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Self-efficacy about sexual risk/protective behaviors: Intervention impact trajectories among American Indian youth

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For adolescents, normative development encompasses learning to negotiate many of life's challenges in safe and healthy ways. Precocious engagement in behaviors out of sync with emotional, cognitive, and physical maturity often foretells the emergence of significant problems. This concern is particularly evident in the development of sexual behavior during adolescence. Sex at appropriate ages with caring partners is a positive developmental outcome; early sexual behavior, in contrast, exposes young adolescents to health risks—including unintended pregnancies, HIV, and other sexually transmitted diseases (STDs)—often before they have developed the emotional, physical, or financial capacity to manage those issues. Sexual intercourse is not inevitably of concern, but the timing and circumstances under which adolescents initiate sexual behavior can put them at significant risk. Thus, successful sexual risk prevention programs for adolescents emphasize *risk* prevention over *sex* prevention, encouraging youth to postpone sexual activity until they are more mature and giving them skills to protect themselves from unintended pregnancies or serious, possibly life-threatening, problems such as HIV/AIDS or other STDs.

One group of adolescents of special concern for STDs is American Indian (AI) youth (Centers for Disease Control and Prevention, 2014). AI youth begin having sex at younger ages and with more partners at rates higher than the national rate (Centers for Disease Control and Prevention, 2011). Concomitantly, AI youth and adults experience between three and nine times the rate of STDs compared to their White counterparts—a disparity evidenced even in the youngest age groups (Centers for Disease Control and Prevention and Indian Health Service, 2014). Once diagnosed with AIDS, AI people have the lowest survival rates at 12, 24 and 36 months compared to all other race groups (Centers for Disease Control and Prevention, 2014). Not surprisingly, HIV prevention has become an important concern in AI communities (citation to be included post-review).

The Indian Health Service (IHS) does not provide STD rates by individual reservation. However, the communities within the reservation where this study was conducted fall in the IHS region that experienced the second highest rates of chlamydia and gonorrhea of all IHS regions (Centers for Disease Control and Prevention and Indian Health Service, 2014). AI residents in the state in which these communities are located made up 15% of HIV/AIDS

cases in 2011, even though they represented only 9% of the population (citation to be included post-review). Such concerning statistics give notice of a challenging context within which AI adolescents make decisions affecting their sexual health. AI youth must navigate many of the same risk factors experienced by adolescents of other race groups but often do so in an environment characterized by past and present trauma and discrimination, elevated rates of alcohol and drug use, and pervasive poverty. The resiliency of many AI youth and their ability to resist risk and excel in spite of adverse conditions has been attributed in part to cultural strengths and kin connectedness foundational in AI communities—suggesting that proposed interventions that incorporate these cultural dimensions may be particularly effective (Fitzgerald & Farrell, 2012; Goodkind et al., 2010; Sarche & Whitesell, 2012). While culture and kinship are hypothesized to work protectively, the thin base of empirical evidence suggests a complex relationship (Baldwin, Brown, Wayment, Nez, & Brelsford, 2011; Kaufman et al., 2007; Kenyon & Carter, 2011; Whitbeck, Chen, Hoyt, & Adams, 2004). Concerned with sexual risk-taking among their youth, our partner communities were committed to supporting an HIV and STD prevention intervention based on cultural strengths. And, given the young age of sexual initiation observed by our partners among these youth, the need for early intervention was widely embraced.

Evidence has long suggested that HIV and sexual risk prevention interventions can improve health and behavioral outcomes, especially if supported by developmentally relevant theoretical models that convey a specific and consistent message to a well-defined target group and provide skill-building for behavior change (Chin et al., 2012; Kirby et al., 2004; Robin et al., 2004). *Circle of Life* (COL; Orbis Associates, 2002) is an HIV-prevention curriculum based on Social Cognitive Theory (Bandura, 1997, 2006). Social Cognitive Theory, and by extension COL, holds that perceived self-efficacy lies at the center of human behavior. People who believe that they can control their thoughts, feelings, and behaviors are more likely to regulate their behavior effectively; such beliefs reflect high self-efficacy (Albarracín et al., 2005). The basic issue revolves around whether or not people believe they can perform a behavior consistently and appropriately when faced with various hurdles and challenges (Bandura, 2007).

The literature supports the relationship of self-efficacy with adolescent problem behaviors such as risky sex (Glassman, Franks, Baumler, & Coyle, 2014; Mahat & Scoloveno, 2010; Peters et al., 2009; Shercliffe et al., 2007). Self-efficacy has been shown to work in two ways: determining the social settings in which youth find themselves (e.g., avoiding problem situations) and effectively resisting social pressures to engage in risky sexual behavior (e.g., refusing sexual advances). Thus, effective self-management of sexuality requires not only social and self-regulative skills but also personal self-efficacy to exercise control over sexual situations (Bandura, 2006). The weaker a person's perceived self-efficacy is in sexual situations, the more social and emotional influences such as desire for acceptance or fear of rejection can increase the likelihood of early or risky sexual behavior. These influences can be especially powerful for peer-oriented adolescents (Bandura, 2006).

More specifically, COL is a 30-hour HIV/AIDS and STD prevention and health education curriculum specifically created for middle-school AI children (Orbis Associates, 2002). COL embodied the theory and concepts of Social Control Theory using the medicine wheel

—a cultural symbol of a circle divided into four equal parts, encompassing spiritual, emotional, physical, and mental wellness as essential aspects of health and well-being. All four parts of this “Circle of Life” shape volition (i.e., self-efficacy), located at the center of the circle. Volition allows youth to make positive choices in all four aspects of health and well-being. COL included both cognitive and affective learning, with a heavy emphasis on skills training and practice. Symbols, stories, and ways of learning familiar to AI youth provided the foundation for classroom implementation (citation to be included post-review; Sales, Lang, Hardin, DiClemente, & Wingood, 2010).

COL is not an adaptation of an intervention used in another setting; it is a program designed specifically for AI middle-school children, with extensive input from AI community elders, parents, educators, and health professionals across the country (citation to be included post-review). Although intended broadly for use with youth in middle school, earlier analyses (citation to be included post-review) demonstrated that COL most effectively delayed sexual initiation when youth participated in the program before age 14 (compared to those who participated at age 14 or older).

With prevention as the primary goal, one needs to look to younger adolescents, who will have had only limited sexual experience. As a result, though, finding changes in the distal outcome—delaying sexual initiation—is challenging. However, a more useful approach to prevention at this young age examines interventions that focus on theoretical mediators of the relationship between risky situations and having sex. In this study, we expanded on the earlier finding of delayed sexual initiation with early exposure to COL (noted above, citation to be included post-review) by examining changes in two potential mediators as reflected in the theoretical underpinnings of COL—self-efficacy for refusing sex and self-efficacy for avoiding sexual situations—to investigate how the developmental trajectories of the younger adolescents in our intervention group diverged from the trajectories of both the older adolescents in the intervention group and the normative trajectories observed in our comparison group.

Method

Setting

This project took place on a Northern Plains AI reservation. (Because community confidentiality is often as important as individual confidentiality for many Native communities ([Norton & Manson, 1996]), we do not use the name of the tribe here but rather this general descriptor.) This tribe is one of the poorest of the federally recognized tribes. For instance, median income across 2006 – 2010 (U.S. Census Bureau, 2011) averaged less than \$28,000, compared to nearly \$52,000 for the U.S.; 20% of those ages 25 and older did not have a high-school diploma, compared to less than 15% of the U.S. total population (U.S. Census Bureau, 2000). While this economic reality presents enormous challenges, considerable strengths are also evident here: The tribe has a long history of cultural independence and activism with strong cultural, family, and community ties.

This project received approval by the tribal research review board and the university’s institutional review board. We invited all middle schools (N=13) on the reservation to

participate; all agreed and all remained in the study through the project end. Using a wait-listed randomized-group intervention design, we randomized schools to one of two groups: intervention (receiving the intervention in Year 1, $n = 6$) and comparison (receiving the intervention in Year 2, $n = 7$) schools. This wait-listed design allowed all respondents to receive the intervention within 12 months; but one group received it after the other group so that comparisons between intervention and non-intervention groups could be made in the interim (Campbell & Stanley, 1963).

Sample

COL was designed for youth in middle-school settings. For the purposes of this study, youths enrolled in 6th, 7th, and 8th grade and between the ages of 11 and 16 at baseline were eligible. Four waves of semi-annual data were collected: Two pre-intervention waves (W1/baseline and W2) and two post-intervention waves (W3 and W4). Because of the high mobility of the youth population on this reservation, identifying eligible youth and their parents/guardians included the review of school rosters across all schools at every data collection wave. Also due to this mobility, many rosters were not complete, so we also advertised widely across the reservation. Parent/guardian consent was obtained by trained project staff, most of whom were community members. During youth data collection, each student for whom we had obtained parent/guardian consent was asked to give assent. For any given wave, a youth could refuse; if the youth had dropped out of school or was in an institutional setting (e.g., hospital, detention center), the youth was ineligible for that wave but could be eligible again in later waves. Since we included all schools on the reservation, many transfers were not lost to follow-up but instead filled out the surveys at a different school. Following the guidance of Brown et al. (2008) on field-based group-randomized control trials, and embracing the communities' request for inclusiveness, we entered youth in the study at any time through W4, with parental permission.

According to the 2000 U.S. Census, the population of middle-school-aged youth on this reservation was approximately 839; from this number, we enrolled 635 youth (76%) in the study. Response rates averaged 84% across waves and no statistically significant differences in attrition appeared by group at any wave. Each youth's presence in the intervention or the comparison schools was tracked throughout the study so that intention-to-treat (ITT) principles could be applied in all analyses regardless of transfer status. A total of 85% completed at least two surveys (mean = 2.8). In all, 47% of the sample were girls; ages ranged from 11 to 16, with a mean of 13.0; 98% self-identified as AI. Roughly 12% ($n = 72$) of the sample reported having had sex, with pre-teens reporting the lowest levels (2%, $n=12$). Intervention ($n = 314$ youth) and comparison ($n = 321$ youth) groups did not differ significantly on any of the variables used in these analyses at W1 nor on age or gender distribution. Examining the possible impact of attrition, those with all four waves of data did not differ significantly from those with fewer than four waves of data on any of the demographic or analytic variables at W1; conversely, intervention youth with at least one post-intervention data point (W3 and/or W4; 87%) did not differ from those with no post-intervention data points (13%) on any of the same variables. To avoid biases introduced by including only participants with complete data, the software used here (Mplus) used full-information likelihood estimation.

Procedures

Trained by the intervention developers, community members served as educators leading COL in the classrooms to ensure uniformity of instruction across schools. Quality of implementation, including consistency in topics, activities, and achieved learning objectives, was reviewed by a supervisor at weekly meetings. While specific schedules required flexibility in COL implementation, the curriculum was completed in all schools within four months. Despite high mobility of this youth population, just over 75% of the intervention youth attended 70% of the classes, with less than 10% attending half or fewer. Wait-listed comparison schools were provided the instruction the fall after the intervention schools had completed COL. However, this study used data only from the pre-intervention data points of the comparison group.

Students completed paper-and-pencil surveys in their classrooms during the regular school day at two time points pre-intervention (spring, 2006, W1; fall, 2007, W2), immediately post-intervention (W3), and at six-month follow-up (W4). Youth completed their surveys in approximately 45 minutes. Staff attempted to contact participants who were not in school on the day of testing up to three times, asking the youth to complete the survey as soon as possible. All youth were compensated \$10 or the equivalent in gifts for their participation at each survey. For the intervention youth, COL took place between W2 and W3, which permitted us to collect two pre-intervention time points to examine possible trends of youth's behavior prior to the intervention.

Measures

We used two measures of self-efficacy, each with a four-point response set. Self-efficacy for refusing sex included four items (Cecil & Pinkerton, 2000), such as "What would you say to having any kind of sex with someone you wanted to go out with again?," with a Cronbach's alpha in this sample of 0.70. Self-efficacy for avoiding sexual situations also drew on four items from Cecil and Pinkerton (2000), such as "I stay away from people who are pressuring me to have sex" (alpha = 0.81).

Analysis Plan

Latent growth curve modeling (LGCM) offers a powerful method to examine the impact of an intervention on individual-level development. Rather than simply examining change only at the group level, such as with repeated-measures analyses of variance, each youth has his/her own developmental trajectory and impact can be determined at a much finer level. Further, *piecewise* LGCM allows the testing of a change in the slope of normative development due to the impact of an intervention. Prior to examining the growth curves of the self-efficacy measures, we assessed whether the expected relationships between these measures and sexual behavior were evident at W1, as support for their potential as mediators.

Results

Cross-sectional Relationships between Mediators and Outcome

For these analyses, we focused on the relationship of adolescents' reports of having ever had sex with the self-efficacy measures at W1, since COL had been found to delay sexual initiation. Results (not shown) exhibited expected patterns, significant at the $p < .05$ level. Those who had never had sex reported higher levels of both refusal and avoidance self-efficacy.

Latent Growth Curve Models

We created six groups, three for each gender: received COL by age 13 (INT13), received COL at age 14 or older (INT14), or comparison (COMP). Using Mplus (Muthén & Muthén, 1998–2012), we tested a piecewise model where W1 and W2 represented the trajectory prior to intervention and W2 – W4 represented the impact of the intervention for INT. (For COMP, a linear trajectory from W1 – W4 represented normative development.) Because the effect of COL was found only for youth who received the intervention by age 13 (citation to be included post-review), we constrained the slopes of the INT14 groups to equal the slopes of the corresponding COMP gender groups. As noted above, Mplus handles missing data through full-information maximum likelihood estimation; we incorporated TYPE = COMPLEX in the analysis to adjust the standard errors for clustering within schools.

For *refusal self-efficacy* (Figure 1), all boys showed a significant drop in self-efficacy across the four waves. INT14 and COMP girls showed a significant drop across all four waves, parallel to the boys; INT13 girls showed a significant drop prior to COL but a flat slope following intervention. For *avoidance self-efficacy* (not shown), all six groups showed no significant change across all four waves.

Discussion

LGCMs can be especially important in studying processes where normative developmental change may be subtle. Perceptions among young adolescents about situations with which they may yet have had little direct experience and, thus, tend to report high levels of baseline self-efficacy, present just such a case. As the adolescents in this study aged, they likely faced more challenges in this area. Moreover, adolescent development in tribal settings may be further complicated by challenges of solidifying cultural and kin identity while navigating high levels of trauma, substance use, and poverty commonly found on many reservations. Together, such challenges may correspond to the drop in youths' reported levels of self-efficacy, even though the absolute changes were small. When a slope of a trajectory is small, even a slight change in that slope post-intervention—especially a change in direction—can be meaningful.

As noted earlier, COL focused on volition (i.e., self-efficacy) in making positive choices. Here, COL changed refusal self-efficacy trajectories for younger girls. In effect, COL countered a normative decline of refusal self-efficacy for girls participating in COL by age 13, enabling them to maintain their higher sense of self-efficacy through follow-up.

These findings may provide an insight into the processes that underlay our previous finding (citation to be included post-review) that COL delayed sexual initiation among those youth who participated in the program by age 13. The goal of COL was first to reinforce for youth that they have volition—the power to make their own decisions—and then to foster the ability to make and carry out healthy decisions. COL appears to have been most effective in enhancing the younger girls' sense of refusal efficacy, the ability to refuse to have sex when faced with that decision. This maintenance of refusal efficacy is in keeping with the skill-building and activities featured in the COL curriculum—e.g., roleplays more often featured youth saying “no” to certain requests. Actually avoiding situations is harder to roleplay in isolation since, for example, declining to go to a party where others might be having sex could, at the same time, be avoiding that situation. In reality, refusal efficacy may be an even more important skill for girls than avoiding risky situations, since it can be applied in a wider range of situations—even ones that a youth might have wished he or she had avoided but didn't.

Upon reflection, the lack of findings for boys in refusal efficacy is perhaps not surprising. While COL was found to be effective in delaying sex for both boys and girls at young ages in earlier work, refusal self-efficacy may be less salient for boys than for girls, given social norms around sexual activity and pregnancy risk. Girls may be more likely to be pressured for sex (with more opportunities to refuse) and may also be more inclined to refuse, both because of social pressure and fear of pregnancy. Moreover, with little opportunity to exercise the skill, resistive efficacy may decline. That neither avoidant nor refusal self-efficacy explained the impact of COL for boys points to the importance of identifying the mechanisms of risk and protection for young boys and the importance of understanding gender differences in the precursors of sexual risk behavior in adolescence.

Limitations

Although an important first step in understanding how this intervention worked, this study has limitations that should be considered. First, follow-up in this study could only cover 6 months, since the comparison group received COL after that time; impact over a longer term could not be determined. Second, the project took place with members of only one tribe, so generalization to other groups of young adolescents must be done with caution. However, a major strength of this study is that the intervention and data collection included nearly the entire population of the reservation, rather than just a small sample; as a result, we can be quite confident that our findings are reliable.

Related to this, the main learning heuristic of COL is the medicine wheel, which may not be relevant for all tribal communities; however, the curriculum encourages local adaptation of the heuristic to fit community cultural learning approaches. Moreover, the curriculum interweaves stories, quotes, and symbols from diverse cultures across the nation, providing an opportunity for AI youth to learn of other traditions.

Third, the LGCM used here assumed that boys and girls had the same patterns of change, differing only in rate of change (slope) and level (intercepts). In addition, while the use of piecewise LGCM provides a powerful look into how possible mediators changed in response to intervention, very small differences in slopes achieved statistical significance due to

limited variance in the responses. Since this project took place among young adolescents, very few of whom had had any sexual experience, a longer timeframe is required to relate changes in mediators—in particular, refusal self-efficacy—to a lowering of sexual risk as the result of COL. However, the cross-sectional relationships suggest that this link may be found.

Finally, these analyses represent conservative estimates of the impact of COL in several ways. Following the ITT guidelines for randomized trials (Brown et al., 2008), we classified youth into intervention or comparison groups based on their school assignment at baseline, regardless of any subsequent moves. Similarly, we made no adjustments for the number of sessions a youth received. Those with few sessions were treated here the same as those who attended all sessions. While this ITT strategy avoids basing results only on participants committed to completing sessions, it also dilutes the measured impact of the intervention. Yet, despite these “strikes” against it, COL showed an impact on refusal efficacy for younger adolescent girls.

Conclusion

COL helped to slow down the normative decline among these young AI adolescent girls’ sense of refusal efficacy (as represented here by the trajectory found among the COMP youth) and, thus, is likely a key process underlying its success in delaying sexual initiation found in our earlier work. Next steps in the curriculum would be to bolster the messages and practice sessions of refusal efficacy to turn the “holding steady” pattern observed here into an actual increase in self-efficacy post-intervention. In addition, investigating other mechanisms supporting delayed sex among young boys receiving COL and a better understanding of how to reach older boys and girls—who may have already had greater exposure to potentially sexual situations—will inform intervention modification and practitioner strategies to support skill and behavior change.

Many espouse the importance of early intervention to prevent problem behaviors such as early sexual initiation; however, such efforts face many challenges. Unlike many other problem behaviors, young adolescents infrequently observe others’ behaviors around sex and discussions of such topics often feel awkward, if not nonsensical. For AI youth, who engage in sexual activity at younger ages compared to other race groups—and in a context that may present opportunity for risk-taking and for cultural protection—a developmental perspective is particularly important. Any early prevention efforts to reduce sexual risk must look for impacts on behavior as youth age into later adolescence and face increasing challenges to healthy sexual decisions. Prevention scientists should continue to grapple with the challenges of early intervention before such problem behaviors become well entrenched and, therefore, perceived to be normative. Despite the importance of early intervention to prevent problem behaviors, though, finding proximal changes in low-incidence behaviors such as having sex is unlikely. The study of the possible mediators theorized to drive intervention effectiveness within a developmentally sensitive analytic approach such as LGCM can inform ongoing efforts to intervene in effective ways.

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Figure 1.

Refusal self-efficacy across waves by gender and intervention group

INT13 — received COL at age 13 or younger

INT14 — received COL at age 14 or older

COMP — wait-listed comparison group