Abstract

Possible selves, cognitions about the self that reflect hopes, fears, and expectations for the future, are reliable predictors of health risk behaviors. However, they remain underexplored in terms of adolescent alcohol use. In a secondary analysis of data from 137 adolescents, we examined the influence of possible selves assessed in 8th grade on alcohol consumption (yes/no and level of use) in 9th grade. Results showed that having a most important feared possible self related to academics in 8th grade predicted alcohol abstention in 9th grade. Among those who reported alcohol use, having many hoped-for possible selves and a most important hoped-for possible self related to academics in 8th grade predicted lower level of alcohol consumption in 9th grade. Interventions that foster the personal relevance and importance of academics and lead to the development of hoped-for possible selves may reduce adolescent alcohol consumption.

Keywords: Alcohol use, identity development, self-concept, social determinants, cognition

Prospective Effects of Possible Selves on Alcohol Consumption in Adolescents

The transition from middle to high school is a critical period of escalating alcohol consumption. Adolescents who drink experience more behavioral problems and are more likely to have substance abuse/dependence disorders during later adolescence and young adulthood than adolescents who do not drink (Bonomo, Bowes, Coffey, Carlin, & Patton, 2004; Ellickson, Tucker, & Klein, 2003; Hingson, Heeren, & Winter, 2006). Moreover, adolescent drinkers with high levels of consumption are the most vulnerable, with the greatest risk of internalizing symptoms and alcohol abuse/dependence disorders in young adulthood (Ellickson et al., 2003; Huurre et al., 2010; Mayhew, Flay, & Mott, 2000; Trim, Meehan, King, & Chassin, 2007). Despite a broad collection of evidence-based interventions currently available (see Substance Abuse and Mental Health Services Administration [SAMHSA] National Registry for Evidence-based Programs and Practices, 2014), national lifetime alcohol use prevalence estimates remain unacceptably high–33% for 8th graders and 62% for 9th graders (Centers for Disease Control and Prevention, 2012; Johnston, O'Malley, Bachman, & Schulenberg, 2012).

It is widely accepted that adolescent alcohol use is multidetermined. Many investigators have focused on contextual determinants (e.g., parent and peer influences), but these factors are not easily amenable to change (Smit, Verdurmen, Monshouwer, & Smit, 2008). Other investigators have focused on intra-individual determinants (e.g., cognitions, personality traits). One intra-individual factor that is an integral component in several interventions is the development of personal goals (for examples see Across Ages, SPORT Prevention Plus Wellness, and Active Parenting of Teens: Families in Action in SAMHSA's National Registry of Evidence-based Programs and Practices). Yet few studies have focused on the role of personal goals as determinants of alcohol use in adolescents, and consequently, little is known about their

role in protecting against (or motivating) alcohol use in early adolescents. In this study, we use Markus' model of possible selves as goal structures (Markus & Nurius, 1986) to explore properties of possible selves that predict patterns of alcohol use across this critical developmental transition.

Determinants of Adolescent Alcohol Use

The major contextual determinants of adolescent drinking behaviors include parent and family characteristics (Abar, Abar, & Turrisi, 2009; Barrett & Turner, 2006; Habib et al., 2010; Marsiglia, Kulis, Parsai, Villar, & Garcia, 2009; Trim et al., 2007) and peer/friend influences (Donovan, 2004; Nash, McQueen, & Bray, 2005; Scheier & Botvin, 1997). These factors are difficult to change. For example, family structure and parental alcohol problems require family/parental engagement for an effective intervention. Because adolescents choose friends with similar experiences (Linden-Andersen, Markiewicz, & Doyle, 2009), positive peer attitudes toward alcohol and peer alcohol consumption likely reflect an already heightened vulnerability to problematic alcohol use. Therefore, the utility of focusing on contextual factors to improve approaches to intervention and prevention is challenging.

Intra-individual determinants include personality traits (Krank et al., 2011; Malmberg et al., 2013), and alcohol-related cognitions (expectancies, prototypes, and intentions) (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Gerrard et al., 2002; Simons-Morton, 2004; Zamboanga, Schwartz, Ham, Hernandez Jarvis, & Olthuis, 2009). Given that personality traits are largely genetically determined and enduring (Hampson & Goldberg, 2006; Hopwood et al., 2009), they also are also difficult to mitigate. Alcohol-related cognitions have been conceptualized as proximal factors that can mediate both contextual and individual determinants of drinking behaviors (Scheier & Botvin, 1997; Sieving, Maruyama, Williams, & Perry, 2000).

Yet to date study of these cognitions has focused on beliefs about the effects of alcohol on *people in general* (Simons-Morton, 2004; Zamboanga et al., 2009) or the perceived attributes of the "*type of adolescent*" who drinks (Gerrard et al., 2008; Gerrard et al., 2002). These cognitions may not have the motivational influence of more individualized *cognitions about the self.* For example, another type of cognition–intentions–have been shown to influence behavior, but only for persons who also have an elaborated self-cognition in the domain (Kendzierski & Whitaker, 1997; Sheeran & Orbell, 2000).

Possible Selves

Possible selves reflect one's hopes ("hoped-for" possible selves), fears ("feared" possible selves), and expectations ("expected" possible selves) for the future (Markus & Nurius, 1986). They are considered a type of goal structure, but are distinguished in that they are highly personalized and specific. Possible selves are cognitive structures that include vivid images of the self in the future state as well as procedural knowledge in the form of strategies for either achieving or avoiding possible selves (Cross & Markus, 1991; Markus & Nurius, 1986). As such, they have been shown to be powerful preditors of adolescent behavior (Aloise-Young, Hennigan, & Leong, 2001; Newberry & Duncan, 2001; Oyserman, Bybee, & Terry, 2006; Oyserman & Markus, 1990a, 1990b), yet have been underexplored in relation to adolescent drinking behavior. Possible selves are modifiable memory structures, and thus, they may be a promising intervention target, particularly in the formative stages of identity development (Oyserman, Terry, & Bybee, 2002).

Owing to different personal experiences, values, and goals, each individual has a unique collection of possible selves. Some investigators have focused on *properties of the total collection* of possible selves, e.g., the number of hoped-for (Black, Stein, & Loveland-Cherry,

2001), number of feared (Oyserman & Markus, 1990a), number of expected (Aloise-Young et al., 2001), number of balanced pairs (a hoped-for and feared possible self in the same domain, e.g., a hoped-for possible self to graduate from high school *and* a feared possible self of not graduating high school) (Aloise-Young et al., 2001; Oyserman & Markus, 1990a, 1990b). Other investigators have focused on a *single possible self*, e.g. presence or absence of a possible self in a specific content domain including alcohol use [e.g., "problem drinker" (Corte & Szalacha, 2010; Lee et al., in press), binge drinker (Quinlan, Jaccard, & Blanton, 2006)], or the content domain of the most important possible self (Hooker & Kaus, 1992).

Previous research has tended to focus either on properties of the total array of possible selves or on properties of a single domain-specific possible self making results difficult to synthesize as a foundation for practice. In the present study, we will examine all possible self properties of 8th graders simultaneously to determine their influence on alcohol-use behaviors in 9th grade, controlling for gender, other known social determinants, and 8th grade alcohol consumption.

Method

Study Design and Setting

We conducted a secondary analysis of longitudinal data from a study of self-cognitions and risk behaviors in adolescents across the transition from 8th to 9th grade (Stein, Roeser, & Markus, 1998). In the original study, data were collected at a public junior high school in a working-class, suburban community during the 8th and 9th grades (1992 and 1993). In both 8th and 9th grades, possible selves and perceived influence of friends were measured individually; family-related variables and alcohol use were measured using classroom administered questionnaires.

Although the original data was collected in 1990s, the key domains of self-definition in adolescents have remained stable over time. For example, among adolescents, a study by Oyserman and Markus (1990a) showed that the most common possible self domains were friendships, academics, occupation, and being happy. Similarly, findings in the 2000s showed academics, occupation, relationship/interpersonal, and friendships to be the most frequent possible selves or important life goals (Knox, Funk, Elliott, & Bush, 2000; Shapka & Keating, 2005). In a more recent study, most high school students generated their possible selves related to occupation, academics, relationship, sport, and risk behaviors (Mainwaring & Hallam, 2010).

To our knowledge, this is a unique dataset–the only dataset that contains the idiographic and longitudinal data on the content and organization of the entire set of possible selves and alcohol use in adolescents during the transition to high school. Given that the domain of adolescent's self-definition has remained stable over the last several decades, this dataset provides a relevant and unique opportunity to explore the role of different possible self properties in alcohol use behaviors during this transition period.

Participants

Of the 160 adolescents in the original study, 137 who completed measures in both 8th and 9th grades were included in this analysis. Mean age in the 8th grade was 13.5 ($SD = 0.6$) years, and 50% were female. Most adolescents were Caucasian (84%), followed by African Americans (13%), and others (3%).

Measures

Alcohol Consumption. Six questions addressed frequency and quantity of use in the previous 12 months for beer, wine, and hard liquor separately (Shope, Copeland, & Dielman, 1994). Responses to frequency questions (e.g., *How often did you drink beer (wine, hard liquor)*

in the past 12 months?") ranged from 0 (haven't had a drink in the past 12 months) to 5 (drink every day). Responses to quantity questions (e.g., "*When you drank beer (wine, hard liquor) during the past 12 months, how many cans or bottles (glasses or shots) did you usually have at one time?*") ranged from 0 (haven't had a drink in the past 12 months) to 6 (seven or more drinks). Quantity and weekly frequency were multiplied to reflect the average number of drinks per week in the previous 12 months for beer, wine, and hard liquor. Then, the number of drinks per week for each beverage type was summed to reflect the level of total alcohol consumption per week in the previous 12 months. The validity of this measure has been supported by using a bogus pipeline procedure that revealed non-significant effects on alcohol use reports (Campanelli, Dielman, & Shope, 1987). Test-retest reliability of self-reported alcohol use in adolescents both on a population and on an individual level has also been shown (Levy et al., 2004; Lintonen, Ahlström, & Metso, 2004).

Possible selves. Hoped-for, feared, and expected possible selves in 8th grade were measured with an open-ended possible-selves questionnaire (Markus & Nurius, 1986). Participants listed as many hoped-for possible selves as they could (at least 3) in response to "*What do you hope you will be like next year?*" They similarly listed feared possible selves in response to "*What do you want to avoid being or are afraid you might be next year?*" and expected possible selves in response to "*What do you expect you might be like next year?*" The hoped-for, feared, and expected possible self-descriptors were content coded in the parent study using a coding scheme developed by Herzog and colleagues (Herzog, Franks, Markus, & Holmberg, 1998; Herzog & Markus, 1999). Inter-rater reliability for the most specific content code categories was 83% in 8th grade and 89% in 9th grade. In the current study, we used higher level codes (e.g., relationships with parents, friendships, occupation, academics, sports/exercise

activities, health behaviors, risky behaviors, and physical appearance) to define the content domains of possible selves and recoded a random sample of 10% of participants' possible selves to confirm accuracy of the original coding.

Properties of the total array of possible selves. *Numbers of hoped-for, feared, and expected possible selves* were derived from each participant's self-generated list. *Number of balanced pairs* of possible selves was the total of matched hoped-for (e.g., hope I will get along in school) and feared possible selves (e.g., fear I will not get along in school) pairs in the same content domain (Oyserman & Markus, 1990b). Each possible self was counted in only one balanced pair.

Properties related to a specific content domain. *Possible self related to alcohol* was determined by reviewing all possible self descriptions and coding them for presence/absence of alcohol-related content. Given that basic memory literature shows that the order of spontaneously generated items (e.g., self-descriptors) reflects accessibility in memory and thus, relative importance (Krosnick, 1989; Towse, Cowan, Hitch, & Horton, 2008), the first-listed hoped-for, feared, and expected possible selves were considered *the most important possible selves* and content coded using the higher level content codes.

Social determinants of alcohol consumption. *Family structure* was measured by using multiple-choice questions to ask participants, "Who do you live with?" with response options of mother, father, stepparent, grandparent, other adult, and someone else. Family structure was dichotomized into "single-parent family" and "two-parent family." *Family cohesion* was measured by the 16-item family cohesion subscale from Family Adaptability and Cohesion Scales (Olson, 1982). A 5-point response for each statement ranges from "almost never" to "almost always." Adequate reliability and validity was demonstrated with a national survey of

couples and families (Olson, 1982). Cronbach's alpha for this scale was 0.86 in the present study. Because family cohesion has a curvilinear relationship with family functioning (Green, Harris, Forte, & Robinson, 1991; Olson, 1991), we dichotomized family cohesion into "effective cohesion" (i.e., midrange levels of cohesion) to reflect optimal family functioning and "ineffective cohesion" (i.e., high or low cohesion) to reflect poor family functioning (Green et al., 1991; Olson, 1982).

Parental alcohol problems were measured with the short form of the Children of Alcoholics Screening Test (CAST) (Hodgins, Maticka-Tyndale, El-Guebaly, & West, 1993). The CAST has high agreement with close family member reports regarding parental alcohol problems (Staley & El-Guebaly, 1991). Five items in a yes/no format address responses to parental alcohol problems, e.g., "Did you ever wish that a parent would stop drinking?" "Yes" answers were summed to obtain a total score for each adolescent (range 0–5). In the current study, the Cronbach's alpha coefficient was 0.77.

Perceived influence of friends was measured by a question: "*How important do you think your friends were in making you the way you are now?*" (Oyserman, 1993). Responses are scored on a 5-point scale (1 = "not at all" to 5 = "very"). Higher scores indicate higher perceived influence of friends.

Statistical Analysis

Zero-inflated gamma regression models (Blough & Ramsey, 2000; Lachenbruch, 2002) were estimated with the SAS PROC NLMIXED (McLerran, 2008) to determine the effects of eight possible self properties on alcohol consumption, controlling for family structure, family cohesion, parental alcohol problems, friends influence, gender, and 8th grade alcohol consumption. Zero-inflated gamma regression modeling was used because the dependent

variable, level of alcohol consumption, is an interval scale (scores with decimals) rather than events/count data and includes high zeroes. Using this approach, the *likelihood* of 9th grade alcohol consumption was estimated simultaneously with the *level* of alcohol consumption for those participants who had used alcohol in the last 12 months. The 9th grade alcohol consumption was estimated using logistic regression (zero alcohol consumption versus non-zero values). For all non-zero values, level of 9th grade alcohol consumption was estimated using gamma regression because of the highly skewed distribution. Relationships between predictors and 9th grade alcohol consumption were expressed as adjusted odds ratios (*ORs*) in the first step and as risk ratios of the mean level of alcohol consumption in the second step (Blough & Ramsey, 2000). Therefore, in gamma regression, for a predictor that is a continuous variable, a one unit increase in the predictor variable results in an increase of the mean outcome value multiplied by *Exp(B)*. For a dichotomous predictor, the mean outcome value of the corresponding group is *Exp(B)* times higher than the reference group.

The model building process included four steps. Model 1 included the control variables (gender and 8th grade alcohol consumption in the last 12 months). In Model 2, social determinants (family structure, family cohesion, parental alcohol problems, and perceived friends' influence) were added. In Model 3, properties of the total array of possible selves were added. In Model 4, properties related to a specific content domain of possible selves were added. Model fit was assessed by likelihood ratio (*LR*) tests.

Results

Alcohol Consumption

Fifty-seven percent (*n* = 78) of the adolescents reported alcohol consumption in 8th grade and 68% (*n* = 91) in 9th grade. Among those adolescents who reported drinking, the majority

(85% in 8th grade and 63% in 9th grade) reported less than one drink/week. Mean alcohol consumption levels for both grades are shown in Table 1. One boy reported very high alcohol consumption (80.6 drinks/week) in 9th grade. We ran further analyses with and without this participant; the findings were unchanged so we kept this participant's data in the analyses.

Properties of Possible Selves

Descriptive statistics for all possible self properties are shown in Table 1. For the *properties related to a specific content domain*, few adolescents spontaneously generated a possible self related to alcohol. In these cases, these possible selves were feared possible selves related to alcohol, i.e., *feared drinker* possible selves (e.g., "I won't drink like my sister," "I don't want to turn into someone who drinks," and "I am afraid of getting back into drinking.") Academics was most frequently listed as the first (therefore, considered most important) content domain for hoped-for, feared, and expected possible selves. Table 2 shows modest bivariate correlations among the possible self properties.

Social Determinants

Over one third of the sample (36.5%) reported living in a single-parent family. Approximately half reported ineffective family cohesion. Among these, 93% ($n = 64$) reported very low levels of cohesion (disengaged) and 7% ($n = 5$) reported very high levels of cohesion (enmeshed). The mean CAST score reflecting parental alcohol problem was low (*Mean* = 0.86, *SD* = 1.3), and perceived influence of friends was moderately high (*Mean* = 3.6, *SD* = 1.2).

Predicting Alcohol Consumption

Overall, the model fit improved from Model 1 (with just the control variables) to Model 4 (with control variables, social determinants, and all properties of possible selves). The *LR* test between Model 1 and Model 4 was significant ($\chi^2(24) = 69.8$, $p < .05$).

Because Model 4 (the complete model that included all predictors) was the best fitting model, we describe the findings in detail for this model (Table 3). For estimating *no alcohol consumption* versus any alcohol consumption in the last 12 months, none of the properties of the total array of possible selves were significant predictors. Having a most important feared possible self related to academics in 8th grade, 8th grade alcohol consumption, and parental alcohol problems were significant predictors of abstaining from alcohol over the last 12 months in 9th grade, after controlling for all other predictors. Adolescents who had a most important feared possible self related to academics were over 3 times more likely to abstain from alcohol in 9th grade, compared to those who did not have a most important feared possible self related to academics. Adolescents who drank alcohol in 8th grade and those who had higher parental alcohol problems were less likely to abstain from alcohol in 9th grade.

For estimating *level of consumption* for all non-zero values of 9th grade alcohol consumption, having many hoped-for possible selves and having a most important possible self related to academics predicted lower level of alcohol consumption in 9th grade after controlling for other predictors. On average, for each hoped-for possible self in the 8th grade, the expected 9th grade mean alcohol consumption level was reduced by 39%. Adolescents whose most important hoped-for possible self in the 8th grade was related to academics had expected 9th grade mean levels of alcohol consumption that were 82% lower than those who did not have a most important hoped-for possible self related to academics in 8th grade. The known determinants, female gender, higher 8th grade alcohol consumption levels, and single-parent family structure also significantly predicted 9th grade levels of alcohol consumption.

To clarify whether the influence of possible selves related to academics on alcohol consumption was related to being the most important possible selves, we also examined whether

having hoped-for, expected, or feared possible selves related to academics anywhere in the

possible self repertoires predicted alcohol consumption. The results showed that just having a

hoped-for, expected, or feared possible self related to academics included in the possible self

repertoire did not predict 9th grade non-use/use of alcohol or level of alcohol consumption.

Discussion

We demonstrated that specific properties of possible selves are differentially protective

against two alcohol-related outcomes (any alcohol use and level of use) in adolescents during the

transition from middle to high school. Properties of a single content domain (academics) and

properties of the total array of possible selves (number of hoped-for possible selves) significantly

predicted alcohol use and level of alcohol consumption one year later. Specifically, having a

most important feared possible self related to academics in 8th grade predicted abstention from

alcohol in 9th grade. Among adolescents who drank in 9th grade, having many hoped-for possible

selves and having a most important hoped-for possible self related to academics in 8th grade

predicted lower levels of consumption in 9th grade. These findings contribute new knowledge

about alcohol consumption in adolescents during this important developmental period and hold

potential for shaping approaches to intervention in the future.

Different possible self properties predicted whether or not and how much an adolescent

drinks during the transition from middle to high school. Abstention from alcohol in 9th grade was

driven by having a most important feared conception of the self in the future related to

academics. In contrast, for those adolescents who used alcohol, the level of alcohol consumption

was reduced both by having a most important "hoped-for" related to academics and having a rich

constellation of hopes as goals. These findings suggest that feared (negative) and hoped-for

(positive) possible selves may play different roles in adolescent drinking behaviors, with fears

inhibiting involvement in alcohol use, and hopes restraining the level of drinking once an adolescent is using alcohol. Researchers have suggested that positive possible selves function as resources to enable individuals to construct different strategies in response to challenges, whereas negative selves are developed to modify behaviors when one wants to change or become different (Markus, Cross, & Wurf, 1990; Markus & Wurf, 1987). Thus, positive possible selves may be more effective for regulating behaviors than negative possible selves (Markus et al., 1990). This may possibly explain our finding that fears are more likely to be associated with whether adolescents report using alcohol but hopes are more likely to be associated with their level of alcohol consumption.

Academics was the most salient possible selves domain and the domain that most powerfully influenced drinking behaviors. We found that academics was most frequently listed first (thus considered the most important content domain) on adolescents' self-generated lists of hoped-for, feared, and expected possible selves. Other investigators have similarly shown that the majority of possible selves in high school adolescents fall in the domain of academics (Knox et al., 2000; Oyserman & Markus, 1990a). But just having an academic possible self anywhere in the possible self repertoire was not a significant predictor of alcohol consumption. Our results suggest that to be protective against alcohol-use and high levels of alcohol consumption in adolescents, academics must be the most important content domain. Our findings are consistent with those of a recent longitudinal study that showed that adolescents with high levels of academic investment (e.g., participation in academic activities, academic plans, perceived importance of school, grades, and how much they liked school) in 10th to 12th grades had less substance use (getting drunk, cigarette use, and marijuana) 7 years later compared to those who had relatively low levels of academic investment (Carlo, Crockett, Wilkinson, & Beal, 2011). In

contrast to other studies of cognitions focused only on a single domain of alcohol (e.g., alcohol expectancies, drinker prototype, and intention to drink), we found that self-cognitions in other domains, particular in academics, are protective against alcohol consumption in adolescents. We speculate that among adolescents whose most important possible selves are related to academics, time and energy invested in academic performance and related goals (Cross & Markus, 1994; Markus et al., 1990) may limit their involvement with alcohol.

Having many hopes for the self in the future was protective against alcohol use. Adolescents who had many hoped-for possible selves in 8th grade had lower levels of alcohol consumption in 9th grade. This finding is similar to those of previous studies showing that positive possible selves may be protective against risk behaviors. For example, Aloise-Young et al. (2001) found that the number of positive expected possible selves predicted lower levels of alcohol and tobacco use in 6th to 9th graders. Newberry and Duncan (2001) found that high school adolescents with lower levels of delinquent behaviors had more positive possible selves.

To our surprise, having a feared drinker possible self did not predict involvement in drinking or level of consumption. Only a few adolescents spontaneously addressed drinking in their possible self statements, and among those who did, all of them expressed fears. This could mean that adolescents were more comfortable acknowledging fears than hopes or expectations related to alcohol, or that feared drinker possible selves are more salient (and thus accessible in memory) than hoped-for or expected drinker possible selves. Also, fears related to alcohol in this age group may not be strong enough to influence alcohol-use behaviors. However, investigators to date who have focused on an expected drinker possible self (Corte & Szalacha, 2010; Quinlan et al., 2006), not a feared drinker possible self, have demonstrated associations with drinking behavior. Moreover, the content of these feared drinker possible selves shows that at least some

of the eight adolescents who spontaneously generated a feared drinker possible self had already been in trouble due to drinking or had a family member or friends who had trouble related to alcohol. This finding suggests that a feared drinker possible self may form as a result of negative personal or familial experiences with alcohol but does not necessarily limit alcohol-use behaviors in adolescents.

Taken together, our results support the view that adolescents who do not have sufficient opportunities to pursue academic goals or a variety of other positive interests may be more vulnerable to engaging in alcohol-use behaviors (Barber, Eccles, & Stone, 2001; Massey, Gebhardt, & Garnefski, 2008). Because possible selves are modifiable, interventions that reinforce the importance and personal relevance of academics and support opportunities for exploration and involvement in new activities may mitigate adolescent alcohol consumption.

Many empirically supported adolescent alcohol prevention programs focus, at least in part, on intra-individual factors and include interventions to promote goal development (see Across Ages, SPORT Prevention Plus Wellness, and Active Parenting of Teens: Families in Action in SAMHSA's National Registry of Evidence-based Programs and Practices for examples). Results of this study may be used to inform and strengthen those interventions in several ways. First, possible selves are highly detailed, specific images of the self in the future that include behavioral routines and strategies. Interventions to foster goal development should include activities that promote detailed imaging of the self one "hopes-to-be in the future." Examples of such interventions may include individual activities such as scrapbook development that encourages adolescents to gather and create images of the self they want to become in a specific behavioral domain (e.g., related to school, work or hobbies) and group activities in which adolescents describe aloud the kind of work they hope to be doing as an adult (see

Oyserman et al., 2002 for related examples). In addition, opportunities for building skills needed to achieve possible selves should be included. Second, goal building for middle adolescents should focus on the creation of academic hoped-for and feared possible selves and address the barriers that prevent the adolescents from believing that the goals are realistic and achievable (see Oyserman et al., 2006). Finally, our results showed that adolescents with more hoped-for possible selves engaged in lower levels of alcohol use suggesting that involvements in extracurricular activities may be central to building a diverse array of hoped-for selves. Activities that include graduated stepping stones and self-competition (e.g., progression from junior varsity to varsity level teams, advancement from white belt to black belt in karate) may encourage development of highly personalized and achievable hoped-for possible selves.

The findings of this study should be considered in light of a few limitations. The original data were collected in the 1990s. Given that the key domains of self-definition have remained stable over time, it is likely that the possible self domains identified in our study that function to protect against alcohol use are also stable over time. Gender was a significant covariate in regression models for the levels of alcohol consumption; girls were more likely to engage in higher levels of alcohol consumption. However, our sample was not large enough to run separate models by gender to determine whether possible self properties influenced alcohol use differently for boys and girls. The sample size may also have limited the confidence of our estimates in the complete model that included all predictors. Future studies with larger samples are needed to examine gender-specific models and to increase the precision of estimation. The majority of adolescents were Caucasian and from a working-class suburban community; thus the findings may not be generalizable to more racially and economically diverse adolescents. Despite these limitations, our findings add important new knowledge about mechanisms

contributing to adolescent alcohol consumption, and in doing so, open up new avenues to intervention.

Conclusion

This is, to our knowledge, the first study to determine the prospective effects of multiple properties of possible selves on adolescent alcohol consumption patterns. Our findings add to the literature by showing that it is not just cognitions related to alcohol use behaviors that contribute to alcohol use patterns in adolescents. Rather, personalized future-oriented cognitions related to key domains (e.g., academics) play an important role in alcohol use patterns in this population. The findings suggest that to improve effectiveness, interventions that focus on the intra-individual factor of goal development must take into account adolescents' recent alcohol-use patterns. For adolescents who do not drink, reinforcing highly-personalized fears related to academic performance may prevent the transition into alcohol use. For those adolescents who have a recent history of drinking, interventions to enhance the importance of academics and develop hoped-for possible selves in domains of interest and skill may reduce adolescent alcohol consumption levels.

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Table 1. Alcohol Consumption and Possible Self Properties ($N = 137$)

Variables	Total	
	Mean (*SD*)	*Min-Max*
Level of alcohol consumption		
8th grade level of alcohol consumption (drinks/week)[a]	1.31 (4.1)	0.03–25.56
9th grade level of alcohol consumption (drinks/week)[a]	3.78 (10.0)	0.03–80.63
Properties of total array of possible self		
Number of hoped-for possible selves	3.32 (0.9)	1–7
Number of feared possible selves	3.36 (1.0)	0–7
Number of expected possible selves	3.47 (1.1)	0–10
Number of balanced pairs of possible selves	1.01 (0.8)	0–3
	N	%
Properties related to a specific content domain		
Feared drinker possible self	8	5.8
Most important hoped-for possible self related to academics	44	32.1
Most important feared possible self related to academics	35	25.5
Most important expected possible self related to academics	60	44.1

[a] Only for those adolescents who reported drinking ($n = 78$ in 8th grade and $n = 91$ in 9th grade).

Table 2. Correlations among Possible Self Properties in 8th Grade

Variables	1.	2.	3.	4.	5.	6.
1. Number of hoped-for possible selves	1.00					
2. Number of feared possible selves	.31**	1.00				
3. Number of expected possible selves	.26**	.37**	1.00			
4. Number of balanced possible selves pairs	.26**	.26**	.03	1.00		
5. Feared drinker possible self[a]	.15	.47**	.15	.07	1.00	
6. Most important hoped-for self related to academics[a]	-.02	.00	-.11	.25**	.03	1.00
7. Most important feared self related to academics[a]	-.19*	-.09	-.10	.11	-.08	.10
8. Most important expected self related to academics[a]	.01	.11	.02	.02	.09	.18*

Note. Spearman's Rho coefficient was used for two ordinal variables, phi coefficient was used for two dichotomous variables, and point-biserial coefficient was used for one dichotomous variable with one continuous variable.

[a]1=Yes, 0=No

*$p < .05$; **$p < .01$

Table 3. Zero-Inflated Gamma Regression Model on Predicting 9th Grade Alcohol Consumption in the Last 12 Months

Predictors	Model 4	
	Exp(B)	95% *CI*
Regression of having zero values of 9th grade alcohol consumption in the last 12 months versus non-zero values (reference category) on predictor variables		
Gender (1=Boy, 0=Girl)	1.92	0.68–5.37
8th grade alcohol consumption (1=Ever used, 0=Never used)	0.11**	0.04–0.32
Number of hoped-for possible selves	1.97	0.97–4.03
Number of feared possible selves	1.04	0.58–1.87
Number of expected possible selves	0.83	0.51–1.32
Number of balanced pairs possible selves	0.83	0.40–1.71
Feared drinker possible self (1=Yes, 0=No)	1.09	0.11–10.85
Most Important hoped-for possible self related to academics (1=Yes, 0=No)	2.41	0.85–6.91
Most Important feared possible self related to academics (1=Yes, 0=No)	3.35*	1.01–11.18
Most Important expected possible self related to academics (1=Yes, 0=No)	1.13	0.41–3.10
Family structure (1=Two-parent, 0=Single-parent)	1.45	0.52–4.10
Family cohesion (1=Effective, 0=Ineffective)	0.77	0.28–2.18
Parental alcohol problems	0.42**	0.22–0.80
Perceived influence of friends	1.13	0.70–1.82
Regression of level of 9th grade alcohol consumption in the last 12 months (positive values) on predictor variables		
Gender (1=Boy, 0=Girl)	0.21**	0.10–0.45
8th grade alcohol consumption	1.15**	1.04–1.27
Number of hope-for possible selves	0.61*	0.39–0.97
Number of fear possible selves	1.23	0.78–1.93
Number of expected possible selves	1.17	0.79–1.76
Number of balanced pairs possible selves	1.27	0.75–2.13
Feared drinker possible self (1=Yes, 0=No)	0.25	0.06–1.09
Most Important hope-for possible self related to academics (1=Yes, 0=No)	0.18**	0.08–0.45
Most Important feared possible self related to academics (1=Yes, 0=No)	1.43	0.51–4.04
Most Important expected possible self related to academics (1=Yes, 0=No)	0.75	0.31–1.82
Family structure (1=Two-parent, 0=Single-parent)	0.20**	0.10–0.43
Family cohesion (1=Effective, 0=Ineffective)	0.51	0.23–1.10
Parental alcohol problems	0.92	0.71–1.21
Perceived influence of friends	0.99	0.71–1.39

Note. *$p < .05$; **$p < .01$