

The Associations between Aggression, Acquired Capability for Suicide and Suicidal Behavior in Male Alcohol Use Disorders[†]

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Although aggression has been associated with suicidal behavior among individual with alcohol use disorders (AUD), little is known about the mechanism this association. hypothesized that aggression an indirect effect on suicidal behavior and this relationship mediated by acquired capability for suicide the ability to overcome the fear and pain associated with suicide (Van Orden et al., 2008). Participants were patients undergoing residential alcohol use disorder treatment at local hospitals in Korea. As hypothesized, the relationship between aggression and suicidal behavior was partially mediated by acquired capability for suicide. Our findings the role of acquired capability in the association between aggression and suicidal behavior in AUD individuals. Implications for suicide risk assessment individuals with AUD discussed.

Keywords: Aggression, Suicidal Behavior, Alcohol Use Disorders (AUD), Acquired Capability for Suicide

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Suicidal behavior is a common problem in individuals with alcohol dependence (Sher, 2006). Suicide ideation is common in patients seeking drug and alcohol treatment (Ilgen, 2009). Approximately 30~40% of alcohol dependent patients have attempted suicide in their lifetime (Koller, Preuss, Bottlender, Wenzel, & Soyka, 2002; Roy, 2003; Roy & Janal, 2007). In addition, a postmortem study performed in Finland indicated that 35% of suicide victims were alcohol misusers (Pirkola, Isometsä, Heikkinen, & Lönnqvist, 2000). Furthermore, the risk rate for suicide in males diagnosed with alcohol use disorder (AUD) was 10 times greater than that of a control sample (Wilcox, Conner, & Caine, 2004).

Several studies have identified some risk factors for suicidal behavior in people with alcohol dependence. The association between aggression and suicidal behavior in AUD has been repeatedly and firmly supported (Hufford, 2001; Modesto-Lowe, Brooks, & Ghani, 2006; Sher, 2006). Aggression is a strong predictor of suicidal behavior (Conner, Duberstein, Conwell, Seidlitz, & Caine, 2001). Greater frequency of suicidal behavior and severity of suicidal ideation in major depression with comorbid alcoholism appears to be related to associated aggressive traits (Sher et al, 2005). Alcohol dependent individuals with a history of suicide attempts have shown greater aggressiveness than those without prior suicide attempts across

a wide range of studies (Koller et al., 2002; Roy, 2003; Roy & Janal, 2007). In a psychological autopsy study comparing AUD and non-AUD suicides, aggression scores were higher in the AUD suicide group (Chachamovich, Ding, & Turecki, 2012). However, little is known about the mechanism by which aggression is related to suicidal behavior.

Acquired capability for suicide, which is a construct within the Interpersonal-psychological theory of suicidal behavior (IPTS; Joiner, 2005), is the ability to enact the lethal self-harm that is necessary to carry out a suicide attempt. Within the framework of IPTS, suicidal desire is caused by the presence of two interpersonal constructs: thwarted belongingness, a sense of disconnectedness from others and perceived burdensomeness, a feeling of being a burden to others. However, suicidal desire alone is not sufficient for an individual to complete or attempt suicide, as he or she must also acquire the capability to enact lethal self-injury (Van Orden, Witte, Gordon, Bender, & Joiner, 2008; Van Orden et al., 2010). Here, the acquired capability to enact lethal self-harm is characterized as lowered fear of death, which involves losing some of the fears associated with suicidal behavior and an elevated tolerance for physical pain (Van Orden et al., 2010). The self-preservation instinct is so powerful that few individuals can overcome this instinct by

force of will and as such can develop fearlessness of pain, injury and death (Joiner et al., 2009). Individuals can acquire this capability through exposure and habituation to the fear and pain related to lethal self-injury, for example through engaging in or experiencing painful and provocative experiences such as prior suicide attempts, repeated accidental injuries and/or numerous physical fights (Joiner, 2005; Joiner et al., 2009). Acquired capability for suicide is the limiting factor in distinguishing those who desire death by suicide from those who will actually make a serious or lethal suicide attempt (Joiner, 2005). Suicide attempters viewed themselves as more fearless in the face of death and insensitive to pain than suicide ideators and reported a greater history of painful and provocative life events than suicide ideators and controls (Smith, Cukrowicz, Poindexter, Hobson, & Cohen, 2010).

The IPTS proposes that aggressive individuals are more likely to experience these painful and provocative events that habituate them to fear and pain related to lethal self-injury, and thus, are more likely to have acquired capability for suicide. People with a high aggression level are more likely to disregard the warning signs against self-harm and engage in risky behavior, which in turn increases their acquired capability for suicide (Ribeiro & Joiner, 2009; Smith & Cukrowicz, 2010). Indeed, greater acquired capability for

suicide and a greater number of suicide attempts have both been associated with lifetime histories of aggression and violence (Van Orden et al., 2008). Also, It is well established that alcohol consumption has a pharmacological and psychological impact on individuals' aggression and that this effect is not only momentary but permanent (Bushman & Cooper, 1990). Elevated levels of aggression in individuals with alcohol use disorders cause harmful results, both to others through violent crimes such as intimate partner violence and to themselves by self-destructive behavior such as suicide (Fergusson, Soden, & Horwood, 2013). Furthermore, chronic alcoholics who behave aggressively are more likely to experience severe interpersonal problems, which in turn lead to an increase in their risk for suicidal behavior (Conner, Duberstein, & McCloskey, 2008). However, there is limited research on the association between aggression and acquired capability for suicide in AUD samples. Based on these findings, we predicted that aggression would have an indirect effect on suicidal behavior and that this relationship would be mediated by acquired capability for suicide.

The purpose of the current study was to examine the associations between aggression, acquired capability for suicide and suicidal behavior in individuals with AUD. On the basis of existing literature, we hypothesized that (1) aggression would be positively associated with

suicidal behavior; (2) aggression would be positively associated with acquired capability for suicide; (3) acquired capability for suicide would be positively associated with suicidal behavior, and (4) acquired capability for suicide would mediate the relationship between aggression and suicidal behavior in individuals with AUD.

Methods

Participants

The sample consisted of individuals who were either inpatients from or outpatients of three treatment centers for alcohol use disorders, located in Gyeonggi-do and Incheon, Korea. Subjects who were not able to complete a battery of questionnaires due to undergoing detoxification, those with psychotic features or neurological problems, as well as those who scored < 8 on the 10-item Alcohol Use Disorders Identification Test - Korean (Kim, Oh, Park, Lee, & Kim, 1999; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) were excluded. Two hundred and eight participants were included in this study.

One hundred and ninety participants (91.3%) were male, 17 participants (8.2%) were female, and one participant declined to provide gender information. The proportion of female was too low to be able to understand gender differences, thus we decided to analyze only the male data

($n=190$). The mean age of the participants was 50.22 years ($SD = 8.6$), with a range from 22 to 71 years. Over a half of the sample had attempted suicide in their lifetime ($n=98$, 51.6%). Ninety-two participants had never attempted suicide in their lifetime (48.2%), 28 had attempted it once (14.7%) and 70 participants had made multiple suicide attempts (36.8%). A total of 24 participants (12.6%) had attempted suicide in the previous year.

Procedures

All participants were given an informed consent prior to participation. For compensation, participants received writing utensils or a cafeteria coupon worth \$ 3. After completing the study questionnaires, one of the authors of the current study also gave a lecture entitled 'Suicide prevention for individuals with alcohol use problems'

The current study is a part of a larger research project into suicidal behavior in AUD individuals that is being carried out by the present authors.

Measures

Alcohol Use Disorders Identification Test - Korean (AUDIT-K). The Alcohol Use Disorders Identification Test is a 10-item self-report measure regarding alcohol use

disorders. The scale covers items about alcohol consumption (item 1-3), alcohol dependence (item 4-6) and alcohol-related problems (item 7-10). Responses to each question are scored from 0 to 4, giving a maximum possible score of 40. The AUDIT score of 8 or higher is considered an indicator of hazardous and harmful alcohol use. The Korean version of the scale has been validated (Kim, Oh, Park, Lee, & Kim, 1999). The internal reliability for the current study was good (Cronbach's $\alpha = .83$).

The Aggression Questionnaire-Korean version (AQ-K). Trait aggression was measured by the Aggression Questionnaire (Buss & Perry, 1992). This scale consists of four sub-factors, physical and verbal aggression, anger, and hostility, which together represent the instrumental, affective, and cognitive domains of trait aggression. The scale has been validated in Korean and two items from the anger sub-factor were omitted, leaving a total of 27 items for use (Seo & Kwon, 2002). Items are rated on a 5-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree). The internal reliability for the current study was good (Cronbach's $\alpha = .88$).

The Acquired Capability for Suicide Scale (ACSS). The Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008) is a 20-item self-report measure which is designed

to assess an individual's lack of fear of lethal self-injury. Individuals rate each item on a scale of 1 (not at all like me) to 5 (very much like me); a higher score indicates a higher capability for suicidal behavior. The ACSS has been translated into Korean (Jo, 2010). The internal reliability was good in both Jo's (2010) (Cronbach's $\alpha = .80$) and the current study (Cronbach's $\alpha = .80$).

Suicidal behavior. Participants were asked to report their lifetime number of suicide attempts (Have you ever tried to attempt suicide? If yes, please write down the numbers of attempts you have made) and whether they had attempted suicide in the previous year (Have you tried to attempt suicide last year?). Based on the responses, we grouped each individual into one of the following three categories: (1) no history of suicide attempts, (2) one suicide attempt, and (3) multiple suicide attempts. These categories were then scored as 1, 2, or 3. Additionally, individuals who had made a suicide attempt in the previous year had an additional 1 added to their score to reflect the recentness of their suicidal behavior and thus the increased probability that their current mental status was relatively more severe.

Statistical analyses

To examine the reliability of study measures,

coefficient alpha were assessed. Correlation analysis was conducted to examine the correlations between all study variables. Mediation analysis was performed using a bootstrapping method recommended by Preacher and Hayes(2008). Bootstrapping, a nonparametric resampling procedures, is an additional method advocated for testing mediation that does not impose the assumption of normality of the sampling distribution (Preacher & Hayes, 2008). Bootstrapping generates an estimate of the indirect effect, including a 95% confidence interval. When zero is not included in the CI, the indirect effect is considered statistically significant at the 0.5 level (Hayes, 2009). Thus one can conclude that the effect of the independent variable on the dependent variable is mediated by the proposed mediating variables. SPSS 18.0 was used for the overall statistical analyses.

Results

Descriptive statistics and correlations for all measures

Descriptive statistics and correlations for all study variables are presented in Table 1. Acquired capability for suicide was significantly correlated with aggression ($r = .20, p < .01$) and physical aggression ($r = .30, p < .01$). Suicidal behavior was correlated with higher levels of aggression ($r = .21, p < .01$), physical aggression ($r = .23, p < .01$), verbal aggression ($r = .22, p < .01$) and acquired capability for suicide ($r = .21, p < .01$). Anger ($r = .10, p = ns$) and hostility ($r = .07, p = ns$) each were not significantly correlated with suicidal behavior. Aggression and its four subscales were all positively correlated with each other.

Table 1. Descriptive statistics and correlations for all measures.

	1	2	3	4	5	6	7
1. AQ-K	-						
2. AQ-K Physical	.83**	-					
3. AQ-K Verbal	.61**	.41**	-				
4. AQ-K Anger	.79**	.48**	.36**	-			
5. AQ-K Hostility	.79**	.45**	.26**	.63**	-		
6. ACSS	.20**	.30**	.11	.04	.09	-	
7. Suicidal behavior	.21**	.23**	.22**	.10	.07	.21**	-
M (SD)	78.56 (16.53)	25.03 (7.23)	14.82 (3.91)	15.35 (4.40)	23.38 (5.98)	58.80 (12.01)	2.01 (1.10)

** $p < .01$.

Note. AQ-K = The Aggression Questionnaire-Korean version, ACSS = The Acquired Capability for Suicide Scale

Mediation analysis of aggression and suicidal behavior

The results of the indirect effect analysis are presented in Table 2. The total indirect effect of aggression on suicidal behavior through acquired capability for suicide was significant at the level of $p < .05$ ($\beta = .003$, CI = .0004 to .007). The direct effect of aggression on suicidal behavior was still significant, when controlling for the mediating variable, which indicates that acquired capability for suicide partially mediates the relationship between aggression and suicidal behavior.

For better understanding, we carried out further analyses examining each subscale of the AQ-K (physical aggression, verbal aggression, anger, and hostility) as independent variables. Among these four sub-factors, only physical aggression had an indirect effect on suicidal

behavior through its impact on the elevated level of acquired capability for suicide ($\beta = .007$, CI = .001 to .018). The direct effect of physical aggression on suicide risk was still significant when controlling for the mediating variable, which indicates that acquired capability for suicide partially mediates the relationship between physical aggression and suicidal behavior.

Discussion

The purpose of the present study was to examine the associations between aggression, suicidal behavior and acquired capability for suicide in individuals with AUD. As predicted, aggression was positively associated with suicidal behavior at a significance level. This result is consistent with previous research,

Table 2 The results of the indirect effect analysis.

	Effect of IV on M (a)	Effect of M on DV (b)	Total Effect (c)	Direct Effect (c')	Indirect effect (ab) (95% CI)
AQ-K	.145**	.017*	.014**	.011*	.003 (.0004 - .007)
AQ-K Physical	.500***	.015**	.036***	.029**	.007 (.001 - .018)
AQ-K Verbal	.334	.017**	.062**	.056**	.009 (-.001 - .020)
AQ-K Anger	.110	.019**	.026	.024	.002 (-.007 - .014)
AQ-K Hostility	.178	.019**	.013	.009	.003 (-.002 - .012)

* $p < .05$, ** $p < .01$, *** $p < .001$.

Note. AQ-K = The Aggression Questionnaire-Korean version

Note. All values represent the unstandardized beta for regression or path coefficients. IV=independent variable(i.e., AQ-K, AQ-K Physical); M=mediator(i.e., acquired capability for suicide); DV=dependent variable(i.e., suicidal behavior). The total effect is the effect of the IV on the DV without considering the mediator. The direct effect is the effect of the IV on DV when controlling for the effects of the mediators. The indirect effect is the effect of the IV on the DV via the mediator.

suggesting that aggression is strongly associated with suicidal behavior in individuals with AUD (sher, 2006; Conner & Duberstein, 2004). It was predicted that aggression would be associated with acquired capability for suicide. The results revealed that aggression was related to acquired capability for suicide. Within the context of the theory, this finding suggests that aggressive individuals are more vulnerable to developing acquired capability for suicide, which is a particular risk factor for suicide (Bender, Anestis, Anestis, Gordon, & Joiner, 2012). Also, the finding that acquired capability for suicide is significantly associated with suicidal behavior supports the central ideas of IPTS. We hypothesized that the association between aggression and suicidal behavior would be mediated by acquired capability for suicide. Consistent with prediction, the results indicate that aggression has an indirect relationship with suicidal behavior, and that relationship is mediated by acquired capability for suicide. Suicidal behavior is a frightening and physically demanding endeavor and, as the IPTS posits, individuals may need to "practice" it in order to become capable of enacting lethal self-harm (Fink, Bodell, Smith, & Joiner, 2013). Our findings suggests that AUD individuals who have higher aggression are more likely to attempt suicide in part because they become fearless to death and insensitive to physical pain.

Additionally, among the four dimensions of aggression, only physical aggression has an indirect relationship with suicidal behavior and that relationship is mediated by acquired capability for suicide. Within the context of the theory, this may indicate that people who express their aggression physically are more likely to engage in painful and provocative events and are thus more likely to have a lowered fear of death and an increased tolerance to the pain related to suicidal behavior (Ribeiro & Joiner, 2009; Smith & Cukrowicz, 2010). Our findings suggest that assessing aggression in individuals especially physical aggression, and acquired capability for suicide is likely to be helpful to predict suicide risk in individuals with alcohol use disorders. Other constructs of aggression, such as verbal aggression, anger and hostility did not have a significant association with acquired capability for suicide and suicidal behavior. This result is consistent with a current research finding, which revealed that anger is not uniquely related to acquired capability for suicide. When a factor of painful and provocative events was entered as a mediator, however, the link between anger and acquired capability for suicide was fully mediated by it (Hawkins et al., 2014). These results might infer that verbal aggression and hostility are indirectly associated with acquired capability for suicide by increasing the possibility to experience painful

and provocative events.

The association between aggression, acquired capability for suicide and suicidal behavior is also consistent with the neurological evidence. A large amount of studies have indicated that altered serotonergic function is associated with suicidal behavior (For a review, see Mann, 2002). Likewise, serotonin has been indicated as a potential biological marker that could parsimoniously explain suicide among individuals with AUD (Conner et al., 2008). It has been suggested that chronic alcohol intake may lead to a state of lowered central 5-HT functioning that is characterized by a propensity for disinhibited behavior, thus increasing the potential for aggressive behavior (Gorwood, 2001; Pihl & Lemarquand, 1998). These serotonergic functions and aggressive behaviors are also regarded as important precursors to individuals engaging in behaviors that increase their acquired capability for lethal self-injury (Ribeiro & Joiner, 2009).

The indirect effect sizes were low and the confidence interval in the study probably did not include zero but was nevertheless at a low level. Thus the results should be interpreted with caution. The smaller indirect effect sizes found in this is understandable considering that acquired capability is unlikely to be a single indicator of suicidal behavior. Indeed, in several IPTS studies, acquired capability for suicide did not seem to be related to clinician-rated risk

for suicide (Van Orden et al., 2008) or past suicide attempts (Anestis & Joiner, 2011; Monteith, Menefee, Pettit, Leopoulos, & Vincent, 2013). However the interaction between acquired capability and suicidal desire, which is composed of perceived burdensomeness and thwarted belongingness, was found to have an association with suicidal behavior in several studies (Anestis & Joiner, 2011; Monteith et al., 2013; Van Orden et al., 2008). Along these lines, further research is necessary to examine the interaction effects based on the IPTS to develop better and more comprehensive understanding suicidal behavior in AUD individuals.

There are several limitations to the current study. First, our samples comprised only male AUD individuals and most of these participants were also inpatients of treatment centers for alcohol use disorders. Therefore, it was impossible to examine potential gender differences in aggression, acquired capability for suicide, and suicidal behavior. Likewise, it is not possible to generalize the findings to non-treatment populations. The cross-sectional study design and the evaluation of suicidal behavior based on retrospective information are also limitations. Further study is needed to determine the causalities involved in the relations between aggression, acquired capability for suicide, and suicidal behavior. Although history of suicide attempt is a major risk factor for future suicide (Giegling et al., 2009), we

suggest that future research should consider other risk factors such as current suicidal ideation or suicide planning.

Although there are several limitations to the present work, our findings nevertheless underline the importance of aggression and acquired capability for suicide in understanding suicidal behavior in male AUD individuals. The results of the present study add to a previous understanding that aggressiveness contributes to suicidal behavior in alcohol dependent patients. Given the high rate of suicidal behavior among individuals with AUD, it is critical for suicide risk assessment to detect risk factors associated with suicidal behavior among individuals with AUD. Our findings indicate that assessing acquired capability for suicide could be helpful for suicide risk assessment, especially for identifying at-risk individuals. This would be particularly important when AUD patients express suicide ideation. The presence of suicide ideation accompanied by high level of acquired capability for suicide may lead to a greater possibility for making a lethal suicide attempt.

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알코올 사용 장애(Alcohol Use Disorders; AUD)를 가진 개인의 자살 행동 위험 요인 중 하나로 그들의 높은 공격성이 거론되어 왔으나 기저의 매커니즘에 대해서는 알려진 바가 적다. 이에 본 연구에서는 알코올 사용 장애를 가진 개인의 공격성이 자살 행동에 미치는 영향과 그 사이에서 습득된 자살 잠재력(자살 행동과 관련된 고통과 두려움을 이겨내고 자살을 실행할 수 있는 능력; Van Orden et al., 2010)이 가지는 매개효과를 검증하고자 하였다. 경인 지역에 위치한 알코올 중독 치료 센터에서 치료를 받고 있는 환자를 대상으로 설문을 실시하였다. 공격성과 습득된 자살 잠재력은 자기보고식 질문지를 통해 측정되었으며 자살 행동 위험은 연구 참여자의 과거 자살 시도에 대한 정보를 바탕으로 연구자가 평가하였다. 매개효과는 Preacher와 Hayes(2008)가 제안한 부트스트래핑 기법을 통해 분석하였다. 그 결과 공격성과 자살 행동의 관계에서 습득된 자살 잠재력의 부분매개효과가 확인되었다. 본 연구 결과는 알코올 사용 장애를 가진 개인의 자살 행동을 이해하는 데 있어 공격성과 습득된 자살 잠재력의 역할을 확인하였다는 점에서 의의가 있다. 알코올 사용 장애를 가진 개인의 자살 위험 평가에 있어 본 연구가 갖는 의의와 연구의 한계점에 대해 논의하였다.

주요어 : 공격성, 자살 행동, 알코올 사용 장애(AUD), 습득된 자살 잠재력