



**KDHRC Working Paper 09-003**

**November 2009**

**Resonant Messages to Prevent Prescription Drug Misuse by Teens**

Eric C. Twombly, Christine B. Agnew, & Kristen D. Holtz

KDH Research & Communication, Inc.

Atlanta, GA

This research was supported by grant number R44DA025375 of the National Institute on Drug Abuse (NIDA) of the National Institutes of Health (NIH). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NIDA or NIH.

## Abstract

Prescription drug misuse is a major health problem, particularly among teens. A key step in curbing misuse is the development of effective prescription drug prevention messages. This paper explores the elements of prescription drug misuse prevention messages that resonate with teens using data from focus groups with seventh and eighth grade students. In contrast to some previous research, students reported that messages with positive alternatives and refusal skills had little resonance, but scare tactic messages about prescription drug misuse resonated strongly. The data also suggest a substantial difference in message resonance between seventh and eighth grade students. Overall, the findings suggest the need to craft and target different types of messages for prescription drug misuse prevention to targeted teen audiences.

Prescription drug misuse – or the nonmedical use of a prescription drug without a doctor’s prescription – is a major health problem, particularly among teens. Over the past ten years, there has been a significant increase in prescription drug misuse by teens (Johnson, O’Malley, Backman, & Schulenburg, 2009; Office of National Drug Control Policy [ONDCP], 2007), which corresponded with a dramatic increase in the number of teens seeking treatment for prescription drug misuse. In fact, the number of teens in treatment for prescription drug misuse increased by more than 300% over this period (Treatment Episode Data Set [TEDS], 2007). Taken together, these factors have raised the attention of public health practitioners and policy makers and led them to support the examination of prevention approaches specific to prescription drugs (National Institute of Drug Abuse [NIDA], 2005).

Research suggests specific elements of messages are effective in preventing substance abuse (Botvin, 1990, 2000; Gorman, 1996; Hansen, 1992). However, there is little systematic evidence about the development of effective prevention messages for the misuse of prescription drugs. A key step for public officials in crafting effective messages is to determine which message elements resonate with teens. Resonance is an important concept because resonant messages positively influence intentions to avoid substance abuse (Harris, 2006). Research on substance abuse prevention messages suggests that message characteristics that relate to effective drug prevention typically emphasize positive alternatives to use, correct misperceptions that drug use is normative, or focus on refusal skills (Hecht & Krieger, 2006). But because teens view prescription drugs differently than illicit drugs (Boyd, McCabe, Cranford, & Young, 2007), one may hypothesize that different types of prevention messages will resonate strongly with teens when those messages focus on prescription drugs.

Thus, this paper explores the characteristics of prescription drug misuse prevention messages that resonate with teens. More specifically, we used data from focus groups with seventh and eighth grade students in the Atlanta metropolitan area to find that resonant prescription drug messages contradict mainline approaches to drug prevention. Students reported that messages with positive alternatives and refusal skills had little resonance, but scare tactic messages about prescription drug misuse resonated strongly. The findings also suggest a substantial difference in message resonance between seventh and eighth grade students, which suggests the need to craft and target different types of messages for prescription drug misuse prevention to different teen audiences.

The remainder of the paper provides a theoretical examination of prescription message prevention and a discussion of our methods and key findings. The paper concludes with the theoretical and practical implications of the study.

While most illicit drug use by teens declined over the past decade, teen prescription drug misuse steadily increased (Johnston, O'Malley, Bachman, & Schulenburg, 2008). In 2003, roughly 2.3 million teens in the U.S. reported lifetime nonmedical use of a prescription drug (Substance Abuse and Mental Health Services Administration [SAMHSA], 2004). By 2008, that number had jumped to 4.7 million teens, or one roughly in five teens in the U.S. (Partnership Tracking Study [PATS], 2009). In contrast, from 2002 to 2008, reported lifetime marijuana use among teens aged 12 to 17 decreased from 20.6 % to 16.5 % (SAMHSA, 2009). What is more, of the estimated 1.7 million emergency room visits related to drug misuse in the U.S. in 2006, more than 700,000 involved prescription drugs (Drug Abuse Warning Network [DAWN], 2008). From 2004 to 2006, emergency room visits due to prescription drug misuse increased 44 % (ibid, 2008).

The misuse of prescription drugs is particularly problematic for two reasons. First, prescription drug misuse has significant physical risks. Indeed, it can severely impact brain development during adolescence, which may produce negative behavioral and neurobiological consequences (Compton & Volkow, 2005). Second, the initiation of prescription drug misuse before the age of 16 may lead to greater drug misuse later in life (SAMHSA, 2006).

Taken together, prescription drug misuse by teens poses a substantial public health problem, not only because of its growing prevalence, but also because it has negative short- and long-term health implications. As a result, there have been loud calls by some public health officials for the development of teen-targeted, theory-driven prevention messages (Johnston, O'Malley, Bachman, & Schulenburg, 2005, 2006).

One method to develop promising prevention messages for prescription drugs is to analyze recent prevention efforts for illicit drugs. During the past 30 years, teen-based drug prevention in the U.S. has generally been delivered through schools and the media. School-based prevention has typically been provided in health education classes.<sup>1</sup> Health-focused school-based prevention programs began in earnest in the early 1960s and typically focused on the dangers of drug use and abuse (Botvin & Griffin, 2007). Research suggests that this approach, particularly when combined with scare tactics, is relatively ineffective in changing substance abuse intentions or behaviors (Botvin & Botvin, 1992).

In the early 1980s, some school-based prevention efforts began to use messages that focused on substance abuse initiation prevention (Botvin, 2000; Hawkins, Catalano, & Miller, 1992). These programs contained messages about drug refusal skills and corrections to the misperception that drug use is normative, and they aimed to enhance teens' social skills and to promote positive alternatives to drug use (Botvin & Griffin, 2007). Unlike previous efforts that

involved scare tactics, later school-based programs showed some effectiveness in preventing tobacco, alcohol, and marijuana use (Hansen, 1992).

Media campaigns are a second form of universal drug prevention. Early approaches include the “War on Drugs” campaign in 1973, “Just Say No” in the 1980s and early 1990s, and the 1987 Partnership for a Drug-Free America campaign with the memorable slogan, “This is your brain on drugs” (Suddath, 2009). Like early school-based approaches, these campaigns included messages that focused heavily on fear appeals and scare tactics. Since the late 1990s, the Office of National Drug Control Policy (ONDCP) has disseminated the National Youth Anti-Drug Media Campaign (NYADMC), which uses mass media to reach youth and adult influencers with drug prevention messages. These messages use multiple approaches, including providing information on the negative consequences of drug use, the social norms of substance abuse, positive alternatives to substance abuse, and refusal skills. Research on the effectiveness of the campaign is mixed. On the one hand, Orwin, Cadell, Kalton, et al. (2006) found little evidence of the campaign’s ability to positively affect attitudes and behaviors toward illicit drug use. On the other hand, Palmgreen, Lorch, Stephenson, Hoyle, & Donohew (2007) suggests that refusal skill and positive alternative messages in the NYADMC campaign relate to decreased marijuana use by teens.

Examining school-based and media prevention approaches reveals common message elements, including refusal skills, social norms, and positive alternatives to use, that positively relate to reduced illicit drug use. The empirical question is whether these elements can significantly reduce teen prescription drug misuse. To do so, they need to overcome the four unique challenges posed by prescription drugs. First, there is a perceived safety their misuse. Roughly 40% of teens report that prescription drugs are safer to misuse than illicit drugs and

nearly 33% believe there is “nothing wrong” with occasionally using prescription medicines without a prescription (PATS, 2009). Second, unlike illicit drugs, prescription drugs are widely available and legal to treat medical conditions (McCabe, Boyd & Teter, 2006). More than 60% of teens report that prescription drugs are easy to obtain from their own or someone else’s prescription (SAMHSA, 2008). Third, media messages, such as direct-to-consumer advertising, create relatively strong social acceptability of prescription drugs, which may decrease the dangers of their misuse. Fourth, the motivations for prescription drug use among teens differ from most illicit drugs. For example, teens rank self-medication as a stronger motivation for misuse of prescription drugs than partying or getting high (PATS, 2009).

### **Method**

Taken on the whole, prescription drug misuse by teens is a pressing public health problem. And while previous universal prevention efforts reveal message elements that resonate with teens, the unique challenges posed by prescription drugs may require different approaches to message development. To test the types of messages about prescription drug misuse that resonate with teens, we conducted two focus groups with students in the Atlanta metropolitan area on the same day in March of 2009. The first focus group included eight seventh grade students. The second focus group contained eight eighth grade students. The groups were moderated by an experienced facilitator and guided by a multifold interview guide.

Because our chief interest is the extent to which different types of prevention messages about prescription drugs resonate with teens, we used existing research (Palmgreen, Donohew, Lorch, Rogus, Helm, & Grant, 1991; Stephenson, Morgan, Lorch, Palmgreen, Donohew, & Hoyle, 2001; Hecht & Krieger, 2006) to create nine categories of drug prevention messages (Table 1). The categories include building self esteem among teens to resist illicit drug use,

information about prescription drug misuse, the perceived harm of drug misuse, positive alternatives to the misuse of drugs, refusal skills, scare tactics, science education that connects the risk of drug misuse to its impact on the brain and body, social norms about drugs, and social skills that may positively relate to a teen's ability to avoid illicit drug use. We used the categories to develop 20 prevention messages for prescription drug misuse. We created three messages for the scare tactic and social norms categories, and two messages for each of the other eight categories.

The dependent variable is a three-fold categorization of message resonance, which we define as the extent to which a student reports that a message may influence him or her and peers to refrain from misusing prescription drugs. To collect data on message resonance, we gave three cards to each student. The cards were shaded green, yellow, and red. During each focus group, the facilitator read aloud the 20 messages. After reading the message, the facilitator asked each student to hold up a green card if the message was highly resonant, a yellow card if it was moderately resonant, and a red card if the message had no resonance. We randomized the order of the messages presented by the facilitator by using a random number generator.

In total, the 16 students generated 320 responses from the nine message categories. To create a balanced analytic approach across categories, we collapsed the responses for the three messages for the scare tactic and social norms categories, respectively, into two messages, giving each message category 16 corrected responses per focus group or 32 responses in the two focus groups. In the end, we had 288 corrected responses from our 16 students. We descriptively analyzed these responses in the aggregate and by the grade of the students.

There are limitations to this study. For example, because the students include only seventh and eighth graders in the Atlanta metropolitan region, the generalizability of the results

should be viewed cautiously. Still, the data suggest several surprising findings regarding the types of preventive messages about prescription drug misuse that resonant with students.

### **Findings**

The data reveal four key findings about message resonance and prescription drugs. First, messages that use scare tactics resonated most highly with students. While students reported that roughly 25% of all prevention messages resonated highly, nearly 69% of students indicated that messages with scare tactics are highly resonant as a prescription drug misuse prevention tool. Another 22% reported that messages that involve scare tactics are moderately resonant. Only 9% of students reported that scare tactics had no resonance. The effect was even higher for seventh graders. Among seventh grade respondents, nearly 69% indicated that scare tactics highly resonated. Another 25% reported moderate resonance. These findings are surprising because there is little evidence that scare tactics appeal to youth in traditional drug prevention campaigns. What is more, there are potential conceptual problems with using messages that involve scare tactics to prevent prescription drug misuse. Indeed, the use of scare tactics may produce the unintended consequence of stigmatizing drugs that have legitimate purposes when used as prescribed. Still, these findings suggest the need to carefully examine why students in this study gravitated toward scare tactics and the extent to which this message category may be used effectively in prescription drug prevention efforts.

Second, messages that focus on refusal skills had little resonance. Students reported that roughly 30% of messages showed no resonance, but they were substantially more likely to rate messages that center on the development of refusal skills, such as “just say no to prescription drug abuse,” as non-resonant. In fact, nearly 70% of students indicated that messages that focus on refusal skills had no resonance. Another 22% of students considered refusal skill messages as

moderately resonant, and only 8% of students found them to highly resonate. What is more, eighth graders (90%) were more likely than seventh graders (50%) to rate refusal skill messages as non-resonant. Taken together, the data suggest that messages that center on refusal skills, particularly related to the “just say no” campaign from the 1980s, were spurned by most teens in the focus groups, particularly skeptical eighth graders.

Third, messages that highlight positive alternatives to prescription drug misuse showed limited resonance. Often considered a bulwark in drug prevention, messages that focus on positive alternatives to prescription drug use fared relatively poorly among students in this study. Overall, only 3% of students considered the positive alternative messages to be highly resonant, and all of those students were seventh graders. Seventh graders also tended to be more ambivalent about positive alternative messages than eighth graders. Nearly 70% of seventh graders rated these messages as moderately resonant, compared with only 38% of eighth graders. In contrast, eighth graders were substantially more likely to consider positive alternative messages as non-resonant. Indeed, nearly 63% of eighth grade respondents rated positive alternative messages as non-resonant, compared with 25% of seventh graders.

Fourth, students were generally ambivalent about prescription drug prevention messages. While scare tactics clearly positively resonated with students and refusal skill messages negatively resonated with them, there was relatively strong ambivalence toward many of the other message categories. Indeed, students reported that roughly 46% of all messages had moderate resonance, reflecting neither a full endorsement nor full rejection of the potential effectiveness of the messages. Eighth graders tended to be less ambivalent generally toward the prevention messages than seventh graders. In total, 38% of eighth grade respondents scored messages as moderately resonant, compared with 54% of seventh graders. Similarly, eighth

graders were substantially more likely than seventh graders to reject the messages as non-resonant. Roughly 17% of seventh grade respondents scored the messages as non-resonant, compared with more than 41% of eighth grade respondents.

### **Implications**

This paper presents some surprising results about messages that aim to influence teens' views on prescription drug misuse. First, that scare tactics resonated highly with both age groups of students tends to contradict recent research on drug prevention. One needs to explore this finding with more generalizable data, but one may hypothesize that hard-hitting messages about the consequences of prescription drug misuse may grab the attention of teens who have not been exposed to much information about these drugs. Similarly, that positive alternative messages showed relatively low resonance may signal the need for different types of messages for prescription drugs than those generally used in prevention efforts on illicit drugs. Taken together, the findings suggest message characteristics recommended by contemporary research may not be effective when applied to prescription drugs. Furthermore, these findings suggest the need to reexamine message elements deemed ineffective, such as scare tactics, to determine their effectiveness in curbing prescription drug misuse.

The results also show wide variation in message resonance between seventh and eighth graders. Although only separated by one year, seventh graders tended to be more positive about prevention messages than eighth graders. In contrast, eighth grade respondents appeared more skeptical and quicker to judge the messages as non-resonant. The substantial distinction between the two groups reflects not only their different developmental characteristics, but also the potential need to craft and target different types of messages to the two groups of students. While creating varied messages by age or school grade may raise the cost of prevention efforts, this

study suggests that, because seventh and eighth graders view and respond to prevention messages in substantially varied ways, the most effective prevention approaches for prescription drug misuse may require a multi-message approach. However, students' general ambivalence to the majority of messages may suggest seventh and eighth grade students are less likely to acknowledge prevention efforts. Younger students may be more open to prevention messages, and one needs to explore the potential of interventions with elementary aged students to see if there are benefits to earlier prevention.

## References

- Botvin, G. J. (1990). Substance abuse prevention: Theory, practice and effectiveness. In M. Tonry & J. Q. Wilson (Eds.), *Drugs and Crime* (pp. 461-519). Chicago, IL: University of Chicago Press.
- Botvin, G. J. (2000). Preventing drug abuse in schools: social and competence enhancement approaches targeting individual-level etiologic factors. *Addictive Behaviors*, 25(6), 887-897. doi: 10.1016/S0306-4603(00)00119-2
- Botvin, G. J. & Botvin, E. M. (1992). Adolescent tobacco, alcohol, and drug abuse: prevention strategies, empirical findings, and assessment issues. *Journal of Developmental and Behavioral Pediatrics*, 13(4), 290-301.
- Botvin, G. J. & Griffin, K. W. (2007). School-based programmes to prevent alcohol, tobacco and other drug use. *International review of psychiatry*, 19(6), 607-615. doi: 10.1080/09540260701797753
- Botvin, G. J., Baker, E., Dusenbury, L., Botvin, E. M., & Diaz, T. (1995). Long-term follow-up results of a randomized drug prevention trial in a white middle-class population. *Journal of the American Medical Association*, 273(14), 1106-1112.
- Boyd, C. J., McCabe, S. E., Cranford, J. A. & Young, A. (2006). Adolescents' motivations to abuse prescription medications. *Pediatrics*, 118(6), 2472-2480. doi:10.1542/peds.2006-1644
- Boyd, C. J., McCabe, S. E., Cranford, J. A., & Young, A. (2007). Prescription drug abuse and diversion among adolescents in a southeast Michigan school district. *Archives of Pediatric Adolescent Medicine*, 161(3), 276-281.

- Compton, W. M. & Volkow, N. D. (2006). Abuse of prescription drugs and the risk of addiction. *Drug and Alcohol Dependence*, 83S, S4-S7. doi:10.1016/j.drugalcdep.2005.10.020
- Ellickson, P. L., McCaffery, D. F., Ghosh-Dastidar, B., & Longshore, D. L. (2003). New inroads in preventing adolescent drug use: Results from a large scale trial of Project Alert in Middle Schools. *American Journal of Public Health*, 93(11), 1830-1836.
- Gorman, D. M. (1996). Do school-based social skills training programs prevent alcohol use among young people? *Addiction Research*, 4(2), 191-210. doi: 10.3109/16066359609010757
- Gottfredson, D. C., & Wilson, D. B. (2003). Characteristics of effective school-based substance abuse prevention. *Prevention Science*, 4(1), 27-38. doi: 10.1023/A: 1021782710278
- Hansen, W. B. (1992). School-based substance abuse prevention: A review of the state of the art in curriculum, 1980-1990. *Health Education: Theory and Practice*, 7(3), 403-430.
- Harris, M. S. (2006). *The role of emotion in anti-drug PSAs: Investigating the impact of guilt arousal on perceived message effectiveness and behavioral intentions to use drugs* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (AAT 3259130).
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, 112(1), 64-105. doi: 10.1037/0033-2909.112.1.64
- Hecht, M. L., & Krieger, J. L. (2006). The principle of cultural grounding in school-based substance abuse prevention: The Drug Resistance Strategies Project. *Journal of Language and Social Psychology*, 25(3), 301-319. doi: 10.1177/0261927X06289476

- Holtz, K. D. & Twombly, E. C. (2007). A Preliminary Evaluation of the Effects of a Science Education Curriculum on Changes in Knowledge of Drugs in Youth. *Journal of Drug Education*, 37(3), 317-333. doi: 10.2190/DE.37.3.f
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2004). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2003* (NIH Publication No. 04-5506). Bethesda, MD. Retrieved on October 21, 2009, from <http://www.monitoringthefuture.org/pubs/monographs/overview2004.pdf>
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2006). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2005* (NIH Publication No. 06-5882). Bethesda, MD. Retrieved on October 21, 2009, from <http://www.monitoringthefuture.org/pubs/monographs/overview2005.pdf>
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2008). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2007* (NIH Publication No. 08-6418). Bethesda, MD. Retrieved on October 21, 2009, from <http://www.monitoringthefuture.org/pubs/monographs/overview2007.pdf>
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2009). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2008* (NIH Publication No. 09-7401). Bethesda, MD. Retrieved on October 21, 2009, from <http://www.monitoringthefuture.org/pubs/monographs/overview2008.pdf>
- Morse, L., Wilbur, K., & Ballard, K. (2004). *Unintended consequences: Implications for health and physical education*. Paper presented at the No Child Left Behind Forum, February 20–21, 2004, Reston, VA. Retrieved October 24, 2009, from <http://www.aahperd.org/aahperd/template.cfm?template=nclb.html>

National Institute on Drug Abuse [NIDA]. (2005). *NIDA Research Report—Prescription drugs: Abuse and addiction*. (National Institute on Drug Abuse, NIH Publication No. 01-4881).

Retrieved on October 20, 2009 from

<http://www.drugabuse.gov/ResearchReports/Prescription/Prescription.html>

Office of National Drug Control Policy [ONDCP]. (2007). *Teens and Prescription Drugs An Analysis of Recent Trends on the Emerging Drug Threat*. Retrieved on October 28, 2009, from [http://www.theantidrug.com/pdfs/TEENS\\_AND\\_PRESCRIPTION\\_DRUGS.pdf](http://www.theantidrug.com/pdfs/TEENS_AND_PRESCRIPTION_DRUGS.pdf)

Palmgreen, P., Donohew, L., Lorch, E. P., Rogus, M., Helm, D., & Grant, N. (1991). Sensation Seeking, Message Sensation Value and Drug Use as Mediators of Psa Effectiveness. *Health Communication*, 3(4), 217-227. doi: 10.1207/s15327027hc0304\_4

Palmgreen, P., Lorch, E. P., Stephenson, M.T., Hoyle, R.H., & Donohew, L. (2007). Effects of the Office of National Drug Control Policy's Marijuana Initiative Campaign on High-Sensation-Seeking Adolescents. *American Journal of Public Health*, 97(9), 1644-1649. doi: 10.2105/AJPH.2005.072843

Robins, L. N., & Przybeck, T. R. (1985). Age of onset of drug use as a factor in drug and other disorders. In C. L. Jones & R. J. Battjes (Eds.), *National Institute on Drug Abuse Research Monograph Series: 56. Etiology of drug abuse: Implications for prevention* (pp. 178-192). Washington, DC: U.S. Government Printing Office.

Partnership Attitude Tracking Study [PATS]. (2009, February). *Teens 2008 Report*. Retrieved on March 1, 2009, from [http://www.drugfree.org/Files/full\\_report\\_teens\\_2008](http://www.drugfree.org/Files/full_report_teens_2008)

Stephenson, M. T., Morgan, S. E., Lorch, E. P., Palmgreen, P., Donohew, L., & Hoyle, R. H. (2002). Predictors of exposure from an anti-marijuana campaign: Outcome research

assessing sensation seeking targeting. *Health Communication*, 14(1), 23-43. doi:  
10.1207/S15327027HC1401\_2

Substance Abuse and Mental Health Services Administration, [DAWN], (2008). *Drug Abuse Warning Network, 2006: National Estimates of Drug-Related Emergency Department Visits*. (Office of Applied Studies, DAWN Series D-30, DHHS Publication No. (SMA) 08-4339). Rockville, MD. Retrieved on October 13, 2009,  
<https://dawninfo.samhsa.gov/files/ED2006/DAWN2k6ED.pdf>

Substance Abuse and Mental Health Services Administration [SAMHSA]. (2009). *Results from the 2008 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-36, HHS Publication No. SMA 09-4434). Rockville, MD. Retrieved on October 28, 2009, from  
<http://www.oas.samhsa.gov/nsduh/2k8nsduh/2k8Results.pdf>

Substance Abuse and Mental Health Services Administration [SAMHSA]. (2005). *Results from the 2004 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-28, DHHS Publication No. SMA 05-4062). Rockville, MD. Retrieved on October 28, 2009, from  
<http://www.oas.samhsa.gov/NSDUH/2k4NSDUH/2k4results/2k4results.htm>

Substance Abuse and Mental Health Services Administration [SAMHSA]. (2008). *Results from the 2007 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NSDUH Series H-34, DHHS Publication No. SMA 08-4343). Rockville, MD. Retrieved May 24, 2009, from  
<http://www.oas.samhsa.gov/NSDUH/2k7NSDUH/2k7Results.cfm>

Substance Abuse and Mental Health Services Administration [TEDS]. (2007). *Treatment*

*Episode Data Set (TEDS) Highlights-2007* (Office of Applied Studies, DASIS Series: s-45, DHHS Publication No. (SMA) 09-4360). Rockville, MD. Retrieved October 24, 2009 from <http://www.dasis.samhsa.gov/teds07/tedshigh2k7.pdf>

Suddath, C. (2009, March). The War on Drugs. *Time Magazine*. Retrieved from

<http://www.time.com/time/world/article/0,8599,1887488,00.html>

## **Footnotes**

---

<sup>1</sup>An emerging school-based prevention approach is to infuse drug prevention messages into basic core curricula, such as mathematics and science. Science-based prevention programming is relatively new, and it is rooted in the recent decrease in time allotted to health education in schools (Holtz & Twombly, 2007; Morse, Wilbur & Ballard, 2004). It typically presents information on the biology of drug misuse without injunctions to avoid use (Holtz & Twombly, 2007). But because of its relative newness, few evaluations have examined its effectiveness, yielding relatively little information to inform the development of effective prevention messages for prescription drugs.