

# How attitudes affect student learning about drugs of abuse

Kristen D. Holtz, KDHRC, and Eric C. Twombly, Georgia State University

**DRUG AND ALCOHOL USE AMONG YOUTH** remains at high levels (Johnston et al., 2006), and this issue is a concern for many in the public health community because of the significant economic, social, and personal costs caused by addiction. Because the risk of addiction is highest in people who begin drug use in their youth (Office of Applied Studies, 2004), the National Institute on Drug Abuse and other government agencies suggest that prevention programs should be implemented universally through schools and should target children at early ages. Research suggests that these types of universal prevention efforts will decrease overall youth drug use and the burden of addiction (McBride, 2003).

Despite governmental calls for universal prevention, particularly in schools, students in the United States now receive less school-based prevention education than they did a decade ago (Orwin, 2006). Indeed, with the implementation of the No Child Left Behind Act of 2001, students spend fewer hours on prevention to allow for additional time on core academic subjects, such as science and math (National Education Association, 2004). The tension between education policy and public health prevention necessitates rethinking approaches to reach children in school-based settings. One method is to infuse health information into core science curricula, providing students with mechanisms to learn about the risks and effects of alcohol and drugs as biological or physiological processes. Teaching children about the impact of illegal substances is vital, because a greater understanding of the risks is linked to lower usage rates (Johnston et al., 2006).

In order for science-based prevention efforts in schools to be successful, students must have the desire and ability to acquire and retain scientific information. Because behavioral change theories suggest that attitudes play a key role in the translation of knowledge into behavior (Ajzen, 1991), we hypothesize that atti-

tudes toward science and drugs are keys in predicting knowledge acquisition about the effects of alcohol and drugs. Therefore, this brief explores how these factors relate to knowledge change about alcohol and drugs when a sample of students in Washington, D.C. area are exposed to a particular curriculum on the science of drug abuse.

## Curriculum

The curriculum, developed with funding from the National Institute on Drug Abuse, provides lessons on the normal functions of the brain, nervous system, and body, and how drugs change these processes. More specifically, it contains six lessons delivered in print, video, and interpersonal modalities that cover several types of drugs, including alcohol, nicotine, inhalants, prescription and over-the-counter drugs, marijuana, cocaine, heroin, steroids, methamphetamine, and “club drugs.” Lessons build cumulatively so that early lessons on the typical functioning of the brain serve as the foundation for later lessons on how drugs change that functioning.

The curriculum was designed as a science-based educational tool to be implemented in classroom settings. This design element relates in large measure to the policy push toward standards of learning in K-12 education. To that end, the curriculum was predicated on National Science Education Standards and standards of learning from several states, including New York, California, and North Carolina.

## Methodology

We collected data from students in fourth and fifth grades using a pretest, post-test, quasi-experimental design. The 93 students who participated in the full curriculum received identical surveys that contained questions pertaining to knowledge and attitudes

about drugs and science before (pretest) and after (post-test) the implementation of the curriculum. Change in knowledge is the dependent variable, and we calculated it with a two-step process. First, we summed the number of correct answers from 18 knowledge questions for each student at pretest and post-test. We subtracted the two scores to create a change measure.

The primary independent variable is positive attitudes about science. We asked students six questions about their opinions of science. Each question used a five-point Likert scale. We created a numeric attitude score for each student by summing the number of answers in which the student indicated “positive” or “very positive,” corresponding to level 4 or level 5 on the Likert scale, dividing that total by six (i.e., the total number of attitudinal questions about science), and multiplying the result by 100. The result is a composite score with a standardized range of zero to 100 that estimates the attitude about science of each survey participant at pretest. For example, a student who reported positive or very positive answers on all six questions received a score of 100.00. We also constructed composite scores for attitude-related questions about drugs of abuse and alcohol by using the same methodology. The analysis also includes a series of control measures, such as age, grade, gender, and school location.

There are two data limitations to this study. First, although the curriculum was developed for students in kindergarten through eighth grade, the most comprehensive data are available for the fourth- and fifth-grade population. As a result, the generalizability of the findings to other school populations should be viewed cautiously. A second limitation is the non-randomness by which students were recruited to participate in the study. Survey participants came from two schools in the Washington, D.C., metropolitan region, and their demographic composition varies from national data on primary and secondary students. Despite these limitations, these data allow us to gain considerable insight into the linkage between change in knowledge about drugs and attitudes about science after the implementation of science-based educational curriculum.

## Findings

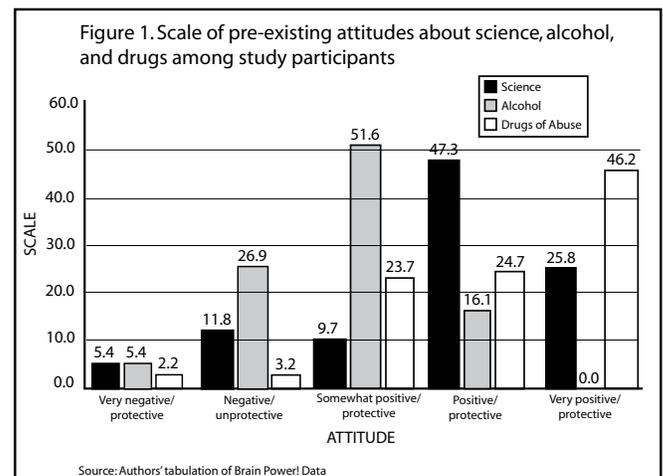
**Students had generally positive attitudes toward science and protective attitudes about drugs of abuse, but their attitudes toward alcohol may be reason for concern.**

As illustrated in Figure 1, more than 73 percent of students had positive or very positive attitudes about science, while only 5 percent viewed science very negatively. Similarly, more than 70 percent of students had protective attitudes about drugs of abuse, and only 2 percent had very unprotective views. Less

positive from a public health or societal perspective was the relatively high degree of unprotective attitudes about alcohol in the study population. Indeed, nearly one-third of survey participants had unprotective or very unprotective attitudes about alcohol. Only 16 percent of students had protective attitudes, and none had very protective attitudes. Because lack of protective attitudes about drug and alcohol use is a significant risk factor for future use, the implications of this finding about alcohol should be considered carefully.

### Students with positive attitudes toward science before the implementation of the curriculum tend to show greater acquisition of knowledge.

Pre-existing attitudes toward science and knowledge acquisition about the effects of drugs on the brain and the body from pretest to post-test are significantly and positively related. This finding is important because it suggests that students who view science positively may be more receptive to science-based educational approaches, a pedagogical movement supported by the National Institutes of Health and some advocacy groups.



### Students with negative or less protective attitudes toward drugs show greater knowledge acquisition.

This finding may relate to the fact that children with low opinions about drugs at the outset of the curriculum had a relative lack of knowledge about the effects of drugs. Indeed, these students tended to score lower on the knowledge-based questions at pretest. When presented with the science-based curriculum, these students were able to gain knowledge more markedly from pretest to post-test, despite their relatively unprotective initial attitudes about drugs.

## Discussion

This study suggests that pre-existing student attitudes toward science and drugs play an important role in student performance on a science-based curriculum on drugs of abuse. The implications of the study are significant in two ways. First, the science-based education curriculum analyzed in this brief — or ones similar in nature — may have value as a drug-prevention tool for students. Knowledge about and attitudes toward drug use have important theoretical linkages to later drug use (Fishbein & Middlestadt, 1987), so early intervention that favorably modifies these behavioral precursors may prevent risky behavior later in life.

Second, the study suggests specific methods that may be used to potentiate student outcomes on such curricula. For instance, the development of new pedagogical methods to improve science achievement by identifying and intervening with students who report more negative attitudes toward science, prior to the implementation of core content, may have value and should be explored further.

Overall, the potential benefits of an effective science education approach to reduce drug abuse appear to be significant. With the development of time-effective and standards-based curricula such as the one described in this brief, students may benefit from increased knowledge upon which to base healthier decisions about drug use. On a broader level, a greater public understanding of the science of drug abuse has been linked lower rates of drug use on personal and community levels, decreased stigma for drug users, and stronger public policies related to substance use and abuse. More research should be done to maximize the development, evaluation, and implementation of programs to achieve both these goals.

## Acknowledgements

This research was supported in part by contract numbers 263-01-D-0188 and N01DA-9-2070 from the National Institute on Drug Abuse. We extend our gratitude to Greta Tessman for her research assistance.

## References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Fishbein, M. & Middlestadt, S.E. (1987). Using the theory of reasoned action to develop educational interventions: applications to illicit drug use. *Health Education Research*, 2(4), 361-371.
- Johnston, L.D., O'Malley, P.M., Bachman, J.G. & Schulenberg, J.E. (2006). *Monitoring the Future 2006: Overview of Key Findings*. University of Michigan News and Information Services: Ann Arbor, MI. [www.monitoringthefuture.org](http://www.monitoringthefuture.org).
- McBride, N. (2003). A systematic review of school drug education. *Health Education Research*, 18(6), 729-742.
- National Education Association. (2004). No subject left behind? Think again. *NEA Today*, 23(3), 26-27.
- Office of Applied Studies, Substance Abuse and Mental Health Services Administration. (2004). *Results from the 2003 National Survey on Drug Use and Health: National findings*. DHHS Publication No. SMA 04-3964, NSDUH Series H-25, Washington, DC: U.S. Department of Health and Human Services.
- Orwin, R. (2006). *Evaluation of the National Youth Anti-Drug Media Campaign: 2004 report of findings*. Rockville, MD: Westat.

*Address Service Requested*



KRISTEN D. HOLTZ is the founder and president of KDH Research & Communication. Her research and applied work focuses on the development and evaluation of innovative approaches for health promotion, disease prevention, and substance abuse education. Dr. Holtz earned her Ph.D. in developmental psychology from George Washington University.



ERIC C. TWOMBLY is an assistant professor at Georgia State University's Andrew Young School of Policy Studies. His research focuses on two areas: the behavior of community-based health and human service organizations and efforts to improve scientific literacy through the development of science-based education curricula. He received his doctorate in public policy from the George Washington University.

KDH RESEARCH & COMMUNICATION is a non-partisan, public health and public policy institution. The goal of the "Informing Public Health" brief series to disseminate innovative, objective, and timely information to solve public health and other social issues.

The views expressed here are those of the authors and do not necessarily reflect those of KDH Research & Communication, its board, or funders.

Permission is granted for reproduction of this document with attribution to KDH Research & Communication.