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## An emotion regulation intervention to reduce risk behaviors among at-risk early adolescents

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### Abstract

This study aimed to evaluate an intervention designed to enhance early adolescents' emotion regulation skill use and to decrease risk behaviors. Adolescents 12 to 14 years old ( $N = 420$ ; 53% male) with mental health symptoms were referred for participation in either an Emotion Regulation (ER) or Health Promotion (HP) intervention consisting of twelve after-school sessions. Participants completed baseline and follow-up questionnaires on laptop computers. Using a generalized analysis of covariance controlling for baseline scores, participants in the ER intervention were less likely to be sexually active and engage in other risk behaviors, such as fighting, at the conclusion of the program. Additionally, participants in the ER intervention reported greater use of emotion regulation strategies and more favorable attitudes toward abstinence. Interventions directly targeting emotion regulation may be useful in addressing health risk behaviors of adolescents with mental health symptoms.

### Keywords

emotion regulation; risk behaviors; adolescents

Risk behaviors, including substance use and sexual behaviors, often begin in early adolescence (Kann et al., 2014; Moore, Barr, & Johnson, 2013). Youth Risk Behavior Surveillance (YRBS; Kann et al., 2014) data indicate that before age 13, 19% of adolescents have used alcohol, 9% have smoked marijuana, and 6% have had sexual intercourse. Those who have sex in early adolescence continue to exhibit greater sexual risk (more sexual partners, greater frequency of intercourse, less condom use) than their peers as they age (Capaldi, Stoolmiller, Clark & Owen, 2002). They are seven times more likely to have unintended pregnancies (Magnusson, Masho, & Lapane, 2011) and twice as likely to test positive for a sexually transmitted infection (STI) at age 18 (Kaestle et al., 2005). Notably, the relationship between positive feelings about sex and sexual initiation is strongest when

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adolescents are younger (Romer & Stanton, 2003), and these attitudes change more dramatically in early adolescence than mid-adolescence (O'Sullivan & Brooks-Gunn, 2005). Thus, intervening early in development is an opportunity to target attitudes, feelings, and behaviors related to risk before they are well established.

A model used to guide adolescent risk behavior interventions is the Social-Personal Framework (SPF; Donenberg et al., 2005), which emphasizes the relationship between non-cognitive factors and individual and social factors for risk. It includes factors not considered in traditional health models, which focus primarily on individual and cognitive constructs. The SPF is consistent with non-cognitive theories and research on adolescent risk-taking, and it does not emphasize cognitive capacities that are not yet present for many early adolescents. The SPF proposes that adolescent sexual risk-taking is a function of the interplay of personal attributes, peer and partner relationship concerns, environmental conditions, and family context. One personal attribute that appears to contribute to adolescent risk is emotion regulation.

Emotion regulation (ER) is conceptualized as the process of "shaping which emotions one has, when one has them, and how one experiences or expresses these emotions" (Gross, 2014). ER uses multiple skills, including identifying affect in others, recognizing one's own emotional state, and using strategies for managing one's emotional response. The most widely used and supported model (Webb, Miles, & Sheeran, 2012) is Gross' process model (Gross, 2014), which describes three primary aspects of ER: the regulation goal that is trying to be accomplished, the strategy used to achieve it, and the outcome from this attempt. The process model identifies five families of ER strategies: situation selection (acting to change the odds of being in an emotion-evoking situation), situation modification (changing a situation to influence its emotional strength), attentional deployment (altering attention to modify one's emotions), cognitive change (re-appraising a situation to change its emotional significance), and response modulation (acting to influence experiential, behavioral, or physiological elements of the emotional response). These strategies are thought to influence emotional response, which in turn influences behavior.

ER often involves decreasing negative emotions and increasing positive emotions, but it may also include increasing negative emotions decreasing positive ones, depending on the situation (Gross, 2013). Gross (2014) has distinguished ER from coping by emphasizing coping's focus on decreasing *negative* affect and its emphasis on long periods of time relative to the more immediate goals of ER. Also, he has contrasted ER to mood regulation because of the latter's emphasis on changing emotional experience rather than behavior.

Most interventions focused on strategies for short-term management of emotion dysregulation have worked with younger children (Clarke & Lewinsohn, 1989; Greenberg, Kusche, Cook, & Quamma, 1995; Webster-Stratton & Herman, 2010). However, such interventions have not been implemented with early adolescents, for whom ER is complicated by changing social norms that render strategies often taught in early childhood (e.g., an imaginary umbrella deflecting hurtful comments or acting like a turtle in its shell) inappropriate. ER represents a logical and critical focus for risk prevention, especially during early adolescence, when social changes present youth with increased opportunity to

engage in risk behaviors. ER is also conceptually logical given research connecting emotions to sexual behavior among adolescents (Houck, Swenson, Donenberg, Papino, Emerson, & Brown, 2014; Shrier, Koren, Ancja, & de Moor, 2010). However, interventions targeting sexual risk often focus on cognitive and skill building elements, with less attention to ER or other social-emotional processes (Jenkins, 2013). Very few studies have targeted both ER and sexual risk, and these have focused on older adolescents (ages 14–18 years; Brown et al., 2011; Brown et al., 2013). Some adolescent interventions, such as Life Skills Training (Botvin & Griffin, 2004), have included components addressing aspects of ER, but typically with limited focus (e.g., anger management) rather than generalized ER skills, and they do not focus on the connections between ER and sexual health. To date, no ER interventions focused on sexual risk and substance use have been aimed at early adolescents, who are just beginning to engage in these behaviors.

For adolescents with emotional and behavioral symptoms, ER may be particularly salient. Emotional and behavioral symptoms are associated with more sexual activity among early adolescents (Hipwell, Keenan, Loeber, & Battista, 2010; Schofield et al., 2010) and with sexual risk behaviors as teens get older (Brooks, Harris, Thrall, & Woods, 2002; DiClemente et al., 2001; Elkington, Bauermeister, & Zimmerman, 2010). These factors can contribute to greater risk for negative sexual outcomes, such as unintended pregnancy or STIs. Mental health symptoms may also signal difficulties in ER skills, which mature throughout development (Kopp, 1989) but have been noted to be delayed in adolescents with emotional or behavioral problems (Dahl, 2001). These delays in ER may represent one pathway through which emotional and behavioral difficulties may place adolescents at risk for engaging in sexual risk behaviors and substance use. Research has demonstrated that when people experience high levels of negative emotion, they act impulsively in attempts to decrease this distress, prioritizing short-term soothing (e.g., sexual activity) over other self-regulation strategies (Tice, Bratslavsky, & Baumeister, 2001). Early adolescent research supports this; two studies examining self-regulation of emotions and behavior in early adolescence found predictive associations with sexual risk taking and substance use later in adolescence (Hessler & Katz, 2010; Raffaelli & Crockett, 2003).

Because mental health symptoms are associated with both sexual risk and challenges in ER, we elected to target early adolescents who exhibited these symptoms for the current study. As such, we created a developmentally tailored intervention teaching ER skills for early adolescents that focused on strategies for use in moments of increased risk (e.g., peer pressure). In pilot work, individual interviews and focus groups were used to gather information from target youth regarding the language used to describe emotions, dysregulation, and emotion regulation; their comprehension of ER strategies; and techniques they used and found helpful. Strategies that were commonly used and understood were conceptually grouped and described using developmentally consistent language (“Get Out, Let It Out, and Think It Out”) for inclusion in the intervention. The manualized program focused on 1) increasing awareness of emotions, the need to monitor them in the self and others, and identifying and labeling them via internal and external cues; 2) recognizing how emotions affect behavior and the benefit of reducing the intensity of emotions to gain control of decision making; and 3) teaching ER strategies for emotionally arousing

situations consistent with Gross' process model (2014). Sexual health information was also integrated into the program.

The aim of this study was to examine the immediate impact of the developed Emotion Regulation (ER) intervention relative to an active comparison intervention, Health Promotion (HP), on reducing early adolescents' engagement in sexual intercourse. The current study also examined the impact of the interventions on other risk behaviors as well as measures of emotional competence. We hypothesized that youth who participated in the ER intervention, relative to those in the HP intervention, would report less engagement in risk behaviors, greater endorsement of ER strategies, and better emotional self-efficacy. We also hypothesized that teachers would report improvements in ER for those participating in the ER condition.

## Method

### Participants

Five schools in three urban public school districts, chosen because of their proximity to the authors' academic institution and because of the diversity of their student population, participated in the study. The participants were 420 seventh grade adolescents recruited between September 2009 and February 2012. All schools came from Level 1 Urban Influence areas (<http://www.ers.usda.gov/data-products/urban-influence-codes.aspx>), and four of the five schools had 63% or more of students who were eligible for free or reduced school lunch. Contacts at the schools, including counselors, administrators, and nurses, referred eligible seventh graders to the program, Project TRAC (Talking about Risk and Adolescent Choices). Adolescents were eligible if they were in 7<sup>th</sup> grade, aged 12–14 years, spoke English, and were at-risk due to symptoms of emotional or behavioral problems or suspected sexual or substance use behavior. A form developed by one of the school districts, used for school staff to make counseling referrals, served as a guide to school personnel for making referrals to the program. It included common symptoms of emotional or behavioral concerns, such as hyperactivity, withdrawing, declining grades, erratic behavior/mood swings, disruptive behavior, or suspected substance use/sexual activity. Students who were known to have a history of being sexually aggressive, be HIV-infected, have developmental delays, be currently pregnant, or have a sibling who had previously participated in the program were excluded. School staff obtained permission from parents for study staff to contact families and obtain face-to-face consent and assent. Exclusion criteria were re-assessed with parents prior to consent to confirm eligibility.

Figure 1 details participant retention. About 1,283 students were attending seventh grade across the five schools each of the three study years (3,849 students). Approximately 27% of students were referred to the program, which is consistent with national data (Merikangas et al., 2010) indicating that 22.2% of adolescents have a mental health disorder causing severe emotional or behavioral symptoms (this study required only symptoms of a disorder). Of those referred, 40% enrolled in the study. Difficulty reaching a parent was the most common reason for participants to not be in the study. Of those who spoke with study staff and declined, a concern about the sexual health content of the program was the most commonly stated reason.

The sample ( $N = 420$ ) comprised 53% males. The average age of participants was 12.96 years ( $SD = .55$ ). The racial composition of the sample was 32% Caucasian, 28% African-American, 2% American Indian/Alaskan Native, 3% Hawaiian/Pacific Islander, 1% Asian and 18% multiple endorsements. Sixteen percent of students did not endorse a racial category. Latino ethnicity was endorsed by 38%. Thirty percent of parents reported a family income  $< \$20,000$ . Descriptive information for the study sample by intervention condition is presented in Table 1.

## Procedures

All procedures were approved by the Rhode Island Hospital institutional review board. Eligible adolescents participated after parental consent and adolescent assent were obtained.

**Assessment**—The current study used data from assessments completed at baseline and immediately after the 12-session intervention (posttest). Adolescents completed an audio-assisted computer self-interview (ACASI) on a laptop computer. Parents also completed demographic and adolescent symptom questionnaires on laptops in the language of their choice (English, Spanish, or Portuguese) at baseline. Teachers completed a paper-pencil questionnaire at baseline and posttest. Compensation for assessments was provided via gift cards.

Assessments were administered to adolescents in a quiet location at school, with a trained research assistant nearby to answer questions. At baseline, measures took approximately 1.5 hours (completed in multiple installments, if necessary). The posttest assessment took about 30 minutes and was completed after the final intervention session, about two months after baseline. Students who were no longer at their original school were assessed at an alternate location.

**Experimental conditions**—Adolescents participated in one of two intervention conditions: Emotion Regulation (ER) or Health Promotion (HP). Both were developed via information collected from focus groups with early adolescents and pretested for feasibility and acceptability with the target population at a subset of the participating schools during a pilot study of over 100 students prior to their use in this efficacy trial. Each manualized intervention was conducted across twelve, twice-weekly, hour-long sessions, in single-gender groups of 4 to 8 adolescents. The interventions were delivered in schools after the school day. Each was led by a mental health clinician (or clinician in training) and a bachelor's degree level research assistant in a male-female pair. Both interventions involved games, videos, group discussions, and workbooks to personalize information learned. They included the same information about sexual development and STI transmission except that activities in the ER condition with an emotion regulation component were modified for the HP condition to eliminate discussion of emotions. A comprehensive approach to sexual risk prevention was used, wherein both the benefits of abstinence and strategies for risk reduction (e.g., alternative sexual behaviors, condom use) were discussed.

To mitigate contamination, schools participated in one condition each school year. Participating schools were organized by grade level, thus 7<sup>th</sup> graders generally had limited contact with 8<sup>th</sup> graders. The five schools were randomly assigned to an order of conditions

over two school years (i.e., ER in Year 1, HP in Year 2 or HP in Year 1, ER in Year 2); schools were re-randomized for the third year of recruitment. Thus, all schools participated in both interventions to avoid nesting intervention condition within school environments.

**ER intervention:** This intervention aimed to enhance ER skills to reduce poor decision making that can lead to unplanned sex or experimentation with drugs and alcohol. The first half of the program focused on illustrating the relationship between emotions and behaviors and providing education about emotions. These sessions also emphasized strategies for labeling feelings in others, identifying emotional arousal in oneself through somatic cues, labeling these feelings, and recognizing their source (“triggers”). The second half of the program focused on teaching the seventh graders developmentally appropriate strategies for regulating emotions during difficult situations, particularly those related to health risks, using three primary groups of strategies identified during qualitative work in the development stage of the program: 1) getting away (physically or cognitively) from triggers for strong emotions, 2) releasing emotional energy in healthy ways (verbally or physically), or 3) changing cognitions and appraisals about emotional triggers. These strategies, referred to in the intervention as “Get Out,” “Let It Out,” and “Think It Out,” corresponded to four of the “families” of ER processes in the process model (see Table 2): situation modification, attentional deployment, response modulation, and cognitive change (Gross, 2014; Webb, Miles, & Sheeran, 2012). The fifth, situation selection, was discussed throughout the program as a way of preventing dysregulation, but was not targeted as a core skill. The unique focus of the intervention was on managing emotions as they occurred, rather than suggesting that adolescents prevent their occurrence.

Teens engaged in games and role plays to practice these strategies and apply them in a variety of risk scenarios. Relationships between emotion regulation and peer relationships, media representations, and substance use were also discussed as applications of the skills. In addition to emotion education, adolescents received sexual health education, including information about anatomy, pubertal development, STIs (including HIV), and disease/pregnancy prevention (abstinence, condoms, non-penetrative sexual behaviors).

**HP intervention:** The HP intervention aimed to enhance awareness of health decisions by providing education about health topics and encouraging participants to engage in healthy behaviors. The HP intervention, matched for time and format, used similar activities and discussed topics including drug and alcohol use, internet safety, violence, nutrition, exercise, sleep, and cigarette smoking. It also included three sessions of the sexual health activities from the ER condition, with modifications to those designed as ER activities. Loosely modeled after a comparison condition previously developed for another project (Brown et al., 2013), its aim was to be information-focused while covering a breadth of topics, similar to the structure of many public school health education curricula. Facilitators did not engage in discussion of emotions related to decision making associated with the topics presented, which were selected based on interests expressed during the pilot study.

**Curriculum training and fidelity**—Treatment fidelity was approached by using a treatment manual describing each session’s activities. Facilitators were trained through live, mock groups, practiced for each of the twelve sessions. Project investigators directed these



“In the last week, when you were having a strong feeling (for example really mad, really sad, or really excited) how often did you: ...get away from whatever was causing your feeling? ...think about the situation differently?” Teens responded on a scale of 1 (“never”) to 5 (“all of the time”). Higher scores indicate more use of the strategies taught. Internal consistency was .73.

**Self-Efficacy Questionnaire for Children- Emotional Self-Efficacy subscale (SEQC-ESE; Muris, 2002)**—The SEQC-ESE contains eight items assessing adolescents’ perceived abilities to manage emotional upset (e.g., “How well do/can you ...control your feelings? ...succeed in being calm again when you are very scared?”). Adolescents responded on a 5-point scale (1 = “not at all” to 5 = “very well”). Higher scores indicate higher emotional self-efficacy ( $\alpha = .83$ ).

**Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997)**—Completed by teachers (typically, English teachers because most students had a consistent English class), the ERC contains two subscales of emotion regulation. The Lability/Negativity subscale consists of 15 items (e.g., “Is easily frustrated”). Higher scores indicate greater inflexibility, unstable moods, and negative affect. The Emotion Regulation subscale consists of 8 items (e.g., “Can say when s/he is feeling sad, angry or mad, fearful or afraid”). Higher scores indicate greater emotional understanding, self-awareness, and empathy. Teachers responded on a 4-point scale (1 = “rarely/never” to 4 = “almost always”). Adequate internal reliability was observed for both the Lability/ Negativity ( $\alpha = .95$ ) and Emotion Regulation ( $\alpha = .84$ ) subscales.

### Sexual Risk Knowledge and Attitudes

**Abstinence Attitudes (Miller, Norton, Fan, & Christopherson, 1998)**—These ten items assess values around abstinence. Adolescents reported level of agreement (1 = “strongly disagree” to 4 = “strongly agree”) with statements such as “Even if I am physically mature, that doesn’t mean I’m ready to have sex.” Higher scores indicate more value placed on abstinence ( $\alpha = .86$ ).

**HIV Knowledge (Brown & Fritz, 1988)**—This 20-item questionnaire assesses adolescent knowledge of HIV/AIDS and condom use (e.g., “A birth control pill will protect you against AIDS”). Participants responded with “true,” “false,” or “don’t know” (which was coded as incorrect). Higher percent correct indicates greater knowledge ( $\alpha = .85$ ).

### Data Analysis

Data were visually screened to identify outliers and non-normal distributions. A minority of youth endorsed engaging in each of the YRBS risk behaviors (range of endorsement across items: 5% to 25%), resulting in highly skewed distributions. Therefore, items assessing risk behaviors were dichotomized to represent youth who engaged in the behavior vs. those who did not. For consistency and clarity, the other items of the YRBS (e.g., drinking milk) were also dichotomized in a similar manner (range of endorsement across items: 47% to 82%). Missing data ranged from 4% to 9%, with more participants opting out of questions about sexual risk behaviors. Missing data were addressed using chained equations (Azur, Stuart,



Frangakis, & Leaf, 2011) with 10 imputed datasets. Analyses were run on each imputed dataset and compiled according to the rules outlined by Rubin (1987). Imputations were run using the R package *mi 0.09-19* (Su, Gelman, Hill, Yajima, 2011). Independent *t*-tests and chi-square analyses were conducted to test for differences on baseline demographic variables between the treatment conditions. Intervention effects at posttest were analyzed using generalized analysis of covariance. Models adjusted for baseline scores on all measures, and to adjust for the sampling of participants from within the five schools, they also adjusted for school. Odds ratios were used to evaluate the size of the treatment effect for dichotomous outcomes and partial eta-squared converted to the metric of Cohen's *d* (Cohen, 1988) was used for continuous outcomes. Data were analyzed using SPSS 18.0.

## Results

Analyses of baseline data revealed no significant demographic differences between the ER and HP conditions on age, gender, ethnicity, race, or household income (see Table 1). Comparisons of adolescents who were retained ( $n = 390$ ) and non-retained ( $n = 29$ ) at follow-up revealed no significant differences on age, gender, race, ethnicity, mental health symptoms, or treatment condition ( $p > .10$  for all variables). Those who were not retained were more likely to come from families with incomes  $\leq \$20,000$  (29% vs. 47%,  $\chi^2(1, 346) = 5.35, p = .02$ , and were more likely to be sexually active (16% vs. 30%,  $\chi^2(1, 419) = 4.01, p = .05$ ). There was no significant difference between conditions on attendance at the 12 after school sessions (9.1 vs. 9.0),  $t(1, 418) = 0.20, p = .84$ .

At the time of baseline assessment, 17% ( $n = 73$ ) of the sample reported ever being sexually active, defined as having given or received oral sex ( $n = 59$ ), having had vaginal sex ( $n = 44$ ), or having had anal sex ( $n = 15$ ). The percent of adolescents who entered the program with previous oral, vaginal, or anal sexual activity was not significantly different between conditions,  $\chi^2(1, 419) = 0.82, p = .37$ . Eleven percent ( $n = 44$ ) of adolescents reported sexual activity within the previous 6-months (oral ( $n = 36$ ), vaginal = 25, anal = 8), with no significant difference between conditions  $\chi^2(1, 419) = 0.50, p = .48$ . Also, clinical cutoff scores were exceeded on either adolescent or parent reports on the YI-4 or ASI, respectively, for 45% of participants. The distribution of diagnostic categories on which youth were in the clinical range by either self- or parent-report was similar between intervention conditions,  $\chi^2(7, 420) = 9.96, p = .19$ .

Table 3 reports non-imputed means, and estimated effect sizes for analyses conducted. The target outcome, engagement in sexual activity (vaginal, anal, or oral), exhibited a statistically significant difference between intervention conditions at posttest, controlling for sexual activity in the previous six months, with adolescents in the HP condition two and a half times as likely as those in the ER condition to be in the sexually active group, OR = 2.50, treatment estimate (se) = 0.92 (0.33),  $p = .01$ . Significant effects were also noted on engagement in other risk behaviors in the past month, including riding with a driver who had been drinking, OR = 2.33, 0.85 (0.34),  $p = .01$ , carrying a weapon, OR = 5.65, 1.73 (0.48),  $p < .01$ , and fighting, OR = 1.71, 0.53 (0.25),  $p = .03$ , such that teens in the HP condition showed 1.71 to 5.65 times higher odds of being in the group that engaged in risk as their counterparts in the ER condition. No significant difference was observed on having smoked

cigarettes in the past month, OR = 1.18, 1.68 (0.28),  $p = .54$ , or in having engaged in binge drinking in the past month, OR = 1.54, 0.79 (0.34),  $p = .21$ . Regarding health-promoting behaviors, participants in the HP condition were marginally more likely to have consumed milk, OR = 1.65, 0.50 (0.28),  $p = .07$  and engaged in 30 minutes of physical activity in the past week, OR = 1.60, 0.47 (0.26),  $p = .07$  than those in the ER condition. No significant differences were observed for eating green salad, OR = 1.06, 0.05 (0.24),  $p = .82$ , or fruit, OR = 0.90, -0.11 (0.25),  $p = .67$ .

A medium effect size was noted on the Emotion Regulation Behaviors Scale,  $d = .30$ , 0.22 (0.08),  $p < .01$ , such that adolescents in the ER condition reported greater use of strategies over time than those in the HP condition. Teens in the HP condition also reported less favorable attitudes toward abstinence over time than those in the ER condition,  $d = .23$ , 0.10 (0.05),  $p = .04$ . No other scales demonstrated significant differences (SEQC, 0.26 (0.46),  $p = .57$ ; HIV Knowledge, 0.98 (2.22),  $p = .44$ ; ERC- Regulation, 0.01 (0.05),  $p = .91$ ; ERC-Negative Liability, -0.04 (0.05),  $p = .35$ ).

## Discussion

To our knowledge this is the first intervention study to specifically target emotion regulation skills with early teens (12–14 years old) to reduce sexual risk behavior. With an indicated sample selected for emotional or behavioral health concerns, this trial comparing an intervention focused on applying emotion regulation strategies in risk situations (ER) with an intervention focused on promoting health knowledge (HP) found that teens in the HP condition were two and a half times more likely to have engaged in oral, vaginal, or anal sex at the conclusion of the program than their peers who participated in the ER intervention. The rate of sexual activity increased in the HP intervention (nearly doubled from relatively low baseline rates), while it remained steady in the ER condition, suggesting that the intervention may have had a positive impact on sexual behaviors during this developmental period in which sexual behaviors (including oral sex, included in the definition of sexual activity in this study) are becoming more typical. Indeed, this falls within the range (9–33%) of state reports from a national study of middle school sexual behavior (Moore, Barr, & Johnson, 2013). Given that the HP intervention contained the same core sexual health information and same group format as the ER intervention, this supports the notion that teaching ER strategies may be useful in reducing risk behaviors for at-risk adolescents.

Likewise, the rates of other, non-sexual risk behaviors increased among HP participants while decreasing or remaining generally stable among ER participants. This suggests that teens in the ER intervention may have generalized these ER skills to other, non-sexual health risk decisions, with beneficial results. Rates of risky decision making related to alcohol and violence were greater among young people in the HP condition despite the fact that the HP intervention contained more information related to substance use and violence than the ER intervention. While the ER intervention included education around sexual health, it did not include didactic information regarding other health topics; rather these other topics were used as examples of situations to which ER strategies could be applied. These group differences are especially encouraging in light of some benefits observed among the HP participants on other non-risk behaviors targeted only in that intervention.

Greater stability in the rates of physical activity and milk consumption was observed in this intervention compared to the ER condition. While not statistically significant, these small-to-moderate effect sizes suggest that, rather than being inert, the comparison condition engaged at-risk teens and had a measurable impact in some (non-risk) areas that likely do not elicit a great deal of emotional arousal for most adolescents.

Overall, these results suggest that programs encouraging abstinence and safer sex behaviors are relevant and appropriate for early adolescents. Twenty-five percent of the comparison condition was sexually active during the study period. The mean score on a scale of attitudes toward abstinence was in the middle of the possible range, suggesting ambivalence toward waiting to have sex. Baseline scores of HIV knowledge revealed an average score of less than 40% correct on a true/false test, suggesting that early adolescents lack important information for keeping themselves safe. While both conditions improved to over 50% after group participation, these scores remain concerning. Items with the fewest correct responses included “AIDS can be cured if treated early” and “A vaccine that will prevent everyone from getting AIDS has been developed.” These results suggest that alternative approaches to teaching HIV information may be needed for at-risk early teenagers.

Teens in the ER intervention reported using ER strategies significantly more often at posttest than those in the comparison intervention. This is an encouraging behavioral sign that students in the intervention retained and used this information to manage emotions outside of the group. This supports the notion that ER skills can be taught to and implemented by early adolescents with mental health symptoms to good effect, especially when considering ER participants’ reports of fewer risk behaviors than HP participants at posttest.

Despite this difference in reported use of regulation strategies, adolescents’ perceived self-efficacy for managing their emotions was not different between conditions at posttest. Scores for both groups at both time points suggested moderate self-efficacy. It may be that this immediate assessment did not provide enough time for teens to internalize changes in their abilities to manage emotions. Also, the intervention may not have addressed some contexts in which adolescents experience dysregulation, such as day-to-day peer interactions. While the program allowed for participant-generated scenarios (including sexual situations), it also focused on the relationship between dysregulation and sexual risk. This may have been less relevant for some participants, making the practice of the skills (e.g., role plays) less applicable to their current daily lives. Therefore, some teens may not have noticed changes in their ER skills. They may benefit more from emphasizing ER in frequently experienced situations (e.g., fights with peers) that can then be generalized to sexual situations.

Some researchers have reported that under some circumstances, combining teens with varying levels of behavior problems in groups may lead to iatrogenic or contagion effects (Dishion, McCord, & Poulin, 1999). However, it is unlikely that these processes account for the effects in the current study. First, much literature has subsequently countered this concern (Weiss, Caron, Ball, Tapp, & Johnston, 2009). Second, we followed recommendations (Burleson, Kaminer, & Dennis, 2006; Dodge, 1999; Mahoney, Stattin, & Lord, 2004) to safeguard against possible effects by 1) enforcing group structure, 2) using

manualized interventions with trouble shooting protocols, 3) training facilitators to attend and respond to comments that may be counter to group goals, and 4) supervising youth at all times during the intervention. Third, both conditions were assembled in the same way and received the same sexual health content, thus both interventions (not only HP) would have been susceptible if such effects were relevant. Fourth, these students were already classmates in other settings; they were not brought together strictly for this study. Finally, marginally significant differences were observed for more favorable outcomes for the HP group on two behaviors targeted in that condition, suggesting potential benefit from the intervention.

Teacher reports of observed emotion regulation, which indicated a mean response of “sometimes” on behaviors exhibiting negative affect and “often” on behaviors of emotional understanding, did not show differences between the interventions. Several possible explanations for this exist. First, the follow up period may have been too short for teachers to have noted behavioral changes. Second, research has documented factors that bias teacher ratings of emotion regulation, including teacher perceptions of the school environment (Pas & Bradshaw, 2013). Unfortunately, this information was not collected as part of the study. Finally, it may be that the ER skills that teens learned for the context of behavioral risk situations (e.g., sex) had not yet generalized to other non-risk settings (such as the classroom) where they might be more likely to be observed by teachers. The situational nature of the behaviors rated by teachers may have made this measure insensitive to intervention impact. Whether these skills might generalize to classroom behaviors is a question for future study.

Finally, the intervention groups’ attitudes toward abstinence were significantly different at the conclusion of the program. However, neither condition showed meaningful improvement in these attitudes. Instead, those in the ER condition maintained similar attitudes, while those in the HP condition developed attitudes that were less favorable regarding abstinence. One explanation for this difference may be that the ER condition may have led to improvements in the strategy family of situation selection (Gross, 2014), for which abstinence attitudes may represent an attitudinal marker. Alternatively, ER skills may delay early adolescents’ acceptance of sexual activity as normative for their age group; this may have important implications for sexual decision making. This may be especially important in early adolescence, as the trajectory of change demonstrated by the HP condition suggests a time during which meaningful changes in attitudes favoring sexual activity may be occurring.

There were limitations to this study. The follow-up period was short, immediately after the intervention, and thus does not inform about the longer term impact of the program. Subjects were recruited from one region of the country, from a fairly narrow age range, and from referrals related to emotional or behavioral concerns, thus limiting the generalizability of the findings. Much of the data reported here depended on adolescent self-report, rather than objective reports of the behaviors assessed (e.g., STI testing or other biological outcomes). However, previous research has suggested that using laptop computers to collect sensitive information from youth can be reliable (Romer et al., 1997). The HP condition focused on knowledge acquisition for risk prevention; another conceptual base for the comparison

condition may have resulted in more behavior change in HP participants, though the approach chosen resembled many public school health education programs. Despite randomization, participants in the HP condition reported more risk at baseline than those in the ER condition, however, this was addressed in the statistical approaches that controlled for baseline. Finally, because patterns of sexual activity are often erratic (and infrequent) in early adolescence, we used a broad frame (six months) at baseline to identify those who had been “recently” active. We did not collect this information for a shorter period (i.e., two months) at baseline, so direct comparison of the time frames was not possible.

This study also possesses several strengths that enhance the conclusions drawn from these findings. The intervention taught an innovative strategy (emotion regulation) in a developmentally appropriate manner that addressed a potential deficit for many of these youth. This strategy may represent an effective extension of early educational approaches to emotional health curricula. Emotion regulation for immediate decision making was the focus, which contrasts to other interventions targeting longer-term emotional distress and stability. In addition, the sample was unique, since early adolescents have not been the focus of risk or ER programming. Also, the intervention had good attendance, suggesting that students were engaged by the content. The sample was also racially and ethnically diverse and targeted a vulnerable population (youth with emotional and behavioral symptoms) who might not respond to traditional health education. The study did not require meeting diagnostic criteria for a mental health problem, but instead included adolescents exhibiting psychological symptoms, who are often not studied despite being at risk. While the study targeted adolescents identified due to emotional or behavioral health symptoms, only 45% met clinical cutoffs on a screening measure of emotional and behavioral disorders, suggesting a broad continuum of students were represented in the study. Finally, the intervention used several strategies to enhance internal validity, including use of an active comparison condition, rigorous training and supervision methods to ensure fidelity to the treatment, and excellent participant retention.

Overall, the study suggests promising implications. These results provide support for the short-term impact of this intervention targeting emotional competence among at-risk youth, demonstrating that early adolescents can benefit from such instruction in the context of sexual risk behavior. ER participants were significantly less risky while participating in the program, and these benefits extended beyond just sexual risk behaviors. Continued assessment of these behaviors is warranted to determine the longer-term impact of the intervention. Sexual activity in young teens is often associated with strong emotions, and unregulated feelings may lead to greater risk behavior, particularly among teens with emotional or behavioral symptoms. The potential benefits of such interventions on youth without such symptoms and over longer follow-up periods will be important areas of future study.

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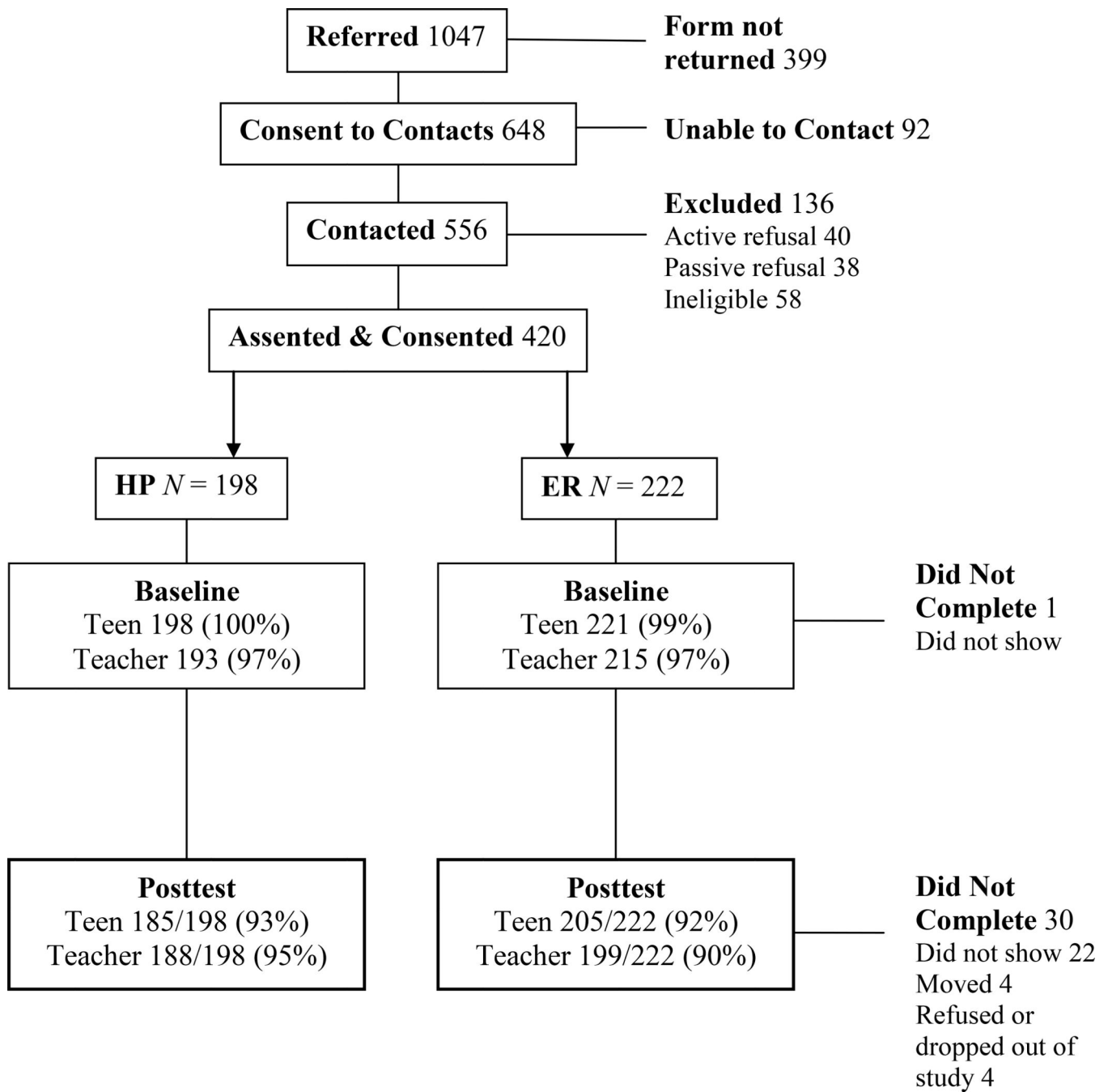
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**Figure 1.**  
CONSORT summary of participation retention

**Table 1**

## Baseline Descriptives by Intervention Condition

	<b>Emotion Regulation (N = 222)</b>	<b>Health Promotion (N = 198)</b>	<b>Test statistic</b>	<b>p- value</b>
Age (years)	12.96(0.55)	12.96(0.56)	$t(416) = 0.03$	.98
Gender (% male)	52	54	$\chi^2(1) = 0.07$	.79
Ethnicity (% Latino)	38	37	$\chi^2(1) = 0.05$	.82
Race (%) <sup>a</sup>			$\chi^2(5) = 6.83$	.23
White/Caucasian	32	32		
Black/African-American	28	27		
American Indian/Alaskan Native	1	4		
Native Hawaiian/Pacific Islander	3	4		
Asian	0	2		
Multiple Endorsements	19	17		
Household income (% \$20,000) <sup>b</sup>	29	31	$\chi^2(1) = 0.26$	.61
Ever sexually active (% yes)	16	19	$\chi^2(1) = 0.82$	.37
Screening cutoff on ASI and/or YI-4 (% yes)	46	43	$\chi^2(1) = 0.39$	.54

<sup>a</sup> 16% of participants did not report a racial category.

<sup>b</sup> 18% did not report household income.

**Table 2**

Emotion Regulation Strategies Taught in Project TRAC

TRAC strategy	Developmental definition	Example	Analogous “family” from process model (Gross, 2014)
“Get Out”	Physically getting away from triggers for strong emotions	Leaving the situation	Situation modification
	Cognitively getting away from triggers for strong emotions	Distraction	Attentional deployment
“Let It Out”	Physically releasing emotional “energy”	Physical exercise or deep breathing	Response modulation
	Verbally releasing emotional “energy”	Self-expression (verbal or artistic)	Response modulation
“Think It Out”	Generating alternative thoughts about emotional triggers	Reappraisal of the emotional stimulus or by using perspective taking (“what would someone who cares about me say?”)	Cognitive change

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**Table 3**  
Observed Means for Pre- and Post-intervention Scores and ANCOVA Test Statistics

	Emotion Regulation		Health Promotion		Effect Size <sup>d</sup>
	Pretest	Posttest	Pretest	Posttest	
<u>Health Behaviors [% (n)]</u>					
Vaginal/anal/oral sex	10% (21)	11% (22)	12% (23)	25% (43)	2.50 (1.31 to 4.76)*
Cigarette smoking	7% (15)	10% (21)	12% (23)	17% (32)	1.18 (0.69 to 2.04)
Binge drinking	8% (18)	7% (15)	14% (17)	15% (28)	1.54 (0.79 to 3.00)
Riding with a driver who'd been drinking	16% (36)	11% (23)	21% (40)	24% (44)	2.33 (1.21 to 4.49)*
Carrying a weapon	8% (17)	5% (10)	14% (27)	20% (37)	5.65 (2.20 to 14.47)*
Fighting	18% (40)	21% (42)	27% (52)	35% (65)	1.71 (1.04 to 2.79)*
Milk	82% (179)	72% (148)	81% (158)	81% (150)	1.65 (0.96 to 1.65)
Green salad	47% (103)	53% (109)	54% (106)	57% (105)	1.06 (0.66 to 1.68)
Fruit	79% (173)	78% (160)	78% (152)	77% (142)	0.90 (0.55 to 1.46)
Physical activity	78% (171)	70% (144)	75% (147)	78% (145)	1.60 (0.97 to 2.65)
<u>Self Report Scales [mean (SD)]</u>					
HIV Knowledge <sup>b</sup>	34.86 (22.76)	53.20 (23.71)	37.59 (23.39)	51.49 (22.57)	0.05 (0.02 to 0.10)
SEQC-Emotional Self-Efficacy	2.89 (.88)	2.98 (.91)	2.92 (.84)	2.96 (.88)	0.08 (0.00 to 0.12)
Emotion Regulation Behaviors Scale	2.88 (.71)	3.15 (.76)	2.89 (.73)	2.98 (.73)	0.30 (0.25 to 0.34)*
Abstinence Attitudes	2.76 (.59)	2.77 (.55)	2.74 (.62)	2.68 (.58)	0.23 (0.20 to 0.27)*
<u>Teacher Report Scales [mean (SD)]</u>					
ERC- Negativity Liability	1.88 (.68)	1.79 (.67)	1.94 (.71)	1.96 (.76)	0.10 (0.08 to 0.13)
ERC- Regulation	2.91 (.58)	2.95 (.59)	3.01 (.60)	3.01 (.60)	0.04 (0.00 to 0.07)

Note. ERC= Emotion Regulation Checklist, SEQC = Self-Efficacy Questionnaire for Children.

<sup>a</sup> Effect sizes for dichotomous variables represented by odds ratios (95% confidence interval); continuous variables (scales) calculated using partial eta squared to estimate Cohen's *d* (range across imputations).

<sup>b</sup> Values for HIV Knowledge represent percent correct; all other values for scales represent average item response.

\*  $p < .05$ .