .09, p=.02.

<sup>c</sup> Difference between change scores for the two attendance groups = 1.41, Cohen’s d = .16, p=.001.

<sup>d</sup> Difference between change scores for the two attendance groups = 0.82, Cohen’s d = .08, p=.03.

<sup>e</sup> Percent of student distribution calculated from chi square crosstabs.

<sup>f</sup> ORs computed by logistic regression after controlling for all 10 demographic covariates and classroom-level clustering.

<sup>g</sup> Logistic regressions show that student workshop attendance significantly predicts change in TOCA-RR Risk: B=-.17, Wald’s X² = 173.69 (1), OR = .84, 95% CI (.70, 1.01), p=.06.

<sup>h</sup> Logistic regressions show that student workshop attendance significantly predicts change in PSC Risk: B=-.31, Wald’s X² = 148.37 (1), OR = .73, 95% CI (.57, .95), p<.05.

<sup>i</sup> Logistic regressions show that student workshop attendance significantly predicts school promotion: B=-.38, Wald’s X² = 240.17 (1), OR = .68, 95% CI (.52, .89), p<.01.

<sup>j</sup> Logistic regressions show that student workshop attendance significantly predicts low school attendance rate in third grade: B= -.41, Wald’s X² = 324.42(1), OR = .66, 95% CI (.53, .83), p<.001.

* p<.10, ** p<.05, *** p<.01, **** p<.001
Supplement 1

Skills for Life Intervention Workshops and Session Schedule
The program provides 15 sessions during second grade (after screening and eligibility determination in first grade).

Work With the Children (10 sessions/5 phases): The program has specific group focus based on color that represent competencies expected to develop as a result of the intervention—yellow (social abilities, autonomy, self-sufficiency, self-esteem); blue (self-control, social abilities, empathy); and green (sociability, conflict resolution, self-esteem).

- Phase 1 - Orientation and group integration (reception of children to workshop and orientation of group identity).
- Phase 2 – Agreed-upon norms and limits (orientation to the acknowledgement of own norms and limits, those of others, and the construction of adequate norms and limits).
- Phase 3 – Emotions (orientation to the identification and expression of positive and negative emotions).
- Phase 4 – Conflict resolution (orientation to rehearsing non-violent conflict resolution techniques).
- Phase 5 – Closing (integration of experiences and workshop closure).

Work With teachers (2 sessions): Presentation of child mental health and discussion of managing students’ problems.

The first session with the teachers takes about 30 minutes per child and is scheduled prior to the start of workshops (usually at the beginning of the school year, which in Chile, runs from early March to the end of December of each calendar year). The second session with the teachers is at the closure of the process.

Work With Parents (3 sessions): Presentation of child mental health and discussion of managing students’ problems.

- Session 1 – Prior to the start of the meetings with children (March or August).
- Session 2 – Between sessions with children (weeks 5 and 6)
- Session 3 – At the end of the workshop (part of closure).
n = 47,539<sup>a</sup>
Students with complete teacher (TOCA-RR) screens in 1<sup>st</sup> grade

n = 43,023<sup>b</sup>
Students with complete data on all 1<sup>st</sup> grade variables
(At risk: n = 7,051; not at risk: n = 35,972)

n = 4,516
Excluded: Students who were missing data on one or more 1<sup>st</sup> grade Department of Education variables

N = 26,429
Students with longitudinally matched TOCA-RR data and all 1<sup>st</sup> grade variables (61% of all valid cases)

n = 18,457
Excluded: Students who were missing longitudinally matched TOCA-RR data

At-Risk Subsample:

n = 3,935
Students who were screened as being at risk on the TOCA-RR in 1<sup>st</sup> grade

Not At-Risk Subsample

n = 22,494
Students who were screened as not being at risk on the TOCA-RR in 1<sup>st</sup> grade