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How early life stress and insecure attachment affect decision-making style and motivation to use alcohol: a structural equation model

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ABSTRACT

Based on previous studies, we hypothesized that early life stress (ELS), insecure attachment (IA), decision-making style (DMS), and one's motivation to use alcohol (MA) have mutual influence. So this study was conducted to clarify the mechanisms between them by structural equation modelling. We surveyed 256 adult men who consumed alcohol and conducted a confirmatory factor analysis to construct an appropriate structural equation model. Results showed direct effects on MA by ELS (36.7%) and IA (23.1%) and an indirect impact on MA with DMS as a mediator, of 12.2% and 9.8%, respectively. The model fit indices of this model satisfied recommended levels at $\chi^2/df = 2.498$, GFI = 0.931 and CFI = 0.959. In conclusion, MA is directly affected by ELS, IA and DMS. Furthermore, DMS acts as a moderator.

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KEYWORDS
Decision-making; early life stress; insecure attachment; motivation to use alcohol; structural equation model

Introduction

Cox and Klinger classified motives to use alcohol as social (i.e. to be sociable), conformity (i.e. to avoid social rejection), enhancement (i.e. to enhance positive mood) and coping (i.e. to attenuate negative emotions) depending on the cue's source and type of reinforcement [1]. Among them, enhancement and coping motives have been closely related to alcohol-related adverse consequences such as heavy alcohol consumption, blackout, self-injury, violence and impairment in social performance and interpersonal relationship [2]. Hence, it is important for researchers to uncover possible mechanisms that drive the enhancement and coping motives for using alcohol.

Numerous previous studies about environmental factors affecting motives to use alcohol have suggested that early life stress (ELS) and insecure attachment (IA) are likely to have adverse effects on motives to use alcohol (MA) [3,4]. ELS indicates a diverse and complex range of external experiences that are caused by repetitive exposure to stressful incidents that are beyond one's coping ability during childhood or adolescence, including abuse, neglect, loss of the primary caregiver and exposure to interparental violence [5]. Attachment refers to a special relationship that develops between an individual and the significant primary caregiver, and is determined by innate traits and the caregiving activities of the primary caregiver [6]. Individuals who experienced repeated ELS or have IA are more susceptible to psychopathology including guilt, depression, low self-esteem, impoverished social skills and repressed hostility [7,8]. These aspects may drive enhancement and coping motives to use alcohol [9]. Further, ELS and IA are likely to be experienced before the commencement of alcohol drinking. Therefore, it is important to clarify possible influences on motives to use alcohol.

Repeated ELS and IA are also related to irrational and intuitive decision-making style (DMS), because they affect neurological transmitters such as corticotrophin releasing factors (CRF) and gamma amino butyric acid (GABA), as well as various brain areas including the amygdala, hippocampus, and frontal cortex which act on decision-making process [10]. Thus, individuals who experienced repeated ELS and have IA are likely to make irrational and intuitive choices and attribute lower values to delayed rewards in the decision-making process [11]. Many studies have reported that these aspects are also potential risk factors for the occurrence of adulthood alcohol use disorders (AUD) [12].

Repeated ELS and IA are identified as influencing on enhancement and coping MA and inducing irrational and intuitive DMS. Through conducting a literature review, we hypothesized that there are relationships between ELS, IA, DMS and MA as supposed in Figure 1. So this study was conducted to clarify the mechanisms of ELS and IA on MA and DMS by structural equation modelling.

Method

The measurement of variables was conducted with surveys between September 25 and September 30, 2017. Participants were recruited using the online service

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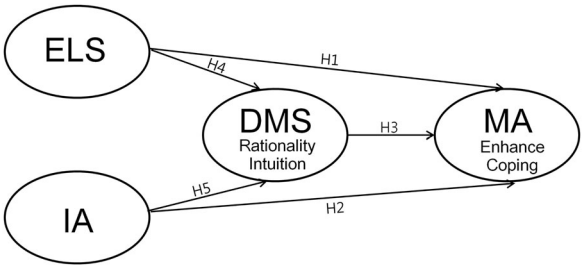

Figure 1. Suggested study model. ELS: early life stress; IA: insecure attachment; DMS: decision masking style; MA: motive of alcohol use. H1: ELS has direct effect on MA; H2: IA has direct effect on MA; H3: DMS has direct effect on MA; H4: DMS acts as mediator effect between ELS and MA; H5: DMS has mediator effect between IA and MA.

system "Do it survey" (www.doit.co.kr). The criteria for this study were as follows. Prospective participants should be male aged 18–65 years old. Participants' previous illnesses and those being managed at the time of system registration were investigated, and subjects with diagnosed mental disorders such as mental impairment, with ongoing memory disorders, or with general diseases such as cirrhosis or head injuries, were excluded. The presence of these diseases was researched in the self-reported form in the survey. A total of 265 individuals participated, with a confidence interval of 95% and a sample error of ±4.34.

Variable measurements were used as follows. To measure ELS, the Parent Child Conflict Tactics Scale (PCCT) [13] and the Conflict Tactics Scale (CTS) [14] were employed. PCCT is composed of 3 components of emotional abuse, physical abuse, and neglect. CTS measures the experience of being exposed to interparental violence. IA was measured using the Parental Bonding Instrument (PBI) [15]. It is composed of three components of care, respect for autonomy, and overprotection. DMS was measured using the Decision-Making Style Scale [16]. It is composed of four components of rationality, intuition, dependence, and interdependence. MA was measured using the Drinking Motives Questionnaire (DMQ) [1]. It comprises four components of enhancement, coping, social, and conformity according to reinforcement patterns (positive and negative) and source types (internal and external). All scales used have been translated into Korean, and the reliability and validity have been confirmed in previous studies.

To identify the association between variables, we conducted a correlation analysis. The estimation of the hypothetical model was done through the maximum likelihood method, and the model goodness of fit was confirmed through a χ^2/df, goodness-of-fit index (GFI), root mean square residual (RMR), root mean square error of approximation (RMSEA), Tucker-Lewis index (TLI), comparative fit index (CFI), and adjusted goodness-of-fit index (AGFI). To confirm the validity of the structural paths in the study model, path coefficients were calculated; bootstrapping was used to validate the statistical significance of the direct, indirect, and total effects. The statistical analysis was completed using SPSS18.0 (SPSS Inc., Chicago, IL, USA), AMOS18.0 (Amos development Corp., Crawfordville, FL, USA), with two-tailed tests and a significance level of $p < .05$.

Results

Participants' sociodemographic characteristics are shown in Table 1. The measured variables were confirmed to have normal distribution through a Shapiro–Wilks test. The results of the correlation analysis between the variables are shown in Table 2. ELS and IA had a positive correlation with the intuition of DMS and enhancement and coping MA, and a negative correlation with the rationality of DMS. The absolute value of the correlation coefficient of the measurement variables was 0–0.48, and there are no identified multicollinearity problems.

In the fit of the hypothetical model, the χ^2 was 119.886, and both the hypothetic model and the model proposed by collected data were the same. The fit indices of the hypothetical model were χ^2/df = 2.498, GFI = 0.931, RMR = 0.07, CFI = 0.959, AGFI = 0.926, meeting the recommended levels (Table 3).

It was found that ELS and IA had a significant influence on DMS, with an explanatory power of 29.2%. The researched variables all had a significant influence

Table 1. Participants' demographic characteristics.

Characteristics	Categories	*n* (%)
Age (years)	~30	58 (21.88)
	31 ~ 40	76 (28.68)
	41 ~ 50	84 (31.69)
	51 ~ 60	47 (17.73)
Marriage	Married	166 (62.64)
	Unmarried or separated	99 (37.36)
Employment	Employed	219 (82.64)
	Unemployed	46 (17.36)
Cohabitation	Cohabitation	188 (70.94)
	No cohabitation	77 (29.05)
Education	~Elementary school	13 (4.90)
	Middle school	23 (8.67)
	High school	81 (30.56)
	College/University	148 (55.84)

Table 2. Correlation among study variables ($n = 265$).

	1	2	3	4	5	6
ELS	1					
IA	0.22†	1				
Rationality (DMS)	0.32†	−0.32†	1			
Intuition (DMS)	0.32†	0.31†	−0.29†	1		
Enhancement (MA)	0.22*	0.29*	−0.28*	0.37‡	1	
Coping (MA)	0.40‡	0.25*	−0.25*	0.44‡	0.53‡	1

Notes: ELS: early life stress; IA: insecure attachment; DMS: decision masking style; MA: motive of alcohol use. 1: early life stress; 2: insecure attachment; 3: rationality (DMS); 4: intuition (DMS), 5: enhancement (MA); 6: coping (MA).
*$p < 0.05$.
†$p < 0.01$.
‡$p < 0.01$.

Table 3. Model fit of the hypothetical model.

Index	χ^2	χ^2/df	GFI	RMR	RMSEA		TLI	CFI	AGFI
					Low	Hi			
Criteria	>0.05	<3.0	≧0.90	≦0.05	≦0.05	≦0.08	≧0.90	≧0.90	≧0.90
Value	119.886	2.498	0.931	0.07	0.04	0.06	0.871	0.959	0.926

Note: GFI: Goodness-of-fit index, RMR: root mean square residual; RMSEA: root mean square error of approximate; LO: low, HI: high; TLI: Tucker-Lewis index; CFI: comparative fit index; AGFI: adjusted goodness-of-fit index.

Table 4. Standardized estimation for the hypothetical model.

Endogeneous variable		Exogeneous variable	Estimate	S.E	C.R	*p*	Standardized estimate (*β*)	SMC
MA	←	ELS	0.624	0.237	2.518	0.017	0.367	0.409
	←	IA	0.370	0.182	2.052	0.041	0.231	
	←	DMS	0.229	0.097	2.357	0.018	0.348	
DMS	←	ELS	0.810	0.355	2.282	0.022	0.331	0.292
	←	IA	0.426	0.181	2.018	0.046	0.283	

Notes: S.E: standard error; C.R: critical ratio; SMC: squared multiple correlation. ELS: early life stress; IA: insecure attachment; DMS: decision-making style; MA: motive of alcohol use.

Table 5. Standardized direct, indirect effect indicated by the hypothetical model.

Endogeneous variable		Exogeneous variable	Standardized direct effect (*p*)	Standardized indirect effect (*p*)	Standardized total effect (*p*)
MA	←	ELS	0.367 (0.017)	0.122 (0.037)	0.489 (0.039)
	←	IA	0.231 (0.041)	0.098 (0.062)	0.329 (0.051)
	←	DMS	0.348 (0.018)		0.348 (0.018)

Note: ELS: early life stress; IA: insecure attachment; DMS: decision-making style; MA: motive of alcohol use.

on MA, and the predictive power was in the order of ELS, DMS and IA. The explanatory power was 40.9% and was statistically significant (Table 4).

In validation of the significance of the direct and indirect effects, the statistical breakdown of effects using the bootstrapping method indicated that the influences on MA were greater in the order of ELS, DMS and IA. In the case of ELS, there were significant indirect effects; however, IA was founded to have insufficient statistical significance (Table 5). As such, the final model is presented in Figure 2.

Discussion

Our results indicated the influence of ELS and IA on MA. In addition, it was identified that DMS acts as a mediator in this process. It is noteworthy that as childhood experiences, ELS and IA have a direct influence on adulthood drinking motive, because it is difficult to discern the direct relationship. Enhance and coping

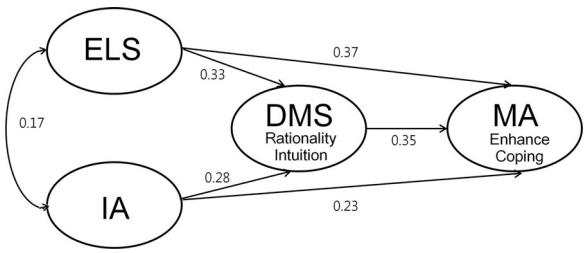

Figure 2. Pathway model for motives to alcohol use. ELS: early life stress; IA: insecure attachment; DMS: decision masking style; MA: motive of alcohol use. ELS and IA have direct influence on DMS. Furthermore, ELS and IA have direct influence on MA, and in this process, DMS acts as a mediator.

MA share the similarity of being induced by internal cues like negative emotion or memories [17]; therefore, negative emotion or memories induced by ELS or IA may serve as internal cues leading to the use of alcohol.

Many studies have already shown that an irrational and intuitive individual is more likely to exhibit AUD. But it is also interesting that irrationality and intuition can be caused by negative childhood experiences. The ability to control one's motivation and decision-making process, which includes prediction of results and suppression of impulses, is associated with working memory, which is mediated by dopamine [12]. Therefore, if research is conducted to examine the correlation between negative childhood experiences and working memory, the direct relationship between these two variables can be further identified. Also, treatment such as neurofeedback, which is currently being used to improve impulse control, is also thought to be available to reduce the incentive to drink [18].

The limitations of this study are as follows. First, it was conducted with the minimal sample size necessary to conduct a confirmatory factor analysis [19]. Second, it did not use scales that can directly investigate alcohol consumption or alcohol problems, such as AUDIT. Third, it did not reflect subjective responses to alcohol such as cravings, expectations and use patterns. In addition, a major limitation is that factors such as gender, inter-generational and dyadic effects, and psychological stress including distress, depression, and anxiety were not evaluated.

Nevertheless, it is meaningful to identify the possible pathway that childhood experiences such as ELS or AI lead to the abuse of alcohol as a coping mechanism in

adulthood. The components that make up an environment in which alcohol is used constitute a complex system, are heterogeneous and interacting, and evolve over the trajectory of one's lifetime [20]. It should be noted that the trajectory can be started from the earlier part of a lifetime before it is exposed to direct alcohol environment. ELS and IA, which are known to be associated with the development of other psychiatric disorders including anxiety or depression [7,8], may be closely related to the occurrence of many addiction disorders, including alcohol addiction.

Disclosure statement

No potential conflict of interest was reported by the authors.

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