Impact Of Self-Regulated Use Of Computer-Based Social-Emotional Learning On Rural Adolescents At Risk For Alcohol Abuse

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ABSTRACT

High rural dropout rates and alcohol abuse persist despite efforts to reduce them. Adolescents at risk for these problems often resist preventive services. A real world, randomized controlled trial of Ripple Effects computerized, social-emotional learning intervention examined whether a) adolescents would comply with group requirements, and options for personal use of the software intervention; and b) if they complied, it would result in positive internal and external outcomes. 107 rural 8th and 9th graders participated. The intervention was self-regulated completion of 42 multimedia tutorials over seven weeks. Sixty-three percent of treatment group students who had access to the technology were compliant. Among those who complied, 95% also opted to explore self-selected content. ANOVAs indicated these students had significantly greater gains in perception of norms and risks about alcohol, and positive trends for marijuana. They were significantly less likely to attribute outcomes to Self, an unexpected finding for "ruggedly individualistic" rural students. T-tests indicated no significant differences between groups for GPA, absenteeism or discipline referrals. School structure, technology limits, and lack of adult monitoring contributed to intervention attrition.

KEY WORDS: rural; adolescent; alcohol; locus of control; computer-based training; self efficacy

BACKGROUND

Rural dropout rates and rural drug use are high and persist despite many intervention efforts (Provasnik et al., 2007; Van Gundy, 2006). Geographic dispersal of the population contributes to the difficulty of finding and sustaining supportive programs to address these problems (Johnson & Strange, 2007). Regardless of geography, youth at most risk are least likely to seek out services. In both rural and urban settings, substance abuse and lowered academic achievement are linked in a feedback loop.

The drug of most frequent choice among all groups is alcohol. Rates of use of alcohol by rural youth aged 12-17 are significantly higher than for urban youth. Among 16-17 year old rural youth, three in five reported drinking in 2003. Rates of alcohol *abuse* are also higher among rural youth. Rural youth aged 12-13 are more than twice as likely as urban youth to abuse alcohol (Van Gundy, 2006). Rural marijuana use is a greater problem in areas where its cultivation and sale is part of the local economy, than in areas where it is not easily accessible. In recent years, researchers have documented an increase in methamphetamine use in rural areas, but the main problem continues to be alcohol.

Self-efficacy, the belief in one's ability to master context-specific requirements of an intended end, has been linked to higher rates of school success and lower rates of substance abuse, including alcohol, among adolescents (Bandura, 1997; Pajares & Urdan, 2006). The physical isolation that characterizes rural life and contributes to a widespread ethic of "rugged individualism" might be expected to promote self-efficacy. It does fosters self-reliance, but that is a different trait. People may believe their lives depend largely upon their own effort, and still not believe they have the capacity to master what it takes to control their lives.

Rural peoples' lives are closely tied to unpredictable acts of nature and to industries like coal and timber, which are controlled by government policies and financial interests far from where they live. When the normal uncertainties of adolescent development are added to the mix, the result may be less a sense of personal power, than a feeling of being stranded in the world with one's freedom, but without a clear sense of how to use it to advantage.

In small, tight communities, where people know each others' business, seeking personal training or counseling to help resolve this dilemma is even less likely than in communities where anonymity is more possible. The question arises whether private, computerized, self-regulated, training might be an effective means to bring training and personal guidance that promote self-efficacy to rural youth who are reluctant to seek it out, and might have positive effects on objective and subjective school-related outcomes, including attitudes about alcohol and marijuana. Prior research has shown that adolescents at high risk of eating disorders resist seeking help, but use interactive, Internet delivered guidance because it is accessible, convenient and anonymous (Taylor, Winzelberg, & Celio, 2001).

Ripple Effects is a student-centered, self-regulated, evidence-based, computerized social-emotional learning (SEL) intervention that addresses a wide range of non-academic factors in school and life success. It can be configured to promote self-efficacy, as well as for other primary, secondary and tertiary interventions. It is in use in more than 500 school districts, including dozens of rural ones, across the United States. Data from two prior studies indicated the program had promising—but not proven—positive effects on school and behavioral outcomes, when used independently by students, without adult mediation of content, in real world, urban school situations (Ray, 1999; Stern & Repa, 2000). This report discusses one of a series of six concurrent National Institute on Drug Abuse (NIDA)-funded studies, begun in 2003, to systematically examine the impacts of Ripple Effects on attitudes, behavior and academic performance among diverse groups of adolescents in diverse school settings.

Purpose

The purpose of this real world study was twofold: to assess implementation process fidelity, and to evaluate intervention efficacy of Ripple Effects computerized intervention, in a resource-scarce, rural, high school setting.

METHOD

Research Design

The school-level study was a longitudinal, repeated measures, randomized controlled trial (RCT), conducted under real-world conditions,

without any direct involvement of program developers in delivery of the intervention. Individual students were the unit of analysis.

We tested these hypotheses:

(1) Under real world school conditions, if given the opportunity and access to technology: a) students would comply with group level requirements for use of the software; b) with no more than three hours of training on the intervention, staff would monitor and ensure that use; and c) students would accept an invitation to explore additional tutorials of personal interest.

(2) If treatment students had three or more hours of exposure to the computerized SEL intervention, their: a) school outcomes would improve; b) perceptions of harm and norms against use of alcohol and marijuana would increase; c) internal locus of control scores would increase, all when compared with control group students.

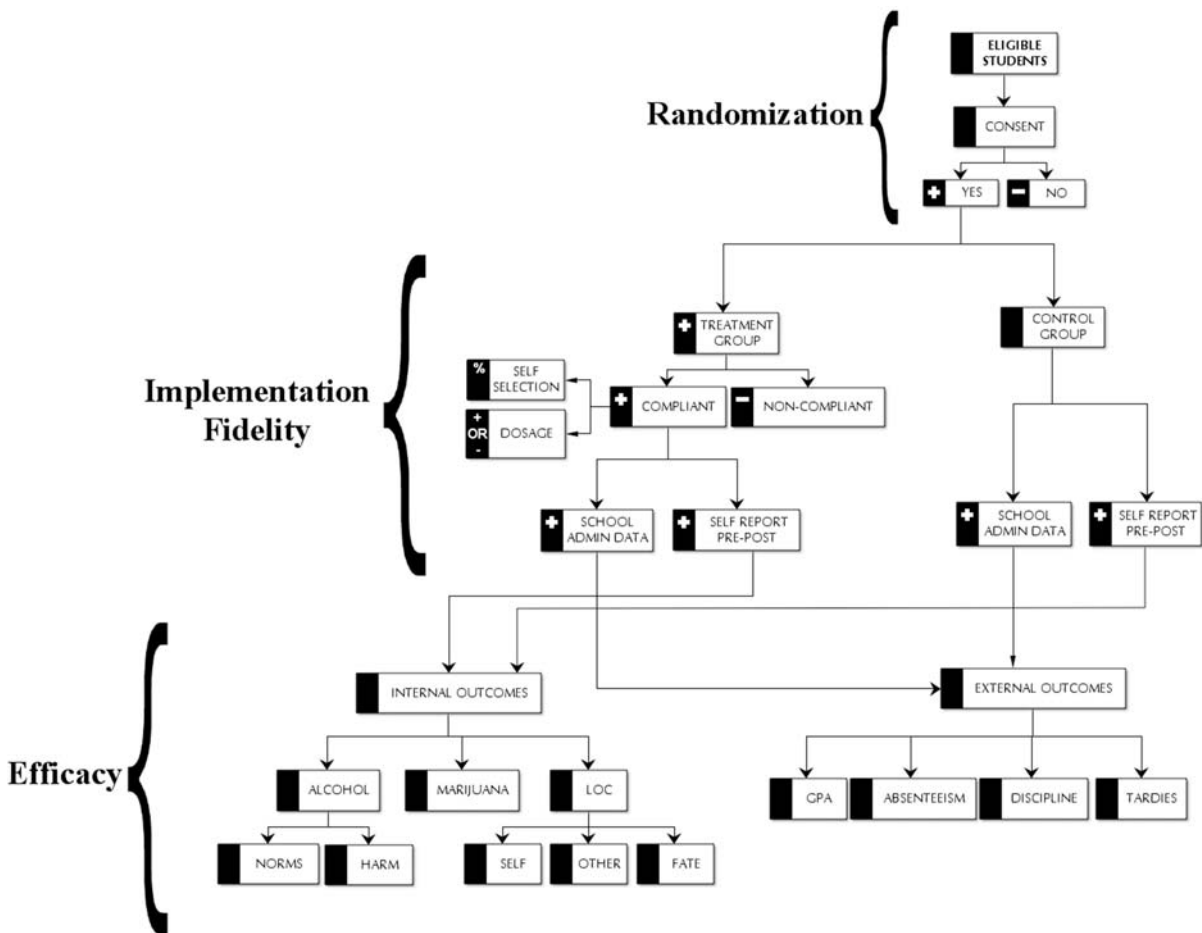Figure 1 provides a flowchart of the research design, including the process and outcome measures.

Figure 1: Flowchart of Research Design

Setting

The study was conducted at a rural high school on the western United States, serving 446 mostly Caucasian students in grades 8-12. Population density in the surrounding county is roughly 36 per square mile. Rural geography, an underground marijuana industry and a depressed timber industry shape the culture of this school and community. The school was described by one teacher as having an "alternative culture," characterized by "rugged individualism." There is a code of silence around kids whose parents are in the marijuana industry. Students share their parents' profound mistrust of government, government programs, and often, authority figures. Alcohol and marijuana are easily accessible to students.

The setting has many problems typical of schools with high turnover and constrained resources. Due to budget cuts, the school was functioning at 83% of its required staffing levels. The school had five principals in the previous six years. The site coordinator, a certified teacher with a focus on special education and behavior problems, estimated he spent at least 25% of instruction time dealing with behavior problems.

Participants

The sample included 129 8th and 9th grade students. Ninety-one percent were Caucasian, 2% were Native American, and the other 7% were even split between in African American, Asian, and Latino. Approximately 30% of students qualified for the free or reduced lunch program, a marker for low socioeconomic status. Fifty-four percent were female.

Assignment to Condition

Of the 129 eligible students, 22 denied consent up front. A staff member randomly assigned the remaining students to treatment (N=51) or control (N=56) condition based upon odd or even day of birth. Two staff members were then selected to monitor the intervention when those students passed through their classes.

Conditions of Use

Treatment condition. Adult implementers brought students to the library during either their English class, or computer elective, and assigned students 42 tutorials from a prefigured scope and sequence (roughly 10.5 contact hours) to complete over seven weeks. After completing their assigned tutorials, students were free to explore any of the remaining 136 tutorials to build strengths or address personal risk factors. Implementers (the 8th grade English teacher, and a special education teacher) did not stay with the treatment group students in the library. They returned to their respective classes to carry out their regularly scheduled instruction duties with the remaining (control group) students. These implementers were expected to check electronic scorecards to verify student completion of assignments, but were not given a free period of time in which to do it.

Control condition. Students in the control condition did "business as usual," either using their computer elective to pursue other programs, or receiving instruction in English class. The Ripple Effects intervention was made available to them at the end of the study.

Intervention

The intervention was a subset of tutorials from Ripple Effects software. At the time of this study, Ripple Effects teen version of computerized SEL training had 178 tutorials (390 as of 2008). It is designed to build protective factors, reduce risk factors, and solve problems in non-academic areas correlated with school success. The tutorials are reading-independent multimedia modules, which take about 15 minutes each, on average, to complete. They are comprised of photos, illustrations, videos, audio, peer-narrated text, and interactive exercises, with a hip-hop look and feel.

The specific configuration of the intervention examined here was designed to promote "self-efficacy." Self-efficacy is the context-specific belief in one's capacity to master what is needed to succeed (Bandura, 1997). Success in this case was defined by

schools as academic achievement and reduction in behavioral problems, and by researchers as positive changes in attitudes toward alcohol, marijuana and locus of control. A scope and sequence was designed to promote cognitive, social and emotional capacity-building toward those intended ends.

Twenty-one of the tutorials addressed "core components" of self-efficacy. Staff collaboratively chose 21 additional tutorials during a three-hour, pre-intervention training session, to address their students' needs. Two thirds of those topics related to addressing problems (i.e. tobacco, disconnected, racial slurs, dating abuse), and one third to promoting strengths (i.e. relaxing, showing care). All 136 remaining tutorials were available for students to privately address individual interests or problems.

Learning process. Independent of specific content, the *Whole Spectrum Learning System* that powers Ripple Effects SEL software (Figure 2) contains elements that have been linked to successful development of self-efficacy: guided mastery, self-regulated learning, observational learning, systematic self-reflection, transfer training, and skill rehearsal (Bandura, 1997; Pajares & Urdan, 2006). All of these modes of learning are introduced with a case study scenario (context-specific application). Additional elements of the system include continuous assessment of content mastery through interactive games; reading independence through peer narration and illustrations; narrative/story as teaching tool, including first person video true stories; and positive reinforcement for completion of the interactive learning processes.

Figure 2: Diagram of the Whole Spectrum Self-Regulated Learning System

Implementer Training

Three staff received a three-hour training session to familiarize them with the software, configure the scope and sequence to respond to site-specific needs, and prepare them to effectively introduce the intervention, monitor its usage, and supervise students' pre- and post-intervention completion of computerized self-report surveys, but not to deliver or mediate any content. Only one the three was an implementer.

Outcome Measures

The analysis included multiple quantitative and qualitative, process and outcome measures.
Quantitative process measures. Quantitative process measures included enrollment attrition, study attrition, intervention attrition (compliance), dosage and self-selection of optional tutorials.

We classified as "enrollment attrition" the percentage of students for whom there was no pre or post-intervention administrative data, because their family had moved or they had been removed from school. We classified as "study attrition" the percentage of students who were physically enrolled in school, but dropped out of the study, either because they withdrew consent, because they could not gain access to the technology, or they failed to complete the pre and post tests. We classified as "intervention attrition" the percentage of students who had consented to the study, and had access to the technology, but, for whatever reason, were non-compliant. That is, they did not have minimal exposure, defined as completion of at least 12 tutorials (equivalent to three contact hours, or 29% of the total assigned content). For all compliant students, "dosage" measured the level of exposure to the required tutorials. We included in efficacy and dosage analysis those treatment group students who had at least three hours exposure to the software program. Exposure to student self-selected content was a yes or no event; we did not analyze that dosage.
Quantitative outcome measures. Quantitative outcome measures included no

fewer than 12 measures of concept mastery, five objective school achievement measures, and two self-report measures. The measure of concept mastery for each tutorial was a set of six multiple-choice questions, disguised as an interactive game. The tests were structured such that the game could not be completed and points awarded until every answer was correct. Students could experiment with answers until they arrived at the correct one. School achievement measures included grade point average (GPA), days absent, tardies, suspensions and discipline referrals.

Self-report measures included two computer-based surveys completed before and again after the intervention, on (1) attitudes toward alcohol and marijuana, and (2) perceived locus of control. Both self-report surveys were adaptations of previously validated instruments. The Monitoring the Future (MTF) survey measures norms and perceptions of harm about alcohol, marijuana and other drugs. The Multi-dimensional Health Locus of Control scales (MHLC) measure attribution of life events to internal (Self) or external (Fate/Other) factors. For both scales, Ripple Effects MTF (REMTF) and Ripple Effects Locus of Control (RELC), Ripple Effects adapted the format to peer-narrated, computerized delivery, with a hip-hop look and feel, and a game-like structure of reinforcement for any answer, with automated data collection. For the locus of control scales, Ripple Effects adapted the "Other" subscale to include other social forces, such as racism, as well as other powerful people.

The reliability coefficient for the REMTF scale on norms and perceptions about alcohol was 0.74, while the coefficients for marijuana norms (0.88) and risks (0.85) were sufficiently high to enable them to be analyzed separately. The RELC scales for Self and Fate both had pre- and posttest alpha values of 0.70. The alpha values for the Other scale, which included the substantive content adaptations, were 0.59 for the pretest and 0.71 for the posttest. Since the pretest did not meet the 0.70 criterion, we analyzed the posttest data alone with independent-samples t-tests.

Qualitative measures. Qualitative process and outcome measures included interview data on staff perception of program usage, barriers to use, and perceived value.

Data Collection

Compliance, dosage and concept mastery. Ripple Effects software automatically collected data on compliance and dosage rates. Dosage was directly tied to completion of the interactive games that measured concept mastery. If students were awarded points for a tutorial, it signified they had successfully provided all the correct answers to the quiz.

School data. School administrators provided pre-intervention demographic data, including Free or Reduced Lunch status, limited English proficiency (LEP), age, gender and ethnicity. They also provided enrollment attrition data, and data on GPA, absenteeism, tardies, suspensions, and discipline referrals for the first semester of the year of the study.

Self-report data. During the Fall of 2003, as part of their regular school activities, students completed the two computer-based, self-report surveys described above, before and within two weeks after the seven-week intervention. At least 12 weeks elapsed from teacher training to final survey.

Qualitative data. At several points along the way, the study coordinator conducted and documented phone interviews with the site program coordinator and implementers about both implementation fidelity and observable student outcomes. There were no site visits by outside observers to confirm staff perceptions.

Methods of Analysis

SPSS was used to run all of the analyses. Several methods of analysis were used, each appropriate to the kind of data being analyzed.

For administrative post-intervention data with normal distribution (GPA), we ran independent-samples t-tests comparing the means of the treatment and control groups.

For administrative data factors with non-parametric distribution, such as absenteeism and discipline, we ran the same tests, but also the Games-Howell posthoc test for pair-wise comparisons. Severely unequal variances can lead to increased Type I or Type II error, and, with smaller sample sizes, this effect can be increased. Games-Howell corrections are used when variances and group sizes are unequal.

The set of control variables included ethnicity, gender, LEP, and free or reduced lunch status, as a measure of socioeconomic status.

For the self-report data with pre and post values (the REMTF norms and risks scales, and the Fate and Self RELC scales), we ran repeated-measures analysis of variance (ANOVAs) with a between-subjects factor (study group) correction. For the Other RELC scale, since the pretest did not meet the 0.70 criterion, we analyzed these posttest data alone with independent-samples t-tests.

To establish dosage, Ripple Effects software created a password-protected file for each student and tracked completion of interactive exercises for each tutorial, assigning 100 points per exercise. These data were exported from each computer, with names decoupled from identifying numbers, and then data aggregated in centralized files. Dosage was calculated from the point count of each student's total number of completed interactive exercises, which divided by an average completion rate of four per hour, resulted in per-student hours of exposure.

To see if the number of hours of exposure to Ripple Effects was associated with differences in outcomes, we ran bivariate Pearson product-moment correlations. In cases where there was pretest data, we ran partial correlations on the posttest data that controlled for the effect of the pretest covariate. For each set of correlations, we used the Bonferroni method to minimize the chances of making a Type I error.

RESULTS

Baseline Equivalence

There were no significant differences at baseline between the two groups on any of the self-report measures. Pretest alcohol scores of both treatment and control students at this site showed about 25% less disapproval of teen use

of alcohol than urban students in studies conducted simultaneously (Author names withheld, 2008). Despite almost three years of effort, we were unable to obtain prior year administrative data from the school district to determine if any differences existed on any school performance measures at baseline.

Process Outcomes

A combination of insufficient staff, loose structure and technology constraints created implementation difficulties throughout this study.

Implementer training. One implementer, plus the principal and the technology support person, attended the three-hour training. Only near the end of the training session did they identify the English teacher as the second implementer. They brought him in to the session with just 30 minutes remaining. As a result, the second implementer received almost no training.

Technology-related issues. There were insufficient computers available in the library to meet the needs of all the treatment group students, creating competition for resources. The fact that the computers were located in the library, but the adult monitors were not, made monitoring compliance almost impossible.

Enrollment attrition. Enrollment attrition consisted of just one TG student who moved (1%). Some elements of administrative data were missing for 6% of TG and 4% of CG students still enrolled.

Study attrition. Of the enrolled TG students (N=50), seven withdrew consent, and eight could not access technology to get pretested in time, for a total of 30% study attrition in the TG (remaining N=35). Of the enrolled CG students (N = 56), four withdrew consent and five could not be tested, for a total of 16% study attrition in the CG (remaining N=47).

Intervention attrition. Of the 35 students left in the TG, 13 did not fulfill the minimum three hour dosage requirement to be considered

compliant with the intervention, a 39% non-compliance or intervention attrition rate (TG N= 22 for school outcomes efficacy analysis).

Of those TG students who complied, 10 (29%) did not complete either the pre or post self-report surveys, leaving 12 TG students in the sample for efficacy analysis of pre-to-post self-report data. Sixty-percent of CG students did not complete either the pre or the post test (CG N=19 for self-report analysis).

Because the intervention attrition rate resulted in unbalanced treatment and control group sizes, we randomly sub-sampled the control group to match the treatment group size. This resulted in some control students having only administrative data, and others having only self-report data, with the remaining having both. The different sample sizes are indicated in each table of findings.

Dosage. Mean dosage for those who complied was 29 topics, or 74% of total required topics, and approximately 7.5 contact hours, depending on student pace.

Participation in self-selection option. Ninety-five percent of the TG students chose to explore tutorials beyond those assigned. They explored eight additional topics on average.

Quantitative Self-report Outcomes

Alcohol norms and risk. Treatment group students had higher gains from pre to post on perception of harm about, and norms against the use of marijuana than the control students. The difference was significant, $p = 0.013$ (Table 1).

Marijuana norms and risk. Treatment group students had higher gains from pre to post on perception of harm about and norms against the use of marijuana than the control students. Neither score was statistically significant. However, the results were clinically meaningful, as can be seen in Table 1.

Table 1.
Differences in Changes in Norms and Perceptions about Alcohol and Marijuana, by Condition

	Pre	Post		Pre → Post
	M (SD)	M (SD)	Change	Difference in Changes between Groups
Alcohol Norms & Risk				5.67*
Treatment	12.17 (3.79)	14.25 (4.71)	2.08	
Control	14.42 (4.06)	10.83 (3.81)	-3.59	
Marijuana Norms				1.16
Treatment	4.42 (2.07)	5.83 (3.46)	1.41	
Control	4.75 (2.09)	5.00 (2.17)	0.25	
Marijuana Risk				2.75
Treatment	6.25 (3.11)	8.17 (3.81)	1.92	
Control	6.25 (2.96)	5.42 (2.35)	-0.83	

Notes: Sample consists of 12 students in the TG and 12 in the CG. Statistically significant differences in changes between treatment and control groups – *$p < .05$. Higher numbers mean greater perception of risk or disapproval.

Table 2.
Pre- and Post- Scores and Differences in Changes in Locus of Control by Condition

	Pre	Post		Pre → Post
	M (SD)	M (SD)	Change	Difference in Changes between Groups
Internal-Self				2.92*
Treatment	25.33 (3.87)	26.75 (4.39)	1.42	
Control	30.42 (5.16)	28.92 (5.88)	-1.50	
External–Fate				-0.49
Treatment	36.58 (3.92)	33.50 (5.95)	-3.08	
Control	37.67 (5.02)	35.08 (7.63)	-2.59	

Notes: The sample consists of 12 students in the TG and 12 in the CG. Statistically significant differences in changes between treatment and control groups – * $p < .05$; Higher numbers represent greater disagreement with the scale.

Locus of control. Control group students were more strongly aligned with the Self scale than the treatment students, and this difference was significant, $p = 0.02$ (Table 2). This means the treatment students were less likely to attribute outcomes to themselves than were the control students. On the Fate scale, difference in gain scores was negative. This means that, compared to the control students, the treatment students were also less likely to attribute consequences to Fate by the end of the study. Treatment students were slightly more likely than the control students to agree with items attributing consequences to Others (Table 3). Neither of the latter two differences was significant.

Table 3.
Differences in Locus of Control-Other by Treatment and Control Group

	Treatment	Control	Difference
	M (SD)	*M (SD)*	
External–Other People & Structures	32.08 (5.18)	34.08 (4.17)	-2.00

Note: Sample consists of 12 students in the treatment group and 12 in the control group.
Higher numbers represent greater disagreement with the scale.

Table 4.
Differences in School Achievement for Ripple Effects and Control Students

	Treatment (n=22)		Control (n=19)			
Outcome	*M*	*SD*	*M*	*SD*	Difference	Cohen's *d*
GPA	2.88	0.82	3.31	0.53	-0.44	0.63
Absenteeism	0.00	0.00	0.00	0.00	0.00	0
Tardies	1.64	2.19	0.95	1.87	0.69	0.40

Table 5.
Differences in Mean Discipline Referrals for Ripple Effects and Control Students

	Treatment (n=22)		Control (n=22)			
Referral	*M*	*SD*	*M*	*SD*	Difference	Cohen's *d*
Assault	0.00	0.00	0.05	0.21	-0.05	0.34
Cut class	0.00	0.00	0.05	0.21	-0.05	0.34
Defiant or disruptive	0.18	0.40	0.09	0.29	0.09	0.26
Tardy	0.00	0.00	0.05	0.21	-0.05	0.34
Total discipline referrals	0.18	0.39	0.23	0.53	-0.05	0.11

Quantitative Objective Outcomes

Concept mastery. Analysis of points awarded for completion of multiple-choice games provided evidence that compliant treatment group students demonstrated at least short term mastery of no fewer than 12 key concepts, and average of 29.

School achievement measures. There were no significant differences between groups on any school achievement measures (Table 4). GPA for the treatment group was almost a half a point lower than the control group. This is a clinically meaningful difference, though not a statistically significant finding. Grades were higher overall for all students, and a larger percentage of all students (11%) had a 4.0 GPA in this study than those in any of the other studies in this series (Author names withheld, 2008). Data provided indicate no absences whatsoever by either treatment or control group. Control students were slightly less likely to come to class late than their peers in the treatment group, but the difference was not significant. Discipline referrals rates were low overall (Table 5). Scores for discipline-related offenses were in both directions, with no significant differences between treatment and control groups. The school reported no suspensions during the intervention period for either group.

Dosage effects. There were no significant correlations between dosage and outcomes at the .002 level (Table 6).

Table 6.
Correlations Between Dosage, GPA, Absences, Tardies, and Suspensions

TG (N=22)	GPA	Absences	Tardies	Suspensions
r	0.34	a	-0.34	a

a: Value could not be computed because at least one of the variables is missing or constant.

Qualitative Data: Staff Reports

Interviews with the school site coordinator indicated there were serious problems with the implementation process, in terms of staffing and technology capacity, that were related to limited resources. The computers available for use were in the library, but neither implementer was close to the library. They brought students to the library, then left them to return either their respective classrooms. Thus implementation responsibilities directly competed with normal instructional responsibilities during the same time period. Not surprisingly, neither consistently monitored scorecards or checked for completion of the journal (an interactive, core component). Neither ensured student completion of the pre and post surveys, resulting in gaps in data.

The English teacher engaged both treatment and control students in discussion about topics that were introduced in the software. Ordinarily this would be a positive extension of the program, but in this case, it may have "contaminated" half of the control group students. Student compliance may also have been affected by an overall loose school structure. If those constraints were not already enough to thwart successful implementation, a forest fire in the region shut the school down for over a week, affecting all school operations, including this study, for the rest of the semester.

Despite all these limitations, the site coordinator reported observing the Ripple Effects intervention having a positive impact on student behavior. He gave as an example, a boy—not in the study—who was on the verge of expulsion and had ruptured relations with his peers, his teachers, and his last remaining advocate, the vice principal. He was required to complete the Ripple Effects intervention as a condition of staying in school. After only one session with the software, he shared with the counselor that a history of physical abuse was

at the root of many of his actions. The abuse was reported. Over the next few weeks he repaired his school-based relations and successfully finished the semester.

DISCUSSION

Implications for Practice

Findings from study reflect both the striking potential and the frustrating limitations of implementing a student-regulated, computer-based, social-emotional learning program in a real world school situation, where resources are short and staff are already stretched thin.

The fact that 95% of students who were even minimally compliant with the group level intervention opted also to seek private guidance on personal matters is a striking process outcome, especially since these students tend to mistrust authority, wherever it resides. We believe the combination of complete privacy, teen-friendly hip-hop "attitude," and peer audio narration that freed the program from association with adult authority and made it mostly reading independent, were key factors in reducing the resistance of these rural students to seeking individualized guidance.

In terms of outcomes, the compliant treatment group's significantly greater gains on norms and perception of harm about alcohol are important. Alcohol is by far the most used and abused drug among these rural youth. Trends in the same direction for marijuana norms and perception of harm are clinically meaningful. They are at a level of effect nearly twice what is often a statistically significant effect size in larger studies. They were gained in setting where marijuana is an important part of an underground economy, and medical use of marijuana has been legalized. If replicated, these results indicate that delivering evidence-based substance abuse prevention via the

computer could make it more widely accessible to rural adolescents.

Not all outcomes were in the direction expected. The significantly lower gains of the treatment group versus the control group on the "Self" scale is intriguing. It is logically consistent with the lower scores on "Fate," and higher scores on attribution to "Others," though neither were statistically significant. Initially this would seem to be a negative outcome. However, in the context of a community that is characterized as "ruggedly individualistic" it is possible that these results could also indicate a reduced sense of *isolated* self, and potentially stronger sense of connectedness to others, rather than a diminished sense of personal power. A much larger study would be needed to examine these relationships more closely.

The negative difference in GPA scores for the treatment group, while not statistically significant, is clinically important. It is inconsistent with results from all of the other five studies that were conducted simultaneously, including one at a middle school in this same rural county, where the higher treatment group scores were significant at the p<.01 level (Author names withheld, 2008). Several hypotheses could account for this divergent result. One is sampling error, due to the small sample size. Another is that the skewed curve for GPA increased the chance of error. There may have been differences at baseline, or attrition bias. The loss of instruction time for English class may have played a part. And of course, the intervention just may not have worked.

Implementation issues. Given the nearly impossible conditions these implementers were working under, the biggest surprise about the moderately high attrition rate is that it was not even higher. In conjunction with the qualitative data, it sheds important light on core implementation process requirements for a student-regulated, computerized program. We learned: Schools need to address technology capacity issues at the front end; implementers need to require, not just invite, use of the software as a group level intervention; adult monitors need to be in close proximity and actively monitor student use; staff do not need much training, but cannot do without it completely; and "Acts of God" occur often enough in the real world to justify planning for.

Study Limitations

Attrition rates and selection bias. The enrollment and study attrition rate of 23%, and the high differential rate between groups (31% TG vs. 16% CG) both shrank and compromised the sample. The further attrition due to missing self-report data (ultimately, just 24% of the original TG sample, and 34% of the original CG sample participated in the self-report testing) was sufficient to shrink the sample to a size that threatens validity, due to the possibility of both Type I and Type II errors, and may have introduced selection bias into what was otherwise a well-designed RCT. The Games-Howell statistical correction could reduce but not eliminate the possibility of these errors.

The absenteeism data are suspect. Theoretically the data collection period (72 out of 90 days of the first semester), coupled with the small sample size, could explain why no absenteeism is reported for either group, despite there being absenteeism for the school as a whole. However, for there to be no absences from the entire 7000 student/days covered by this study defies practical probability. The most likely explanation is it was not fully recorded. Since eligibility for state funding is tied to average daily attendance rates, and this school had already been subjected to severe budget cuts, it is possible that only "unexcused" absences were counted, and those were very narrowly defined.

Generalizability

This study examined the impact of a self-efficacy configuration of a particular software program, Ripple Effects. Results cannot validly be extended to other computer-based SEL interventions that do not use the same learning system, or cover the same content. These findings were gained from one study involving a narrow demographic group: rural, mostly Caucasian high school students. Results cannot

automatically be extended to other demographic groups and/or other settings. We have separately reported analyses of the impact of the intervention on urban African American and Latino students in four settings (Author names withheld, 2008). We think results from this study are best understood as part of the larger mosaic of effectiveness studies.

CONCLUSION

The data from this real world study contradict the hypothesis that simply providing an opportunity is enough to get students to use a self-regulated, computerized, SEL intervention, or to get implementers to effectively monitor it, but it supports the hypothesis that students who otherwise may be unlikely to seek out counseling will use the software to seek out personal guidance, once they have seen how it works, and some students will be motivated to complete the assigned intervention despite minimal adult monitoring.

The data also support the hypothesis that, with rural high school students, the intervention can be an effective tool for increasing norms against and perceived harm of the use of alcohol. Historically, across all groups, these attitudes have been directly correlated with reduced actual use of alcohol. Trends in the same direction on scores about marijuana suggest it may also be useful in reducing or preventing marijuana use as well.

The data do not confirm the value of this intervention as a means to increase internal locus of control; which may or may not be correlated with context-specific self-efficacy

The trends toward lower GPA, which is at odds with those from concurrent studies, was an unexpected finding. Positive trends in discipline referrals may be promising, but the lack of baseline administrative data limits the conclusions we can draw about either outcome. All of these things argue for a larger study. Perhaps even more, they argue for increased respect and appreciation for the many teachers who routinely have to cope with difficult, competing responsibilities and

somehow manage to still implement social-emotional learning programs, however imperfectly.

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