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Trajectories of Positive Alcohol Expectancies and Drinking: An Examination of Young Adults in the US and Sweden

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Abstract

Positive alcohol expectancies and alcohol use tend to increase from adolescence to young adulthood, yet little is known about the associations between these constructs across cultures. The current study adds to the extant literature by examining the growth trajectories of positive alcohol expectancies and drinking behavior among United States (US) and Swedish participants during a critical period where significant change in these outcomes may be expected to occur. A total of 870 (US, $N = 362$; Sweden, $N = 508$) high school seniors completed baseline, 6-month, and 12-month assessments of alcohol expectancies and drinking (i.e., drinks per week). Changes in positive alcohol expectancies and drinking behavior were examined using a parallel process latent growth model. In both samples, higher baseline levels of positive alcohol expectancies were associated with a higher number of drinks consumed per week at baseline. In the US sample, lower baseline levels of positive alcohol expectancies were associated with a greater increase in positive alcohol expectancies at 12-month follow-up, and lower baseline levels of drinks per week were associated with a greater increase in drinks consumed per week at 12-month follow-up. In the Swedish sample, an increase in positive alcohol expectancies over time was associated with an increase in drinks consumed per week over the same period of time. Additional research is needed to examine when and for whom expectancy-based alcohol interventions are most efficacious.

Keywords

positive alcohol expectancies; alcohol consumption; early young adult drinking; cross-cultural comparisons; United States; Sweden

1. Introduction

The period of time immediately following high school has been identified as a critical period for alcohol use initiation and escalation (Bachman et al., 2014; Johnston, O'Malley, &

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Bachman, 1999; Maggs & Schulenberg, 2004). As such, the identification of predictors of alcohol use initiation and escalation among late adolescents and early young adults has been an area of intense research. One predictor, alcohol expectancies, has been found to be among the strongest predictors of drinking behavior after controlling for other predictors (Jester et al., 2015). Alcohol expectancies are defined as the perceived consequences (positive or negative) that are anticipated by an individual as a result of the consumption of alcohol (Chen et al., 2011). Studies conducted in the United States (US) and abroad have examined the relationship between expectancies and drinking behavior (Iwamoto, Corbin, Lejuez, & MacPherson, 2014; Patrick, Wray-Lake, Finlay, & Maggs, 2010; Shell, Newman, & Xiaoyi, 2010), yet few studies have examined the relationship between these constructs prospectively (Mitchell, Beals, & Kaufman, 2006; Patrick et al., 2010). The current study aims to fill these gaps in the literature.

1.1 Relationship Between Alcohol Expectancies and Drinking

Positive alcohol expectancies, by definition, are positive consequences that an individual anticipates will result from the consumption of alcohol, including feeling more sociable, courageous, and/or peaceful. Although negative alcohol expectancies have been reported to be associated with alcohol abstention, positive alcohol expectancies have been identified as a much stronger predictor of drinking among individuals under 35 years of age, particularly with respect to alcohol consumption and hazardous drinking (Bot, Engels, & Knibbe, 2005; Leigh & Stacy, 2004; Zamboanga, Horton, Leitkowski, & Wang, 2006). Research indicates that positive alcohol expectancies are a stronger predictor of drinking frequency and hazardous drinking (Bot et al., 2005; Leigh & Stacy, 2004; Zamboanga et al., 2006), account for unique variance in drinking behavior (Jester et al., 2015), and have served as the sole expectancy-based unit of analysis in other studies (Iwamoto et al., 2014). Thus, changes in positive alcohol expectancies during a critical juncture in the lives of young adults will likely be more strongly associated with changes in the trajectory of drinking than negative alcohol expectancies.

1.2 Trajectories of Positive Alcohol Expectancies and Drinking

Numerous studies have examined the developmental trajectory of positive alcohol expectancies in the US. It has been suggested that alcohol expectancies form around age 10 and are well formed by age 12 (Christiansen, Smith, Roehling, & Goldman, 1989; Thush & Wiers, 2007). During adolescence, a gradual shift occurs where individuals report more positive than negative alcohol expectancies (Chen et al., 2011; Miller, Smith, & Goldman, 1990), however this increase in positive alcohol expectancies has been found to level-off during the transition from adolescence to young adulthood. For example, Sher and colleagues (Sher, Wood, Wood, & Raskin, 1996) reported that positive alcohol expectancies plateau and stabilize during young adulthood. The extent to which the development and trajectories of positive alcohol expectancies in the US are similar to that of Sweden is unclear given the paucity and cross-sectional nature of previous studies (e.g., Andersson, Johnsson, Berglund, & Öjehagen, 2007; Ståhlbrandt et al., 2008). In terms of normative drinking trajectories in the US, individuals start drinking during adolescence, increase their drinking behavior throughout young adulthood, and tend to decrease their drinking behavior by their mid-twenties (Bachman et al., 2014; Johnston et al., 1999; Maggs & Schulenberg,

2004). In comparison to the US, similar normative drinking trajectories have been reported in Sweden (Wennberg & Andersson, 2013), although a recent decline in alcohol consumption among men, women, and those under 50 years of age has also been observed (Raninen, Leifman, & Ramstedt, 2013).

In a seminal study, Mitchell (2006) reported a significant relationship between the development of positive alcohol expectancies and drinking behavior, with greater increases in expectancies were associated with greater increases in drinking over time. Moreover, participants with higher baseline positive alcohol expectancies increased their drinking behavior less quickly over time compared to participants with lower baseline positive expectancies score. This study suggests that the growth trajectories of positive alcohol expectancies and drinking behavior “move” together across adolescence in the US, but it is unclear whether this relationship is observed in young adulthood given that the trajectory of positive alcohol expectancies reportedly levels-off while drinking behavior increases during this developmental period (Bachman et al., 2014; Johnston et al., 1999; Maggs & Schulenberg, 2004; Sher et al., 1996).

In a study conducted in a country more comparable to Swedish culture, Natvig Aas (1998) examined the longitudinal relationship between alcohol expectancies and drinking among seventh-grade students in Norway. Among all respondents, positive alcohol expectancies predicted drinking prospectively and, reciprocally, drinking predicted alcohol expectancies. Moreover, positive alcohol expectancies increased for most drinker groups from 7th to 9th grade suggesting that the trajectories of positive alcohol expectancies in Sweden may be similar to the trajectories reported in the US among adolescents, findings which may generalize to young adults in Sweden.

1.3 Current Study

It has been suggested that the relationship between positive alcohol expectancies and drinking behavior may vary as function of whether these constructs are examined in adolescence or young adulthood (Sher et al., 1996). Moreover, this relationship may vary as a function of whether participants reside in the US or Sweden (Shell et al., 2010). The current study was designed to examine the growth trajectories of positive alcohol expectancies and drinking behavior from students’ senior year in high school to after high school in the US and Sweden. Based on previous research, we hypothesized that positive alcohol expectancies will remain stable while the number of drinks participants consume per week will increase during the year following participants’ baseline assessment in both the US and Swedish samples (Bachman et al., 2014; Johnston et al., 1999; Maggs & Schulenberg, 2004; Sher et al., 1996). The current study is in response to calls for the examination of positive alcohol expectancies and drinking behavior prospectively (e.g, Baer, 2002), as well as the need to examine the extent to which trajectories of positive alcohol expectancies and drinking behavior vary between US and Swedish young adults.

2. Method

2.1 Participants

Participants in the current study were US and Swedish high school seniors who completed baseline, 6-month, and 12-month follow-up assessments as a part of a larger longitudinal study. The current study included only participants who were randomized to the assessment-only control group and who reported consuming alcohol during one of the three follow-up assessments. The US sample included 362 high school seniors (63% female) from 22 high schools across the state of Washington in the United States and 508 high school seniors (67% female) from 17 high schools in Sweden for a total sample of 870 participants.

2.2 Procedure

In the United States, research staff visited classrooms to recruit high school seniors. Students who were 17 or 18, had fluency in English, and were interested in participating were invited to complete a web-based baseline survey. In Sweden, students who were between the ages of 17 and 19 and had fluency in Swedish were recruited to complete a paper baseline survey. In both countries, all participants who completed baseline assessments were invited to complete subsequent follow-up assessments. Participants were paid \$20 in the United States for the completion of each survey and were also entered into a drawing to win a laptop and iPod. In Sweden, participants received one cinema ticket (valued at \$15 US dollars) and were entered into a drawing to win one of two smart phones/tablet computers or a weekend trip to New York after completing each survey. The procedures were approved either by an Institutional Review Board (U.S. sample) or Regional Ethics Committee (Swedish sample).

2.3 Measures

2.3.1. Demographics—General demographic information (e.g., age, gender, race, college attendance and ethnicity) and questions pertaining to the current study (e.g., alcohol expectancies and drinking behavior) were collected from participants.

2.3.2. Positive Alcohol Expectancies—The 15-item Brief Comprehensive Effects of Alcohol Questionnaire (B-CEOA; Ham, Stewart, Norton, & Hope, 2005) was administered to assess positive (8-items) and negative (7-items) expectancies associated with the effects of alcohol consumption. Responses to each item were summed to create a subscale score for positive and negative alcohol expectancies. The internal consistency reliability coefficient of the positive and negative expectancy B-CEOA subscales in the current sample were $\alpha = 0.81$ and $\alpha = 0.79$, respectively.

2.3.3. Drinks Per Week—The 7-item Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) was administered to assess participants' drinking behavior. Participants were asked to record the amount of alcohol they consumed on average each day of a typical week in the past three months. The amount consumed each day was summed across the seven days to create a composite for weekly alcohol consumption. The internal consistency reliability coefficient of the DDQ in the current sample was $\alpha = 0.64$.

2.4 Analysis Overview

Mplus Version 7.4 (Muthén & Muthén, 1998–2015) was used to analyze the data. Moreover, data were collected in the US and Sweden from different school sites. To account for the multilevel nature of the data, a sandwich estimator (i.e., variant of the Taylor linearization method) was used to adjust the model parameters for clustering within school (Asparouhov, 2004, 2006; Kovacevic, 2006).

A parallel process latent growth curve model (PPLGM) was used to model more than one growth trajectory simultaneously; thus allowing for the examination of interrelationships among latent constructs across time (Mitchell et al., 2006; Muthén, 2002; Schulenberg & Maggs, 2001). Age, negative alcohol expectancies, and college attendance at six months were controlled for in the conditional model (i.e., with covariates) because: (1) Swedish participants were statistically older than US participants, (2) suppressor effects have been reported with negative alcohol expectancies (Leigh & Stacy, 2004), and (3) differences exist between US and Swedish participants with respect to college attendance in the current study. Due to overdispersion, a non-count and count models were compared using the Akaike Information Criteria (AIC) and Bayes Information Criteria (BIC) where lower values of AIC and BIC would indicate a better fitting model.

3. Results

3.1. Descriptive Statistics and Preliminary Models

Bivariate correlations show that positive alcohol expectancies and drinks per week were positively correlated, both cross-sectionally and prospectively within the US and Swedish samples (see Table 1). Moreover, independent samples *t*-test examining mean differences in positive alcohol expectancies between the US and Swedish samples indicated that US participants held significantly greater positive alcohol expectancies than Swedish at baseline and at 12-month follow-up. In terms of drinks per week, the Swedish sample reported consuming significantly more drinks compared to the US sample at baseline and at 6-month follow-up, but not at 12-month follow-up. In terms of modeling the non-normally distributed drinks per week variable, non-count and count models were compared (Table 2). The negative binomial count model had lower AIC and BIC values than the non-count model indicating that the count model better fit the data. Thus, we modeled the drinks per week variable using a negative binomial count model.

3.2. Parallel Process Latent Growth Model

Initial testing indicated that the measurement model of alcohol expectancies was not measurement invariant across the US and Swedish samples, with the model fitting the data well in the US sample but not in the Swedish sample (see Table 2). As a result of the lack of measurement invariance, the parallel process growth models were estimated separately for each country.

The mean intercept and slope of positive alcohol expectancies and drinks per week by country in the unconditional (i.e., without covariates) and conditional (i.e., with covariates) PPLGM are provided in Table 3. The mean intercept parameters for positive alcohol

expectancies and drinks per week were significantly different from 0 in the US and Swedish samples and in the unconditional and conditional models. In terms of the examination of mean slope parameters, mean slopes associated with both linear and quadratic growth were examined. The linear component associated with the mean slope of positive alcohol expectancies was statistically significant and positive in the Swedish sample but not in the US sample in both the unconditional and conditional models. In terms of drinking, the linear and quadratic component associated with the mean slope of drinks per week was statistically significant in the US sample but not in the Swedish sample in the unconditional model.

The associations between the latent growth factors in the US and Swedish samples in the unconditional and conditional PPLGM are provided in Table 4. Due to substantive overlap between the unconditional and conditional models, interpretation of these results will focus on the associations between latent growth factors in only the conditional model. Statistically significant residual variances were also observed in the measurement of the mean intercepts and slopes in the conditional PPLGM (see Table 4). This indicates that there was significant individual heterogeneity in the intercepts and slopes in the US and Swedish samples.

The intercept for positive alcohol expectancies was significantly negatively correlated with the latent slope of positive alcohol expectancies in the US sample, but not in the Swedish sample. In terms of drinking, the latent intercept for drinks per week was negatively associated with the latent slope of drinks per week in the US sample, but not the Swedish sample.

In both samples, the intercepts of alcohol expectancies and drinks per week were statistically significant and positively correlated, suggesting a higher baseline score on the positive alcohol expectancies subscale was associated with a higher baseline number of drinks consumed per week in the US and Swedish samples. The slope of positive alcohol expectancies and slope of drinks per week were significantly positively correlated in only the Swedish sample.

4. Discussion

The current study examined the growth trajectories of positive alcohol expectancies and drinking behavior among US and Swedish participants during a period where significant change in alcohol-related expectancies and drinking behavior may occur. Importantly, the current study augments past prospective studies by extending the examination of positive expectancies and drinking trajectories from adolescents to early young adulthood.

Based on previous research (Sher et al., 1996), we hypothesized that positive alcohol expectancies would remain stable across time, a prediction which was supported in the US sample. However, the hypothesis was not supported in the Swedish sample where positive alcohol expectancies increased from baseline to one-year post baseline. This finding suggests that Swedish participants may still be in the process of developing expectations regarding the salutary effects of alcohol consumption or that these expectations have not stabilized.

In terms of drinking behavior, we hypothesized that the number of drinks US and Swedish participants would consume per week at baseline would increase one-year post baseline (Bachman et al., 2014; Johnston et al., 1999; Maggs & Schulenberg, 2004). Indeed, US participants reported consuming more drinks per week one-year post baseline, with a slight acceleration in weekly drinking at 6-month follow-up and with a much steeper acceleration in weekly drinking from 6-month follow-up to one-year post baseline (see Figures 2 & 3). The growth trajectory of the slope for weekly drinking in the Swedish sample was not statistically significant, suggesting little change in the amount of alcohol consumed during a typical week by Swedish participants at one-year post baseline which could be associated to the reported decline in alcohol consumption over the past decade in Sweden (Norström & Svensson, 2014; Raninen et al., 2013).

Consistent with Mitchell et al.'s (2006) results, the intercept-to-slope latent variable correlations within each construct revealed a negative correlation between the latent intercept and latent slope of positive alcohol expectancies in the US sample. This suggest that participants with higher baseline positive alcohol expectancies subscale scores reported anticipating fewer positive benefits associated with the consumption of alcohol one-year post baseline after controlling for age, negative alcohol expectancies, and college attendance. One explanation for this finding could be that if holding higher positive alcohol expectancies is associated with the consumption of more alcohol, then elevated levels of drinking behavior may increase the probability of experiencing negative alcohol-related consequences (White & Hingson, 2014). Thus, heavy drinking participants may view drinking less positively over time as a result of experiencing negative alcohol-related consequences. These results could also be explained by regression toward the mean, with those who drink at opposite ends of the spectrum likely to engage in more normative drinking behavior over time.

A negative correlation between the latent intercept and latent slope of weekly drinking was observed in the US sample suggesting that heavy drinking high school seniors decreased the amount of drinks they consumed weekly one-year post baseline. Conversely, light drinking high school seniors increased the amount of drinks they consumed per week after high school. This finding is consistent with past research which indicates that individuals transition from heavy drinking to more moderate forms of drinking over the course of young adulthood (Karlman et al., 2006; Windle, Mun, & Windle, 2005), as well as other research which suggests that non-drinkers and moderate drinkers increase their drinking behavior after high school (Windle et al., 2005).

A higher baseline positive alcohol expectancies subscale score was associated with US and Swedish participants reporting having consumed a higher number of drinks per week at baseline. This finding provides further support for both expectancy theory and social cognitive theory in that individuals are likely to engage in behaviors that they expect will lead to pleasant outcomes. In terms of the slope-to-slope latent variable correlations which represent the extent to which growth trajectories of positive alcohol expectancies and drinks consumed per week move together across time, the results suggest that the two constructs were significantly positively correlated in the Swedish sample but not in the US. That is, an increase in the trajectory of positive expectancies one-year post baseline was associated with

an increase in the trajectory of drinking among Swedish participants. This finding is consistent with Mitchell et al.'s (2006) study which examined the trajectories of expectancies and drinking among American Indian youth, where it was reported that the growth trajectories of positive alcohol expectancies and drinking behavior were correlated. The results from the current study extend the generalizability of Mitchell et al.'s findings to young adults after high school generally and to young adults who reside in Sweden specifically.

4.1 Implications

Given that the results indicated that positive alcohol expectancies and drinking behavior moved together prospectively in the Swedish sample during the assessment period, expectancy challenge interventions may be especially efficacious both during students' senior year in high school as well as after high school in Sweden. Expectancy challenge interventions modify participants' beliefs about the effects of drinking in order to influence future drinking behavior, attempting to either decrease the saliency of the positive effects of alcohol or increase the saliency of the negative effects of alcohol (Cruz & Dunn, 2003; Darkes & Goldman, 1993). Importantly, the efficacy of these interventions are heavily influenced by the degree to which the trajectories of alcohol expectancies and drinking behavior are correlated; thus identifying critical periods of time where alcohol expectancies and drinking are highly correlated in specific populations would likely augment the efficaciousness of expectancy challenge interventions. Based on the results from the current study, an expectancy challenge intervention (or any intervention that attempts to modify individuals' positive alcohol expectancies) may be efficacious when delivered during students' senior year in high school as well as directly after high school in Sweden.

4.2. Limitations

One explanation for the lack of association in the slopes of positive alcohol expectancies and drinking behavior in the US sample could be attributed to the measurement of positive alcohol expectancies. That is, a composite of positive alcohol expectancies was created from eight items of the B-CEOA for each participant. A more nuanced approach would be to examine if differences are observed across assessments within each item pertaining to the probability that a pleasurable outcome will result from the consumption of alcohol. Direct comparisons (i.e., examining country as a moderator of US and Swedish growth trajectories) between the US and Sweden in the current study should be cautioned against given that the positive alcohol expectancies measure was not invariant across the US and Swedish sample and differential rates of college matriculation in the US and Sweden. This suggests that the B-CEOA may measure different constructs in the US and Swedish samples; thus, comparisons between the US and Swedish samples may not reflect true differences in alcohol expectancies.

5. Conclusion

The current study examined the growth trajectories of positive alcohol expectancies and drinking during a critical transition in the lives of US and Swedish high school students. More research is needed to examine the interrelationships in the growth trajectories of

positive alcohol expectancies and drinking behavior, whether these interrelationships are influenced by specific critical events (e.g., 21st birthday), and if expectancy challenge interventions are more efficacious in Sweden than in the US if administered during students' senior year in high school or after high school attendance.

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Figure 1.

Parallel process latent growth model of positive alcohol expectancies (PAE) and drinks per week (DPW). Negative alcohol expectancies (NAE), age, and college attendance (6-months) served as covariates.

Figure 2.
Positive alcohol expectancies (PAE) growth trajectories of US and Sweden participants

Figure 3.
Drinks per week (DPW) growth trajectories of US and Sweden participants

Table 1

Correlations and means between positive alcohol expectancies and drinks per week

Variables	US						Sweden			p-value		
	1	2	3	4	5	6	M	SD	t(df)			
1. PAE - Baseline	-	.55***	.46***	.27***	.32***	.36***	21.05	4.92	19.34	4.89	5.04(860)	p < .001
2. PAE - 6-month	.48***	-	.52***	.17**	.31**	.26***	21.09	4.95	20.52	4.4	1.80(866)	p = .07
3. PAE - 12-month	.49***	.58***	-	.17**	.22***	.25***	21.08	5.05	19.87	4.79	3.59(866)	p < .001
4. DPW - Baseline	.26***	.22***	.18***	-	.62***	.37***	2.83	5.09	5.55	5.19	-7.63(851)	p < .001
5. DPW - 6-month	.24***	.29***	.28***	.57***	-	.44***	3.43	6.05	5.25	5.49	-4.60(862)	p < .001
6. DPW - 12-month	.22***	.23***	.29***	.46***	.62***	-	5.80	7.12	5.12	5.11	1.62(860)	p = .11

Note. PAE = Positive Alcohol Expectancies; DPW = Drinks Per Week. Correlations above the diagonal = US. Correlations below the diagonal = Sweden. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Table 2

Overall model fit of the conditional parallel process latent growth model

<i>Country</i>	DPW - Non-Count					DPW - Count		
	$\chi^2(df)$	CFI (TLI)	RMSEA	SRMR	AIC	BIC	AIC	BIC
US	23.77(10)**	.97(.91)	.06(.03 – .09)	0.03	12880.36	12993.14	10856.94	10981.39
Sweden	73.33(10)***	.90(.74)	.11(.09 – .14)	0.09	17032.70	17062.94	16154.51	16289.44

Note. DPW = Drinks Per Week. For the non-count and count models, a maximum likelihood estimator with robust standard errors was used. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Table 3

Mean intercepts and slopes of positive alcohol expectancies and drinks per week

Unconditional Model						
	Intercept		Linear component		Quadratic component	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
US sample						
Positive Alcohol Expectancies	21.05***	.31	.03	.14	-	-
Drinks Per Week	1.45***	.07	.00	.14	.16*	.07
Swedish sample						
Positive Alcohol Expectancies	19.76***	.18	.20**	.08	-	-
Drinks Per Week	1.70***	.04	-.01	.09	-.01	.05
Conditional Model						
	Intercept		Linear component		Quadratic component	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
US sample						
Positive Alcohol Expectancies	21.06***	.32	.02	.14	-	-
Drinks Per Week	1.30***	.06	.06	.16	.14	.08
Swedish sample						
Positive Alcohol Expectancies	19.62***	.18	.32***	.08	-	-
Drinks Per Week	1.71***	.16	-.06	.23	-.01	.06

Note. Unconditional = without covariates; Conditional = with covariates. Means are unstandardized and are estimated from the model. $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Table 4

Correlations of latent constructs in the parallel process latent growth model

Variables	Unconditional Model			
	1	2	3	4
1. PAE - Intercept	-	-.41	.39**	-.15
2. PAE - Slope	.36 ^a	-	-.12	.19
3. DPW - Intercept	.54***	-.16 ^a	-	-.90**
4. DPW - Slope	-.03	.51 ^a	-.22	-
Conditional Model				
1. PAE - Intercept	-	-.59**	.48**	-.54
2. PAE - Slope	.25	-	-.16	.76
3. DPW - Intercept	.57***	-.23	-	-.72***
4. DPW - Slope	.02	.46*	-.08	-
Residual Variance - US	18.55***	6.85	.64***	.07
Residual Variance - Sweden	6.35***	.83	1.08***	.49

Notes. Correlations above the diagonal = US. Correlations below the diagonal = Sweden. Standardized parameter estimates are reported, with statistical significance associated with unstandardized estimates. Unconditional = without covariates; Conditional = with covariates.

^aStatistical significance could not be assessed due to a negative variance in the positive alcohol expectancies slope. Correlations are estimated based on the model.

$p < .05^*$, $p < .01^{**}$, $p < .001^{***}$