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THE EFFECTS OF STUDENTS' CURRICULUM ENGAGEMENT, ATTITUDES TOWARD THEIR TEACHERS, AND PERCEPTION OF THEIR TEACHERS' SKILLS ON SCHOOL-BASED PREVENTION CURRICULUM OUTCOMES*

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Abstract

We examined the association between changes in the substances and mediating variables targeted by the All Stars drug prevention curriculum, and students' engagement in and enjoyment of the curriculum, their attitudes toward their teachers, and their perceptions of their teachers' skills. Forty-eight school staff administered at least one All Stars class, for up to three consecutive years, to their seventh grade students in 107 classes in a large Midwestern school district. A sample of 2428 students completed a linked pretest and post-test, for a response rate of 91%. We found that students' engagement in and enjoyment of the curriculum, their attitudes toward their teachers, and their perceptions of their teachers' skill were all associated with positive changes in the curriculum's five mediators, but not with changes in students' substance use per se. Study findings suggest the importance of these three attributes to the achievement of the objectives of prevention curricula.

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For well over two decades, school-based drug prevention curricula have constituted the nation's primary strategy for preventing adolescent drug use, for which nearly all of the nation's districts receive support from the Safe and Drug Free Schools Program of the United States Department of Education (Hantman & Crosse, 2000). As of 2005, 42.6% of the nation's middle schools were administering a curriculum specified as evidence-based by at least one of several registries (Ringwalt, Vincus, Hanley, Ennett, Bowling, & Rohrbach, 2008), a figure that has increased by nearly 25% since 1999 (Ringwalt, Ennett, Vincus, Thorne, Rohrbach, & Simons-Rudolph, 2002).

It is now widely believed that prevention curricula are unlikely to achieve their intended effects unless they are administered with fidelity to both their prescribed content and instructional strategies, as intended by their developers (Backer, 2001; Berman, Greenwood, McLaughlin, & Pincus, 1975; Bosworth, 2000; Drug Strategies, 1999; Fullan & Pomfret, 1977; McCormick, Steckler, & McLeroy, 1995; National Institute on Drug Abuse (NIDA), 1997). Less attention has been paid, however, to students' attitudes toward their teachers, and the skill with which their teachers administer the prevention curricula (Gottfredson & Wilson, 2003; McNeal, Hansen, Harrington, & Giles, 2004; St. Pierre, Osgood, Siennick, Kauh, & Burden, 2007). Over 15 years ago, Tobler (1992) suggested that teachers who implement prevention programs should demonstrate competency in group process and interactive teaching, skill in focusing and directing students, ability to tolerate ambiguity, and trust that their students have the capacity to make good decisions. A number of other observers have written about the importance of teacher enthusiasm, animation, and respect for students' opinions (Dusenbury, Brannigan, Falco, & Hansen, 2003; Hansen, 1996; Rohrbach, Gunning, Sussman, & Sun, 2008; Sobel, Rohrbach, Dent, Gleason, Brannon, Johnson, et al., 1989). Initial confirmation of the importance of these attributes has come from a recent study conducted by Tonkin and her colleagues (in press) who reported that students' perceptions of the teachers of their prevention programs were related, albeit modestly, both to their receptivity to the program content and to the achievement of its outcomes. It has even been suggested by St. Pierre and her colleagues (2007) that students' attitudes toward their teachers may be as important to the success of a prevention curriculum as their teachers' fidelity to it.

Drawing on attachment theory (Ainsworth, Blehar, Waters, & Wall, 1978), a number of investigators have suggested that students' attitudes toward and perceptions of their teachers' skills, and other characteristics of the student-teacher relationship play an essential role in students' ability to learn (Eccles & Roeser, 1999). Teachers are believed to affect classroom outcomes (Jennings & Greenberg, 2008) through a variety of mechanisms, which include teachers' interactions with their students, their ability to engage their students' active participation in classroom activities, and the level of enthusiasm they demonstrate (Botvin et al., 1995; Dusenbury, Brannigan, Hansen, Walsh, & Falco, 2005; Tonkin et al., in press). Empirical support for this notion comes from Goodenow (1993) who reported a link between students' perceptions that their teachers cared for them—that is, supported, respected, and demonstrated interest in them—and their efforts both in regards to academic achievement and social responsibility. In a study of detained adolescents, Voisin and his colleagues (2005) found that respondents reporting low connectedness to their teachers were more likely to use marijuana and amphetamines (although this relationship could easily be reciprocal in nature). Further evidence of the importance of the student-teacher relationship – or what has been called “pedagogical caring” (Wentzel, 1997) – is provided by a study that found that students' relatedness to their teachers was particularly salient for boys beginning middle school, and was strongly associated with their engagement in learning activities. Murray and Greenberg (2000) similarly reported that students' connectedness to their teachers was related to their social, emotional, and academic adjustment. Indeed, teachers

may constitute the most important element in student learning (Wright, Horn, & Sanders, 1997).

Several researchers have mentioned that insufficient attention has been paid to the effects of various attributes related to student-teacher relationships on the proximal and behavioral outcomes of school-based drug prevention curricula (Gottfredson & Wilson, 2003; St. Pierre, Osgood, Mincemoyer, Kaltreider, & Kauh, 2005; Tonkin et al., in press). The purpose of this study was to assess the association between the behaviors and mediating variables targeted by the All Stars curriculum and students' engagement in and enjoyment of the curriculum, their attitudes toward their teachers, and their perceptions of their teachers' skills. We hypothesized that the success with which the curriculum achieved its intermediate and behavioral objectives would be attributable, in part, to the strength of each of these variables.

METHODS

The All Stars Curriculum

All Stars is an evidence-based prevention program designed to reduce adolescent substance use through changes in specific mediating variables (Hansen, 1996; Harrington, Giles, Hoyle, Feeney, & Yungbluth, 2001; McNeal et al., 2004), namely: normative beliefs, personal commitments not to use substances, perceptions that substance use may interfere with personal values and lifestyles, school bonding, and parental attentiveness. The curriculum consists of 24 sessions, of which 13 are required and are administered to the entire class during classroom time. The program includes interactive and cooperative learning activities such as debates, games, and general discussion. Each session is designed to affect at least one of the curriculum's five mediating variables. Crucial for revealing students' beliefs in non-use norms is the use of their answers to the "Opinion Poll" survey that they complete at the beginning of the program. Answers are revealed to students as part of a game. In nearly all instances, students' attitudes about, and use of substances support a positive norm, which is then reinforced through guided discussion. All Stars has been extensively implemented and evaluated, and has repeatedly yielded evidence of effectiveness (Hansen & Dusenbury, 2004; Harrington et al., 2001).

For this study, All Stars was taught by 48 school staff who participated in a program evaluation designed to test whether personal coaching could improve the fidelity with which school staff taught the All Stars curriculum. The evaluation included 45 middle schools in a large Midwestern school district that were randomly assigned to an intervention or control condition. Because multivariate analyses did not reveal any main or interactive effects for the treatment condition, either on substance use or on All Stars' mediators (Ringwalt, Pankratz, Hansen, Dusenbury, Jackson-Newsom, Giles et al., 2009), the effects of the coaching condition on this study's outcomes was not considered further. Each school staff taught All Stars at least once per year to one class of seventh graders; 36 taught it twice over two successive years, and 23 taught it three times in three years. Altogether, 33 of the 48 staff were classroom teachers; the rest came from outside the classroom, but within the school, and comprised social workers, counselors, teaching assistants, and physical education teachers. As indicated by Table 1, participating school staff's average age was about 40, one-fifth were male, and half were African-American. They averaged almost ten years of experience in the field of education.

Study Participants—Parents of eligible students in were provided a consent form that explained the study, informed them of the investigators' intent to videotape their children's classrooms, and requested their permission to survey their children during classroom time. To secure parental consent, we both mailed the consent form to them and sent the forms

home with the students themselves. We received parental permission to survey a total of 2,448 of 2,682, or 91%, of eligible students.

Data Collection—All participating students completed two surveys about four months apart, both prior to and following their exposure to the All Stars curriculum. We prepared individual packets for each student that included an assent form and a copy of the questionnaire that was identified by a unique bar code that was linked to each student's name. The 114 item questionnaire took students an average of 20 minutes to complete, at the end of which they sealed it in a blank envelope we provided and placed it in a box at the front of the class. Altogether, 2400 students responded to the pretest survey, 2240 students also completed the post-test, and 2428 responded to either the pretest or posttest survey, yielding a response rate 91%. Students were not given incentives to complete the survey. Using the unique bar codes built into the surveys, we were able to link all post-tests to their respective pretests.

Measures—Students responded to three sets of questions pertinent to the study's independent variables that were included on the study's second survey (i.e., post-test). An example of each set of questions, and the psychometric properties of each set, may be found in Table 2. Questions included one published scale, students' engagement in and enjoyment of All Stars (Giles, Harrington, & Fearnow-Kenney, 2001), and two others that we developed for this purpose, namely students' attitudes toward their teachers and their perceptions of their teachers' skills. Four Likert-type response options were provided for each scale, and all three response continua were converted to 10 point scales by means of a monotonic transformation that preserved both the ordinal and interval properties of the data. Scales were then scored in a positive direction so that 10 indicated the most desirable response.

Because two of the three scales had never been validated, we conducted an exploratory principal components analysis for which we used *Mplus* version 5 (Muthén & Muthén, 1998–2007). We hypothesized that the factors described above should be moderately correlated, and so employed an oblique direct quartamin rotation to extract up to a potential five factor solution. Both one and two factor solutions were clearly inadequate (i.e., RMSEA > .08), which indicated that the complete set of 38 items should constitute at least three factors. The fit of the three factor solution was good (CFI = .99, TLI = .99, RMSEA = .06), and all items loaded precisely as expected. The four and five factor solutions also fit well but were not considered further, as they were neither as parsimonious nor as interpretable as the three factor solution. As expected, inter-correlations among the three factors were moderately high: student engagement/enjoyment was correlated at .64 with perceptions of teacher's skill and .70 with attitudes toward the teachers, and the latter two factors were correlated at .74.

Our study's dependent variables comprised, in part, All Stars' five curriculum mediators: *lifestyle incongruence*, *normative beliefs*, *commitment*, *bonding to school*, and *positive parental attentiveness*. Survey items assessing these mediators were assessed with four point Likert-type responses, which we again converted to 10 point scales. As before, we adjusted the valence of the items so that higher scores represented more desirable outcomes (e.g., greater bonding to school) and lower scores were less desirable outcomes (e.g., beliefs that most of their peers use alcohol). We then averaged responses to the items that constituted each scale to yield an approximately normally distributed overall mean scale score. Table 3 displays the number of items constituting each mediator's scale, alpha coefficients assessed with our pretest survey data, and an example item. The study's remaining dependent variables included discrete questions that tapped students' recent use of three key

substances. We assessed whether students had, in the last 30 days, smoked a cigarette, taken more than a sip of an alcoholic beverage, or used marijuana.

The demographic characteristics of participating students are displayed in Table 1. Their average age at pretest was 12.5, the majority identified as African-American or Hispanic/Latino. The questionnaire is available from the first author upon request.

ANALYSES

Our analysis plan consisted of regressing each of the study's outcomes, which comprised five continuous All Stars mediators and three dichotomous 30-day substance use variables, on the study's three independent variables. Note that we did not conduct a mediational analysis per se. We controlled for students' pertinent pretest scores in each of the eight models. We also controlled for any of the three staff-related characteristics (race, gender, and position) and two student characteristics (race and gender) that were significantly related to the study outcome of interest. Multi-level models were used to account both for nesting of students within schools and for multiple years of curriculum implementation (up to three) by school staff. We constructed and ran all our models in SAS version 9.1, using Proc Glimmix for our logistic substance use models and Proc Mixed for our linear mediator models.

RESULTS

Results of our multilevel models are shown in Tables 3 and 4. Note the direction of the variables specified in the column headings of both these tables. As indicated by Table 3, none of the study's three independent variables were associated with All Stars' behavioral outcomes. However, ten of the 15 associations we examined between the study's independent variables and All Stars' five mediators were highly significant ($p < .001$), and only in one case did we fail to find an association. The size of the regression parameters related to school bonding (.14–.18) suggests that the three independent variables were most strongly associated with this All Stars mediator, but the strength of the relationship was modest: there was only about a 15% change in the mediator for each unit of change in the study's independent variables.

DISCUSSION

We found multiple significant relationships between changes in students' All Stars' mediator scores and their attitudes toward their teachers, their perceptions of their teachers' skills, and their enjoyment of and engagement in the curriculum. While the strength of these relationships was modest, our study clearly demonstrated the importance of these three variables in regards to the achievement of the curriculum's objectives.

We are not surprised that the associations between the study's three independent variables and school bonding yielded the strongest set of associations of the studies five mediators, given that the former are presumably integral to the latter. We note, however, that we controlled for students' scores on each mediator at pretest, so if the students had scored high on school bonding both prior to and following their exposure to All Stars, the *change* in their score on this measure would have been trivial. The point to be made here is that students' positive attitudes toward their teachers, and their engagement in the curriculum, appear to have made a significant contribution to All Stars' ability to *improve* their feelings about their school as a whole. However, this finding cannot be considered conclusive, as it is always possible that the improvement was caused by some third, unmeasured variable such as developmental maturation.

We also found that all three measures of students' attitudes and perceptions made a positive contribution to the four other All Stars mediators. Given that they are central to the curriculum, it is not surprising that students' attitudes toward teachers and their engagement in the curriculum were related to their commitments not to use substances, or to their understanding that substance use was likely to be incompatible with their ability to realize their life's goals. More surprising however, was the positive relationship found between all three variables and parental attentiveness. It is possible that teachers who generated strong attachments with their students were more likely to assign homework that involved students in exercises designed to increase communication with their parents. Or, perhaps, students were more sensitive and responsive to their parents' contributions to All Stars homework assignments because of their positive attitudes toward their teacher. Alternately, students reporting positive attitudes toward their teachers may have been more likely to generalize these feelings to their parents as the other authority figures in their lives. Furrer and Skinner (2003) speculate that children's sense of relatedness to their parents may shape their relationships with their teachers; if so, it seems possible (if somewhat less likely) that the direction of causality may be reciprocal. That is, students who respond well to authority figures may be closer to both their teachers and parents.

In regards to normative beliefs about peers' frequency of substance use and perceptions that peer see substance use as socially desirable, both students' engagement in and enjoyment of All Stars, and their attitudes toward their teachers may have been key to students' willingness to follow teachers' directions as they guided students through the process of discovering their peers' attitudes and comparing them to their own. The purpose of targeting normative beliefs—perhaps as important as any in the All Stars curriculum—is to correct students' frequent assumptions that substance use among their peers is widespread and socially desirable, thus disinhibiting their own inclinations to use. It is clear that students' positive attitudes toward their teachers are critical to their emotional engagement in their classrooms (Furrer & Skinner, 2003).

We were disappointed by our failure to find an association between our study's three independent variables and any of the three behavioral outcomes we examined, namely 30-day alcohol, tobacco, and marijuana use. A set of analyses conducted *ex post facto* revealed that there was little change over time in the prevalence of use of the first two, but there was considerable *relative* change (from 5.0% to 6.2%, an increase of about 25%) in the latter. Even, so, the lack of *absolute* change in all three dichotomous measures of substance use left with very small change scores, and thus limited power to detect differences.

Study findings generally complement those reported recently by St. Pierre and her colleagues (2007), who investigated relationships between the personalities Project ALERT teachers and key program outcomes. Personality characteristics assessed included "conscientiousness," or steadfastness in following through with commitments; "sociability," or the teacher's desire to be with others; "individuation," which appears to be a combination of self-confidence and assertiveness; and "altruism." Of these, all but the last were associated with desired program effects. We note that St. Pierre et al. (2007) measured these attributes with sets of questions addressed by the teachers themselves, while our measures were based on students' self-reports. Whether one type of measure is more closely related than the other to prevention program outcomes is an open question. It would be helpful if students and teachers were assessed with similar measures in the future.

Altogether, the importance of students' perceptions of their teachers' skill and their degree of curricula engagement is only beginning to be assessed by investigators in the field of substance use prevention. In the general, the education literature, however, has linked these variables to a variety of outcomes, including self-efficacy, achievement values, interest in

school, social and emotional adjustment, and academic performance (Blumenfeld, 1992; Furrer & Skinner, 2003; Murray & Greenberg, 2000; Skinner, Zimmer-Gembeck, & Connell, 1998; Wagner & Phillips, 1992). As an explanatory framework, several investigators have referenced attachment theory, which suggests the importance of supportive relationships with responsive and trusted teachers (Ainsworth et al., 1978). St. Pierre and her colleagues (2007) suggest that these characteristics may be just as important as program fidelity in this regard; McNeal and his colleagues (2004) suggest that the bond between students and their teachers may be critical to their beliefs about and values concerning substance use. We note that in the McNeal et al. study bonding to school per se was largely unrelated to program effectiveness; it was the students' relationship with the teacher that seemed to matter the most, a finding that has been reported elsewhere (Battistich, Schaps, Watson, & Solomon, 1996; Hawkins, Catalano, & Miller, 1992).

IMPLICATIONS FOR RESEARCH AND PRACTICE

As suggested by Domitrovich and Greenberg (2000), our study findings indicate that student's attitudes toward their teachers, their perceptions of their teachers' skills, and their engagement in a prevention curriculum all contribute to the achievement of immediate program objectives. These variables are related to several mentioned by Dusenbury and her colleagues (2005) as critical to prevention effectiveness, namely "teacher enthusiasm" and "student engagement." Other characteristics that have been assessed include teachers' "respectfulness," "ability to understand students," and "likeability" (Rohrbach, Dent, Skara, Sun, & Sussman, 2007), as well as teachers' level of understanding of their students' world (Hammond, Sloboda, Tonkin, Stephens, Teasdale, Grey, et al., 2008), "caring" and "support" (Wentzel, 1997), and "credibility" (Tonkin et al., in press). As mentioned earlier, there are clearly other dimensions that we have not tapped, and that remain to be suggested by theory or practical experience. Also remaining to be explicated and studied are the various pathways by which these characteristics affect program outcomes, and how the interactions of these characteristics with various dimensions of fidelity may affect program outcomes.

A number of studies now suggest that it is not sufficient for facilitators to assiduously follow instructions concerning curriculum content and teaching methods, because their efforts may still fail to achieve effects if they lack the requisite skills, including the ability to build positive relationships with their students. While these skills certainly can be practiced and learned, as well as modeled within the context of in-person training, it seems unfeasible to expect program trainers to impart them during the course of the standard one or two day training provided by most prevention programs. Instead, findings suggest that schools should screen teachers carefully for the personal attributes and skills required if desired prevention program effects are to be achieved (Tonkin et al., in press).

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Table 1

Characteristics of Sample Teachers and Students

	%
Participating facilitators	<i>N</i> = 48
Age, Mean (SD)	40.2 (9.7)
Gender (male)	20.8
Race/ethnicity	
African-American	50.0
White	41.7
Classroom teacher	68.8
Years experience in education, Mean (SD)	9.7 (7.1)
Participating students	<i>N</i> = 2,431
Age, Mean (SD)	12.5 (0.6)
Gender (male)	47.3
Race	
African-American	56.7
White	11.0
Hispanic/Latino	26.9

Table 2

Survey Questions Constituting Each Independent Variable and All Stars Mediator

Independent variables	# questions	Alpha	Examples of questions asked
Engagement in and enjoyment of All Stars	10	.93	I liked the questions my teachers asked in All Stars
Students' attitudes toward their teachers	12	.94	I like my teacher
Students' perceptions of their teachers' skills	16	.91	My teacher is good at getting our attention
All Stars mediators			
Lifestyle incongruence	11	.76	I will have a happier life if I stay away from alcohol
Normative beliefs	12	.82	My friends think smoking cigarettes is cool
Commitment	11	.83	I have made a decision not to get high by sniffing fumes
Positive parental attentiveness	7	.77	My parents often talk with me about things they think are important

Table 3

Results of Mixed Models Relating Student Substance Use to Student's Curriculum Engagement, Attitudes Toward Their Teachers, and Perception of Their Teachers' Skills ($N = 48$)

	Cigarette use	Alcohol use	Marijuana use
	Odds Ratio (SE)	Odds Ratio (SE)	Odds Ratio (SE)
Curriculum engagement/enjoyment	.04 (.05)	-.03 (.03)	-.10 (.06)
Attitudes toward teachers	.03 (.05)	-.03 (.04)	-.06 (.06)
Perceptions of teachers' skill	.07 (.06)	-.06 (.04)	.00 (.08)

Note: No effects were statistically significant.

Results of Mixed Models Relating Mediators of Substance Use to Curriculum Engagement, Attitudes Toward Their Teachers, and Perception of Their Teachers' Skills (*N* = 48)

	Normative beliefs	Personal commitments	Lifestyle incongruence	School bonding	Parental attentiveness
Engagement/enjoyment	.04 (.02) *	.08 (.02) ***	.08 (.02) ***	.14 (.02) ***	.07 (.02) **
Attitudes toward teachers	.05 (.02) *	.10 (.02) ***	.08 (.02) ***	.18 (.02) ***	.09 (.03) ***
Perceptions of teachers' skills	.02 (.02)	.08 (.03) **	.08 (.02) ***	.16 (.03) ***	.06 (.03) *

* *p* < .05,
** *p* < .01,
*** *p* < .001