© Journal of the Indian Academy of Applied Psychology
July 2013, Vol.39, No.2, 182-188.

Effect of Level of Alcoholism and Personality on Cognitive Failure among Male Alcoholics

Shica Ann Joseph,
Sri Ramachandra Medical College and Research Institute, Chennai

D. Barani Ganth, and S. Thyagarajan
Pondicherry University, Puducherry

Alcoholism is a widely used term which is generally referred to chronic drinking, or periodic consumption of alcohol that is characterized by impaired control over drinking, chronic intoxication, preoccupation with drinking, impaired cognitive functioning, and changes in one's personality. The main objective of this study is to find out the difference in the levels of cognitive failure across different levels of alcoholism. This study also examined the correlation of the Big Five Personality dimensions with level of alcoholism and cognitive failure. The sample for the study consisted of 91 male participants who have the habit of drinking alcohol. Michigan alcoholism screening test (MAST) was used to categorize the participants into three groups (levels) of alcoholics. The Cognitive Failure Questionnaire (CFQ) was used to assess the cognitive functioning of the three groups. The Big Five Locator was administered to identify the individual's score on five different personality dimensions. Results indicated that the three groups of alcoholics differed significantly in their level of cognitive failure, i.e. the different levels of alcoholism significantly affect the degree of cognitive failure within an individual. Certain personality dimensions, along with level of alcoholism, significantly predict cognitive failure. Married men significantly differed from unmarried men in their level of alcohol consumption and degree of cognitive failure.

Keywords: Alcoholism, Personality, Cognitive Failure

Alcohol consumption is known to affect the cognitive functioning of an individual. The frontal lobe of the brain is the first organ to be affected, which leads to deficits in cognitive abilities of learning, organization, memory, and a range of executive functioning, apart from taking a toll on visuo-spatial and verbal abilities and the speed of information processing (Fein & Bachman,1990). Alcohol, being a neurotoxin, kills the red blood cells, thereby, reducing the oxygen supply to the brain (Dowieko, 2006). Literature examining the effects of alcohol on cognitive failure had a relatively long history. Many studies on alcohol and other substance use disorder have found that people tend to perform poorly on tasks assessing attention and/or functioning of the working memory using either vocal or auditory verbal stimuli (Duka, Townshend, Collier, & Stephens, 2003, Lober et al., 2009). Results from another study by Kim,Yoon, Lee,Choi and Go (2003) arrived at a conclusion that alcohol hangovers have a negative effect on cognitive functioning, mainly the higher cortical and visual functions in the left hemisphere and posterior right hemisphere. Although difference in memory and attention has been found with various substance uses, it is mainly associated with alcohol disorders.

The deficits in organic functioning and related cognitive and behavioral changes are related to the stage of alcohol consumption. At the initial stages of alcohol abuse, generally, the changes go unnoticed whereas during intermediate stages, one might experience decreased problem-solving and non-verbal abstracting skills, deficits in perceptual-spatial motor performance, and problems with short term memory and reduced new learning skills (Parsons, Butters & Nathan, 1987). During moderate alcoholism which is generally during the middle age, brain atrophy is common and may lead to cerebral shrinkage

(Oscar-Berman, 1992).With continued use of alcohol beyond middle age, permanent loss of short-term memory and loss of frontal lobe-related executive functioning is reported (Brokate et al, 2003). Alcohol use also results in the demyelination which leads to the reduction in neuron information transmission speed (Rosenbloom, Sullivan & Pfefferman, 2003).

Studies aimed to identify neurological deficits associated with chronic alcohol abuse found that a consistent pattern of intellectual and adaptive ability deficits associated with alcoholism (Chelune & Parker, 1981). Cognitive functioning such as abstract thinking and problem solving tend to be impaired as the level of alcohol consumed goes on increasing, whereas verbal skills and general psychometric intelligence remains intact. It is commonly known that alcohol consumption impairs information processing, although it is not clear if the impairment occurs in all the stages of information processing, or in the early rather than the later stages. Tzambazis (2000) examined the effects of orally-administered alcohol on both early and later stages of information processing and found that alcohol impairs the speed of information processing and simple and choice reaction time and differentially impairs higher-order cognitive abilities. Any cognitive deficit due to alcoholism might be linked to set of variables such as demographic (age, gender, income etc) drinking related (early, intermediate, chronic) and cognitive style variables, and is closely related with the functional impairment of the brain.

Apart from the above variables, another consideration on cognitive failure among alcoholics is the role of certain personality dimensions. In fact, certain personality dimensions predispose an individual for alcohol/ substance use, which, in turn, leads to cognitive failure. A study done by Cook, Young, Taylor, Bedfod, and Anthony (1998) showed that alcohol consumption is positively correlated with sociability and extraversion, and negatively with conscientiousness and willingness to conform. It was also shown that those who consume no alcohol are a little more withdrawn, a little less ambitious, a little less generally well organized and competent, than people who drink in moderate amounts. In a clinical study on Antisocial Personality Disorder (APSD), 'Alcohol, and Aggression' by Moeller and Dougherty (2001), it was found that people with ASPD have higher rates of alcohol-related problems, in turn, showing more aggressive behavior than those without ASPD. The link between alcohol and aggressive behavior may stem from biological factors, such as ASPD-related impairments in the functions of the neurotransmitters like serotonin or in the activities of executive brain regions.

Recent studies on the effect of personality on substance use have come out with evidence that certain personality dimensions foster substance use while some of them hinder the same and act as a moderator. Turiano, Whiteman, Hampson, Roberts and Mroczek (2012) in their study found that within the middle age, higher levels of neuroticism, extraversion, openness to experience, and lower levels of conscientiousness and agreeableness predicted the degree of substance use. They also added that an increase in neuroticism and openness predicted an increase in substance use such as smoking, drugs, and alcohol consumption, whereas an increase in conscientiousness and agreeableness predicted a decrease in substance abuse. It was emphasized that higher levels of conscientiousness leads to self regulatory behavior and moderates the role of other traits. Based on the literature review, the objectives of the present study were framed as under:

i. To study the correlation of personality dimensions with alcoholism and cognitive failure

ii. To examine the effect of level of alcoholism and personality on cognitive failure

iii. To identify the significant difference in the level of cognitive failure among the different levels of alcoholism.

iv. To study the role of marital status on level of alcoholism and cognitive failure

Method

Sample:

A total of 130 male participants residing in a metro city of Kerala, who have a habit of drinking

alcohol regularly, at least once a week, were approached using purposive and snowball techniques of sampling. Occasional and social drinkers were excluded. The measures were administered to them personally, and in some cases, through email. Out of the 130 men, 91 participants responded to the questionnaires administered to them. The age range was 24-63 years (mean age of 30.63) and they belonged to various socio-economic statuses (high, middle, and low).

Measures:

Michigan Alcoholism Screening Test (MAST): It was developed by Selzer (1971) as a self-report questionnaire that consists of 24 items. MAST is widely used in clinical and research settings to assess the level of alcoholism in an individual, and related behaviors in the various walks of life, such as social, occupational, legal, and family. MAST classifies the respondents into three categories such as normal drinker, early or middle drinker, and problem drinkers. MAST possesses good internal- consistency reliability as indicated by Cronbach's alpha coefficients of 0.83 - 0.93 (Gibbs, 1983). The test-retest reliability coefficient of the total MAST score as found by Zung (1982) ranged from 0.90 - 0.96. A study by Ross, Gavin and Skinner (1990) showed that MAST was highly correlated with Alcohol Dependence Syndrome (r=0.79) and with the presence of diagnosed alcohol disorders (r=0.69).

Cognitive Failure Questionnaire: It consists of 25 items, which measures the cognitive functioning of the individual in his daily activities, i.e, relating to everyday errors in perception, memory, and motor functions (Broadbent, Cooper,Fitzgerald & Parkes,1982). Total score ranges from 0-100; 0 indicates the absence of cognitive failure, higher the score, higher the degree of cognitive failure in the individual. Cronbach's alpha was found to be 0.81 by the authors. It also showed a test-retest reliability of r=0.824.

The Big Five Locator: A test developed by Howard et al. (1996) helps in assessing the various personality dimensions of the individual and is also used to assess team traits. The Big Five Locator is a quick and easy paper-pencil test with no time limit. Most respondents, however, will be able to complete the test in two minutes time. The five fundamental dimensions that the test measures are: negative emotionality, extraversion, openness to experience, agreeableness, and conscientiousness. Coefficient alpha as reported by the authors were negative emotionality -0.63, extraversion - 0.77, openness to experience- 0.69, agreeableness -0.74, and conscientiousness - 0.75.

Results

Table 1. Relationship of personality dimensions with alcoholism (MAST) scores and cognitive failure.

Personality Dimension	Cognitive Failure	MAST
Negative emotionality (B1)	0.268*	0.187
Extraversion (B2)	-0.101	-0.071
Openness to experience (B3)	0.188	0.228*
Agreeableness (B4)	-0.313**	-0.206*
Conscientiousness (B5)	-0.484**	-0.369**

*p<0.05, ** p<0.01

Perusal of table 1 shows that the personality dimensions, B4 (Agreeableness) with a value of -0.313 and -0.206 and B5 (Conscientiousness) with

Table 2: Contribution of Alcoholism score (MAST) and personality scores (The Big Five Locators) on Cognitive Failure

Variables	Beta Value	t-value	R square	Adjusted R square	â	F
MAST	0.486	5.765**				
Negative Emotionality(B1)	0.184	2.326*				
Extraversion(B2)	0.069	.839	0.522	0.488	44.874	15.305**
Openness toExperience(B3)	0.018	.216				
Agreeableness(B4)	-0.175	-2.039*				
Conscientiousness(B5)	-0.238	-2.806*				

*p<0.05, ** p <0.01

-0.484 and -0.369, have a significant negative correlation, with both MAST score and cognitive failure respectively, whereas B3 (Openness to experience), 0.228, has a significant correlation with MAST, and B1 (Negative emotionality), 0.268 with cognitive failure.

From Table 2, it is inferred that the total MAST score which indicates different levels of alcoholism and the different personality dimensions predicts the cognitive failure of an individual significantly. Both MAST scores and personality dimension together predict 49% of the variance in cognitive failure. Among all, the total MAST score emerges as the most significant predictor, followed by the personality dimensions of B5 (Conscientiousness) B1 (Negative emotionality), and B4 (Agreeableness) respectively.

Table 3. ANOVA and Post HOC tests for level of alcoholism (MAST) and cognitive failure scores

Category	N	Mean	F
Normal	30	32.27†	
Moderate	30	39.63†	30.56***
Problem	31	55.23†	

***p<0.001, †p<0.01

Table 3 shows the mean values of the three levels of alcoholism, ANOVA, and post hoc results. From the table, it can be inferred that the highly significant F ratio (30.56) shows that the three categories of drinkers are significantly different in their level of cognitive failure. The post hoc analysis shows that each group differs from other groups significantly, i.e the three groups are significantly different amongst each other. It can be seen that the problem drinkers, seem to have higher level of cognitive failure than the other two categories. Thus, it can be concluded that there is a progressive degeneration of one's cognitive functioning as the level of alcohol consumption increases.

Table 4: Mean and t-value of married and unmarried groups with regard to their level of alcoholism and Cognitive Failure

Variable	Unmarried (N=61)	Married (N=30)	t
MAST	5.03	3.00	3.210**
Cognitive Failure	45.16	37.13	2.451**

** p<0.01

From Table 4, it is evident that the mean value of MAST score among unmarried group is significantly higher than the married group, thus, providing evidence that unmarried participants tend to have a higher level of alcoholism than married participants. As in the case of MAST score, it is evident that the unmarried group of individuals significantly differs from the married group in terms of cognitive failure too.

Discussion

Looking at the correlation between personality dimensions with alcoholism and cognitive failure, it is seen that agreeableness and conscientiousness clearly have a significant negative correlation with alcoholism and cognitive failure, whereas openness to experience and negative emotionality have a significant positive correlation with both the variables. Past and recent literatures (Sadowski, & Cogburn, 1997; Soubelet, & Salthouse, 2011) emphasize the negative correlation of agreeableness and conscientiousness. Negative correlations found in terms of conscientiousness and agreeableness with alcohol and cognitive failure can be attributed to the systematization and organization that an individual adopts into his life. Incorporation of such personalities enables the individual to either abstain from alcohol or consume mild levels which will not affect their cognitive functioning in any area of their life. From the regression results, it can be said that MAST has a major positive effect on cognitive failure and conscientiousness has a negative effect on cognitive failure. It can be understood that while the level of alcoholism increases cognitive failure, conscientiousness tends to reduce the same. This finding confirms the previous research findings emphasizing the role of conscientiousness in reducing the risky behavior of substance abuse including alcoholism (Turiano et al., 2012)

Looking at the significant difference between the groups of alcoholics, normal, moderate and heavy drinkers are significantly different in cognitive failure scores. Also, it can be seen that each group individually differs from the other significantly. Evidently, as the level of alcohol consumed increases, there is a progressive degeneration of one's cognitive functioning. A

study done by Ozkaragoz, Satz and Noble (1996) corroborates with this finding adding support to the degenerative nature of alcoholism.

The results with regard to the marital status and alcoholism and cognitive failure is interesting as there is higher level of alcoholism and cognitive failure is reported among the unmarried group compared to the married group. It can be inferred that marriage moderates the level of alcohol intake and thereby, reduces cognitive failure. Studies with the objective of finding the role of marriage on alcoholism have found similar results. Leonard and Rothbard (1999), through their study, aimed to explain the marriage effect with respect to drinking and drinking problems. The authors were of view that married individuals consume lesser amounts of alcohol, and have fewer alcohol-related problems when compared to unmarried or divorced individuals. One possible explanation for this result could be the role change an individual undergoes after marriage. There is more responsibility as a husband to satisfy the needs of the spouse in terms of spending time, saving money for the family needs, and meeting out all other social expectation. There is enough social pressure too, as societal expectations and views on a bachelor are different from that of a married man.

Luoto, Poikolainen, and Utela (1998), in their study, sought to examine the relationship between an individual's alcohol consumption with demographic characteristics such as unemployment, education, marital status, and sex during times of both low and high unemployment. Results showed that during high unemployment period, poorly educated, single, unemployed men showed a significantly higher risk of upper-level alcohol consumption when compared to those men who were employed. As seen from the above mentioned studies, the transition from single to married life, leads to lesser intake of alcohol, as a result of which, married men tend to have lesser cognitive failures. Different phases of one's life cause a person to consume higher levels of alcohol. These include as an individual who is extrovert in nature, socially active, and adventurous, to be in sync with the social norms, who consumes large quantities of alcohol; on the other hand, poor education, relationship troubles, social rejection, unemployment, and other negative stressors can also lead to a person to consume high levels of alcohol. Such high levels impair the functioning on different parts of the brain leading to cognitive failures within the single man. Therefore, unmarried men, who drink uncontrollably, tend to show more cognitive failure as a result of the impairment caused to the frontal and prefrontal cortex of the brain due to the significantly high levels of alcohol consumed as when compared to married men.

Limitations

The study is cross-sectional in nature and hence, we are unable to understand the causal link between the predictor variables and dependent variable. In addition, this study adopted snowball sampling technique due to which the researchers had no control over the age range of the participants and the effect of age could not be studied. The study was conducted on a sample from one state and therefore, conducting studies on a larger scale involving participants from different cultures might lead to a better understanding of cultural differences with respect to alcoholism and its effect on cognitive failure.

Conclusion

The present study proved that the dimensions of personality namely, conscientiousness and agreeableness, had a significant negative correlation with alcoholism and cognitive failure, whereas negative emotionality and openness to experience had a significant positive correlation with both the variables. Alcoholism (MAST score) was proved to be a major contributing factor towards the cognitive failure of an individual. A significant difference was found among the three different groups of alcoholics, thereby, showing a significant difference in the degree of cognitive failure. Higher alcohol consumption leads to higher cognitive failure in the individual. Therefore, from the results and the supporting literature, we can conclude that high levels of alcohol consumption and an individual's personality contribute to cognitive failure in an individual. The results can be applied in family therapy setting and de-addiction counseling, wherein the clientele can

be educated on the ill-effects of continued use of alcohol, leading to cognitive failure and also, the role of personality in determining the alcoholism.

References

Blankfield, A (1982). Grief and Alcohol**:** *The American Journal of Drug and Alcohol Abuse*, *9*(4), 435-446.

Broadbent, D.E., Cooper,P.F., FitzGerald, P., & Parkes, K.R (1982). The Cognitive Failures Questionnaire (CFQ) and its correlates. *British Journal of Clinical Psychology*, *21,* 1-16.

Brokate, B., Hildebrandt, H.,Eling, P., Fichtner, H., Runge, K., & Timm, C. (2003). Frontal lobe dysfunctions in Korsakoff's syndrome and chronic alcoholism: Continuity or discontinuity? *Neuropsychology*, *17*, 420–428.

Caspi, A., Bogg, D., Dickson, N., Harrington, H., Langley, J., Moffit, T. E.,& Silva, P.A (1997). Personality differences predict health-risk behaviors in young adulthood: Evidence from a longitudinal study. *Journal of Personality and Social Psycholo*gy, *73*, 1052-1063.

Chelune, G.J., & Parker, J.B (1981). Neuro psychological Deficits Associated with Chronic Alcohol Abuse *Clinical Psychology Review*, *1(*2), 181-195.

Cook, M., Young, A., Taylor, D., & Bedford, A. P (1998). Personality Correlates of Alcohol Consumption. *Personality and Individual Differences*, *24*(5), 641-647.

Doweiko, H.F (2006). Concepts of chemical dependency (7th ed). Pacific Grove, Calif: Brooks/ Cole Publishing Co.

Duka, T., Townshend, J.M., Collier, K, & Stephens, D.N. (2003). Impairment in Cognitive Functions after Multiple Detoxification in alcohol inpatients. *Alcoholism: Clinical and Experimental Research*, *27*, 1563-1672

Fein, G., & Bachman, L (1990).Cognitive Impairments in Abstinent Alcoholics. *Western Journal of Medicine*. *152,* 531-537.

Gibbs, L. E. (1983). Validity and reliability of the Michigan Alcoholism Screening Test: A review. *Drug and Alcohol Dependency*, *12,* 279-285.

Hasin, D.S., & Grant, B.F (1987). Neuropsychological Functioning in Alcoholics: Psychiatric Co-morbidity, Drinking History, and Demographic Characteristics. *Comprehensive Psychiatry*, *28* (6), 520-529.

Hoaken, P.N.S., Giancola, P.R., & Pihl, R.O (1997). Executive Cognitive Functions as Mediators of Alcohol- Related Aggression. *Alcohol & Alcoholism*, *33* (1), 47-54.

Howard, P.J., Medina, P.L., & Howard, J.M (1996). The big five locator: A quick assessment tool for consultants and trainers. San Diego, CA: Pfeiffer & Company.

Kaplan, H.I., & Benjamin, J.S (1985). Modern Synopsis of Comprehensive Textbook of Psychiatry/IV (4th ed); Baltimore, USA: Williams &Wilkins.

Kim.D.J.,Yoon.S.J., Lee.H.P., Choi.B.M., & Go.H.J. (2003).The Effects of Alcohol Hangover on Cognitive Functions in Healthy Subjects. *International Journal of Neuroscience*, *113*, 581–594.

Leonard, K.E., & Rothbard, J.C (1999). Alcohol and the marriage effect. *Journal of Studies on Alcohol* (Suppl. 13):139–146.

Loeber, S., Duka, T. Welzel H, Nakovics H, Heinz A, Flor H, & Mann K (2009). Impairment of Cognitive Abilities and Decision Making after Chronic Use of Alcohol: The Impact of Multiple Detoxifications. *Alcohol and Alcoholism, 44*, 372-381.

Luoto, R., Poikolainen, K., & Uutela, A (1998). Unemployment, sociodemographic background and consumption of alcohol before and during the economic recession of the 1990s in Finland. International Journal of Epidemiology, *27*, 623-629.

Oscar-Berman (1992).Cognitive Brain Deficits Associated with Alcohol Abuse: Treatment Implications. *The American Association of Behavioral and Social Sciences Journal*, *15.*142-151.

Ozkaragoz, T., Satz, P., & Noble, E.P (1996). Neuropsychological Functioning in Sons of Active Alcoholic Fathers, Recovering Alcoholic and Social Drinking Fathers**.** *Journal of Alcohol, 14* (1), 31-37.

Pasrsons, O.A., Butters, N., & Nathan, P.E (1987). Neuropsychology of alcoholism: Implications for diagnosis and treatment. New York: Guilford Press.

Rosenbloom, M.J. Sullivan, E.V. & Pfefferbaum, (2003) A. Using magnetic resonance imaging and diffusion tensor imaging to assess brain damage in alcoholics. *Alcohol Research & Health,* 27,146–152.

Ross, H. E., Gavin, D. R., & Skinner, H. A. (1990). Diagnostic validity of the MAST and the Alcohol

Dependence Scale in the assessment of DSM-III alcohol disorders. *Journal of Studies on Alcohol, 51*, 506-513.

Sadowski, C. J., & Cogburn, H. E. (1997). Need for cognition in the Big-Five factor structure. *Journal of Psychology, 131,* 307-312.

Selzer, M.L. (1971). The Michigan Alcoholism Screening Test. The Quest for a New Diagnostic Instrument. *American Journal of Psy*chiatry, *3*,176-181.

Soubelet, A. & Salthouse, T. A. (2011). Personality-Cognition Relations across Adulthood. *Developmental Psychology, 47*(2), 303-310.

Turiano, N.A., Whiteman, S.D., Hampson, S.E., Roberts, B.W., & Mroczek, D.K (2012). Personality and substance use in midlife: Conscientiousness as a moderator and the effects of trait change. *Journal of Research in Personality*. *46*, 295–305.

Zung. B.J (1982). Evaluation of the Michigan Alcoholism Screening Test in assessing lifetime and recent problems. *Journal of Clinical Psychology*, *38*(2), 425-39.

Received: October 24, 2012
Revised: January 31, 2013
Accepted: April 30, 2013

Shica Ann Joseph, Trainee Clinical Psychologist, Sri Ramachandra Medical College and Research Institute, Chennai

D. Barani Ganth, Assistant Professor, Department of Applied Psychology, Pondicherry University, Puducherry – 605 014

S. Thyagarajan, PhD, Assistant Professor, Department of International Business, Pondicherry University, Puducherry – 605 014