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The relationship between motivational structure, sense of control, intrinsic motivation and university students' alcohol consumption

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ABSTRACT

The aim of this study was to determine how sense of control and intrinsic motivation are related to university students' motivational structure and alcohol consumption. Participants were 94 university students who completed the Personal Concerns Inventory, Shapiro Control Inventory, Helplessness Questionnaire, Intrinsic–Extrinsic Aspirations Scale, and Alcohol Use Questionnaire. Results showed that sense of control and intrinsic motivation were positively correlated with adaptive motivation and negatively correlated with alcohol consumption. Mediational analyses indicated that adaptive motivation fully mediated the relationship between sense of control/intrinsic motivation and alcohol consumption.

1. Introduction

Human beings can decide how and when to pursue particular goals or to give up their pursuits. Various theorists (e.g., Klinger, 1977; Klinger & Cox, 2004a; Lee, Sheldon, & Turban, 2003) assert that goal striving is a salient aspect of humans' lives, and that goals pursuits help determine people's meaning of life. To address the dynamics underlying people's goal strivings, Cox and Klinger (2002) introduced the construct *motivational structure*. It refers to the combination of factors (e.g., knowing what do to, commitment, emotional expectations) that influence person's goal strivings. Motivational structure varies from one person to another, but it is the more-or-less stable way in which each person pursues his or her goals. Motivational structure, however, is not entirely rigid because people's current concerns and their goals for resolving them and their success with or failure at goal pursuits can change the way in which the person strives for their goals.

To measure motivational structure, Klinger et al. developed the Motivational Structure Questionnaire (MSQ; Klinger, Cox, & Blount, 1995) and the Personal Concerns Inventory (PCI; Cox & Klinger, 2004a). With the MSQ and PCI, Klinger and Cox (2004b) have identified two motivational patterns, which they call adaptive motivation and maladaptive motivation. Several studies (e.g., Cox & Klinger, 2002; Fadardi & Cox, 2008) have found that compared to people with an adaptive motivational structure, people with an maladaptive motivational structure have (a) fewer positive incentives, (b) less hope for achieving their goals, (c) less anticipated happiness from achieving goals and less anticipated sorrow from not achieving them, (d) longer expected distances from goal attainments, (e) less feeling of commitment to goals, and (f) less perceived personal control over achieving goals.

The motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004a,b) brings together factors (e.g., heredity, personality, current positive and negative affect) that contribute to people's motivation to drink alcohol. According to the model, when individuals are unable to achieve emotional satisfaction through other goal pursuits, they are more likely to regulate their affect by drinking alcohol. They might drink, for instance, to feel more optimistic or less anxious and depressed (Hussong, Hicks, Levy, & Curran, 2001). In this way, alcohol consumption might be a maladaptive attempt to restore desirable emotional states. In fact, there is evidence that motivational problems are associated with excessive drinking (Beckman, 1980; Cox & Klinger, 2004a; Deaton, 1975). The more maladaptive people's motivational structure is, the greater will be their risk of drinking excessively, and the lower their chances of reducing their consumption (Cox, Blount, Bair, & Hosier, 2000; Cox & Klinger, 2002, 2004a).

The present study was designed to identify motivational factors that help determine whether motivational structure is adaptive or maladaptive and how these factors contribute to people's motivation to drink alcohol. As Cox and Klinger's motivational model suggests, it is reasonable to expect that sense of control would be related to motivational structure. Sense of control is a person's belief that he or she has control over desired outcomes; people strive to enhance their control over their personal lives (Shapiro, 1994). Seligman (1975, 1994) showed that having a sense of control is adaptive, especially in difficult situations. It helps a person to maintain the motivation to overcome problems that might arise. Feeling a lack of control is related to maladaptive goal pursuits (Shapiro & Astin, 1998).

If a person believes that he or she does not have control over events that happen, learned helplessness might result (Seligman,

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1975). According to Stipek (1988), helplessness is in conflict with humans' vital drive to control their environment. There is evidence (e.g., Gernigon, Thill, & Fleurance, 1999; Skinner, 1995) that feeling helpless has negative consequences in three domains: cognitive, emotional, and motivational. Cognitively, a helpless individual believes that outcomes are out of his or her control; motivationally, the person's level of activity and effort decreases, and gradually he or she gives up; and emotionally, increasing feelings of sadness, anxiety, and hostility erode the person's emotional well-being. Feelings of not being in control of one's surroundings damage the person's self-efficacy and perceived ability to learn in similar situations (Ramirez, Maldonado, & Martos, 1992). Learned helplessness has many adverse effects. Learned helplessness has been reported to be associated with psychological disorders, especially with depression (e.g., Gundogdu & Aydin, 1994; Peterson & Seligman, 1984), stress (e.g., Geer, Davison & Gatchel, 1970; Maier, Peterson, & Schwartz, 2000), anxiety (e.g., Gotlib, 1984; Waschbusch, Sellers, LeBlanc, & Kelle, 2003), poor social skills, feelings of incompetence, and poor problem-solving strategies (Steinberg & Gano-Overway, 2003); all of these result in individuals' feeling that they are struggling for no reason (Dweck, Davidson, Nelsin, & Enna, 1978). According to Cook (1993), all of these negative feelings may reduce the individual's happiness and satisfaction with life.

On the other hand, there is evidence that people with intrinsic motivation are immune to feelings of despair, sense of failure, and helplessness. Intrinsic motivation refers to people's natural tendency to pursue their own interests and to exercise their capabilities and, in doing so, to seek out and overcome challenges (Reeve, 2002). Intrinsically motivated people are interested in learning and achieving; this, in turn, tends to be associated with creativity, cognitive flexibility, positive emotions, and self-esteem (e.g., Elliot, Faler, McGregor, Campbell, Sedikides & Harackiewicz, 2000; Kasser, 2002; Milkulincer, 1994). Intrinsically motivated people view their personal choice as important when they decide whether to pursue a goal; they experience their goal-seeking activities as meaningful; and they enjoy performing their tasks, regardless of whether or not they succeed in reaching their goals and regardless of feedback from the environment (Ames, 1992). They see their mistakes or failures as valuable experiences and opportunities to learn (Kong & Hau, 1996; Simons, Dewitte, & Lens, 2000).

Relationships among motivational orientation (i.e., intrinsic/extrinsic motivation), sense of control, and motivational structure have not previously been systematically investigated. However, there is compelling evidence that maladaptive motivation is associated with drinking behavior, and that extrinsic motivation and a low sense of control are associated with negative affect, which likely contributes to people's decisions to drink alcohol. Accordingly, in the present study, relationships among these motivational variables were assessed, with an aim of understanding how these relationships are related to university students' alcohol consumption.

It was hypothesized that (a) sense of control and intrinsic motivation would be positively correlated with adaptive motivation but negatively correlated with alcohol consumption; (b) helplessness would be negatively correlated with adaptive motivation but positively correlated with alcohol consumption; and (c) that adaptive motivation would mediate both the relationship between sense of control and alcohol consumption and the relationship between motivational orientation (i.e., intrinsic motivation) and alcohol consumption. The hypotheses were derived from the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004b).

2. Method

Participants. On the basis of a power analysis, a sample size of 94 was deemed adequate. Accordingly, 94 (male = 43.6%, mean age = 20.41 years, *SD* = 2.62; females = 56.4%, mean age = 20.07 years, *SD* = 1.65) psychology undergraduate student drinkers were recruited from the School of Psychology Student Participant Panel at Bangor University. Participants received course and print credits for their participation. Dependent drinkers were not eligible to participate—a criterion that was announced in the recruitment announcement; no participant drank more than 27 units of alcohol per week. Data collection was discontinued when 94 participants meeting the inclusion criteria had been recruited. In analyses related to alcohol consumption, four participants were excluded because they indicated that they did not drink alcohol. Nondrinkers were excluded because personality differences between drinkers and nondrinkers have been reported (e.g., King, Bernardy, & Hauner, 2003).

2.1. Instruments

Personal Concerns Inventory. An abridged version of the Personal Concerns Inventory (PCI) was used to assess participants' motivational structure. Participants were not asked to describe their concerns but to rate only their most important goals in each area of life (see Cox & Klinger, 2004b). The life areas included (a) Home and Household Matters, (b) Relationships, (c) Love, (d) Intimacy and Sexual Matters, (d) Self-changes, (e) Employment and Finances, (f) Leisure and Recreation, (g) Health, and (h) Education. After participants had decided whether or not they had a current concern in a particular life area, they were asked to rate their goal for resolving each concern on 11 dimensions: (a) Appetitive Action (to *get*, *obtain*, or *accomplish*); (b) Aversive Action (to *get rid of*, *prevent*, or *avoid*); (c) Perceived Control; (d) Knowledge (about how to achieve the goal); (e) Chances of Success (*if I do my best*); (f) Chances of Success if Not Try (*if I do nothing*); (g) Joy (expected from achieving the goal); (h) Conflict (expected unhappiness from achieving the goal); (i) Sorrow (from failure to achieve the goal); (j) Commitment (to achieving the goal); and (k) Goal Distance (i.e., how long it would take to reach the goal). Each scale ranged from "0" to "10." The ratings across a respondent's goals are summarized into motivational indices, from which that respondent's motivational profile can be drawn (Cox & Klinger, 2004b). The PCI is both valid and reliable (see Klinger & Cox, 2004b).

Shapiro Control Inventory. The Shapiro Control Inventory (SCI; Shapiro, 1994) measures perceived sense of control. It includes 187 items that are scored on ten control scales (overall, positive, negative, domain-specific, positive assertive, positive yielding, negative assertive, negative yielding, desire for control, and locus of control). We calculated scores for the sense of control subscales, and in Table 4 we report bivariate correlations between them and the other variables. However, for the inferential analyses, we avoided the complexities of using multiple indices of sense of control by selecting Overall Sense of Control scale as a simple, reliable indicator of sense of control. The SCI is both valid and reliable (Shapiro, 1994).

Intrinsic–extrinsic motivation. Motivational orientation (i.e., intrinsic vs. extrinsic motivation) was measured with the Aspiration index. Aspirations refer to people's life goals, which can be either intrinsic aspirations (e.g., meaningful relationships, personal growth, community contributions) or extrinsic aspirations (e.g., wealth, fame, image). Research has shown that having strong extrinsic aspirations is negatively associated with mental-health indicators, whereas having intrinsic aspirations is positively associated with mental-health indicators (Kasser & Ryan, 1993, 1996) and with a sense of well-being (Ryan et al., 1999). The Aspirations index (Kasser & Ryan, 1993, 1996) was used to measure intrinsic–extrinsic life goals. It comprises three categories of extrinsic aspirations (i.e., wealth, fame, and image) and three categories of intrinsic aspiration (i.e., meaningful relationships, personal growth, and community contributions). Respondents are asked to rate each aspiration on the following dimensions: (a) the *importance* of each aspiration to themselves, (b) their beliefs about the *likelihood* of attaining each aspiration, and (c) the degree to which they have already *attained* each one.

Helplessness Questionnaire. The Helplessness Questionnaire (Lester, 2001) is a 30-item, Likert-type inventory that measures helplessness (giving-up), hopelessness (pessimism), and haplessness (beliefs in bad luck or misfortune). These subscales are significantly correlated with depression, and Lester has reported that they have good reliability ($a > .63$). To avoid problems of multicollinearity, the Helplessness subscale was used as a simple, reliable indicator of helplessness in the current analyses.

Alcohol Use Questionnaire. The Alcohol Use Questionnaire (AUQ, Cox, 2000) was used to assess respondents' quantity and frequency of alcohol consumption during the prior year. It asks about the quantity and frequency of consumption of various types of alcoholic beverages (i.e., beer, wine, spirits, and alcopops), from which various standard quantity × frequency indices of consumption can be calculated. Mean weekly drinking was the index of alcohol consumption used in the current study.

2.2. Procedure

All participants were tested in small groups of approximately five participants each in a room with normal illumination and minimum background noise. Prior to distributing the questionnaires, the experimenter briefly explained the goals of the study to the participants and how they should complete each questionnaire. Next, participants were given a package that included an information sheet, consent form, demographic information sheet and each of the measures described in the Instruments section. After participants had completed the questionnaires, they were given a debriefing sheet and course and print credits, and they were thanked for their participation and dismissed.

3. Results

The number of male and female participants and their mean age according to years of university education are shown in Table 1. An independent-samples *t*-test showed that males ($M = 20.41$, $SD = 2.62$) and females ($M = 20.07$, $SD = 1.65$) did not differ on age [$t_{(92)} = -1.11$, $p = .27$] or mean years of university education: males ($M = 1.73$, $SD = .74$), females ($M = 1.90$, $SD = .77$), $t_{(92)} = .77$, $p = .44$.

3.1. Preliminary analyses

Principle components analysis of the PCI. To facilitate data analysis and for ease of interpretation, the PCI indices were subjected to principle component analysis (PCA; Bollen & Lennox, 1991). The appropriateness of the PCI results for PCA was checked against Preacher and MacCallum's (2002) guidelines. Bartlett's test of sphericity [$X^2_{(55)} = 320.12$, $p < .005$] and Kasier–Meyer–Olkin's (KMO) yielded a medium-to-high value of .72, supporting the suitability of a PCA. As in prior studies (e.g., Cox et al., 2000; Cox & Klinger, 2002;Fadardi & Cox, 2008), a two-component solution was selected. Table 2 shows the loadings on the two components. Component 1 accounted for 32.54% of the variance, and Component 2 accounted for 14.91%.

Table 1
Means and standard deviations of male and female participants' age according to their year of university education.

Gender	Year of education					
	First year		Second year		Third year	
	Males: $N = 18$; Females: $N = 18$		Males: $N = 16$; Females: $N = 22$		Males: $N = 7$; Females: $N = 13$	
	M	SD	M	SD	M	SD
Male	19.35	1.42	20.93	3.03	22.67	3.14
Female	18.88	1.07	20.40	2.01	20.94	2.12

Table 2
Loadings of the PCI indices on two factors.

PCI indices	Factor 1	Factor 2
Appetitive motivation index	.66	.45
Aversive motivation index	−.46	#
Control over achieving goals	.68	−.47
Knowledge about how to achieve goals	.49	−.31
Likelihood of achieving goals if try	.62	−.54
Likelihood of achieving goals if not try	−.42	.46
Happiness from achieving goals	.77	#
Unhappiness from achieving goals	−.43	#
Sadness from failure to achieve goals	.64	.31
Commitment to achieving goals	.81	#
Distance from goal achievements	#	.65

Note. # = loadings < .30.

Consistent with prior analyses of the PCI, Component 1 reflects *adaptive motivation*. Respondents who scored high on Component 1 were trying to reach attractive goals rather than avoid or get away from negative ones. They believed that they had control over their goal attainments, knew what to do to achieve their goals, and believed that their own efforts were important. They were also emotionally involved in their goal pursuits, expecting strong happiness if they succeeded and strong sadness if they did not succeed, and they were highly committed to achieving their goals, which, they believed, would be attained in the relatively near future. Component 2 reflects *maladaptive motivation*. Participants who scored high on Component 2 reported not knowing how to achieve their goals, and they felt little control over achieving them. They believed that luck played a more important role in their goal attainments than their own efforts, and they anticipated little happiness from achieving their goals and little sadness from failing to achieve them.

As the current and earlier (e.g., Cox et al., 2000; Cox & Klinger, 2002; for a review, see Klinger & Cox, 2004b) results indicate, the *pattern* of high or low loadings on each PCI factor can be used to describe it as more adaptive or maladaptive. Usually, a pattern of positive high loadings on Commitment, Control, Happiness, and Chances of Success If Try suggests an adaptive motivational structure. A pattern of high positive loadings on Happiness and Chances of Success but not on Commitment and Control would suggest a maladaptive motivational pattern. This is because theoretically (Klinger & Cox, 2004a) people should be committed to pursuing goals from which they expect to experience joy and at which they expect to succeed.

Sense of control. As indicated, the SCI has 11 subscales, but it would be difficult to test hypotheses related to each of them. In order to reduce the number of analyses, simple bivariate Pearson correlations were calculated to identify relationships among the SCI subscales. Results showed that Overall Sense of Control was highly correlated with most of the major SOC subscales ($p < .05$ or less). The nonsignificant relationships were for modes of control (e.g., Positive Assertive), but these subscales were not of interest for the subsequent analyses.

To determine relationships among participants' scores from Lester's Helplessness Questionnaire and their scores on the Extrinsic Aspirations index and Intrinsic Aspiration index, simple bivariate Pearson correlations were also calculated (see Table 3). As Table 3 shows, Helplessness was negatively correlated with Intrinsic Motivation

Table 3
Intercorrelations among scores from Lester's Helplessness Questionnaire, and the Aspiration index.

Scales	Helplessness	Hopelessness	Haplessness	Intrinsic M	Extrinsic M
Hopelessness	.63**				
Haplessness	.51**	.43**			
Intrinsic M	−.39**	−.30**	−.24*		
Extrinsic M	.47**	.32**	NS	−.21*	

Note. Intrinsic M = intrinsic motivation, extrinsic M = extrinsic motivation, $^{*}p < 0.05$, $^{**}p < 0.01$.

Table 4
Intercorrelations among PCI adaptive motivation, alcohol consumption, sense of control, and intrinsic and extrinsic motivations.

Variables	PCI AM	Week drink	Overall SoC	Pos SoC	Neg SoC	Dom SoC	Pos Asser	Pos Yield	Neg Asser	Neg Yield	Desire Cont	Intrinsic M	Extrinsic M
Week drink	−.32**												
Overall SoC	.50**	−.26**											
Pos SoC	.53**	−.25*	.96**										
Neg SoC	−.39**	.29**	−.87**	−.73**									
Dom SoC	.32**	−.30**	.68**	.66**	−.59**								
Pos Asser	.33**	NS	.56**	.60**	−.36**	.50**							
Pos Yield	NS	NS	.23*	.28*	NS	.24*	.30**						
Neg Asser	NS	NS	−.36**	NS	NS	NS	.39**	NS					
Neg Yield	NS	NS	−.30**	NS	.37**	−.27**	−.21*	.28**	NS				
Desire Cont	NS	NS	.41**	NS	NS	NS	NS	−.21*	.39**	NS			
Intrinsic	.54**	−.34**	.47**	.48**	−.35**	.38**	.40**	.32**	NS	NS	NS		
Extrinsic	−.33**	.37**	−.30**	−.25*	.24*	NS	NS	−.22*	NS	NS	NS	−.25*	
Helpless	−.29**	.50**	−.30**	−.32**	.24*	NS	−.29**	NS	−.32**	NS	NS	−.39**	.47**

Note. PCI AM = PCI adaptive motivation; Week drink = weekly drinking; overall SoC = overall sense of control; Pos SoC = positive sense of control; Neg SoC = negative sense of control; Dom SoC = domain sense of control; Pos Asser = positive assertive; Pos Yield = positive yielding; Neg Asser = negative assertive; Neg Yield = negative yielding; Desire Cont = Desire for control; intrinsic M = Intrinsic motivation; extrinsic M = extrinsic motivation; helpless = helplessness $^{*}p<.05$ and $^{**}p<.01$, one-tailed.

but positively correlated with Extrinsic Motivation. Hopelessness was also negatively correlated with Intrinsic Motivation but positively correlated with Extrinsic Motivation. Similarly, Haplessness was negatively correlated with Intrinsic Motivation.

3.2. Hypothesis testing

Table 4 shows intercorrelations among the different indices of sense of control, adaptive motivation, alcohol consumption, intrinsic/extrinsic motivation, and helplessness. As Table 4 shows, Overall Sense of Control and Intrinsic Motivation were positively related to adaptive motivation and negatively related to alcohol consumption. Helplessness, on the other hand, has negatively correlated with adaptive motivation and positively correlated with alcohol consumption. Thus, the first and second hypotheses named in the Introduction were supported.

3.2.1. First mediational analysis

It was hypothesized that motivational structure would mediate the relationship between sense of control and alcohol consumption. Fig. 1 shows the hypothesized mediational relationship. Overall Sense of Control was selected as the predictor variable because it was strongly correlated with most of the other major Sense of Control subscales (see Table 4). Limiting the number of variables in this way reduced the complexity of the mediational analysis. Before conducting the analysis, it was useful to test simple correlations among the variables as a preliminary step in testing the mediational relationship. The results revealed significant correlations among Overall Sense of Control, adaptive motivation, and alcohol consumption.

To test whether the effect of sense of control on alcohol consumption was mediated partially or completely by adaptive motivation, four checks were made (Baron & Kenny, 1986; Miles & Shevlin, 2001). First, sense of control significantly predicted alcohol consumption [$F_{(1,\ 88)}=7.72$, $p<.007$]. Second, sense of control also significantly predicted adaptive motivation [$F_{(1,\ 88)}=29.21$, $p<.005$]. Third, adaptive motivation significantly predicted alcohol consumption, after the effects of sense of control had been controlled [$F_{(1,\ 87)}=6.51$, $p<.002$]. However, after the effects of adaptive motivation had been controlled, sense of control no longer predicted alcohol consumption, $F_{(1,\ 86)}=6.51$, $p=.18$. These results indicate that adaptive motivation played a mediating role in the relationship between sense of control and alcohol consumption.

Finally, Sobel's test (Sobel, 1982) was used to determine whether the mediator carried the influence of the independent variable onto the dependent variable. The significant *z*-value indicates that adaptive motivation was a full mediator of the relationship between sense of control and alcohol consumption. Sobel's test also showed the extent to which the effects of the independent variable on the dependent variable were direct or indirect (i.e., whether they occurred through the mediator) (Preacher & Hayes, 2004). The software package MedGraph-I (Jose, 2003) was used to calculate the direct and indirect effects and to graphically show the mediational relationship among the variables. A direct effect is the effect of X (i.e., sense of control) on Y (i.e., alcohol consumption) after M (i.e., PCI adaptive motivation) has been controlled, and an indirect effect (mediated effect) is the effect of X on Y when the effects of the mediator M are not excluded. A direct effect of −.10 and an indirect effect of −.16 [i.e., −.26 to (−.16) = −.10; direct and indirect effects occur through the mediator] were calculated for the model (see Fig. 2).

3.2.2. Second mediational analysis

It was also hypothesized that motivational structure would mediate the relationship between intrinsic motivation and alcohol

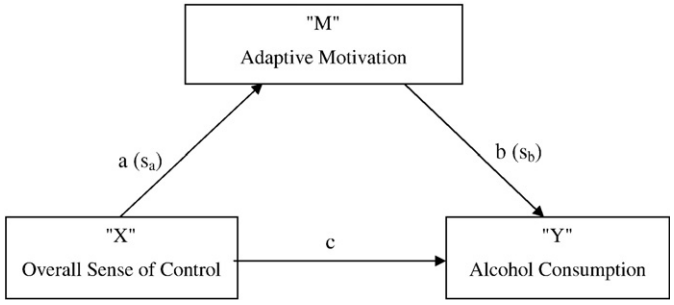

Fig. 1. The hypothesized relationships among sense of control, adaptive motivation, and alcohol consumption.

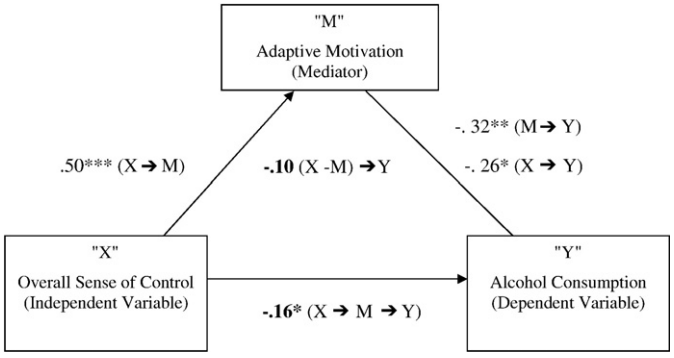

Fig. 2. Mediational relationship between sense of control and alcohol consumption with adaptive motivation controlled. The correlation coefficients in bold are from the Sobel test.

Table 5
Summary of the four steps in the mediational analysis testing relationships among sense of control, adaptive motivation, and alcohol consumption.

	Analysis	Visual depiction
Step 1	Conduct a simple regression analysis with X predicting Y to test for path "c" alone.	X → Y
Step 2	Conduct a simple regression analysis with X predicting M to test for path "a".	X → M
Step 3	Conduct a simple regression analysis with M predicting Y to test the significance of path "b" alone.	M (− X) → Y
Step 4	Conduct a multiple regression analysis with X and M predicting Y.	X (− M) → Y

consumption. To test this hypothesis, a mediational analysis was also conducted. It was useful first to calculate bivariate correlations among the variables as a preliminary step in evaluating the mediational relationship. There were significant correlations among intrinsic motivation, adaptive motivation, and alcohol consumption (see Table 4).

To test whether adaptive motivation mediated the effect of intrinsic motivation on alcohol consumption partially or completely, four steps were taken according to Baron and Kenny's (1986) guidelines (Table 5). First, intrinsic motivation significantly predicted weekly drinking [$F_{(1, 88)} = 9.06$, $p < .001$]. Second, intrinsic motivation significantly predicted adaptive motivation [$F_{(1, 88)} = 22.34$, $p < .000$]. Third, adaptive motivation significantly predicted alcohol consumption, after the effects of intrinsic motivation had been controlled [$F_{(1, 87)} = 5.62$, $p < .000$]. After the effects of adaptive motivation had been controlled, intrinsic motivation no longer predicted alcohol consumption [$F_{(1, 86)} = 8.18$, $p = .14$]. Finally, Sobel's test was run to determine whether the mediator carried the influence of the independent variable onto the dependent variable. The *z*-value was calculated. The direct effect was −.12 and the indirect effect was −.20 [i.e., −.32 to (−.20) = −.12] (see Fig. 3).

4. Discussion

The results of the current study are consistent with those of other studies (e.g., Logan, Olson, & Lindsey, 1993) that reported a positive relationship between sense of control and intrinsic motivation. The results also support those of studies (e.g., Chaney et al., 1999; Foy & Mitchell, 1990; Mirowsky & Ross, 1990) that found negative relationships between sense of control and both extrinsic motivation and helplessness. Moreover, the results are consistent with previous findings (e.g., Peterson, Maire, & Seligman, 1993; Shields, 1997; Stipek, 1988) that extrinsically motivated people are more vulnerable to developing a poor sense of control, helplessness, and poor problem-solving abilities.

For the first time, the current study showed that intrinsic motivation and sense of control were positively correlated with adaptive motivation. The results of the correlational analyses were elaborated by the mediational analyses. These results point to the conclusion that people with adaptive motivation are intrinsically motivated with respect to the goals that they select, and they feel a sense of control over achieving them. These characteristics of people with adaptive motivation can have many positive consequences. *First*, people who are intrinsically motivated work on tasks because they find them enjoyable (Pintrich & Schunk, 2002). Intrinsically motivated people focus mainly on their goals, and their behavior is organized around benefiting from goal attainments; this has positive emotional consequences (e.g., Elliot et al., 2000; Milkulincer, 1994). Moreover, if such people fail to achieve a goal, they see the failure as an opportunity to improve their performance (Bandura, 1982; Shields, 1997); they then become even more strongly committed to achieving their goals (Klinger, 1977). Intrinsically oriented individuals also tend to take risks and to undertake difficult tasks (Matusov, 1997). *Second*, evidence (e.g., Mirowsky, 1995, 1997; Shapiro, 1994; Seligman, 1991; Wortman, Sheedy, Gluhoski, & Kessler, 1992) indicates that people with a strong sense of control feel enthusiastic and are optimistic about being able to achieve their goals in the near future. Characteristics such as having a high sense of control and being intrinsically motivated are important features of an adaptive motivational structure.

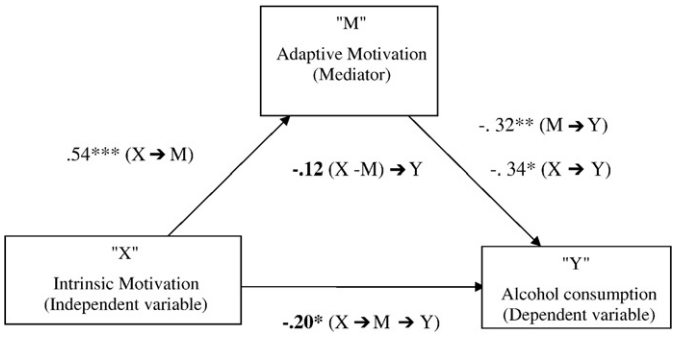

Fig. 3. Mediational relationship between intrinsic motivation and alcohol consumption with adaptive motivation controlled. The correlation coefficients in bold are from the Sobel test.

Evidence based on the motivational model of alcohol use (Cox & Klinger, 1988, 2004b) shows that decisions to drink alcohol are more likely when individuals are unable to achieve emotional satisfaction through other goal pursuits or to overcome frustrations that burden their lives. A maladaptive motivational structure is associated with individuals' lower expected chances of achieving their goals (i.e., greater pessimism). As Klinger (1975) argued, when people's goal strivings are blocked (leaving them feeling out of control), they become invigorated, putting all their energy to overcoming the obstacles to achieving the goal. However, failure to achieve a goal despite all the person's efforts might lead to feelings of helplessness. Thus, a reasonable explanation for the positive relationship between helplessness and drinking is that negative feelings such as helplessness lead some individuals to drink alcohol in an attempt to overcome their negative feelings (Surgenor, Horn, Hudson, Adamson, & Robertson, 2006; Waxman & Huang, 1998).

According to Stipek (1988), feelings of helplessness and a poor sense of control are strongly related to each other, and both are associated with poor problem-solving skills (Chaney et al., 1999; McQuillan & Rodriguez, 2000). Therefore, helplessness, a poor sense of control, and maladaptive motivation might be in a vicious cycle, such that people's helplessness and lack of perceived control reduce their chances of successful goal attainments, and the lack of success, in turn, intensifies their negative feelings. Attempting to cope by drinking alcohol might further exacerbate the situation.

In summary, current study identified relationships among sense of control, intrinsic motivation, motivational structure, and alcohol consumption. The results show that, compared to people with maladaptive motivation, those with adaptive motivation (a) perceived greater positive and overall sense of control, (b) were more intrinsically motivated, (c) felt less helpless, and (d) drank less alcohol. This study was the first one to demonstrate that motivational structure fully mediates the effects of sense of control and intrinsic motivation on alcohol consumption. These results have important implications for both theory and practice. The results suggest that experimental manipulations to increase people's sense of control and intrinsic motivation would cause their motivational structure to become more adaptive.

This initial study of the relationship between motivational structure, sense of control, intrinsic motivation, and university students' alcohol consumption is not without limitations. *First*, the participants were healthy university students whose age ranged from 18 to 25 years. Using a less constricted sample or different age groups or testing problematic drinkers, we might have identified different associations among the variables that we studied. For instance, it has

been reported that the use of alcohol to cope with negative emotions is more likely to occur in early adulthood than among older adults (Tyssen, Vaglum, Aasland, Gronvold, & Ekeberg, 1998). Lachman and Weaver (1998) found that sense of control is age-related, with younger participants reporting greater feelings of being in control than older ones. Klinger (2007) reported that motivational structure varies with age and that older participants name fewer goals than younger ones, and they report less expected sorrow if they fail and less expected optimism about succeeding with their goal pursuits. Man, Stuchlikova, and Klinger (1998) found that healthy university students had a more adaptive motivational structure than problem drinkers. In short, the current study is limited in that its results cannot be generalized to, for example, older adults or problem drinkers. *Second*, the study was cross-sectional. Ideally, a longitudinal study should be conducted to better identify directions of associations and cause-and-effect relationships.

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Contributors

Authors A and B designed the study and wrote the protocol. Author A conducted literature searches and provided summaries of previous research studies. Author A conducted the statistical analysis. Author A wrote the first draft of the manuscript, but Author B contributed significantly to the final manuscript. Both authors contributed to and have approved the final manuscript.

Conflict of Interest

Neither author was paid to conduct the study. Both authors declare that they have no conflicts of interest.

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