

Do Positive Alcohol Expectancies Have a Critical Developmental Period in Pre-Adolescents?

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ABSTRACT. Objective: Positive outcome expectancies have been shown to predict initiation of alcohol use in children and to mediate and moderate the relationship between dispositional variables and drinking behavior. Negative outcome expectancies for alcohol appear to weaken as children progress to middle adolescence, but positive expectancies tend to increase during this time. Positive alcohol expectancies have been found to increase in children in third and fourth grades, indicating what some investigators have termed a possible critical period for the development of positive expectancies. **Method:** In the present study, we assessed alcohol expectancies at baseline, 6, 12, and 18 months in 277 second-through sixth-grade students. Children completed the Alcohol Expectancy Questionnaire–Adolescent. Univariate analyses of covariance were conducted. **Results:** There were significant main effects for grade on

positive alcohol-expectancy change for Global Positive Transformations at 12 and 18 months, Social Behavior Enhancement or Impediment at 6 and 12 months, and Relaxation/Tension Reduction at 6 and 18 months, whereby a consistent pattern emerged in that lower grades did not differ from each other, but they differed significantly from the higher grades. **Conclusions:** Data support a critical developmental period for positive alcohol expectancies, with the greatest change observed between third and fourth grade and between fourth and fifth grade, and only in those expectancies clearly describing positive outcomes (e.g., Relaxation/Tension Reduction) via positive or negative reinforcement versus those with either combined or ambiguous outcomes (e.g., Social Behavior Enhancement or Impediment). (*J. Stud. Alcohol Drugs*, 75, 000–000, 2014)

ADOLESCENT SUBSTANCE USE REMAINS a serious public health concern, with concomitant alcohol and tobacco use prevalence rates approximately 20% in adolescent populations (Anthony and Echeagaray-Wagner, 2000). Recent U.S. epidemiologic data also suggest that the average age at first alcohol use is approximately 15 years—a marked decrease from 17.5 years in 1965 (Johnston et al., 2014; Substance Abuse and Mental Health Services Administration, 2003).

There is evidence of initiation for alcohol use as early as by the end of Grade 6 (Johnston et al., 2014). The intensity and frequency of use of alcohol and tobacco is greatest in adolescence and young adulthood (Bachman et al., 1997; Jackson et al., 2005). In a recent statewide survey, the average age at first alcohol use reported by students was 12–13 years (International Survey Associates, 2008). Collectively, these findings identify students enrolled in late elementary to middle school grades as being at greatest risk for initiating the use of alcohol. It is therefore crucial to determine what

individual difference factors may play a role in the initiation process. One individual difference that appears relevant in this respect is alcohol-outcome expectancies.

An adolescent's outcome expectancies regarding the anticipated reinforcing and punishing consequences of substance use, based on prior experiences and observational learning, may influence decisions about whether to use a particular substance. Considerable research suggests that outcome expectancies measured in early adolescence predict the onset of alcohol use (Christiansen et al., 1989). Outcome expectancies for positive and negative effects of alcohol have been identified explicitly and implicitly in children between 11 and 12 years of age and are thought to develop before direct use of alcohol (O'Connor et al., 2007). Thus, targeting and dispelling alcohol expectancies for positive outcomes may prove prudent in the context of prevention efforts for early adolescents.

Research has amassed to support the contention that adolescents' alcohol expectancies play a causal role in the initiation of alcohol use and subsequent maintenance of drinking behavior (Ariza Cardenal and Nebot Adell, 2000; Goldman et al., 1999; Jones et al., 2001; Simons-Morton et al., 1999). Alcohol expectancies appear to form at a relatively young age and tend to precede initial alcohol use (Goldman et al., 1987; Kraus et al., 1994). Positive alcohol expectancies may be particularly relevant to the initiation of adolescent alcohol use such that adolescents holding greater positive versus negative alcohol expectancies tend to endorse favorable attitudes regarding alcohol use and drinking in general (Jones et

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al., 2001; Morrison et al., 1996). Adolescents holding greater positive alcohol expectancies are also more likely to report future intentions to drink alcohol and higher levels of alcohol consumption during adolescence than those with lower levels of positive alcohol expectancies (Earleywine, 1995; Gruber et al., 1996; Simons-Morton, 2004; Smith and Goldman, 1994). Adolescents' alcohol expectancies predict not only alcohol use initiation but also the quantity and frequency of future drinking behavior (Barnow et al., 2004; Christiansen and Goldman, 1983; Lee et al., 1999). Further, alcohol expectancies mediate the relationship between behavioral problems and alcohol consumption among adolescents (Barnow et al., 2004). Greater positive alcohol expectancies have been found to reliably distinguish adolescent alcohol users from adolescents engaging in concurrent alcohol and tobacco use (Schmid et al., 2007). Negative alcohol expectancies, however, may be more important in adolescents' decisions to delay alcohol use or avoid it altogether (Leigh, 1999; Leigh and Stacy, 2004; Smith and Goldman, 1994).

Alcohol expectancies are believed to change throughout early childhood and adolescence independent of actual substance use experimentation. Children between ages 5 and 10 years primarily endorse negative expectancies about alcohol, have clear beliefs about appropriate alcohol use, and report having a generally good understanding of the effects of drinking alcohol (Casswell et al., 1985, 1988; Miller et al., 1990). However, as children mature into adolescence, alcohol expectancies appear to shift and subsequently become increasingly more positive with age (Cameron et al., 2003; Dunn and Goldman, 1996; Gustafson, 1992). Specifically, by age 13, adolescents primarily endorse positive alcohol expectancies (Cameron et al., 2003; Dunn and Goldman, 1996, 1998; Miller et al., 1990; Schell et al., 2005). This developmental shift toward more positive alcohol expectancies may play a causal role in the decreasing age at first alcohol use among early adolescent populations. In fact, Miller et al. (1990) have proposed a "critical period" of development for positive alcohol expectancies, occurring in Grades 3 and 4, and suggest that children as young as 7 years old should be targeted in alcohol use prevention efforts to alter the developmental course of positive alcohol expectancies.

Given these issues, the present study sought to provide a better understanding of the age-related changes of alcohol-outcome expectancies in children and adolescent populations using prospective data from a large sample of students (Grades 2 through 6) enrolled at two elementary schools in the southern United States. The purpose of the present longitudinal study was to evaluate changes in positive alcohol-outcome expectancies among pre-adolescents to determine whether these changes showed evidence of a critical developmental period. Specific hypotheses were (a) children would show increased positive alcohol-outcome expectancies with age and (b) there would be a critical period of expectancy development indicated by significant differences between

younger and older children's expectancy growth from baseline to 6, 12, and 18 months.

Method

Participants

The methodology for this study was approved by the Human Subjects Institutional Review Boards of Louisiana State University, Pennington Biomedical Research Center, and the Catholic Dioceses of Louisiana. Participants were children enrolled in second through sixth grade at two Catholic elementary schools in Louisiana. All students enrolled at the two schools were eligible for participation in the study. Forty-seven percent ($N = 313$; 160 boys, 153 girls) of the eligible children were assessed with baseline measurements after their parents consented and the children assented to participate. At the 6-month assessment, two students had withdrawn from the study ($n = 311$). Twenty-four students withdrew from the study before the 12-month assessment ($n = 287$ participants), and nine students withdrew before the 18-month assessment, leaving 88.8% ($n = 278$) of the initial sample. Participants were a subsample (the control condition) for a larger clinical trial involving healthy life changes and obesity prevention as the control condition for a tobacco, alcohol, and other drug prevention program (see Copeland et al., 2010). There was therefore no reason to believe that participants in the present study would exhibit anything other than typical expectancy development regarding alcohol.

Instruments

Alcohol Expectancy Questionnaire-Adolescent. Alcohol expectancies were assessed using portions of the Alcohol Expectancy Questionnaire-Adolescent (AEQ-A; Christiansen et al., 1995). The AEQ-A comprises 90 statements about possible effects of alcohol, to which participants respond using a true/false dichotomous response format. The AEQ-A includes seven factor-analytically derived scales: (a) Alcohol is a Powerful Agent that Makes Global Positive Transformations, (b) Alcohol Can Enhance or Impede Social Behavior, (c) Alcohol Improves Cognitive and Motor Abilities, (d) Alcohol Enhances Sexuality, (e) Alcohol Leads to Deteriorated Cognitive and Behavioral Function, (f) Alcohol Increases Arousal, and (g) Alcohol Promotes Relaxation or Tension Reduction. Items are summed to yield scale scores. This measure possesses solid psychometric properties, including predictive validity of adolescents' alcohol use (e.g., Christiansen et al., 1989). In the present study, the Alcohol Enhances Sexuality and Alcohol Increases Arousal scales of the AEQ-A were omitted based on appropriateness of content for the age of the children participating. We used the positive outcome expectancy scales of Alcohol is a Powerful Agent that Makes Global Positive Transformations (15

items), Alcohol Can Enhance or Impede Social Behavior (17 Items), Alcohol Improves Cognitive and Motor Abilities (10 Items), and Alcohol Promotes Relaxation or Tension Reduction (13 items).

Alcohol-related information. Participants were asked the following regarding alcohol: “Have you ever tried alcohol?” Subsequent questions addressed whether they had used alcohol within the last month and, if relevant, about alcohol use rate and frequency.

Procedure

Participation was defined as agreement to undergo four assessments scheduled at the beginning and end of the school year for 2 academic years, approximately 6 months apart, resulting in measurements at baseline, 6 months, 12 months, and 18 months. The measures described above were collected for each participant in the study. Questionnaires were administered in a group format in the classroom setting and were read aloud to the youngest children (second and third graders).

Results

Participant characteristics

Among the 313 participants at baseline, there were 76 (24.3%) students in second grade, 59 (18.8%) in third, 65

(20.8%) in fourth, 63 (20.1%) in fifth, and 50 (16%) in sixth. The mean age was 9.04 years ($SD = 1.48$); 51.1% ($n = 160$) were male; and 93% ($n = 291$) White, 4.8% ($n = 15$) African American, 1.3% ($n = 4$) Hispanic, and 0.9% other. At baseline, 24.0% ($n = 75$) of students reported that they had tried alcohol. Participant scores on the AEQ-A were as follows: Global Positive Transformations: $M (SD) = 0.19 (0.46)$; Alcohol Can Enhance or Impede Social Behavior: $M = 1.12 (0.70)$; Alcohol Improves Cognitive and Motor Abilities: $M = 0.06 (0.24)$; Relaxation/Tension Reduction: $M = 1.44 (1.06)$.

Differences between dropouts and completers

We compared baseline characteristics of participants who dropped out of the study subsequent to baseline data collection ($n = 28$) with those who remained in the study beyond that point ($n = 285$) and there were no significant differences on the baseline measures collected at the time of study enrollment.

Positive alcohol-expectancy change

To assess alcohol-expectancy development, we excluded children who endorsed having tried alcohol ($n = 75$) at baseline. An additional participant had incomplete data for the 18-month assessment and was therefore excluded from all subsequent analyses. With the remaining 209 participants, we conducted univariate analyses of covariance (ANCOVA)

TABLE 1. Alcohol (AEQ-A) positive expectancy scores at baseline, 6, 12, and 18 months by grade

Variable	Overall ($N = 209$)	2nd grade ($n = 59$)	3rd grade ($n = 40$)	4th grade ($n = 41$)	5th grade ($n = 43$)	6th grade ($n = 26$)	p	η^2
Global Positive Transformations								
Baseline	0.19 (0.46)	0.11 (0.31)	0.13 (0.23)	0.17 (0.48)	0.19 (0.39)	0.17 (0.41) _d	n.s.	–
6 Months	0.13 (0.17)	0.13 (0.14)	0.07 (0.26)	0.10 (0.30)	0.18 (0.39)	0.17 (0.39)	n.s.	–
12 Months	0.13 (0.38)	0.06 (0.32) _a	0.04 (0.19) _b	0.17 (0.47)	0.31 (0.47) _{ab}	0.27 (0.45)	.016	.08
18 Months	0.17 (0.38)	0.05 (0.22) _a	0.08 (0.27) _b	0.22 (0.42) _c	0.50 (0.51) _{abcd}	0.28 (0.67)	<.0001	.19
Social Enhance/Impede								
Baseline	1.12 (0.70)	0.94 (0.73) _a	0.96 (0.70) _{abc}	1.21 (0.71) _a	1.29(0.68) _{abc}	1.33 (0.55) _{ab}	.01	.055
6 Months	1.13 (0.70)	0.93 (0.77) _a	1.00 (0.63) _b	1.2 (0.69) _a	1.4 (0.66) _{ab}	1.39 (0.50) _{ab}	.005	.053
12 Months	1.3 (0.64)	1.1 (0.61) _{ac}	1.2 (0.67) _b	1.3 (0.60)	1.7 (0.63) _{ab}	1.5 (0.52) _c	.003	.084
18 Months	1.4 (0.68)	1.2 (0.70)	1.3 (0.78)	1.4 (0.59)	1.5 (0.60)	1.8 (0.41) _c	n.s.	–
Improved Cognitive and Motor								
Baseline	0.06 (0.24)	0.09 (0.29)	0.09 (0.28)	0.06 (0.24)	0.02 (0.14)	0.00 (0.00)	n.s.	–
6 Months	0.02 (0.12)	0.02 (0.13)	0.05 (0.22)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	n.s.	–
12 Months	0.01 (0.08)	0.00 (0.00)	0.04 (0.19)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	n.s.	–
18 Months	0.01 (0.09)	0.02 (0.16)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	n.s.	–
Relaxation/Tension Reduction								
Baseline	1.4 (1.06)	1.3 (0.92) _a	1.1 (0.98) _b	1.5 (1.2)	1.8 (1.1) _{ab}	1.5 (1.1)	.03	.046
6 Months	1.55 (1.2)	1.19 (1.0) _a	1.12 (0.81) _b	1.5 (1.03) _c	2.2(1.30) _{abc}	2.3(1.46) _{abc}	<.0001	.203
12 Months	1.7 (1.3)	1.4 (1.0)	1.5 (1.2)	2.0 (1.5)	2.0 (1.3)	2.3 (1.3)	n.s.	–
18 Months	1.8 (1.4)	1.4 (1.2) _{ac}	1.2 (0.82) _{bc}	2.0 (1.5) _{bc}	2.9 (1.4) _{abc}	3.0 (1.5) _{ab}	<.0001	.186

Notes: AEQ-A = Alcohol Expectancy Questionnaire–Adolescent; n.s. = not significant; – = no value/not applicable. Subscript letters along the rows of values indicate significant between-group differences by grade. Subscript letters along the columns indicate significant within-group differences across the follow-up assessment points. Participants who endorsed using alcohol at any point were excluded from subsequent statistical analyses. At 6 months, overall $N = 188$, 2nd grade $n = 54$, 3rd grade $n = 40$, 4th grade $n = 41$, 5th grade $n = 35$, and 6th grade $n = 18$. At 12 months, overall $N = 145$, 2nd grade $n = 49$, 3rd grade $n = 29$, 4th grade $n = 29$, 5th grade $n = 26$, and 6th grade $n = 12$. At 18 months, overall $N = 116$, 2nd grade $n = 41$, 3rd grade $n = 26$, 4th grade $n = 23$, 5th grade $n = 20$, and 6th grade $n = 6$.

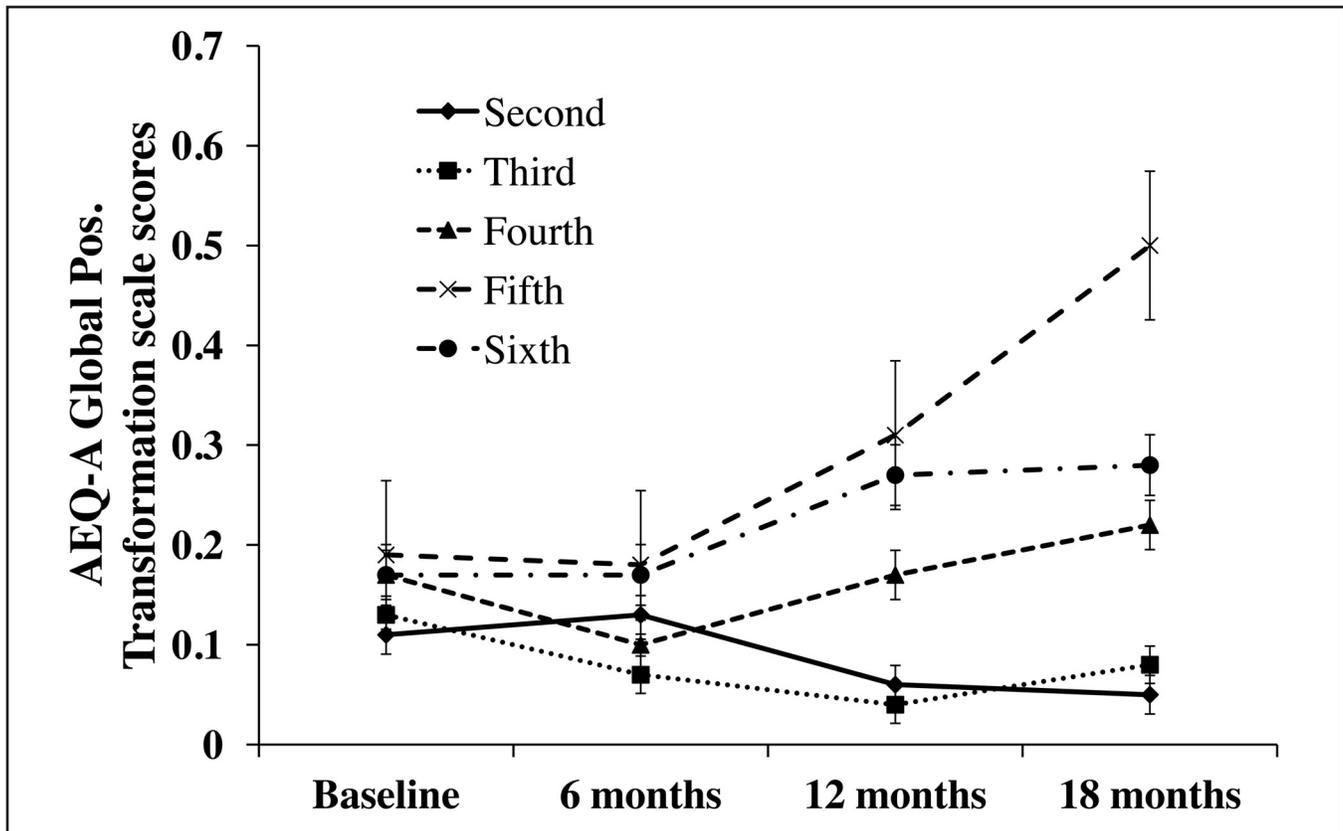


FIGURE 1. Alcohol Expectancy Questionnaire–Adolescent (AEQ-A) Global Positive Transformation Expectancies by grade and time; pos. = positive

for each of the four respective positive-alcohol-expectancy scales (Global Positive Transformations, Alcohol Can Enhance or Impede Social Behavior, Alcohol Improves Cognitive and Motor Abilities, and Relaxation/Tension Reduction) with grade as the factor, the corresponding baseline AEQ-A score as the covariate, and scores on the corresponding AEQ-A subscale at 6 months, 12 months, and 18 months as the dependent variables. At each time point, additional participants were excluded from analyses if they had tried alcohol at the respective follow-up time point (i.e., $n = 21$ at 6 months, $n = 43$ at 12 months, $n = 29$ at 18 months). Post hoc tests were conducted for pairwise comparisons between grades in expectancy scale scores (see Table 1 for results).

Global positive transformations

The ANCOVA was significant for the AEQ-A Global Positive Transformations scale at 12 months, $F(4, 144) = 3.16$, $p = .016$, partial $\eta^2 = .08$, and at 18 months, $F(4, 115) = 6.33$, $p < .0001$, partial $\eta^2 = .19$, whereby the higher grades had stronger expectancies compared with the lower grades. Post hoc tests showed a pattern whereby second and third graders' expectancies did not differ from each other, but they both significantly differed from fifth graders' (Figure 1).

Alcohol Can Enhance or Impede Social Behavior

The ANCOVA revealed a significant main effect for grade on the AEQ-A Alcohol Can Enhance or Impede Social Behavior scale at 6 months, $F(4, 187) = 2.53$, $p = .005$, partial $\eta^2 = .05$, and at 12 months, $F(4, 144) = 3.21$, $p = .003$, partial $\eta^2 = .08$. Post hoc tests showed a general increase in expectancies with grade, but the pattern was less consistent than with other expectancies (Figure 2).

Alcohol Improves Cognitive and Motor Abilities

The ANCOVA for the AEQ-A Alcohol Improves Cognitive and Motor Abilities scale was not significant at any time point (Figure 3).

Relaxation/Tension Reduction

The ANCOVA was significant for the AEQ-A Relaxation/Tension Reduction scale at 6 months, $F(4, 184) = 5.57$, $p < .0001$, partial $\eta^2 = .20$, and at 18 months, $F(4, 115) = 6.29$, $p < .0001$, partial $\eta^2 = .186$, whereby the higher grades had stronger Relaxation/Tension Reduction expectancies for alcohol compared with the lower grades. Post hoc tests showed

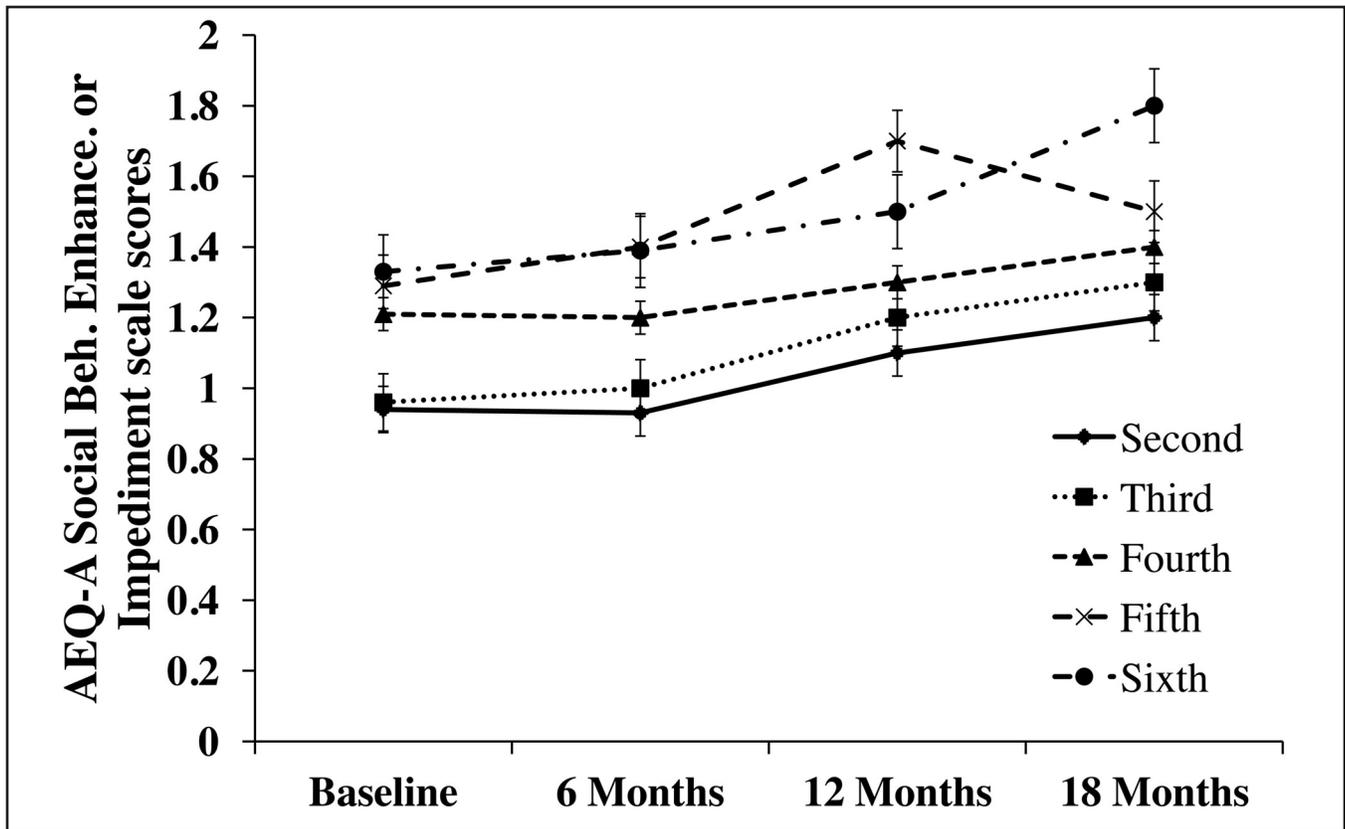


FIGURE 2. Alcohol Expectancy Questionnaire–Adolescent (AEQ-A) Social Behavior Enhancement or Impediment Expectancies by grade and time; beh. = behavior; enhance. = enhancement

a consistent pattern whereby second, third, and fourth graders' expectancies did not differ from each other, but they all differed significantly from those of fifth and sixth graders (Figure 4).

Discussion

The results from this study are consistent with the notion of a critical developmental period for positive alcohol expectancies. Among the children who had not tried alcohol at baseline, there was a general pattern whereby second through third or fourth graders' alcohol-outcome-expectancy strength showed the most resemblance and was significantly lower than that of the fourth or fifth and sixth graders. This sizable increase in positive beliefs about alcohol from the third to fourth grade or fourth to fifth grade transition among children supports the existence of a critical period in their developmental trajectory. This learning is necessarily distinct from that of the reciprocal learning process between expectations and actual use of a substance proposed for individuals who have developed beliefs about the effects of alcohol and how those beliefs are then modified with direct experience with the substance. With the exception of those children who had experienced drinking alcohol at baseline ($n = 75$) and therefore

were excluded from subsequent statistical analyses on that basis and those with a change in drinking status from "never" to "tried" alcohol at the 6-, 12-, and 18-month assessment points ($n = 21$, $n = 43$, and $n = 29$, respectively), the rest of the sample did not yet have direct pharmacological experience with alcohol to potentially influence their alcohol-outcome expectancies. Future research is warranted to determine what factors may influence this process, such as has been found previously in the literature (Brown et al., 1987).

The four AEQ-A scales were selected for use in the study because (a) we were interested in the developmental progression of positive alcohol-outcome expectancies in children and (b) among the scales representing positive outcomes, we wanted those comprising age-appropriate content for the sample participating in the study. Therefore, we selected the AEQ-A scales Global Positive Transformations, Alcohol Can Enhance or Impede Social Behavior, Alcohol Improves Cognitive and Motor Abilities, and Relaxation/Tension Reduction. Two of these scales, Global Positive Transformations and Relaxation/Tension Reduction, displayed a distinct developmental period in which they significantly increased, consistent with our predictions.

It is unclear why the Alcohol Can Enhance or Impede Social Behavior and the Alcohol Improves Cognitive and

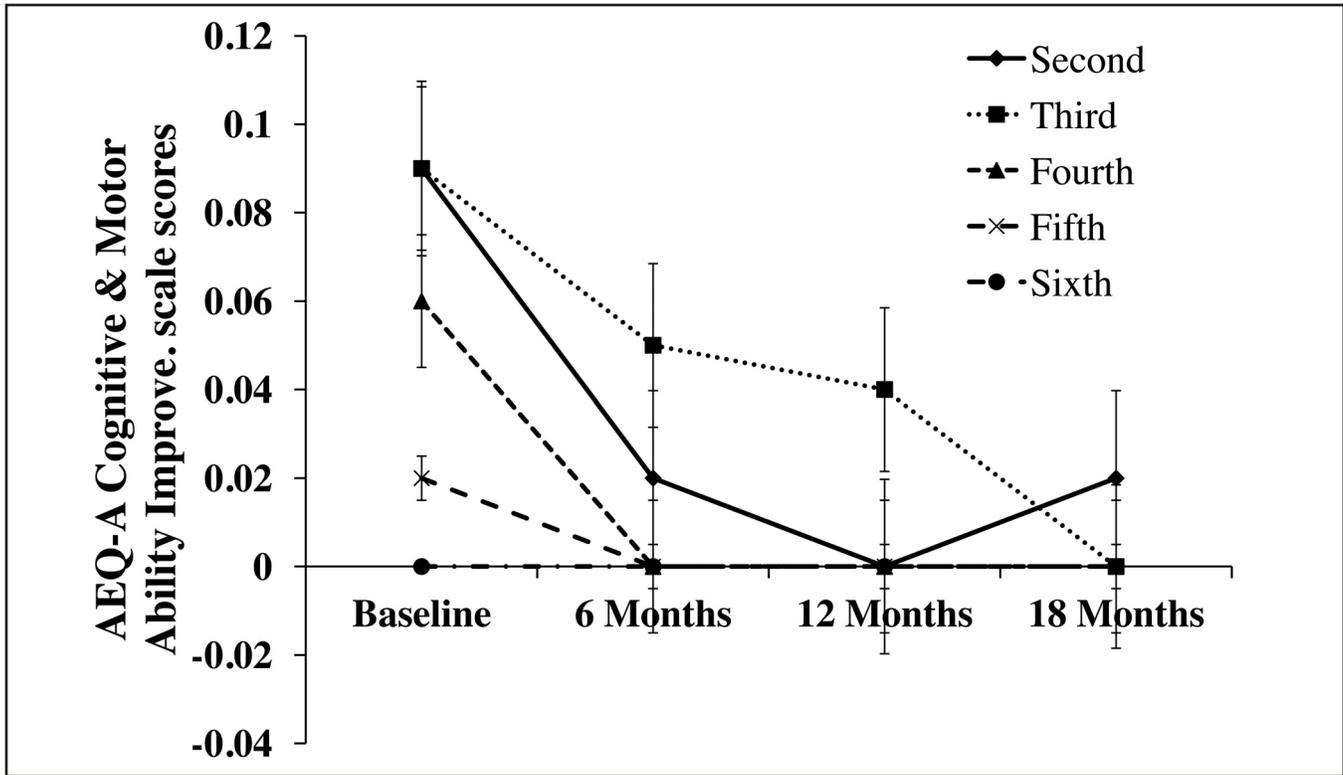


FIGURE 3. Alcohol Expectancy Questionnaire–Adolescent (AEQ-A) Cognitive and Motor Ability Improvement Expectancies by grade and time; improve. = improvement

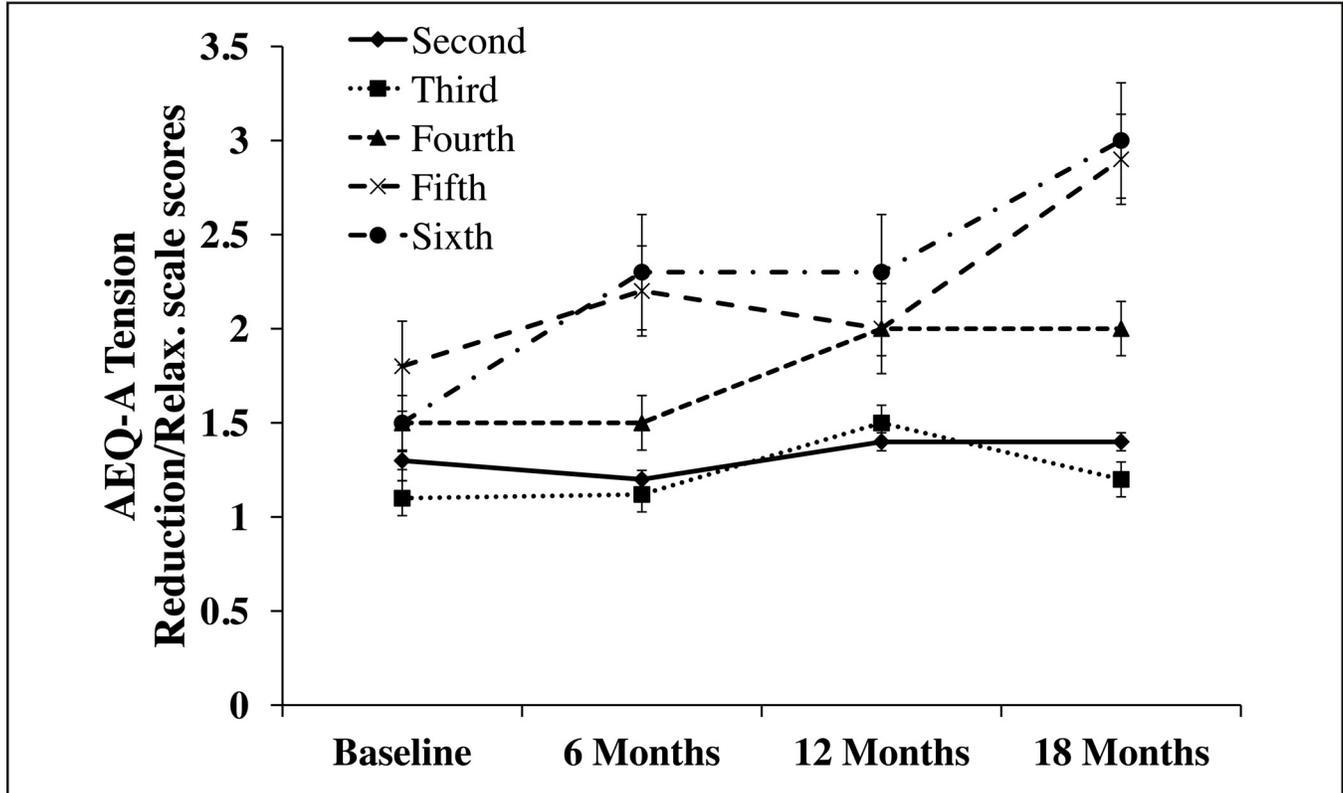


FIGURE 4. Alcohol Expectancy Questionnaire–Adolescent (AEQ-A) Tension Reduction/Relaxation Expectancies by grade and time; relax. = relaxation

Motor Abilities scales did not show this same pattern of development. In the case of the Alcohol Can Enhance or Impede Social Behavior scale, the content represents both positive and negative outcomes, which may preclude it being labeled a true “positive” outcome expectancy. The scale scores reported by the children imply that this may have been the case, as the overall developmental trend appears to be that these beliefs decrease versus increase. In the case of the Alcohol Improves Cognitive and Motor Abilities scale, change may not have been observed because of the restricted variability in responses and because so few expectancies were endorsed on this scale. This is consistent with the original AEQ-A adolescent sample (Christiansen et al., 1995).

The present findings support previous research that outcome expectancies for alcohol emerge before direct pharmacological experience with the substance and can be acquired indirectly via observational learning or other social cognitive mechanisms (e.g., reports of peer alcohol use), as all children in the study did not endorse experimentation with alcohol at the time of assessment. Positive alcohol expectancies as measured by the AEQ-A subscales with positive outcomes become increasingly stronger over time, wherein fourth, fifth, and sixth graders endorsed increasingly higher values than did the second and third graders. Other positive subscale (e.g., Global Positive Transformations) values became higher over time, but the crucial difference appeared between fourth and fifth grade. Whether these findings confirm the existence of what is operationalized as a critical period of alcohol-expectancy development (i.e., Miller et al., 1990), there was a consistent, significant age-related shift in children’s views of alcohol-related outcomes in the present study. These findings are consistent with the cross-sectional findings reported by Bekman et al. (2011) that positive expectancies increased across grades.

Limitations to the present study include the following: (a) the prevalence of children with direct alcohol/drinking experience was quite low, likely attributable to the sample being drawn from the Catholic school system. Involvement in family activity, cohesive family structure, and cultural norms of abstinence and religion (e.g., Foxcroft et al., 1995; Pritchard and Martin, 1996; Segal and Stewart, 1996) have been identified in the literature as protective variables for substance misuse among children and adolescents. The documented association between religiosity and alcohol use tends to be interpreted as religious coping (i.e., cognitive and behavioral techniques rooted in religion or spirituality such as prayer, for managing stressful events; Miller et al., 2000). (b) The external validity of the present findings is likely limited given the predominantly White sample. The findings therefore may not be generalizable to racially diverse populations. Also, given that the participants were attending private Catholic schools, they are not representative of children from socioeconomically disadvantaged populations. (c) Another important limitation is the small sample size in older grades,

particularly in later waves because of both dropout and alcohol use.

In suggesting that there is a critical developmental period for positive alcohol-outcome expectancies, several implicit assumptions follow. First, the duration of the period is finite. That is, there is a distinct onset and offset to the time in which positive expectancy growth is affected in this particular way. Second, the valence of the beliefs/expectancies is positive. That is, drinking alcohol is associated with positive outcomes through either positive or negative reinforcement. Last, the acquisition of negative alcohol-related outcome expectancies entails a different process. In Miller et al.’s (1990) discussion of a potential critical positive alcohol-expectancy developmental period, it is difficult to identify an explicit operational definition of the construct to test its existence more precisely than in the present study. Evidence from the present study supports the occurrence of a critical developmental period for positive alcohol expectancies, an illustration of the extent of growth that occurs, and the time at which the greatest growth is likely to occur. These findings are consistent with those of Settles et al. (2014), in which the transition from fifth to sixth grade was associated with increases in positive alcohol expectancies for social facilitation, which subsequently predicted drinking at the end of sixth grade. Given our knowledge of how positive alcohol expectancies are associated with increased use of alcohol, the next logical step is to conduct research to discover how, when, and under what conditions negative alcohol-outcome expectancies develop and how this knowledge can best be incorporated into programs for prevention of problem drinking and alcohol abuse/dependence.

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