Children’s Beliefs About Long-Term Health Effects of Alcohol and Cocaine Use

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Objective: To assess age differences in children’s beliefs about the long-term health effects of alcohol and cocaine, to use such beliefs to predict attitudes toward and intentions to use these substances, and to establish whether accurate beliefs are more predictive than inaccurate ones.

Methods: Children ages 6 to 12 (N = 217) responded to an open-ended question about the effects of long-term alcohol and cocaine use and to 12 structured questions asking whether each produces alcohol-like, cocaine-like, and tobacco-like effects.

Results: Differentiation among alcohol, cocaine, and tobacco effects was limited but increased with age. Beliefs about health effects had no impact on alcohol attitudes and intentions, but intentions to drink were stronger among older and white children. Anti-cocaine attitudes and intentions were associated with being older and non-White and with having accurate knowledge of cocaine’s true health effects—but also with believing falsely that cocaine has tobacco-like effects and that drugs in general have catastrophic effects.

Conclusions: With age, and as predicted by Werner’s orthogenetic principle, children differentiated more sharply between substances. Although negative misconceptions can contribute to anti-drug attitudes and intentions, children should nonetheless be taught about the distinct effects of different substances on health.

Key words: children; health beliefs; expectancies; drug prevention; alcohol; cocaine; ethnicity.

The perception that substance use has negative consequences is a deterrent to the use and abuse of alcohol and drugs (e.g., Smith & Goldman, 1994). This relationship is predictable not only from traditional learning theories and health belief models (e.g., Bush & Iannotti, 1990) but from social-psychological formulations such as the theory of reasoned action (Fishbein & Ajzen, 1975), in which beliefs about the outcomes of engaging in a behavior predict attitudes toward the behavior and, in turn, intentions to engage in it and actual performance of it.

Most research on beliefs about the consequences of substance use has centered on alcohol expectancies (i.e., personalized beliefs about the physical, behavioral, and psychological consequences of drinking; Smith & Goldman, 1994). Children form strong negative expectancies about alcohol very early; with age, they also become more aware of its
positive effects (Dunn & Goldman, 1996; Johnson & Johnson, 1995; Miller, Smith, & Goldman, 1990). Weak negative expectancies and/or strong positive expectancies predict positive attitudes toward use, intentions to use, and actual use of alcohol in adolescence and adulthood (Earleywine, 1995; Morrison, Simpson, Gillmore, Wells, & Hoppe, 1996; Smith & Goldman, 1994). However, the expectancies scales used in previous research have generally focused on the short-term consequences of substance use. The belief that substance use results in serious health problems should also discourage experimentation (Morrison et al., 1996), especially among children, who lack a sense of how much substance use and how many years of it may be required in order for chronic health problems to emerge. What do children of different ages know about the health consequences of long-term alcohol and drug use? Do beliefs about the harmful effects of drugs predict anti-drug attitudes and intentions? Are accurate beliefs any more predictive than inaccurate ones?

A few studies have asked children of different ages about the harmful effects of substance use. For example, Porter-Serviss, Opheim, and Hindmarsh (1994), who asked fourth- to sixth-grade children about several substances, reported that only 9% failed to indicate that cocaine is harmful, but 23% seemed unaware that beer is harmful. Szalay, Inn, Strohl, and Wilson (1993) found that elementary school students were more likely than secondary and postsecondary respondents to offer negative word associations to drugs but less likely to refer to specific health consequences. More revealing of the content of children’s beliefs are qualitative data reported by Huetteman, Sarvela, and Benson (1992), who interviewed children in kindergarten through eighth grade about tobacco and alcohol. Children appeared to acquire knowledge of smoking earlier than knowledge of drinking but generally displayed little specific knowledge of long-term health effects until the later grades. Even young children displayed awareness that alcohol is bad for people and makes them drunk and sick, but mentions of brain damage increased with age, and only seventh and eighth graders mentioned liver damage.

Heinz Werner’s (1957) orthogenetic principle provides a useful starting point for hypothesizing about the development of beliefs about the health effects of different substances. According to Werner, development generally proceeds from global, undifferentiated states to more specific, differentiated understandings and, ultimately, toward a coherent integration of differentiated understandings. Studying perceptions of the likelihood that different disease risk factors can cause AIDS, colds, and cancer, Sigelman, Maddock, Epstein, and Carpenter (1993) found that, from age 9 to age 20, differentiation of the risk factors uniquely associated with the three different diseases increased. Awareness of true risk factors for each disease actually changed little with age; instead, the prominent developmental trend was a decrease in misconceptions—for example, in the belief that casual contact causes AIDS.

Applying this work to the domain of drugs, we should expect young children, aware already that drugs are bad, to associate both alcohol and cocaine with a wide range of negative health effects. Especially likely are misconceptions suggesting that the use and abuse of alcohol and cocaine result in damaging effects such as lung cancer that are more properly associated with smoking, about which children know quite a bit (Huetteman et al., 1992). Also, because cocaine is less familiar than alcohol, children may infer that alcohol-related effects such as brain damage hold for cocaine as well. Older children, by contrast, should more sharply differentiate the effects of alcohol and cocaine from each other and from the hazardous effects of smoking. Thus, across early to middle childhood, age-related increases in awareness of the true effects of the two drugs should be evident, as should decreases in misconceptions about their effects.

Finally, beliefs about the harmful effects of drugs should predict negative attitudes toward their use and intentions not to use them, as suggested by previous research (Bachman, Johnston, O’Malley, & Humphrey, 1988; Szalay et al., 1993). In one of the few available studies of children, Morrison et al. (1996) reported that perceived long-term negative outcomes of smoking predict anti-smoking attitudes better than either perceived immediate negative outcomes or perceived positive outcomes. This suggests that expectancies about long-term health effects may be at least as predictively significant as the expectancies about short-term health effects typically assessed in expectancy research.

No one has asked, however, whether accurate beliefs are any more predictive of attitudes, intentions, and behaviors than inaccurate ones. Some studies of beliefs about HIV/AIDS suggest that both accurate knowledge of true risk factors and a lack of misconceptions about low-risk behaviors such as sharing drinking glasses predict more positive atti-
tudes toward and willingness to interact with people with AIDS (e.g., Ambati, Ambati, & Rao, 1997). However, the theory of reasoned action (Fishbein & Ajzen, 1975) and similar formulations suggest that it may not matter whether beliefs about the consequences of substance use are accurate so long as they are negative. Although the mistaken belief that HIV is spread through casual contact directly suggests the wisdom of avoiding people with AIDS, holding mistaken beliefs about the catastrophic health effects of drugs may only strengthen a child’s resolve not to use them.

We adopted a multimethod approach to the questions of interest, first asking an open-ended question about what would happen to someone who used a lot of alcohol (or cocaine) over many years, then presenting structured questions about 12 long-term health effects, 4 associated with alcohol, 4 with cocaine, and 4 with tobacco. Alcohol was selected as a focus because it is the adolescent drug of choice (Johnston et al., 1996). Cocaine was selected because it was frequently in the news when this study was planned and yet contrasts with alcohol because it is a stimulant rather than a depressant and is less familiar.

We hypothesized the following: (1) with age, children will increasingly endorse true and reject false statements about the long-term health effects of alcohol and cocaine, and, accordingly, will better differentiate between the two substances; (2) measures of accurate knowledge will be largely independent of measures of false beliefs (Ambati et al., 1997; Sigelman et al., 1993); and (3) both accurate and inaccurate beliefs about the negative health effects of substance use will predict anti-drug attitudes and intentions.

Although the literature provides little basis for hypotheses, racial and gender differences were also explored. Some research suggests that African American adolescents hold more negative expectancies about and are more disapproving of drugs than White ones (Gillmore et al., 1998; Ringwalt & Palmer, 1990) and use them less (Johnston, O’Malley, & Bachman, 1996), whereas other work suggests that African American children hold more misconceptions about health issues (e.g., Telljohann, Durgin, Everett, & Price, 1996). Similarly, although boys experiment more than girls with drugs (Johnston et al., 1996), some work suggests that girls hold more negative alcohol expectancies than boys (Kraus, Smith, & Ratner, 1994) while other work does not (Gillmore et al., 1998).

**Method**

**Participants**

Participants were 217 children attending two Catholic primary schools in Prince George’s County, Maryland. These schools were chosen because they were located in a racially and demographically diverse section of the Washington, D.C., metropolitan area and in a school system receptive to research. All 363 children in grades one to six of the participating schools who were in attendance when parent consent packages were distributed in class were given an opportunity to participate. The consent packages contained an explanatory letter, a consent form, and a parent survey with demographic items and questions about the child’s exposure to alcohol and cocaine. In all, 84.8% of the parents returned the consent forms, and 71.4% of those agreed to participate, resulting in parent consent for 220 children. Three children then refused to participate, for an ultimate participation rate of 60% (217 of 363).

For purposes of analysis, students were grouped into three grade groups: first and second graders (n = 78), third and fourth graders (n = 68), and fifth and sixth graders (n = 71). First and second graders had a mean age of 6.76; third and fourth graders a mean age of 8.68; and fifth and sixth graders a mean age of 10.70. There were 101 boys and 116 girls.

The D.A.R.E. drug prevention program had been administered in the fifth and sixth grades of one of the two schools earlier in the school year. D.A.R.E. programs focus on building self-esteem and resistance skills and provide little information about the physiological and behavioral effects of drugs. As would be expected, most of the children studied had exposure to alcohol, but few had exposure to drugs. According to parents (N = 208), 92.3% of the children had seen someone drink alcohol, and almost half (46.4%) had seen someone drunk, but only 9.2% had seen someone high on drugs, and none had seen someone use cocaine or crack.

The sample was 47.7% White non-Hispanic, 38.8% African American, 5.6% Hispanic, 5.6% Asian, and 2.3% other as indicated by parent report. Preliminary analyses revealed only one significant difference among the different minority groups (African Americans had lower scores on a measure of intentions to use alcohol, as indicated later). As a result, and because ns for minorities other than Afri-
can Americans were low, participants were classified as White or Minority for purposes of analysis. Education of the male head of household (mother's education was only slightly lower) was as follows: 15.9% went no farther than high school, 36.5% had some postsecondary education short of a college degree, 19.6% were college graduates, and 28.1% had graduate or professional education. Nakao and Treas's (1994) Socioeconomic Index (SEI) scores, which reflect the educational levels and salaries associated with various occupations and can range from 15 to 97, averaged 67.98 (SD = 14.22; range = 23–97) for the parent in each family with the highest SEI score.

**Procedure**

Parent consent packages with demographic surveys were distributed in class by members of the research team and were to be taken home and brought back to class by the children. Children provided their own written consent at the start of their individual interviews, which took place over two sessions at school. Interviews were conducted by one African American and three White females who had been trained and had conducted pilot interviews. The items of interest here were part of a larger interview that began with demographic questions and went on to open-ended questions and then to structured questions about alcohol and cocaine. The order of questions about the two drugs was counterbalanced.

**Measures**

In order to tap children's spontaneous beliefs about the health effects of alcohol and cocaine, we first asked an open-ended question about each drug's long-term health effects. Later in the interview, we presented a list of long-term health effects and sought children's judgments of the likelihood of each. Finally, we administered drug attitude and intention measures.

**Open-Ended Measures of Beliefs About Health Effects.** Each child was asked the following about each drug: "Now let's say that someone drank lots and lots of beer [took lots and lots of cocaine] every day for lots of years. What do you think drinking all that beer [taking all that cocaine] will do to his body?" Each distinct response was coded in terms of 11 variables created on the basis of pilot work and preliminary review of transcripts. They were ultimately converted to 11 dichotomous variables (0 = not mentioned, 1 = mentioned) capturing mentions of (1) death, (2) sickness or disease, (3) damage to the body, and mentions of specific types of disease or damage affecting (4) the heart, (5) the brain, (6) the nose, (7) the liver, (8) appearance (e.g., gaining weight), (9) behavior/personality (e.g., becoming mean), (10) cognition/perception (e.g., losing memory, having trouble seeing), and (11) pathological behavior (e.g., going crazy, beating people up).

Two research assistants coded a randomly selected sample of 52 responses from both the alcohol and cocaine sections of the survey. Intercoder reliability, measured by coefficient kappa in order to correct for chance agreement, ranged from .63 to 1.00 and averaged .85 across the 10 dichotomous codings for which there were any mentions (no child mentioned the nose). All kappas were significant at the .001 level.

**Structured Measures of Beliefs About Health Effects.** Structured items concerning possible long-term health effects of alcohol and cocaine assessed alcohol-like effects (liver disease, big stomach, brain damage, and long-term forgetting), cocaine-like effects (heart attack, nose damage, weight loss, and need for less sleep), and tobacco-like effects (lung cancer, bad cough, yellow stains on teeth, and trouble breathing). Children were asked whether each effect would happen if a person "has been drinking alcohol (using cocaine or crack) for many years." A response card showed the options NO! (definitely will not happen), no (probably will not happen), yes (probably will happen), or YES! (definitely will happen). For each type of effect (i.e., alcohol-like, tobacco-like, and cocaine-like), the four appropriate item scores, each of which ranged from 0 (definitely not) to 3 (definitely), were averaged. This resulted in three perceived negative health effects subscales for each drug. For alcohol, alcohol-like effects were true, and cocaine-like and tobacco-like effects were false. For cocaine, cocaine-like effects were true, and alcohol-like and tobacco-like effects were false.

**Attitudes and Intentions.** Attitudes toward each drug were assessed by averaging two items that asked if it is an okay idea or a bad idea for a teenager to drink one beer (use a little cocaine or crack) at a special party and for an adult (grown-up) to try beer (cocaine or crack) just once to see what it is like. Possible responses ranged from very bad idea (0) to very okay idea (3). Alphas for the resulting two-item scales were .64 for alcohol, .66 for cocaine.

The intentions to use scale asked children
whether they thought they would ever try a little beer (cocaine or crack) just once to see what it is like, drink beer (use cocaine or crack) when they are in high school, and drink beer (use cocaine or crack) when they are an adult (grown-up). The response scale was NO!, definitely not (0), no, probably not (1), yes, probably (2), and YES!, definitely (3). Alphas for the resulting 3-item scale were .65 for alcohol, .58 for cocaine. Reliabilities were similar for the youngest and oldest halves of the sample.

### Results

We first present data regarding variations by grade group, ethnic group (White vs. Minority), and gender in beliefs about the long-term health effects of alcohol and cocaine. We then assess whether these beliefs predict drug-related attitudes and intentions.

#### Beliefs About Long-Term Health Effects

Table I shows the proportions of children who mentioned each of the 11 possible effects of alcohol and cocaine in response to the open-ended questions. Chi-square tests for differences between the three age groups (1st–2nd graders vs. 3rd–4th graders vs. 5th–6th graders) revealed no significant age differences, nor were race or gender differences significant.

Table I. Proportion of Children Mentioning Each Long-Term Effect in Response to Open-Ended Questions (N = 217)

<table>
<thead>
<tr>
<th>Effect</th>
<th>Alcohol</th>
<th>Cocaine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body damage</td>
<td>.57</td>
<td>.57</td>
</tr>
<tr>
<td>Death</td>
<td>.37</td>
<td>.52***</td>
</tr>
<tr>
<td>Brain damage</td>
<td>.27</td>
<td>.29</td>
</tr>
<tr>
<td>Heart problems</td>
<td>.26</td>
<td>.28</td>
</tr>
<tr>
<td>Sickness or disease</td>
<td>.31</td>
<td>.22*</td>
</tr>
<tr>
<td>Behavioral effects</td>
<td>.20</td>
<td>.15</td>
</tr>
<tr>
<td>Cognitive effects</td>
<td>.16</td>
<td>.12</td>
</tr>
<tr>
<td>Pathological/Violent</td>
<td>.05</td>
<td>.04</td>
</tr>
<tr>
<td>Appearance changes</td>
<td>.05</td>
<td>.04</td>
</tr>
<tr>
<td>Liver damage</td>
<td>.03</td>
<td>.02</td>
</tr>
<tr>
<td>Nose damage</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

*p < .05.  
***p < .001.

Independent samples with df = 1 and N = 217 indicated that children perceived cocaine as more likely than alcohol to result in death, \( \chi^2 = 10.68, p < .001 \), but less likely to result in sickness, \( \chi^2 = 5.31, p < .05 \). Otherwise, the perceived effects of the two drugs were similar.

Table II shows, for the sample as a whole, the percentages of children who believed that each of the 12 specific effects inquired about would probably or definitely occur. Sizable majorities of children believed that both alcohol and cocaine (and the two were not viewed very differently) have numerous undesirable effects on health and are particularly likely to result in forgetfulness, heart attacks, brain damage, and difficulty breathing. Confusion about which drug causes which effects is evident. For example, children were as likely to say that cocaine use causes liver damage as that alcohol use does, and they believed that both alcohol and cocaine use are quite likely to result in trouble breathing and stained teeth. The only effects judged unlikely to occur by a majority of the sample were a big stomach, reduced need for sleep, nose damage, and weight loss (the last three being true cocaine effects).

A preliminary analysis of variance (ANOVA) that included gender, type of health effect, drug, and grade level revealed no significant gender differences or interactions between gender and other variables; data for girls and boys were therefore pooled. A 3 (Type of Effect: Alcohol-Like Effects vs. Cocaine-Like Effects vs. Tobacco-Like Effects) × 2
(Drug Asked About: Alcohol vs. Cocaine) × 3 (Grade Level: 1st–2nd vs. 3rd–4th vs. 5th–6th) × 2 (Ethnicity: Minority vs. White) ANOVA with repeated measures on the first two factors was used to analyze grade level and ethnic differences in perceived long-term health effects.

Table III shows the mean scores on the three effect scales for each substance by grade group. The analysis revealed main effects of drug, $F(1, 208) = 19.86, p < .0001$; grade level, $F(2, 208) = 4.79, p < .01$; ethnicity, $F(1, 208) = 7.00, p < .01$; and type of health effect, $F(2, 207) = 183.33, p < .0001$. Moreover, there were significant interactions involving type of effect × grade level, $F(4, 414) = 9.36, p < .0001$; type of effect × drug × grade level, $F(4, 414) = 3.17, p < .05$; and type of effect × grade × ethnicity, $F(4, 414) = 3.03, p < .05$.

The main effect of ethnicity was significant, and it was involved in a significant interaction with type of effect and grade. Minority children were generally more likely than White children to indicate that the long-term health effects inquired about—whether true or false—would occur (overall mean for Minority children = 1.90, for White children = 1.74). In 3 out of 36 specific cell comparisons the direction of difference was the reverse, resulting in the significant interaction effect: At the youngest grade level, White children more strongly believed that both substances have tobacco-like effects and that cocaine has alcohol-like effects.

The interaction between drug, type of health effect, and grade level was unraveled through Scheffé’s tests and tests for simple effects, with alpha set at .05. Children did not find effects properly associated with cocaine use plausible as effects of alcohol at any age level, but these cocaine-like effects were judged significantly more likely by 1st–2nd graders than by older children. Effects associated with smoking were more often attributed to alcohol by 1st–2nd and 3rd–4th graders than by 5th–6th graders, suggesting that tobacco-related misconceptions decline with age. No grade differences in endorsement of true health effects of alcohol use were found. The main developmental trend, then, was not an increase in accurate knowledge but a weeding out of mistaken ideas about alcohol’s effects. Looking at the same results another way indicated that both 1st–2nd graders and 3rd–4th graders believed that alcohol was more likely to cause consequences associated with tobacco use than consequences properly associated with alcohol use, and that it was more likely to cause effects associated with alcohol use than effects associated with cocaine use. Only 5th–6th graders perceived true alcohol effects to be more probable than tobacco-like effects, which in turn were more likely than cocaine-like effects.

For cocaine, children did not strongly endorse the effects actually associated with its use. Both 1st–2nd and 5th–6th graders scored significantly higher on the true cocaine effects scale than did 3rd–4th graders. Mistaken ideas that cocaine use results in effects associated with smoking were common, significantly more so among 1st–2nd graders than among 5th–6th graders. Finally, cocaine use was fairly strongly associated at all ages with health effects more accurately attributed to alcohol use; the three grade groups did not differ. Comparing the means at each grade level separately reveals that 1st–2nd graders endorsed tobacco effects significantly more than alcohol effects, and alcohol effects significantly more than true cocaine effects, as effects of cocaine use. Both 3rd–4th graders and 5th–6th graders endorsed tobacco and alcohol effects about equally strongly and significantly more strongly than true effects of cocaine use.

Finally, comparisons of means for the two drugs revealed that 1st–2nd graders did not distinguish between alcohol and cocaine; that 3rd–4th graders attributed significantly more cocaine-like effects to cocaine than to alcohol; and that 5th–6th graders attributed both cocaine effects and tobacco effects more readily to cocaine than to alcohol. At no age, then, did children have a clear notion of the specific health effects of either alcohol or cocaine, although the oldest children came closest. A post hoc analysis indicated children who said cocaine users smoke cocaine (36.9%) were no more likely than those who

<table>
<thead>
<tr>
<th>Grade group</th>
<th>1st–2nd</th>
<th>3rd–4th</th>
<th>5th–6th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol results in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol-like effects</td>
<td>1.99</td>
<td>1.92</td>
<td>2.02</td>
</tr>
<tr>
<td>Tobacco-like effects</td>
<td>2.18</td>
<td>2.08</td>
<td>1.72</td>
</tr>
<tr>
<td>Cocaine-like effects</td>
<td>1.59</td>
<td>1.12</td>
<td>1.24</td>
</tr>
<tr>
<td>Cocaine results in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol-like effects</td>
<td>2.05</td>
<td>2.01</td>
<td>2.02</td>
</tr>
<tr>
<td>Tobacco-like effects</td>
<td>2.27</td>
<td>2.15</td>
<td>2.02</td>
</tr>
<tr>
<td>Cocaine-like effects</td>
<td>1.63</td>
<td>1.27</td>
<td>1.55</td>
</tr>
</tbody>
</table>

Means in each row that do not share a subscript in common are significantly different at $p < .05$.
said they sniff it (30.4%) to claim that cocaine has 
tobacco-like effects or to deny that it has the effects 
it actually has.

**Perceptions of Long-Term Effects as 
Predictors of Drug Attitudes and Intentions**

Each child’s score on each of the long-term effects 
scales can be conceptualized as having two components: (1) a general tendency to associate drugs in 
discriminately with a wide range of bad health 
effects, and (2) a tendency to endorse or reject the 
asociation of a specific type of long-term health ef fect with a specific drug. The highly knowledgeable 
child would show little tendency to “catastrophize” 
about the generally harmful effects of drugs; would 
strongly endorse effects actually associated with a 
particular substance, and would strongly reject items 
about effects not associated with that substance.

To explore the implications of accurate and in 
accurate beliefs about the health effects of alcohol 
for attitudes and intentions, we tested a regression 
model with the following predictors: age, ethnicity 
(0 = Minority, 1 = White), general harmful effects 
(the child’s mean score on all six long-term effects 
scales, three for alcohol and three for cocaine), 
alcohol-like effects of alcohol, cocaine-like effects of 
alcohol, and tobacco-like effects of alcohol. Each of 
the last three variables was a difference score re lecting the child’s mean score on a specific long 
term effect scale minus his or her mean score across 
the six long-term effects scales. Through this meth 
odology, endorsement of each specific perceived 
health effect of alcohol was assessed independently 
of the individual’s general tendency to attribute 
harmful effects to one or the other or both drugs.

The same regression model, substituting specific ef ects measures based on the three effects of cocaine 
scales, was used to predict cocaine attitudes and in 
tentions.

Preliminary correlational analyses indicated that 
the four health effects measures were not 
highly intercorrelated. For alcohol, perception of 
general harmful effects was associated with think 
ing that alcohol has tobacco-like effects \(r = .23, 
 \ p < .001\), \( N = 217\), and strong endorsement of 
cocaine-like effects was associated with weak en 
dorsement of both true alcohol effects \(r = .24, 
 \ p < .001\) and tobacco-like effects \(r = .21, p < .01\). For cocaine, knowing the true effects of co 
caine was associated with not overgeneralizing 
about the harmful effects of drugs \(r = .14, p < .05\); 
not misattributing alcohol-like effects to co 
caine \(r = .18, p < .01\); and not misattributing 
tobacco-like effects to cocaine \(r = .23, p < .001\).

Correlational analyses also revealed that attitudes 
and intentions were moderately correlated but dis 
tinct \(+.57\) for alcohol, \(+.63\) for cocaine, \(p < .0001\). 

In the regression analysis with attitude toward 
酒 use as the dependent variable, only 7% of 
the variance was accounted for by the six pre 
dictors, \(F(6, 207) = 2.51, p < .05\), and none of them 
was a significant unique predictor. Collectively, the 
predictors accounted for 14% of the variance in in 
tentions to use alcohol, \(F(6, 207) = 5.42, p < .0001\). 
Intentions strengthened with age, \(t(207) = 3.78, 
 \ p < .001\). Also, although most children did not in 
tend to use alcohol, intention scores were higher 
among White children than among Minority-group 
children, \(t = 2.06, p < .05\). This effect was largely 
attributable to the African American children; there 
was a significant difference among subgroups of mi 
nority children on this measure, \(F(3, 108) = 3.11, p < .05\). None of the long-term effects measures had a 
significant impact.

The findings for cocaine were quite different. 
The predictors jointly accounted for 18% of the 
variance in attitudes toward cocaine, \(F(6, 207) = 7.73, 
 \ p < .0001\). White children expressed more 
positive attitudes than Minority children, \(t = 2.44, 
 \ p < .05\), and attitudes became more negative with 
age, \(t(207) = -4.99, p < .0001\). In addition, the 
higher the scores on the overgeneralization of 
harmful effects scale, the cocaine-like effects scale, 
and the tobacco-like effects scale, the more negative 
the child’s attitudes toward cocaine use \((t = -2.40, 
 \ -2.89, -2.65, \text{ respectively, } p < .05)\).

Finally, 7% of the variance in intentions to use 
cocaine was explained, \(F(6, 207) = 2.68, p < .05\). 
Intentions to avoid using cocaine were uniquely as 
associated with being older, \(t = -2.88, p < .01\), and, 
individually, with knowing more about the true 
long-term effects of cocaine, \(t = -2.09, p < .05\).

**Discussion**

This study was limited in that it was cross-sectional 
rather than longitudinal, relied on measures of only 
moderate reliability, and involved Catholic school-
children. It cannot separate the contributions of 
cognitive growth and socialization experiences to 
age-related differences in beliefs about drugs. Nonethe 
less, this multimethod study revealed age differ-
ences in children’s perceptions of the long-term consequences of alcohol and cocaine use that are generally consistent with Werner’s (1957) concept of a developmental progression from global, undifferentiated concepts to increasingly differentiated ones.

The open-ended questions, perhaps because they required children to generate verbal responses spontaneously, revealed primarily undifferentiated responses at all ages. Structured questions also revealed many failures to differentiate the effects of different substances and a general tendency to overattribute harmful effects to both alcohol and cocaine. However, the structured questions may have allowed children to express intuitions that they could not articulate in response to the open-ended questions. These questions revealed greater differentiation among substances with age, particularly a decrease across age groups in misconceptions about the ability of both alcohol and cocaine to cause lung cancer, yellow teeth, breathing problems, and other effects more properly associated with a more familiar substance, tobacco.

It appears useful, then, to view development as a weeding out of mistaken ideas, ideas that may arise from overgeneralizing from the familiar to the less familiar (Sigelman et al., 1993). It is also important to recognize that accurate knowledge and misconceptions can coexist, as evidenced by the generally weak correlations among health effects scales. This should caution health educators in schools and drug treatment facilities to teach children not only what a given substance does to undermine health but what it does not do.

The data also revealed intriguing differences between White and Minority (primarily African American) children. With few exceptions, Minority children attributed more harmful effects, true and false, to alcohol and cocaine. They also displayed weaker intentions to use alcohol and more negative attitudes toward cocaine, confirming some previous research. It is therefore worth asking whether a strong sense that substances are harmful helps to account for lower rates of substance use among African American youths than among other racial and ethnic groups (but see Gillmore et al., 1990, for disconfirming evidence).

Anti-alcohol attitudes and intentions were strongest among younger and Minority children but were not affected by beliefs about the health effects of alcohol, suggesting that other factors may be more significant (for example, expectancies about the short-term, psychological effects of drinking). Expectancies research aside, there is plenty of reason not to expect drug knowledge to accurately predict drug attitudes, intentions, and behavior. Alcohol and drug prevention programs that focus primarily on educating youths about substances have had disappointing effects (MacKinnon, Weber, & Pentz, 1988; Stol & Hill, 1996), and relationships between health knowledge and behavior are often tenuous (Helweg-Larsen & Collins, 1997).

For cocaine, by contrast, accurate knowledge of the drug’s true effects was predictive of both negative attitudes toward its use and intentions not to use it. Children were also better off from a prevention standpoint if they not only had accurate knowledge but also generally attributed negative health effects to drugs and believed that cocaine use results in breathing difficulties, lung cancer, and the like. In other words, the findings support the hypothesis that children may be better off believing that cocaine has a multitude of negative health effects—including effects it does not have—than understanding its specific effects and holding few misconceptions about it.

Although inaccurate beliefs about the catastrophic effects of drug use may serve an adaptive function in childhood, however, it is doubtful that children will be better off in the long run if they have a negative but largely wrong picture of what drugs do to people. As children get older, they are likely to gain direct and vicarious experience with drug use, see that many of their dire predictions do not hold up, and possibly reject much of what they learned earlier about drugs on the ground that it is probably fallacious. Education about the long-term damage specific drugs can do is clearly needed, starting in elementary school, and it should be based on data regarding children’s common misconceptions of the sort provided here. Since the true effects of drugs like cocaine are frightening enough, it makes sense to increase knowledge of these effects while also helping children to differentiate more sharply among different drugs and to understand why some of their misconceptions are wrong. Education that goes a step further and explains how drugs undermine physical and mental health may help children become more enlightened about the specific health consequences of using drugs while remaining as determined as ever not to use them.
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References


Telljohann, S. K., Durgin, J., Everett, S. A., & Price, J. H.