Impact of Computer-Based, Psycho-Social Training on Depression, Among Youth At Risk for Gang Involvement and Other Forms of Delinquency

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ABSTRACT

Youth in gang ridden neighborhoods are at risk of trauma-related mental health disorders, which are linked to school failure and delinquency. They rarely seek out services for these problems. A school-based gang prevention program in Los Angeles (JIPP) uses a computer-based social-emotional training program (Ripple Effects) as the psycho-social component of a comprehensive intervention that also addresses bio-behavioral, academic and family support issues. This case series measured the impact on depression of exposure to the computerized training among 163 students in the JIPP program. Four cohorts of students completed the Beck Depression Inventory at the beginning and end of the 18 week multi-component intervention. The intervention resulted in statistically significant score decreases for one cohort (p<.01) and for the four cohorts combined (p<.01). Limitations in the study make it impossible to attribute the changes solely to the Ripple Effects intervention. We present these findings as promising, but inconclusive.

KEY WORDS: depression; at-risk youth; trauma; gang prevention; Juvenile Intervention and Prevention Program

BACKGROUND

Trauma from exposure to family and community violence puts adolescents at-risk behaviorally, emotionally, and academically (Hawkins, Farrington & Catalano, 1998). It is linked to aggressive behavior and lower academic performance. It is also linked to lower levels of social competence and negative mental health outcomes, including posttraumatic stress symptoms, such as emotional numbing and increased arousal (Siegfried, Ko & Kelley, 2004). A consistent association has been found between traumatic exposure to interpersonal violence and both substance abuse and depression. Exposure to violence is associated with these negative mental health outcomes, even after taking into account other socio-economic and familial variables (Boney-McCoy & Finkelhor, 1995, 1996; Kessler et al., 1995; Resnick et al., 1997).

Hopelessness, self-blame, and lack of control can result from trauma. These feelings in turn can lead to overwhelming despair and an inability to imagine the future (Cole et al., 2005). Violence is both cause and effect in the spiral of emotional trauma. “Youth exposed to traumatic events present not just internalizing problems, such as depression or anxiety, but also externalizing problems like aggression, conduct problems, and oppositional or defiant behavior” (Ford, Chapman, Hawke, & Albert, 2007). Offending and other subsequent victimization typically occur following exposure to family and/or
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Community violence. Recent studies have proposed that trauma is the lynch pin between mental health states and the development and persistence of conduct disorder.

Many researchers agree with Susan Cole’s assertion that “Trauma is not an event itself, but rather a response to a stressful experience in which a person’s ability to cope is dramatically undermined” (Cole et al, 2005, p. 18). Evidence suggests that coping strategies can increase resilience in the face of trauma (Bonnano, 2005); that cognitive-behavioral strategies to change self-talk can be effective interventions for depression (Butler, Chapman, Forman, & Beck, 2006); and that cognitive-behavioral-mindfulness training can help prevent sub-clinical youth depression from reaching the stage of medical disorder (NIMH, 2004).

Some of these same strategies have been shown to directly reduce anti-social behavior as well. Training in social-cognitive-behavioral strategies, attention focusing, social-skill training and personal guidance have all been linked to improved outcomes (Lipsey, 2007).

However, youth who have been exposed to family and/or community-based trauma in poor, gang-ridden neighborhoods, rarely seek out mental health resources for training in these methods. Even if they do seek them out, those services are rarely accessible in their communities. Even when some services are available, the chance that the available service will be culturally competent, evidence-based and precisely matched to the particular background and individual risk factors of each young person is extremely low. To maximize protection, early intervention with traumatized young people is indicated, even though they often are resistant to receiving services (Kelley et al., 2004). The internet and computer technology offer new, more accessible ways to provide such treatment (Bandura, 1997).

The Juvenile Intervention and Prevention Program (JIPP), instituted by a coalition between the Los Angeles Unified School District (LAUSD) and the Los Angeles Police Department (LAPD), is a comprehensive program that seeks to address the interdependent variables that affect academic, social and mental health outcomes among students with multiple risks, who have exhibited delinquent or pre-delinquent behavior, in a community setting that is characterized by personal and collective trauma. The program provides evidence-based strategies to address risk factors in multiple domains: self, school, family and community. The comprehensive program includes various levels of support through the LAPD, California State University, Los Angeles graduate interns, LAUSD, and Belmont Senior High school personnel, as well as other intensified interventions.

The JIPP program has four concentrated micro-interventions: 1) Bio-Behavioral; 2) Psycho-Social-Emotional; 3) Academic; and, 4) Family System Support. The component to address psycho-social issues aims to reawaken the feeling of hope in these adolescents and empower them to take control of their future. It is centered on an evidence-based, computerized, social-emotional training intervention called Ripple Effects.

Ripple Effects is designed to build resilience and problem solving abilities through development of broad social emotional competence. JIPP’s LCSW chose it for the psycho-social component because of its close alignment with JIPP standards and goals. Research-based and LAUSD-approved, Ripple Effects is used by the district as an individualized alternative to suspension. A fundamental purpose of Ripple Effects at JIPP is to help students understand underlying reason(s) for engaging in anti-social, self-defeating and/or risky behaviors, and identify and enact positive strategies that will lead to academic and life success, despite obstacles. It helps increase adolescents coping strategies, and uses cognitive, behavioral, social skill, and attention focusing (mindfulness) strategies proven to be effective in reducing depression and PTSD in live settings. Cost of the program is $9900 for a site license.

Prior research has shown Ripple Effects to be an effective intervention on multiple levels. Data from a randomized control trial (RCT) with 157 middle school students indicated it increased two
key components of resilience: empathy and problem solving skills (De Long-Cotty, 2007). Six RCTs documented that the program is effective in raising grades, and reducing suspensions, among middle and high school students with multiple risk factors (Bass, Perry, Ray & Berg, 2008). In the six studies, data indicated clinically meaningful but not statistically significant lower discipline referrals rates in treatment groups, compared to control groups.

A quasi-experimental study involving 3,865 students from Bibb County Public Schools in Georgia, showed that exposure to Ripple Effects resulted in decreased discipline referrals and repeat referrals to In-school suspension (Norris, Ray, Berg, & Patterson, 2008). As importantly, that study revealed which personal risk factors students chose to address, when given the chance to do so privately through the computer. Data collected in the study, showed that regardless of the behavioral infraction, more than half of all youth selected tutorials related to abuse and trauma as part of their “therapeutic sanction.”

No prior study to date has examined the efficacy of the Ripple Effects program as an accessible, personalized mental health intervention to address depression among youth with multiple risk factors.

**Purpose**

The purpose of this study was to assess the impact of Ripple Effects computer-based training software on depression and related behavior among adolescents with multiple risks for negative academic, social and mental health outcomes, as one part of the JIPP intervention.

**METHOD**

**Research Design**

This was a repeated measures, longitudinal study, involving four cohorts over a two year period at a single school, with pre- and post- tests by cohort. There was no comparison group.

**Method of Assignment to Study**

Students were selected for participation in the program by deans, administrators, and counselors of the various schools that comprise the Belmont High School Community, as well as by Student Attendance Review Boards, the City Attorney, and the Department of Children and Family Services. These students were assigned to the program as an alternative to suspension, and/or positive intervention as prescribed by the LAUSD discipline foundation policy. Students were also referred by the juvenile court for truancy and other misdemeanors. Some were referred by parents who attended an informational meeting.

**Setting**

The setting for this study is the Belmont High School Community, located in the Pico-Union district of Los Angeles. The neighborhood has the highest concentration of immigrants, non-citizens, low-income families, households with second languages, and residents without a high school diploma in all of LA. It is notorious for housing two of the country’s infamous gangs, 18th Street and Mara Salvatruchas. These socio-economic factors put students at serious risk for academic failure, anti-social behavior, negative peer interaction and emotional injury and illness.

Belmont High School is the second largest high school in the country. Its graduation rate hovers around 55.6%, almost 30% lower than the California average. Approximately 70% of today’s ninth graders are not expected to graduate; 55% of those who make it past the ninth grade are expected to graduate. The school has recently been divided into several smaller schools, known as learning communities, all housed on the same campus.

**Study Sample**

163 students divided into four successive cohorts (three through six) participated in the intervention. The group was comprised of 2% elementary school students, 32% middle school students, and 66% high school students. The
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population was overwhelmingly Latino (91%). It also included 6% African American, 2% Asian, <1% Caucasian, and <1% Other. Seventy-one percent of the students in the group were male. This is a highly transient population, with some students moving in and out of corrections settings, and many students part of an undocumented, Latino underclass, traveling back and forth from their country of origin to pursue economic opportunities. All of these students had previously experienced school failure, most of them due to behavioral offenses. This population has been identified as being at very high-risk of dropping out, becoming involved in gang activity, and/or being involved with juvenile justice.

Human Subjects Protection

Both parental permission and student consent was required for participation in the JIPP program, including any medical tests or intervention. IDEA law requires early intervening assessment of kids who have risk of special ed or school failure. The Ripple Effects program is an LAUSD approved program for that intervention, thus was covered under the broader parental and student consent.

Intervention

Content base. In the Ripple Effects program, 390 tutorials (more than 5000 screens) collectively present a comprehensive body of strategies that have been shown to be effective in live instruction settings (Wilson, Lipsey, & Derzon, 2003). Lessons are organized into strengths (assets), problems (behavioral, academic, social), and reasons (risk factors “inside you” and “outside you” at individual, family peer, school, community and social structure levels). These tutorials are also cross indexed by concrete “challenges” in the domains of self, family, peers, school, community and larger society. By scrolling down a list displayed in a cell phone, users can directly access any of the topics in the index alphabetically.

Learning system. The tutorials are peer narrated, reading-independent, training modules, which take about 15 minutes each, on average, to complete. They are comprised of photos, illustrations, videos, sound, text, and interactive exercises, with a hip hop look and feel. The interactive screens of each tutorial were defined as core components, and were tracked via an electronic scorecard.

JIPP-specific configuration of Ripple Effects. JIPP introduced Ripple Effects after completion of a six week, bio-behavioral physical training designed to reduce resistance to psychological and behavioral change. Content drawn from the program was specifically configured to fit the overall goals of the JIPP program, and was delivered in two six-week courses. The first course, with a theme of empowerment, focused on building personal strengths. Specifically it was designed to promote core social-emotional competencies, which could increase resilience in the face of adverse situations and power good decision-making and positive social behavior. It included training in cognitive, behavior and mindfulness strategies that have been linked to self efficacy, resilience, reduced depression and rates of PTSD and improved academic achievement (Bandura, 1997; Benard, 2004; Butler et al., 2006; Zins et al., 2004).

The second six week course, was configured to promote leadership skills and address social responsibility. It emphasized practical problem-solving and conflict resolution skills, as a means to channel frustration, anger or depression into activism and civic participation. A major premise of the Ripple Effects program is that, if young people who have undergone personal trauma and social discrimination are expected not to drop out, or numb their pain with alcohol or drugs, then schools and communities must provide training not only in skills to survive the trauma, but in skills to change unjust social systems that are the source of much of their pain.

Intervention delivery. This was a real world intervention and study. No Ripple Effects personnel were involved in any aspect of intervention delivery. An Accredited Teacher and Special Education Coordinator administered the intervention. They introduced students to the
software and monitored compliance, but did not mediate any part of the content. All content for this part of the program was “in the box.” This served two functions: protecting student privacy, and preserving fidelity to science-based information and evidence-based practices.

The process for monitoring student dosage, and by proxy, implementation rates, was an automated one. Ripple Effects built-in data management system created a password-protected file for each student and tracked completion of interactive exercises, which are the core components of each tutorial.

The learning was self-paced and self-directed. Each topic represents approximately 15 minutes of exposure. Students who were absent for a particular session could make it up, thus increasing the chance of adequate dosage for each student. Students were assigned 2-3 topics per 30-45 minute sessions, once a week, for a period of twelve weeks, for an average of 7.5 contact hours per student. The sessions were rotated in the schedule with the Math and English classes.

The class sessions were divided into two activities. The first consisted of the thirty-minute computer lab session in which students worked individually through the prescribed interactive topics on their computers. Students were also able to privately explore tutorials to address their personal risk factors. Thus the program had both strength-building and risk-reducing functions.

The second part of the program was a forty-five minute break-out session in which students participated in group discussions about topics that came up in their personal exploration. Graduate level counseling interns, under the supervision of the Assistant Principal, a Licensed Clinical Social Worker (LCSW), guided these post-program discussions and were available for follow up questions. This latter activity is a different condition of use from prior experimental studies of the impact of Ripple Effects, where topics were assigned, but no public discussion was included.

**Implementer training.** The Assistant Principal/LCSW provided to the student interns a three hour training on how to introduce the program, put it in the context of empowerment and leadership, facilitate productive class discussion, and monitor individual student progress in completing assignments. The LCSW had previously been certified by Ripple Effects as authorized to conduct staff training for the intervention.

**Outcome Measures**

There were three levels of outcome measures: Psycho-social emotional (depression); behavioral (discipline referrals); and, academic (test scores). The depression measure was The Beck Depression Inventory (BDI, BDI-II) (Beck, 1988). This widely used, 21-question multiple-choice, self-report inventory was designed to measure the severity of depression in individuals aged 13 and over. It is divided into two kinds of questions: those related to symptoms of depression, such as sleep disturbance, fatigue, weight loss, hopelessness and irritability, and those related to “negative cognitions” that have been empirically associated with depression. Those negative cognitions are in turn broken down into three groups, about self, about others and about future. School discipline referrals measured behavior, while test scores served as the measure for academic performance.

**Data Collection**

Pre-intervention demographic data, including socioeconomic status, gender and ethnicity, was collected and provided by the school district. Study attrition rates were measured by the percent of students who dropped out of the program, during its course. In Spring and Fall of 2006 and 2007, as part of their participation in the JIPP program, students completed the BDI before (I) and again after (II) the eighteen-week intervention. The pre- to post-depression survey was self-administered. Student interns were available to assist and to answer questions in English or Spanish. Completed depression surveys were collected from students, and compiled at the end by the LCSW, with the aide of the math instructional coach to compile the data. School
administrators provided post-intervention outcome data on test scores, absenteeism, suspensions, and discipline referrals.

**Method of Analysis**

Excel’s Data Analysis Toolpak was used to run all of the analyses and calculate the summary statistics. We conducted independent-sample t-tests to compare the mean of the entry scores with the mean of the exit scores for each cohort of students, and for all cohorts combined, on the BDI. The t-tests assume that the two samples come from populations with unequal variances. This assumption is made because the sample sizes and sample variances of the entry and exit groups are substantially different. No statistical analysis were conducted for discipline referral and test score data.

**RESULTS**

**Attrition**

There was moderate attrition throughout the intervention. Rates varied by cohort, ranging from 49% of cohort three, to 29% of cohort six. The mean attrition rate for the 163 participants in the four cohorts combined was 40%, or 66 students. For those who did not complete the program, 46% were dismissed due to excessive absenteeism, 28% dropped out, 9% were suspended, 8% moved or transferred, 7% were withdrawn by parents, and one student was killed in a gang-related incident. Thirty-eight percent of males and 13% of females successfully completed the program.

**Impact on Depression**

There is a decline in average Beck Depression Inventory scores between students who were tested at entry and students who were tested upon exit of the 18-week intervention. Table 1 reports the difference in mean scores between entry and exit for cohorts three through six, and all cohorts combined. Average scores declined for each individual cohort; however, only cohort three exhibited a difference that is statistically significantly different from zero. The intervention also resulted in statistically significant score decreases for all cohorts combined.

Cohort three experienced a decline of 8.12 points on the Beck Depression Inventory. This represents a decrease of approximately 44 percent from the mean of scores at entry. Prior to the intervention, the average cohort three student was evaluated as experiencing “borderline clinical depression.” After completing the program, the average cohort three student was assessed as having a “mild mood disturbance.” The decline in scores for the other three cohorts ranged between 22 and 29 percent. The overall effect on all cohorts was a decline of approximately 30 percent.

After using the Ripple Effects, software-based intervention and completing the JIPP Program, the number of students who fit into the normal range increased from 35% to 66%, while the number whose answers classifies them as mildly depressed, or moderately depressed was 34%, and severely depressed was 0%. Mild mood disturbances, borderline clinical depression, and moderate depression all dropped upon completion of the program. The mean after the program was at 10.5, which is the low end of the mild mood disturbance category and just half a point above the normal category (Figure 1).
Table 1.  
Mean Score Differences from Entry to Exit on the Beck Depression Inventory

<table>
<thead>
<tr>
<th>Cohort</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Difference</th>
<th>t-statistic</th>
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</thead>
<tbody>
<tr>
<td>Cohort 3</td>
<td>37</td>
<td>18.59</td>
<td>11.09</td>
<td>19</td>
<td>10.47</td>
<td>9.77</td>
<td>-8.12*</td>
<td>-2.81*</td>
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<tr>
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<td>32</td>
<td>14.19</td>
<td>10.29</td>
<td>20</td>
<td>10.05</td>
<td>10.22</td>
<td>-4.14</td>
<td>-1.42</td>
</tr>
<tr>
<td>Cohort 5</td>
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<td>14.52</td>
<td>9.25</td>
<td>43</td>
<td>11.12</td>
<td>11.26</td>
<td>-3.40</td>
<td>-1.68</td>
</tr>
<tr>
<td>Cohort 6</td>
<td>21</td>
<td>14.52</td>
<td>9.00</td>
<td>15</td>
<td>11.40</td>
<td>10.38</td>
<td>-3.12</td>
<td>-0.94</td>
</tr>
<tr>
<td>Cohorts 3-6</td>
<td>163</td>
<td>15.38</td>
<td>9.93</td>
<td>97</td>
<td>10.81</td>
<td>10.48</td>
<td>-4.57*</td>
<td>-3.46*</td>
</tr>
</tbody>
</table>

Note: *p < 0.01.

Figure 1: Reductions In Mean Scores On Beck Depression Inventory From Entry To Exit, By Cohort, and For Cohorts Three to Six Combined.
Behavioral Outcomes

Since implementing JIPP, suspension rates have significantly decreased. The number of days of suspension has decreased by 50%, and the number of incidents of suspension has decreased by more than 90%. Suspension rates for disruptive/defiant behavior have decreased by more than 70%. The suspension rate for other behaviors such as harassment/threatening, damaged/stolen property, injury to person, and possession of dangerous objects have all decreased by more than 30%. These outcomes are consistent with findings from other studies on the impact of the Ripple Effects intervention on suspension rates.

Academic Outcomes

Most JIPP students showed improvement in both English and Math test scores after completing the program. One out of every four students gained 10% or more in their English test scores from pre-to-post intervention. Thirty-six percent of the students gained 10% or more in their Math test scores. In the English Academic class 56% of students showed an improvement, while 58% of students showed an improvement in Math.

DISCUSSION

Implications for Practice

The Ripple Effects software, as configured for the JIPP program, potentially offers promise as a scalable psycho-social intervention for youth with multiple risk factors. Findings from this pilot study have special relevance for those schools and districts that are dealing with gang activity, and/or have persistent, disproportionate representation of Latino students in disciplinary actions, or persistent gaps in achievement between these students and their Anglo and Asian American peers.

It is important to note that Ripple Effects was used as a supplemental intervention, in the context of a comprehensive program that addressed multiple levels of student needed. Data from this study confirm it can add value to, but in no way suggest it can replace, bio-behavioral and cognitive interventions designed to reduce risk and increase protective factors.

Because expertise is “in the box,” fidelity to evidence-based practice is assured without implementers needing substantial training. This greatly expands the number of people, such as the college interns here, who can effectively administer and monitor, what otherwise would be considered very specialized areas of psycho-social interventions. For this reason, it may be especially useful as a supplement to other treatment in juvenile justice and community settings where awareness of the mental health needs of troubled youth are high, but the capacity to deliver needed services is low.

Limitations of Study

Design. This was a real world intervention, which had an evaluation component; not a research study, which had an intervention component. The case series, with multiple cohorts and a validated instrument for pre and post measures, provided much stronger evidence than is often the case in real world intervention, but of course, does not have the same weight as a randomized, controlled trial or a quasi-experimental study with comparison group.

Multi-component intervention. JIPP is comprehensive and integrated, addressing cognitive, behavioral and psycho-social needs of the whole child. This approach, while obviously of great benefit to students, presents challenges and imposes limitations from the research side. By definition, several intervention factors are in play at once, thus we could not conduct valid componential analysis to make causal inference about any of them. In particular, although academic and behavioral outcomes were consistent with prior studies of Ripple Effects, they cannot be attributed solely to that intervention in this case.

Data collection and attrition. The data does not allow us to identify which of the entry students remained in the intervention and were tested at exit, nor to match entry and exit scores for individual students. Thus it is possible that
depressed students were disproportionately represented among those who left. Therefore, analysis of the change in mean scores for only the sample of students who completed the program cannot be interpreted as proof of effectiveness as a depression intervention.

**Generalizability.** The study sample was almost entirely comprised of Latino students with multiple risk factors, including close proximity to an area of heavy gang activity and previous school failure of some kind. Thus findings cannot validly be applied to students with much different constellations of risk and protective factors.

**Conclusion**

Data from this pilot study suggests that Ripple Effects computerized, psycho-social intervention, as part of a comprehensive set of services, may be an effective tool to promote mental health and reduce depression among youth with multiple risk factors, who might otherwise be reluctant to take advantage of mental health services. That promise of efficacy is not proof. A larger trial with a matched comparison group is needed. In the meantime, the fact that one student’s exit data was missing because he had died, provides a reminder of the urgency of addressing the interlinking issues of youth trauma, violence, and mental health.

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Alice Ray, MBA, the CEO of San Francisco-based Ripple Effects, has dedicated her professional life to designing and implementing programs to reduce violence and promote positive outcomes for children and youth.

Max Vasquez, MA is currently the instructional math coach at Belmont High School in Los Angeles. Mr. Vasquez was responsible for the tabulation of all data collected for this article. Mr. Vazquez teaches the math intervention classes for JIPP.

Nadine Albarran, MS of Los Angeles, recently graduated from California State University, Los Angeles and was responsible for facilitating the groups using the Ripple Effects intervention.