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Associations of teacher credibility and teacher affinity with learning outcomes in health classrooms

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Abstract

In the present study (N = 633), we examine the role of teacher credibility and teacher affinity in classrooms. We explore the relations among these two characteristics and student gains in knowledge and valuing of learning about HIV and pregnancy prevention across high school classrooms. Results marshaled support for the notion that teacher characteristics are associated with classroom-level gains in learning outcomes. Above and beyond student-level predictors, teacher credibility (aggregated to the classroom level) was positively related to increases in knowledge across classrooms, whereas aggregated teacher affinity was positively related to an increased valuing of learning about HIV and pregnancy prevention across classrooms. Future directions and implications for practice are discussed.

Keywords

Credibility; Affinity; Motivation; Social context; Health education; HIV/Pregnancy prevention

1 Introduction

Psychologists have extensively examined students' perceptions of classroom and school environments. Perceptions of the classroom environment in particular are influenced by students' perceptions of how their teachers promote classroom learning. Within the study of students' perceptions of their teachers, there remains a need to study students' perceptions of teacher traits (or characteristics), and how those perceptions are related to student outcomes. Indeed, perceptions of teacher characteristics may play important roles in education, since

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teaching involves an internalization of information, beliefs, and values (Alexander et al. 2002). Whereas the field of Communication has examined the association between teacher characteristics and learning outcomes (e.g., students' perceptions of their instructors and their perceptions of how much they had learned), there is much more to be learned in terms of how these elements are associated with subsequent changes in student outcomes.

One school subject typically understudied is health education. For students enrolled in high school health classrooms, learning outcomes have implications for students' life choices as adolescents transition into adulthood. Health educators often focus on ways of resisting social pressure to engage in unhealthy practices (e.g., Jemmott and Jemmott 2007). Yet, a health teacher's job also involves "convincing" students that certain practices should be adopted and others avoided. Health teachers stress the importance of maintaining healthy lifestyles (broadly defined), and attempt to positively impact students' beliefs and behaviors.

In this study, we examine the relations between adolescents' perceptions of their health teachers (i.e., teacher credibility and teacher affinity) and students' learning, and how much they value learning about HIV and pregnancy prevention. First, we briefly describe research on classroom learning climate and review extant research on the ways in which students' perceptions of teachers are associated with learning outcomes; next, we describe two characteristics of teachers (credibility and affinity) that may promote gains in knowledge and valuing of learning about HIV and pregnancy prevention; last, we examine relations between teacher characteristics and student learning and values, using an expectancy-value framework.

2 Perceptions of teachers and learning outcomes

Researchers acknowledge that learning in schools involves much more than 'cold cognition' or simple information processing (Pintrich et al. 1993); it involves an array of additional variables, including personal choice, individual needs and motivational beliefs (Pintrich 1990; Pintrich and De Groot 1990). The perceived psychological climate or structure of the classroom contributes immensely to how learning and motivation occur in academic settings (Turner and Meyer 2000). For example, students' perceptions of a supportive classroom environment are linked to their wellbeing (Colarossi and Eccles 2003; Roeser et al. 2000), motivation and adjustment (Connell and Wellborn 1991; Eccles 1993), and achievement (Fraser and Fisher 1982; Roeser et al. 1998). Conversely, characteristics of problematic climates (e.g., classrooms characterized by bullying and victimizations) have negative implications for school adjustment and learning outcomes (Graham and Juvonen 1998; Juvonen 2006; Juvonen et al. 2006). The general finding on the psychological climate of schools and classrooms is that environments perceived as welcoming to students yield higher morale, increased attendance, and better grades (Moos and Moos 1978). Students' perceptions of their teachers are undoubtedly related to learning outcomes. Researchers have examined perceptions of teachers through a number of different lenses. Some explore students' perceptions of classroom goal structures (Ames and Archer 1988; Anderman et al. 1998; Midgley 2002; Turner et al. 2002), whereas others examine perceived support for students' psychological needs for autonomy, competence, and relatedness (Deci et al. 1991; Reeve and Jang 2006). These constructs have been positively associated with the use of

adaptive learning strategies, persistence, and academic performance in students. Thus researchers have overwhelmingly concluded that teachers play a major role in how much students care about what they are learning, how much knowledge they retain, and how motivated they are to continue learning in the future (Anderman and Anderman 2010).

From a statistical standpoint, it is important to acknowledge that the relations of students' perceptions of teachers to student outcomes involves different units of analysis (i.e., students nested within teachers). One way researchers have assessed these relations is through the use of multilevel modeling. Through techniques such as these, researchers are able to assess the relations between changes in learning outcomes in individual students, as a function of students' aggregated perceptions of teacher characteristics and behaviors (e.g., Anderman and Young 1994). In the present study, we employ multilevel regression to examine the relations between perceptions of teacher characteristics and changes in knowledge and valuing of learning across different health education classrooms.

3 The learning environment as a persuasive context

Whereas persuasion is not the primary focus of the present manuscript, overwhelming similarities exist between the constructs we describe and those presented in the basic persuasion literature. Since the findings of the persuasion literature speak directly to the teacher characteristics we are exploring in the present investigation, we incorporate this literature to provide a fuller understanding of the phenomena under investigation.

Persuasion refers to "any procedure that has the potential to change someone's mind" (Briñol and Petty 2009, p. 2). By change, we mean that persuasion results in the internalization of information, beliefs, and values. Stated another way, "persuasion involves convincing individuals to look differently or more deeply at some concept or subject" (Alexander et al. 2002, p. 796). Persuasion is typically viewed as relevant to careers in politics, sales, and law, but may also be relevant to careers in education. Indeed, persuasion occurs in our everyday interactions—even in schools. Though social exchange in the classroom does have reciprocal components (Davis 2003), implicit in the agenda of formal education is the notion that the teachers will transmit knowledge about a subject, as well as valuing of learning about that subject, to a classroom of students. Viewing classrooms as persuasive contexts might prove useful to understanding how knowledge and values develop in students.

Persuasion is the resultant of three main factors: the source, the message, and the audience (for comprehensive explanations of social judgment processes, see McGuire 1978; Petty and Briñol 2006; Petty and Cacioppo 1986). In the classroom context, the teacher (the source) has the potential to change the mind of the student (the recipient) through his or her message. Researchers have begun to utilize the persuasion literature to highlight new ways in which educational environments promote learning outcomes (e.g., Murphy 2001a,b; Murphy and Mason 2006; Woods and Murphy 2001). Alexander,Murphy, and their colleagues (Alexander et al. 2002; Murphy 2001a,b) have begun to examine the pedagogical approach of teaching as persuasion—a metaphor for teaching to produce desired academic learning outcomes in students. Consistent with the persuasion literature (e.g., Petty and

Cacioppo 1986), Alexander et al. demonstrated that students' knowledge, beliefs, and interests can increase as a function of compelling and thought-provoking lessons. These researchers made science lessons persuasive by delivering scientific facts and principles to students in a rich historical, thought-provoking way. Murphy and Mason (2006) stated that "there is much work to be done in the area of classroom interventions that will promote knowledge and belief change" (p. 319). Knowledge and belief change in health classrooms may be particularly important, since adolescents' knowledge and value of learning about HIV and pregnancy prevention have the potential to provide immediate impacts on health outcomes.

In health education classrooms, teachers provide students with crucial information about how to avoid risky situations. The knowledge and beliefs that students acquire from health education classrooms therefore have immediate implications for students' life trajectories. Teachers are impacting students' lives in "real time." It is therefore imperative that researchers highlight the factors that help teachers convince students of the importance of health education material.

We do not examine the components of persuasive course content or persuasive messages in this study; such research has been outlined elsewhere (Alexander et al. 2002; Murphy and Mason 2006). Instead, in the present study we examine students' perceptions of teacher characteristics, which are conceptually parallel to what persuasion researchers refer to as "source traits." It is important to understand how these elements operate within classrooms, because such perceptions may be associated with the salience of course material as it is taught to the student. We now highlight the ways in which two "source traits" have been used in the Communication literature to study learning and value.

3.1 Persuasive teacher characteristics: credibility and affinity

The appeal of an individual is due in large part to his or her credibility and affinity. Specifically, both of these constructs are seen as fundamental qualities of "the source" in the persuasion literature, and have important implications for how learning occurs in classrooms.

3.1.1 Teacher credibility—Dating back to Aristotle, credibility has been identified as one of the most powerful resources available to a speaker (Cooper 1932). Since then, several researchers have documented the critical effect of source credibility in persuasion (e.g. Chaiken and Maheswaran 1994; Eagly and Chaiken 1993; Heesacker et al. 1983; Hovland and Weiss 1951; Kelman and Hovland 1953; Petty and Wegener 1998; Pornpitakpan 2004; Tormala et al. 2006). In general, research indicates that persuasion is more likely to occur if the communicator is perceived as being highly credible. Petty (1997) noted that one outcome of source credibility is its ability to enhance the learning of persuasive arguments. Some researchers have assessed the utility of this construct in the domain of education.

As characterized by Aristotle and others, ethos (or credibility) is an appeal used in rhetoric to strengthen the effectiveness of one's argument (Cooper 1932). Cooper asserts that humans tend to believe individuals that we perceive to be legitimate. Similarly, the concept of teacher credibility refers to the "believability" of a teacher (Frymier and Thompson

1992). A credible teacher is one who is able to explain complex material to students in a way they can understand; who can actually work in (or has worked in) the subject area which he or she is teaching; and who is able to effectively respond to students' questions (Pogue and Ah Yun 2006).

To be credible, communicators must be perceived as being both competent and trustworthy (Hovland and Weiss 1951; Tripp et al. 1994). Measures of teacher credibility have remained consistent with this conceptualization—viewing the construct as a combination of competence and character (McCroskey and Young 1981). Competence refers to a student's perceptions of the teacher's knowledge and experience, whereas character is an evaluation of the teacher's moral fiber. For example, in evaluating the character of a teacher, a student might question how good of a person the teacher seems to be, or whether the teacher seems to be operating in the best interests of students (McCroskey and Young 1981).

Studies on teacher credibility provide converging support for the idea that students' perceptions of teacher credibility account for some differences in learning outcomes across classroom settings. For example, using an undergraduate sample, McCroskey and Teven (1999) found that students who perceived their Communication instructors as credible were more likely to report that they learned more from their instructor, and that they experienced positive affect in the class. In an experimental setting, Pogue and Ah Yun (2006) demonstrated that teacher credibility predicted greater motivation and positive affect in a sample of college students.

3.1.2 Teacher affinity—Frymier and Thompson (1992) demonstrated that teacher credibility is likely to operate in conjunction with another Communication construct—teacher affinity. In an educational context, this construct represents the extent to which the student perceives the instructor as likable. The persuasion literature indicates that affinity for a speaker impacts the magnitude of attitude change (Briñol and Petty 2009). Specifically, affinity serves as as a cue that boosts the salience of a speaker's message. The persuasion literature tells us that likable individuals are those who tend to have a nice appearance (Chaiken 1979), who appear to be similar to the message recipient (Brock 1965), or are perceived as being popular (Kahle and Homer 1985; Tripp et al. 1994).

In an education setting, students report high levels of affinity for instructors who exhibit positive self-disclosure, compromise, and engage in respectful dialogue with students in the classroom (Bell and Daly 1984). Thus, previous work has demonstrated that teachers have some control over the degree to which their students perceive them as likable. Further, teacher affinity has been linked to learning and motivational outcomes. For example, in a longitudinal study of undergraduates, Frymier (1994) demonstrated that affinity-seeking strategies employed by university instructors (Time 1) predicted teacher affinity (Time 2); and that teacher affinity predicted how much students felt they had learned by the end of their course (Time 3). Teacher affinity is positively related to perceived learning (Frymier 1994), greater appreciation for subject matter (Gorham et al. 1981), and higher levels of academic motivation (Beebe and Butland 1993).

3.2 Distinguishing credibility and affinity from student–teacher relationships

Although teacher credibility and teacher affinity may be construed as measures of teacher-student relationships, it is important to note the differences between these communication variables and relationships. In her review of the literature on student–teacher relationships, Davis (2003) noted: “It is because of this focus on the teacher that much of the research on student–teacher relationships within the motivation literature has focused on dimensions that fall within teachers’ ‘control’ (e.g., class context, climate, expectations, behaviors, tasks, and strategies)” (p. 212). Following Davis’s critique of the literature on student–teacher relationships, we argue that teacher credibility and teacher affinity are not student–teacher relationship variables—particularly because the term “relationship” implies a bi-directional measurement of a student’s feelings toward the teacher, as well as the teacher’s feelings toward that student (or the student’s perceptions of the teacher’s feelings toward the student). For the purposes of this study, we are not examining interpersonal relationships; rather, teacher credibility and affinity are conceptualized as characteristics embodied by the teacher. We argue that these characteristics may be associated with learning outcomes across classroom settings.

4 Knowledge and valuing of learning

The work of Briñol and Petty (2009) suggests that attributes of a speaker may not only affect how deeply an audience thinks about the message, but also shape beliefs about the subject matter. In the present study, we hypothesize that teacher characteristics are related to both the value students place on learning, and actual learning.

One established conceptualization of adolescents’ valuing of learning is the expectancy-valuemodel. Perhaps the most popular version of this model is the one developed and validated by Eccles and colleagues (Eccles and Wigfield 1995;Wigfield and Eccles 1992, 2000, 2002). The model was originally designed to evaluate the expectancies and values of students in the domain of mathematics. Studies examining expectancies and values have since proven useful in other domains of education, such as reading and athletics (Eccles and Harold 1991;Wigfield 1997).We focus specifically on the value component, since achievement values predict engagement in learning activities when participation is not required (Wigfield and Eccles 1992). Studies have demonstrated that greater valuing of learning in a particular academic domain (e.g. mathematics) is associated with intentions and actual future engagement in those domains; this has been demonstrated for mathematics (e.g. Meece et al. 1990), reading (e.g. Wigfield 1997), and sports (e.g. Eccles and Harold 1991). In line with this research, it is likely that the valuing of learning about HIV and pregnancy prevention should complement a student’s knowledge about the topic, and consequently foster a continued interest in learning about safe sexual practices.

Value has four sub-components: attainment value, intrinsic value, utility value, and cost. Attainment value is the extent to which success at an academic task validates a student’s self-concept. For instance, if a student identifies with being knowledgeable about HIV and pregnancy prevention, he or she may be more likely to engage in learning about the topic in order to confirm pre-existing self perceptions. Intrinsic value is how much the learning task naturally appeals to the student. In other words, this would be the sheer satisfaction a student

feels when engaging in class discussions on this topic. When a student views success at a particular learning task as useful toward reaching a subsequent goal, the student is more likely to engage in the activity (Wigfield and Eccles 1992); this is considered utility value. For example, a student might take learning about HIV and pregnancy prevention very seriously if he or she believes this knowledge will be useful during real life situations. Cost is the consideration of what a student must sacrifice in order to engage in the task (Eccles et al. 1995). When students consider taking time out to learn about HIV and pregnancy prevention, they may think about what other activities they are sacrificing in order to do so.

Wigfield and Eccles (2002) argue that "it is difficult if not impossible to understand students' motivation without understanding the contexts they are experiencing" (p. 128).With rare exception, students' valuing of learning has remained unexamined in the context of health classrooms (cf. Anderman et al. 2009). Thus, examining the relations of the perceived attributes of teachers to knowledge and valuing of learning in health classrooms contributes to our understanding of teacher influence in education, as well as to our understanding of classroom learning outcomes.

5 The present study

The research on teacher credibility and teacher affinity has demonstrated the important relation of these teacher characteristics to individual learning outcomes (Beebe and Butland 1993; Frymier 1994; Frymier and Thompson 1992; Gorham et al. 1981; McCroskey and Teven 1999; Pogue and Ah Yun 2006). However, research to date has not (a) addressed the relations of credibility and affinity to learning outcomes across multiple classrooms settings (i.e., examined between-classroom variation); (b) demonstrated the relations of teacher credibility and affinity to students' valuing of learning; and (c) utilized a measure of knowledge (i.e., actual performance on a test of knowledge)—previous studies have instead relied on students' perceptions of how much they had learned, rather than actual measures of knowledge. Thus the present study expands upon previous research by addressing these three issues.

Based on previous research on classroom context and persuasion, we predict that the students' perceptions of teacher affinity and credibility (aggregated to the classroom level) will explain classroom-level variability in changes in learning and achievement values over the course of a semester. Across health classrooms, aggregated student perceptions of teacher affinity and teacher credibility should be positively related to greater knowledge and valuing of learning about HIV and pregnancy prevention, after controlling for the presence of individual-level predictors and baseline measures of these outcomes.

Because researchers have identified the importance of classroom social contexts in understanding learning and motivation, gains in knowledge and motivational constructs such as task value will likely be context dependent. Therefore, in the present study we control for individual-level predictors in order to conduct a more stringent test of the relations between credibility and affinity with learning outcomes. In addition to demographic variables such as gender, ethnicity, and prior sexual experience, we include measures that are related to knowledge and value beliefs. Specifically, we control for the presence of students' attitudes

towards waiting to have sex, peer norms, learning expectancies, and sensation-seeking, because such background factors are associated with learning outcomes in health education (Anderman et al. 2009; Gray and Anderman 2008).

We specifically hypothesize that:

1. Perceived teacher affinity will be positively related to classroom-level gains in knowledge and valuing of learning about HIV and pregnancy prevention after the presentation of a 14-day unit on HIV/pregnancy prevention, when controlling for gender, attitudes toward waiting to have sex, learning expectancies, sensation-seeking, prior sexual experience, ethnicity, and the covariates at baseline.
2. Perceived teacher credibility will be positively related to classroom-level gains in knowledge and valuing of learning about HIV and pregnancy prevention after the presentation of a 14-day unit on HIV/pregnancy prevention, when controlling for gender, attitudes toward waiting to have sex, learning expectancies, sensation-seeking, prior sexual experience, ethnicity, and the covariates at baseline.

6 Method

6.1 Sample

Participants in the present study were recruited from seven high schools in two geographically similar cities in the Midwestern United States. The sample consisted of 633 high school students enrolled in freshman health education classes. There were 10 instructors, each of whom taught an average of three health classes per day. The student sample is divided almost evenly in terms of gender (47.1% male and 52.9% female). Participants ranged from ages 13 to 18 (82.4% of the sample were 14 and 15 years of age), and most were in ninth grade. In terms of ethnicity, 50.8% were Caucasian, 37.1% African American, 1% Asian/Pacific Islander, 3.1% Latino, 1% Native American, and 5.5% reported being multiracial or of other ethnic backgrounds.

6.2 Data collection procedures

All data collection procedures for this study were approved by an Institutional Review Board. Data reported in this study were part of a larger study on school learning environments and HIV/pregnancy prevention in which participating high schools used a standardized curriculum on HIV/pregnancy prevention. Specifically, all teachers used Barth's *Reducing the Risk* curriculum during the 14 days of instruction (Barth 1996); therefore, since identical curricular materials were used across all classrooms, variation in credibility and affinity should not be related to the possibility that teachers may have used different curricula across the classrooms.

Data were collected at two time points during the fall of 2003. The baseline questionnaires were administered to students during regularly-scheduled health classes. The surveys took between 40 and 55 min for students to complete. All students were told that their surveys were confidential and were given standardized instructions. Follow-up questionnaires were administered in communal spaces (e.g., the gym, the cafeteria, or the library). In addition, we took extra steps to insure the privacy of all students while completing the questionnaire.

Specifically, each participant received a manila envelope containing a copy of the questionnaire. Inside the envelope was a survey tagged with ultraviolet ink. At both survey administrations, students received their individual surveys in a manila envelope with a sticker with their name. Once the envelope was handed to the student, the sticker was removed and destroyed. We used the invisible ink to mark identification numbers on the surveys, so that we could match surveys across waves (but so that students would see no visible identifiers on either their surveys or their classmates' surveys). We also used six different versions of the survey simultaneously, with different colors of paper and questions in different orders on each survey, in order to further increase privacy.

When surveys were returned to our offices, an ultraviolet light made the codes visible, and the ID code was then copied onto the front of each survey, using regular ink. The records indicating names and student codes were kept in locked filing cabinets, so that data were never directly linked with names.

6.3 Reducing the risk curriculum

All students received an established skills-based HIV and pregnancy prevention curriculum called *Reducing the Risk* (RTR; Barth 1996). RTR is a curriculum endorsed by the Centers for Disease Control and Prevention's Division of Adolescent and School Health. The RTR curriculum has proven effective in reducing HIV-related risk behavior on many occasions (Barth). The RTR intervention consisted of 14 modules containing specific strategies and activities designed for each class session. The curriculum focused primarily on practicing strategies that could be used to avoid risky sexual encounters such as unprotected sex. RTR was not designed to directly impact how much students value learning about HIV and pregnancy prevention, or the amount of knowledge students retain.

6.4 Measures

Surveys using five and seven-point Likert-type items were administered to all participants at two time points. At baseline, students completed 56 items before beginning the RTR modules. Approximately 3weeks after completion of the 14-module RTR curriculum, students completed an 80-item survey. Demographic data were collected at the first survey administration, including gender, ethnicity, and prior sexual experience (i.e., whether or not the student had had sexual intercourse). Gender was coded as a dummy variable, where 0 = *male* and 1 = *female*. Since African Americans in particular are at higher risk for contracting HIV (CDC 2008), ethnicity was coded as 0 = *other* and 1 = *African American*. Prior sexual experience was coded as 0 = *virgin* and 1 = *non − virgin*. Other baseline measures included sensation seeking, expectancy and valuing of learning about HIV/pregnancy prevention, attitudes towards having sex, normative peer sexual behavior, and a test of knowledge about HIV/pregnancy prevention. Descriptions of the survey measures and their psychometric properties are presented in Table 1. At the second data collection, students' perceptions of teacher credibility and affinity were assessed along with Time 2 valuing of learning and knowledge. All items used in the present study previously were pilot tested in a separate sample of over 300 adolescents.

7 Results

Means, standard deviations, and correlations are presented in Table 2. Given the hierarchical structure of the data (students nested within health classrooms), we used multilevel analysis to assess the relations of teacher credibility and affinity to knowledge and valuing of learning about HIV and pregnancy prevention, while controlling for those measures at baseline.

7.1 Preliminary analysis

There are many ways to define teacher credibility and teacher affinity. The measures used in the present study are adapted versions of established measures. Teacher credibility and teacher affinity are conceptualized as distinct constructs. Undoubtedly, there may be some shared variance among these measures. To be sure that the scales of teacher credibility and teacher affinity were tapping into separate constructs, we entered the items from scales into a principal-components analysis with varimax rotation. Data were appropriate for PCA, with KMO = .911 and Determinant < .001. Using the Kaiser rule of Eigenvalues greater than 1.0, only the two factors of teacher credibility and teacher affinity emerged. The factors demonstrated simple structure—that is, no item crossloaded at .4 or greater.

7.2 Multilevel analyses

We used HLM Version 6.08 (Raudenbush and Bryk 2002) to conduct the multilevel analyses. We predicted that perceptions of teacher credibility and affinity (aggregated to the classroom level) would be positively related to (a) valuing of learning and (b) knowledge about HIV and pregnancy prevention at Time 2, after controlling for the presence of individual-level predictors, including the Time 1 assessment of the corresponding outcome variables. There were 28 health classrooms in total, with an average of 23 students in each. Since the present study examines contextual variables, we first estimated random-intercept models for both dependent variables using only level-one predictors collected at baseline and no classroom-level predictors.

The student-level models are represented by the following equations, with all level one (student-level) predictors being collected at Time 1 (pre), and the dependent variables being measured at Time 2 (post):

$$\text{Valuing of Learning at Time 2} = \beta_{0j} + \beta_{1j}(\text{gender}) + \beta_{2j}(\text{attitudes about sex}) + \beta_{3j}(\text{expectancy}) + \beta_{4j}(\text{value at Time 1}) + \beta_{5j}(\text{sensation seeking}) + \beta_{6j}(\text{prior sexual experience}) + \beta_{7j}(\text{knowledge at Time1}) + \beta_{8j}(\text{peer sexual behavior}) + \beta_{9j}(\text{ethnicity}) + r_{ij}.$$

$$\text{Knowledge at Time2} = \beta_{0j} + \beta_{1j}(\text{gender}) + \beta_{2j}(\text{attitudes about sex}) + \beta_{3j}(\text{expectancy}) + \beta_{4j}(\text{value at Time 1}) + \beta_{5j}(\text{sensation seeking}) + \beta_{6j}(\text{prior sexual experience}) + \beta_{7j}(\text{knowledge at Time1}) + \beta_{8j}(\text{peer sexual behavior}) + \beta_{9j}(\text{ethnicity}) + r_{ij}.$$

In the random-intercepts models only, the intercepts were allowed to vary between classrooms. All level-one variables were group-mean centered. Since the goal of our study was to examine the relation of contextual factors to valuing of learning and knowledge (controlling for individual-level predictors), the between-classroom variance for these

analyses therefore was calculated in the presence of individual-level predictors. The *residual intraclass correlation* (i.e. *residual ICC*) represents the amount of variability that can be attributed to between-classroom differences (as well as the degree of similarity among students within the same classroom) by controlling for the presence of level-one predictors (see Snijders and Bosker 1999). We used conditional models (random-intercepts) to assess the degree of residual intraclass correlation among the classrooms. Results revealed that a significant proportion of the variance in both dependent variables can be attributed to differences among classrooms. Specifically, 6.3% of the variance in valuing of learning at Time 2 occurs between classrooms, χ^2 (26) = 55.88, $p < .001$. Similarly, 10.6% of the variance in knowledge at Time 2 occurs between classrooms, χ^2 (26) = 75.98, $p < .001$ (see Table 3). Thus, the data warrant multilevel analyses which model between-classroom variance in the dependent variables.

In terms of contextual variables, individual measures of teacher credibility and teacher affinity were aggregated by classroom, and then added to the final multilevel models as classroom-level predictors of variance in the intercepts for the valuing of learning and knowledge models. All level-one predictors were retained in the final models regardless of their contribution to variation in Time 2 knowledge and valuing of learning at either level of analysis. The between-classrooms models are represented by the following equation:

$$\beta_{0j}=\gamma_{00}+\gamma_{01}(\text{Teacher affinity})+\gamma_{02}(\text{Teacher credibility})+u_{0j}.$$

Table 4 provides a summary of the findings for the final multilevel models predicting valuing of learning and knowledge. While the contribution of each predictor variable is presented in the table, only the classroom-level variables are of interest in the present investigation. Therefore, only level two variables predicting variance in β_0 will be discussed further. Since all level-one variables were group-mean centered, the intercept, β_0, should be interpreted as the variability in average classroom scores on the dependent variables when attitudes toward waiting to have sex, learning expectancies, sensation-seeking, and the covariates are at their classroom average; and at the classroom proportion of females to males, Blacks to non-Blacks, and virgins to non-virgins. The classroom-level variables of teacher credibility and teacher affinity should be interpreted as explaining the variance in β_0.

Using the Raudenbush and Bryk (2002) convention for determining proportion of variance accounted for, we found that the contextual variables of teacher credibility and teacher affinity accounted for 29.94% (*PVAF* = .2994) of the variance in adjusted means for valuing of learning about HIV/pregnancy prevention at the classroom level. As predicted, teacher affinity was associated significantly and positively with mean classroom value at Time 2 (γ_{01}), which suggests that, across classrooms, valuing of learning about HIV and pregnancy prevention may be facilitated by teacher affinity. However, teacher credibility was not a statistically significant predictor of students' valuing of learning (γ_{02}). Significant variability between classroom means (τ_{00}) for Time 2 value remains to be explained, χ^2 (24) = 47.78, $p < .01$.

In terms of students' knowledge, we found that the contextual variables of teacher credibility and teacher affinity accounted for 27.93% (*PVAF* = .2793) of the variance in

adjusted means at the classroom level. As predicted, teacher credibility was associated significantly and positively with mean classroom knowledge at Time 2 (γ_{02}), which suggests that, across classrooms, knowledge about HIV and pregnancy prevention may be facilitated by teacher credibility. However, teacher affinity was not a statistically significant predictor of students' knowledge (γ_{01}). There are still differences in knowledge across classrooms (τ_{00}) that might be explained by other level-two variables, χ^2 (24) = 62.22, $p < .001$.

8 Discussion

In the present study, we demonstrated support for the notion that the characteristics embodied by teachers are related to important learning outcomes in adolescents, even after controlling for a host of other variables, including baseline measures of knowledge and value. Consistent with our predictions, teacher credibility was positively associated with classroom-level gains in knowledge. Likewise, teacher affinity was positively associated with classroom-level gains in value. Unexpectedly, teacher credibility was not significantly related to valuing of learning; nor was teacher affinity significantly related to knowledge. Though the present findings do not mirror those of previous studies on teacher credibility and teacher affinity, the use of an actual test of knowledge to assess knowledge gain, and an established measure of motivational beliefs (specifically, students' valuing of learning), lend credence to our findings.

Although speculative, the literature points us to an explanation of why teacher credibility and affinity were each associated with only one dependent variable. The potential mechanisms underlying the relationship between source traits and increased persuasion might explain such findings. Since humans have a desire to be "right", credible sources are often more effective because we assume they know what they are talking about (Hass 1981). It follows, then, that we are likely to remember knowledge presented by a credible source because doing so helps us satisfy our need to be accurate. We also have a need for assimilation (also known as affiliation, belonging, or relatedness) (Brewer 1991; Deci et al. 1991). Perhaps having higher levels of affinity for their teachers satisfies students' assimilation needs. Values may subsequently be transmitted more easily from teacher to student when psychological distance is decreased. Such possibilities provide fertile ground for future research on the role of persuasive sources on learning outcomes.

It is plausible to imagine a teacher who is highly knowledgeable (i.e., high in perceived credibility), but very disconnected from students (i.e., low in perceived affinity). Whereas students may learn a great deal, the psychological distance between the teacher and students may inhibit students from becoming passionate about the material. Similarly, it is plausible to also imagine a teacher who is well liked by students (high affinity), but is not perceived as very knowledgeable (low credibility). Whereas reduced psychological distance may lead to the transmission of values from teacher to learner, students may not devote their cognitive resources to learning from this non-credible information source. Neither of the aforementioned scenarios is optimal. Since both knowledge and value are important, it is important that teachers remain reputable in terms of both credibility and affinity.

The present investigation provides a number of contributions. First, our research provides some validation of the claim that teacher characteristics contribute to effective communication with students. Second, we have demonstrated that the characteristics of teachers are associated with gains in knowledge and valuing of learning about a school subject, while accounting for between-classroom variation (i.e., intraclass correlations). Specifically, our results indicate that students tend to learn more when they are in classrooms where the teacher is perceived as being credible. Additionally, our results show that students tend to value what they learn when they perceive their teacher as high in affinity. In the context of HIV and pregnancy prevention, our results are especially important. When talking to high school students about reproductive behavior, what they know does not matter if lessons about the larger picture (i.e., maintaining a healthy lifestyle) are not internalized.

8.1 Limitations

The present study has limitations that must be acknowledged. First, all data collected in the present study are self-report. Students may not feel comfortable answering sensitive questions. Nevertheless, many precautionary measures were taken during data collection to minimize such risks, as previously described. Second, both the measures of teacher credibility and teacher affinity were collected during the second wave of data collection (at the same time as the dependent variables). Since students' perceptions of their teachers had not yet been formed during the first survey administration (that is, at the beginning of the academic term), but were likely formed before the second survey administration, a directional relation between teacher characteristics at Time 2 and learning outcomes was inferred. The direction of the inferred relationship is supported by extant literature on source traits (see Briñol and Petty 2009). Third, the present study examined the relation of teacher credibility and affinity in 10 teachers across 28 classrooms. Since teachers taught multiple sections of health education, it is conceptually impossible to isolate the effect of the teacher from the effect of the classroom in this two-level multilevel model. The present research could benefit from a larger sample of teachers, which would allow the addition of a teacher-level unit of analysis to the multilevel model (i.e., a three-level model). Since the study only has two time points, we were unable to examine the cascading effects of increases in knowledge and valuing of learning on actual HIV/pregnancy prevention behaviors.

Turner and Meyer (2000) noted that "contextualized findings provide more externally valid information for teachers because they help explain the why and how behind student–teacher interactions" (p. 71). The present field study provides an example of a deductive approach to understanding how teacher characteristics operate in the classroom. Yet Turner and Meyer note, "What our constructs mean in a particular setting must inform any investigation of context" (p. 79). Thus, a quantitative analysis of teacher credibility and teacher affinity is necessary (albeit not sufficient) for understanding the ways in which these constructs operate to increase learning outcomes.

9 Conclusions and future directions

Every teacher (or any person for that matter) has a unique set of qualities or strengths. Similarly, each teacher may go about convincing students of the importance of course material in his or her own unique way. Most likely, whether they realize it or not, the teachers who are perceived by students as high in affinity and credibility are the ones who are most effective at playing on their strengths to get students to like them, and to be perceived as credible sources of information. In the context of health classrooms especially, if teachers remain cognizant of the powerful influence of teacher characteristics, and how those characteristics operate, teachers may utilize their communication skills to enhance student learning. Our results suggest that this may lead to more effective classroom instruction. Whereas the present work was conducted in health education, we have no reason to suspect that these source traits will be any less important in other school subject areas.

Murphy and Alexander (2004) noted that “there is much that we need to know about the persuasion process in the classroom before its potential can be more fully realized in the educational environment” (p. 357). The present study provides several directions for future investigation. Future research should examine the effects of teacher characteristics on learning outcomes in traditional school subject areas such as math, science, and social studies. The cascading effects of such psycho-social classroom constructs as credibility and affinity are also important to study. Researchers might examine the relation of teacher characteristics to behavioral outcomes such as self-control. Unlike experimental studies of source traits, students in classrooms are exposed to the source (i.e., the teacher) countless times. Future research should examine whether exposure frequency moderates the association of teacher characteristics with learning outcomes.

Extant literature suggests that it is possible to increase students’ perceptions of teacher credibility and affinity. When individuals employ strategies such as positive self-disclosure, positive reinforcement, and compromise, they are perceived as higher in credibility and affinity (Bell and Daly 1984). Applied social psychologists should consider applying their expertise of source traits in design experiments—a theory-inaction approach where teachers and researchers collaborate in designing, implementing, and assessing experimental instructional practices (Brown 1992).

In health classrooms, the end goal is not for students to recite learned information back to the teacher; rather, the intended result is for students to take what they learned and apply it within the contexts of their own lives. Previous health education research has stressed that knowledge is certainly important (Bandura 1990), but knowledge by itself does not predict behavior as much as students’ valuing of learning. Whereas knowledge is associated with in-school learning, students’ beliefs often are associated with occurrences outside of school (Alexander and Dochy 1995; Murphy and Alexander 2004). Teachers should aim to increase students’ perceptions of their credibility and affinity to influence both of these important learning outcomes.

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References

Alexander PA, Dochy FJRC. Conceptions of knowledge and beliefs: A comparison across varying cultural and educational communities. American Educational Research Journal. 1995; 32:413–442.

Alexander PA, Fives H, Buehl MM, Mulhern J. Teaching as persuasion. Teaching and Teacher Education. 2002; 18(7):795–813.

Ames C, Archer J. Achievement goals in the classroom: Students' learning strategies and motivation processes. Journal of Educational Psychology. 1988; 80(3):260–267.

Anderman EM, Young AJ. Motivation and strategy use in science: Individual differences and classroom effects. Journal of Research in Science Teaching. 1994; 31(8):811–831.

Anderman EM, Griesinger T, Westerfield G. Motivation and cheating during early adolescence. Journal of Educational Psychology. 1998; 90(1):84–93.

Anderman, EM.; Anderman, LH. Classroom motivation. Up Saddle River, NJ: Pearson; 2010.

Anderman EM, Lane DR, Cupp PC, Zimmerman R, Phebus V. Comparing the efficacy of permanent classroom teachers to temporary health educators for pregnancy/HIV prevention instruction. Health Promotion Practice. 2009; 10:597–605. [PubMed: 18381972]

Bandura A. Perceived self-efficacy in the exercise of control over AIDS infection. Evaluation and Program Planning. 1990; 13:214–217.

Barth, RP. Reducing the risk. 3rd ed. Santa Cruz, CA: ETR Associates; 1996.

Basen-Enquist K, Masse LC, Coyle D, Kirby D, Parcel GS, Banspach S, Nodora J, et al. Validity of scales measuring the psychosocialdeterminants of HIV/STD-related risk behavior inadolescents. Health Education Research. 1999; 14:25–38. [PubMed: 10537945]

Beebe, SA.; Butland, MJ. Implicit communication and learning: Explaining affmity-seeking behaviors in the classroom; Paper presented at the Speech Communication Association Convention; Miami. 1993 Nov.

Bell RA, Daly JA. The affinity-seeking function of communication. Communication Monographs. 1984; 51(2):91–115.

Brewer MB. The social self: On being the same and different at the same time. Personality and Social Psychology Bulletin. 1991; 17:475–482.

Briñol P, Petty RE. Source factors in persuasion: A self-validation approach. European Review of Social Psychology. 2009; 20:49–96.

Brock TC. Communicator-recipient similarity and decision change. Journal of Personality and Social Psychology. 1965; 1:650–654. [PubMed: 14300242]

Brown, AL. Design experiments: Theoretical and methodological challenges in creating complex interventions in the classroom. In: Salomon, G., editor. Distributed cognition: Psychological and educational considerations. New York: Cambridge University Press; 1992. p. 188-228.

Centers for Disease Control (CDC). [Retrieved July 7, 2008] HIV/AIDS and African Americans. 2008. from http://www.cdc.gov/hiv/topics/aa/index.htm

Chaiken S. Communicator physical attractiveness and persuasion. Journal of Personality and Social Psychology. 1979; 37(8):1387.

Chaiken S, Maheswaran D. Heuristic processing can bias systematic processing: Effects of source credibility, argument ambiguity, and task importance on attitude judgment. Journal of Personality and Social Psychology. 1994; 66(3):460–473. [PubMed: 8169760]

Colarossi LG, Eccles JS. Differential effects of support providers on adolescents' mental health. Social Work Research. 2003; 27:19–30.

Connell, JP.; Wellborn, JG. Competence, autonomy, and relatedness: A motivational analysis of self-esteem processes. In: Gunnar, MR.; Scroute, LA., editors. Minnesota symposium on child psychology: Vol. 23. Self-process in development. Hillsdale, NJ: Erlbaum; 1991. p. 43-77.

Cooper, L. The rhetoric of Aristotle. New York: Appleton-Centrury-Crofts; 1932.

Davis HA. Conceptualizing the role and influence of student–teacher relationships on children's social and cognitive development. Educational Psychologist. 2003; 38(4):207–234.

Deci EL, Vallerand RJ, Pelletier LG, Ryan RM. Motivation and education: The self-determination perspective. Educational Psychologist. 1991; 26(3–4):325–346.

Eagly, AH.; Chaiken, S. The psychology of attitudes. Fort Worth, TX: Harcourt Brace Jovanovich; 1993.

Eccles JS. School and family effects on the ontogeny of childrens' interests, self-perceptions, and activity choice. Nebraska Symposium on Motivation. 1993; 40:145–208. [PubMed: 1340520]

Eccles JS, Harold RD. Gender differences in sport involvement: Applying the Eccles expectancy-value model. Journal of Applied Sport Psychology. 1991; 46:26–43.

Eccles JS, Wigfield A. In the mind of the actor: The structure of adolescents' academic achievement task values and expectancy-related beliefs. Personality and Social Psychology Bulletin. 1995; 21:215–225.

Eccles JS, Adler T, Meece JL. Sex differences in achievement: A test of alternate theories. Journal of Personality and Social Psychology. 1984; 46:26–43.

Fraser BJ, Fisher L. Predicting students' outcomes from their perceptions of classroom psychosocial environment. American Educational Research Journal. 1982; 19(4):498–518.

Frymier AB. The use of affinity-seeking in producing liking and learning in the classroom. Journal of Applied Communication Research. 1994; 22(2):87–105.

Frymier AB, Thompson CA. Perceived teacher affinity-seeking in relation to perceived teacher credibility. Communication Education. 1992; 41(4):388–399.

Gorham JK, Kelley DH, McCroskey JC. The affinity-seeking of classroom teachers: A second perspective. Communication Quarterly. 1981; 37:16–26.

Graham S, Juvonen J. Self-blame and peer victimization in middle school: An attributional analysis. Developmental Psychology. 1998; 34:587–599. [PubMed: 9597367]

Gray, DL.; Anderman, EM. RiSE-UP Research Award Address: Predicting condom negotiation efficacy in economically disadvantaged adolescents; Presented at the Association for Psychological Science 20th Annual Convention; Chicago, IL. 2008 May.

Hass, RG. Effects of source characteristics on cognitive responses and persuasion. In: Petty, RE.; Ostrom, TM.; Brock, TC., editors. Cognitive responses in persuasion. Hillsdale, NJ: Erlbaum; 1981. p. 141-172.

Heesacker M, Petty RE, Cacioppo JT. Field dependence and attitude change: Source credibility can alter persuasion by affecting message-relevant thinking. Journal of Personality. 1983; 51:653–666.

Hovland CI, Weiss W. The influence of source credibility on communication effectiveness. Public Opinion Quarterly. 1951; 15:635–650.

Jemmott, LS.; Jemmott, JB. Applying the theory of reasoned action to HIV risk-reduction behavioral interventions. In: Ajzen, I.; Albaraccin, D.; Hornik, R., editors. Prediction and change in health behavior. Mahwah, NJ: Earlbaum; 2007. p. 243-263.

Juvonen, J. Sense of belonging, social relationships, and school functioning. In: Alexander, PA.; Winne, PH., editors. Handbook of educational psychology. 2nd ed. Mahwah, NJ: Erlbaum; 2006. p. 255-674.

Juvonen J, Nishina A, Graham S. Ethnic diversity and perceptions of safety in urban middle schools. Psychological Science. 2006; 17:393–400. [PubMed: 16683926]

Kahle LR, Homer PM. Physical attractiveness of the celebrity endorser: A social adaptation perspective. Journal of Consumer Research. 1985; 11(4):954.

Kelman HC, Hovland CI. "Reinstatement" of the communicator in delayed measurement of opinion change. Journal of Abnormal and Social Psychology. 1953; 48:327–335.

McCroskey JC, Teven JJ. Goodwill: A reexamination of the construct and its measurement. Communication Monographs. 1999; 66:90–103.

McCroskey JC, Young TJ. Ethos and credibility: The construct and its measurement after three decades. Central States Speech Journal. 1981; 32:24–34.

McGuire, WJ. An information-processing model of advertising effectiveness. In: Davis, HL.; Silk, AJ., editors. Behavioral and management sciences in marketing. New York: NY: Wiley; 1978. p. 156-180.

Meece JL, Wigfield A, Eccles JS. Predictors of math anxiety and its consequences for young adolescents' course enrollment intentions and performances in mathematics. Journal of Educational Psychology. 1990; 82:60–70.

Midgley, C. Goals, goal structures, and patterns of adaptive learning. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers; 2002.

Moos RH, Moos S. Classroom social climate and student absences and grades. Journal of Educational Psychology. 1978; 70(2):263–269.

Murphy PK. Teaching as persuasion: A new metaphor for a new decade [Special issue]. Theory into Practice. 2001a; 40:222–278.

Murphy PK. What makes text persuasive? Comparing students' and experts' conceptions of persuasiveness. International Journal of Educational Research. 2001b; 35:675–698.

Murphy PK, Alexander PA. Persuasion as a dynamic, multidimensional process: An investigation of individual and intraindividual differences. American Educational Research Journal. 2004; 41(2): 337–363.

Murphy, PK.; Mason, L. Changing knowledge and beliefs. Handbook of educational psychology. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers; 2006. p. 305-324.

Petty RE, Briñol P. Understanding social judgment: Multiple systems and processes. Psychological Inquiry. 2006; 17:217–223.

Petty, RE. The evolution of theory and research in social psychology: From single to multiple effect and process models. In: McGarty, C.; Haslam, SA., editors. The message of social psychology: Perspectives on mind in society. Oxford, England: Blackwell Publishers Ltd; 1997. p. 268-290.

Petty, RE.; Cacioppo, JT. The elaboration likelihood model of persuasion. In: Berkowitz, L., editor. Advances in experimental social psychology. New York: Academic Press; 1986. p. 123-205.

Petty, RE.; Wegener, DT. Attitude change: Multiple roles for persuasion variables. In: Gilbert, D.; Fiske, S.; Lindzey, G., editors. The handbook of social psychology. 4th ed. New York: McGraw-Hill; 1998. p. 323-390.

Pintrich, PR. Implications of the psychological research on student learning and college teaching for teacher education. In: Houston, R., editor. The handbook of research on teacher education. New York: Macmillan; 1990. p. 826-857.

Pintrich PR, De Groot E. Motivational and self-regulated learning components of classroom academic performance. Journal of Educational Psychology. 1990; 82:33–40.

Pintrich PR, Marx RW, Boyle RA. Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. Review of Educational Research. 1993; 63(2):167–199.

Pogue LL, Ah Yun K. The effect of teacher nonverbal immediacy and credibility on student motivation and affective learning. Communication Education. 2006; 55(3):331–344.

Pornpitakpan C. The persuasiveness of source credibility: A critical review of five decades' evidence. Journal of Applied Social Psychology. 2004; 34(2):243–281.

Raudenbush, SW.; Bryk, AS. Hierarchical linear models: Applications and data analysis methods. 2nd ed. Thousand Oaks: Sage; 2002.

Reeve J, Jang H. What teachers say and do to support students' autonomy during a learning activity. Journal of Educational Psychology. 2006; 98:209–218.

Roeser R, Eccles J, Sameroff A. School as a context of early adolescents' academic and social-emotional development: A summary of research findings. The Elementary School Journal. 2000; 100:443–471.

Roeser R, Eccles J, Sameroff AJ. Academic and emotional functioning in early adolescence: Longitudinal relations, patterns, and prediction by experience in middle school. Developmental and Psychopathology. 1998; 10:321–352.

Snijders, TAB.; Bosker, R. Multilevel analysis: An introduction to basic and advanced multilevel modeling. Thousand Oaks: Sage; 1999.

Tormala ZL, Briñol P, Petty RE. When credibility attacks: The reverse impact of source credibility on persuasion. Journal of Experimental Social Psychology. 2006; 42:684–691.

Tripp C, Jensen TD, Carlson L. The effects of multiple product endorsements by celebrities on consumers' attitudes and intentions. Journal of Consumer Research. 1994; 20(4):535.

Turner JC, Meyer DK. Studying and understanding the instructional contexts of classrooms: Using our past to forge our future. Educational Psychologist. 2000; 35(2):69–85.

Turner JC, Midgley C, Meyer DK, Gheen M, Anderman EM, Kang Y, et al. The classroom environment and students' reports of avoidance strategies in mathematics: A multimethod study. Journal of Educational Psychology. 2002; 94(1):88–106.

Wigfield, A.; Eccles, JS. The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In: Wigfield, A.; Eccles, JS., editors. Development of achievement motivation. A volume in the educational psychology series. San Diego, CA: Academic Press; 2002. p. 91-120.

Wigfield A, Eccles JS. The development of achievement task values: A theoretical analysis. Developmental Review. 1992; 12:265–310.

Wigfield A, Eccles JS. Expectancy-value theory of achievement motivation. Contemporary Educational Psychology. 2000; 25:68–81. [PubMed: 10620382]

Wigfield A. Reading motivation: A domain specific approach to motivation. Educational Psychologist. 1997; 32:59–68.

Wigfield A, Eccles JS, MacIver D, Reuman DA, Midgley C. Transitions during early adolescence: Changes in children's domain-specific self-perceptions and general self-esteem across the transition to junior high school. Developmental Psychology. 1991; 27:552–565.

Woods, BS.; Murphy, PK. Teaching educational psychology to the implicit mind. In: Torff, B.; Sternberg, RJ., editors. Understanding and teaching the intuitive mind. Mahwah, NJ: Lawrence Erlbaum Associates; 2001. p. 145-186.

Zimmerman, R.; Anderman, EM. Bethesda, MD: Grant proposal submitted to the National Institute for Nursing Research; 2002. Improving school learning environments for HIV prevention.

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Table 1

Description and psychometric properties of measures

Scale	Baseline α	Follow-up α	Item	Values
Attitudes toward waiting to have sex (Basen-Enquist et al. 1999)	0.82	–	I believe people my age should get as much sexual experience as they can. (R)	1 = Disagree a lot, 5 = Agree a lot
			I believe it's okay for people my age to have sex with a steady boyfriend or girlfriend. (R)	1 = Disagree a lot, 5 = Agree a lot
			I believe people my age should wait until they are married before they have sex.	1 = Disagree a lot, 5 = Agree a lot
			I believe it's okay for people my age to have sex with someone they love. (R)	1 = Disagree a lot, 5 = Agree a lot
Sensation seeking (Zimmerman and Anderman 2002)	0.81	–	I would like to explore strange places.	1 = Disagree a lot, 5 = Agree a lot
			I like wild parties.	1 = Disagree a lot, 5 = Agree a lot
			I like to do frightening things.	1 = Disagree a lot, 5 = Agree a lot
			I get restless when I spend too much time at home.	1 = Disagree a lot, 5 = Agree a lot
			I would like to take off on a trip with no preplanned routes or timetables.	1 = Disagree a lot, 5 = Agree a lot
			I would like to try bungee jumping.	1 = Disagree a lot, 5 = Agree a lot
			I would like to have new and exciting experiences.	1 = Disagree a lot, 5 = Agree a lot
			I prefer friends who are excitingly unpredictable.	1 = Disagree a lot, 5 = Agree a lot
Peer sexual behavior (Zimmerman and Anderman 2002)	0.84	–	Most of my friends have had sex.®	1 = Disagree a lot, 5 = Agree a lot
			Most of my friends are waiting until they're older to have sex.	1 = Disagree a lot, 5 = Agree a lot
			Most of my friends are sexually active.®	1 = Disagree a lot, 5 = Agree a lot
			Most of my friends are waiting until they are married to have sex.	1 = Disagree a lot, 5 = Agree a lot
			Most of my friends have not "gone all the way."	1 = Disagree a lot, 5 = Agree a lot
Expectancy (adapted from Eccles et al. 1984; Wigfield et al. 1991)	0.75	–	How good are you at learning about the prevention of pregnancy and HIV?	1 = A lot worse, 7 = A lot better
			How good would you be at learning something new about the prevention of pregnancy and HIV?	1 = Not good at all, 7 = Very good
Value (adapted from Eccles et al. 1984; Wigfield et al. 1991)	0.9	0.9	How much would you like learning about the prevention of pregnancy and HIV?	1 = Not useful, 7 = Very useful
			How much would you like learning about the prevention of pregnancy and HIV?	1 = Not important, 7 = Very important
			I find learning about the prevention of pregnancy and HIV:	1 = Very boring, 7 = Very interesting
			For me, being good at learning about the prevention of pregnancy and HIV is:	1 = A little, 7 = A lot

Scale	Baseline α	Follow-up α	Item	Values
			How useful is learning about the prevention of pregnancy and HIV?	1 = Not as much, 7 = A lot more
Knowledge (True/False)	0.81	0.75	Latex condoms are better than animal-skin condoms.	T/F
			The best way to use a condom is to leave some space at the tip.	T/F
			Using a condom whenever you have sex with.	T/F
			The chance of getting pregnant is 1 out of 12.	T/F
			About 1/2 of all teen pregnancies are unplanned.	T/F
			Teens have babies who weigh a lot.	T/F
			The best time to talk to a partner about sex is right before sex.	T/F
			Teenagers can get birth control pills from family planning clinics.	T/F
			Using condoms is the most effective way of all methods to avoid pregnancy and STDs.	T/F
			The only teens who really need to worry are homosexuals and injecting drug users.	T/F
Teacher Credibility (McCroskey and Young 1981)	–	0.88	Semantic Differential: Intelligent/Unintelligent. (R)	1 = Intelligent, 7 = Unintelligent
			Semantic Differential: Untrained/Trained.	1 = Untrained, 7 = Trained
			Semantic Differential: Stupid/Bright.	1 = Stupid, 7 = Bright
			Semantic Differential: Dishonest/Honest.	1 = Dishonest, 7 = Honest
			Semantic Differential: Untrustworthy/Trustworthy.	1 = Untrustworthy, 7 = Trustworthy
			Semantic Differential: Really nice/Not nice. (R)	1 = Really nice, 7 = Not nice
Teacher Affinity (Anderman et al. 2009)	–	0.89	My instructor respected my opinion.	1 = Not at all true, 5 = Very true
			My instructor really understood how I felt about things.	1 = Not at all true, 5 = Very true
			My instructor tried to help me when I was sad or upset.	1 = Not at all true, 5 = Very true
			I could count on my instructor for help when I needed it.	1 = Not at all true, 5 = Very true
			My instructor created a comfortable environment in which I could talk about HIV and pregnancy prevention.	1 = Not at all true, 5 = Very true

Table 2

Correlations and descriptive statistics for student-level and classroom-level variables

	Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1.	Gender	1.53	0.50	–										
2.	Attitudes about sex (T1)	2.73	1.09	−0.28***	–									
3.	Expectancy (T1)	5.39	1.40	0.19***	−0.01	–								
4.	Value at Time 1	5.42	1.41	0.27***	−0.02	0.63***	–							
5.	Value at Time 2	5.61	1.34	0.24***	−0.02	0.38***	0.58***	–						
6.	Sensation Seeking (T1)	3.44	0.88	−0.11**	0.36**	−0.03	−0.07	−0.02	–					
7.	Prior sexual experience (T1)	0.41	0.49	−0.08	0.46***	0.08	0.08*	0.14**	0.17***	–				
8.	Knowledge at Time 1	3.18	2.20	0.08	0.17***	0.18***	0.17***	0.06	0.12	0.22***	–			
9.	Knowledge at Time 2	4.31	2.90	0.05	−0.13**	0.14***	0.06	0.07	0.06	−0.15***	0.25***	–		
10.	Peer sexual behavior (T1)	2.80	1.08	0.15***	−0.55***	−0.12**	−0.08	−0.12**	−0.22***	−0.46***	−0.18***	0.09*	–	
11.	Ethnicity	0.39	0.49	0.06	0.02	0.15***	0.19***	0.13**	−0.22***	0.15***	−0.02	−0.18***	−0.10*	–

Gender coded as males=0, females=1. Prior sexual experience coded as virgin=0, non-virgin=1. Ethnicity coded as other=0, black=1

* $p < .05$;

** $p < .01$;

*** $p < .001$

Table 3

Residual intraclass correlations for dependent variables

Variable	τ_{00}	σ^2	*Residual ICC*	χ^2	*p*
Value at Time 2	0.078	1.121	0.063	55.875	<.001
Knowledge at Time 2	0.356	2.988	0.106	75.987	<.001

Table 4

Contextual models (group-mean centered) with teacher affinity and teacher credibility predicting value and knowledge at time 2

Fixed effects	Value at Time 2				Knowledge at Time 2			
	γ	***B***	***SE***	**Reliability**	**γ**	***B***	***SE***	**Reliability**
β_0 Model for classroom mean				0.402				0.540
Intercept	γ_{00}	3.507*	1.355		γ_{00}	−0.290	2.595	
Teacher credibility	γ_{01}	0.012	0.297		γ_{01}	1.157*	0.570	
Teacher affinity	γ_{02}	0.507*	0.302		γ_{02}	−0.349	0.575	
β_1 Model for gender								
Intercept	γ_{10}	0.200	0.114		γ_{10}	−0.138	0.189	
β_2 Model for attitudes about sex (T1)								
Intercept	γ_{20}	−0.184**	0.066		γ_{20}	−0.286**	0.109	
β_3 Model for expectancy (T1)								
Intercept	γ_{30}	−0.010	0.051		γ_{30}	0.199*	0.084	
β_4 Model for value at Time 1								
Intercept	γ_{40}	0.512***	0.050		γ_{40}	0.042	0.082	
β_5 Model for Sensation seeking (T1)								
Intercept	γ_{50}	0.044	0.068		γ_{50}	−0.008	0.113	
β_6 Model for prior sexual experience (T1)								
Intercept	γ_{60}	0.257*	0.130		γ_{60}	−0.406	0.216	
β_7 Model for knowledge at Time 1								
Intercept	γ_{70}	−0.031	0.028		γ_{70}	0.360***	0.046	
β_8 Model for peer sexual behavior (T1)								
Intercept	γ_{80}	−0.141*	0.061		γ_{80}	−0.028	0.101	
β_9 Model for ethnicity								
Intercept	γ_{90}	0.043	0.120		γ_{90}	−0.558**	0.199	

Level-1 N = 633. Level 2 N = 28

*$p < .05$;

** $p < .01$;

*** $p < .001$