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Research Paper

Metacognition and Empathy among Patients with Alcohol Use Disorder: Moderating Role of Psychoticism

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ABSTRACT

Alcohol Use Disorder (AUD) is a common and a serious mental health condition. It has serious social, psychological and physical repercussions and impacts millions of people globally (APA, 2013). **Objective:** This study aimed to examine the moderating role of psychoticism in the relationship between metacognition and empathy among early- and late-onset patients with AUD. **Method:** Cross-sectional design was employed, 80 men diagnosed with AUD were recruited from various rehabilitation centres based in Delhi- NCR, who completed AUDIT, PAMS & NAMS, EQ-28 and EPQ-RS. **Results:** Independent t-test revealed no statistically significant differences between groups on any measured variables. Correlation analyses revealed a significant positive correlation between negative metacognitive belief and AUD in both groups and a moderate negative correlation between empathy and AUD in the late onset group. In either group, psychoticism did not significantly moderate the relationships between the measured variables as indicated by moderation analyses. However, it revealed that AUD was a significant positive predictor of negative metacognitive beliefs in both AUD groups and a significant negative predictor of empathy deficit in late onset AUD group. **Discussion:** Findings suggest that the severity of AUD is predicted by negative metacognitive beliefs, and that empathy deficits in late-onset group are associated with excessive drinking. These results emphasise the clinical importance of incorporating empathy-focused and metacognitive interventions into the AUD treatment. Personalised approaches based on the age of onset show particular promise. Future longitudinal research is required to elucidate the relationships between these constructs, which could potentially improve treatment outcomes. While emphasising the necessity of more sensitive personality assessments in clinical practice.

Keywords: *Alcohol Use Disorder, Metacognition, Empathy, Psychoticism*

Alcohol Use Disorder (AUD) is a common and a serious mental health condition marked by excessive drinking practices that impair functioning and cause discomfort. It has serious social, psychological, and physical repercussions and impacts millions of people globally (APA, 2013). The National Survey on Extent and Pattern of Substance Use in India (2019), estimated an overall AUD prevalence of 14.6%, with 2.7% dependent alcohol use and 5.2% hazardous and harmful drinking patterns

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(Ambedkar et al., 2019). Similarly, the 2016 National Mental Health Survey (NMHS) in India, which included participants aged 18 and above from 12 states, found an AUD prevalence of 4.7%, with a higher incidence among men (9.1%) compared to women (0.5%) (Gururaj et al. 2016). To address AUD, a variety of treatment approaches have been developed which includes pharmacological interventions (e.g., disulfiram), cognitive-behavioral therapy (CBT), motivational enhancement therapy, 12-step facilitation programs, skills-based relapse prevention, coping strategies, and family therapy (Kadden, 1995). However, even with effective psychological interventions, the success rates remain limited, with relapse and a return to dysregulated alcohol use being common outcomes. Understanding the psychological factors that lead to AUD is therefore, crucial for developing more effective prevention and treatment strategies.

The age at which an individual first consumes alcohol is a critical predictor of alcohol-related problems. Research by Fischer et al. (2015), has shown that an early onset of alcohol use is associated with a lower quality of life and an increased risk of developing AUD. Early initiation of alcohol consumption is also linked to a higher likelihood of psychiatric disorders (Kessler et al., 1997; SAMHSA, 2013) and psychosocial challenges (Falk et al., 2008; Hawkins et al., 1997; Shrier et al., 1997). Therefore, examining whether early or late onset to alcohol influences AUD symptoms and hinder recovery.

Metacognition and Alcohol use

Metacognition, which involves the knowledge and processes in appraising, controlling, and monitoring one’s thoughts (Wells, 2000) has been applied to conceptualize and treat conditions such as depression and anxiety with significant success (Normann et al., 2014; Wells, 2009). More recently, it has also been suggested as a useful framework for understanding and addressing AUD (Spada & Wells, 2005, 2006; Spada et al., 2013, 2015). Individuals with AUD may use alcohol as a means of cognitive and emotional regulation (Spada & Wells, 2005 & 2007; Ipek et al., 2015). The Self-Regulatory Executive Function (S-REF) model has provided new understandings of the role of metacognition in psychopathology during the past 25 years (Wells and Matthews, 1994 & 1996; Wells, 2000). The processes that monitor, generate and sustain intrusive and biased cognitive experiences over the content itself are at the core of the S-REF model (Wells, 2009). According to this, when people are in distress, the Cognitive- Attentional Syndrome (CAS) is activated, maintaining psychological conditions which is a dysfunctional coping mechanisms. It has recently been suggested that AUD can be treated using the metacognitive model (Spada and Wells, 2005 & 2006; Spada et al., 2013 & 2015). Adopting more adaptive metacognitive beliefs, like “Thoughts are not facts” or “My worry is controllable,” could inhibit the activation of CAS and support recovery.

According to research, there are two types of metacognitive beliefs about alcohol use (Spada & Wells, 2008): Negative metacognitive beliefs, are the belief that alcohol-related thoughts are dangerous and should be controlled e.g., “thinking about drinking is dangerous and should always be avoided” (Spada and Wells, 2005 & 2006; Spada et al., 2009 & 2013). Positive metacognitive beliefs, are the beliefs about outcome expectancy related to the use of alcohol e.g., “drinking reduces my anxious feelings"(Wells, 2009). These kinds of beliefs are crucial in encouraging people to use alcohol as a way to regulate their cognitive and affective states and were found in studies that sought to understand the structure of alcohol-specific metacognitive beliefs in problem drinkers (Spada et al., 2007a). This metacognitive approach has been suggested as a way to conceptualise AUD in research conducted in the past ten years (Spada et al., 2013 & 2015; Caselli et al., 2013a). When combined, these findings lend support to the S-REF model's suitability for conceptualizing the onset and maintenance of AUD and raise the possibility that metacognitive therapy (Wells, 2009) could be helpful in its treatment.

Empathy and Alcohol Use

Empathy is the capacity to understand and share the feelings of others, often seen as a key factor in social relationships and emotional well-being (Decety, 2004). Previous researches have reported lower levels of empathy in patients with alcohol dependency (Maurage, 2011; Martinotti, 2009). Interestingly, while some of the studies suggested a general empathy deficit (Martinotti, 2009). In contrast, Schmidt et al., (2016) study identified no general empathy deficit in AUD individuals using self-report measures. Research consistently demonstrates that males tend to report lower levels of empathy than women, particularly on self-report questionnaires. In a non-referred sample of white men, Neumann and colleagues in (2008) study, demonstrated a correlation between alcohol use and empathic deficits in adults.

However, this correlation was not observed in a racially diverse sample of 196 men and 318 women, nor in women or African Americans.

Empathy's and its components demonstrates a complex relationship with age. Kumar et al., (2022), discovered that older individuals exhibit more significant empathy deficits, associated with increased alcohol consumption. In contrast, Ziaei et al. (2021) study, found that aged individuals were more involved in brain regions of the salience network when it came to cognitive empathy towards negative emotions. Consequently, it can be concluded that the relationship between empathy and alcohol use disorder is intricate and requires further investigation to facilitate a more comprehensive understanding. The role of empathy in a psychotherapeutic relation is a key factor that needs to be assessed in order to plan the suitable approach for the patient. An impairment in the ability to understand the mental and affective state of others could be at the root of the high levels of impulsivity, aggression, and antisocial behaviour, which represent key characteristics of some typologies of alcoholics (Decety, Jackson, 2004). Additionally, Neumann et al. (2003), investigated the potential for traits such as impulsivity to interfere with the development of empathy. It thus appears crucial, at clinical as well as theoretical levels, to further explore the extent of these emotional deficits in alcoholism, as several affective abilities have not yet been satisfactorily evaluated.

Psychoticism and Alcohol Use

Personality traits have also gained scientific attention in the study of alcoholism (Wiesbeck et al., 2004; Weijers et al., 1999, 2001 & 2003; Thome et al., 1999; Fallgatter et al., 1998). Impulsivity, interpersonal hostility, aggression, and a lack of empathy are characteristics of psychoticism. A higher likelihood of substance use disorders, especially AUD, is frequently linked to high degrees of psychoticism (Eysenck, 1990). Müller et al., (2007), discovered that psychoticism was one of the two most significant discriminatory parameters and was the first node in the model, correctly classifying 64% of the patients as relapsed and 12% as abstinent. According to Heath et al., (1997) study, men who scored at least 75th on the EPQ psychoticism scale were at risk for alcohol dependency, but not women. Further, Reddy et al., in (2020), revealed that 65.93% of the 100 AUD patients had strong psychoticism traits. These people had a higher chance of developing severe AUD and starting drinking earlier in life. Psychoticism was substantially associated with both early alcohol use (before the age of

18) and prolonged duration of AUD, indicating a loop which increases the severity of AUD and vice versa. Results may be enhanced by integrated therapies that address maladaptive personality factors as well in AUD.

The degree to which metacognition, empathy, and alcohol consumption are related can be influenced by psychoticism. Few research have specifically examined the relationship between AUD and personality traits like psychoticism in India, despite the fact that AUD is a significant public health issue in India. A Cross-Sectional Study from Central Rural India (Gedam & Patil, 2018) concluded that, personality traits may be linked to poor treatment outcomes and have an impact on the intensity of alcohol use. Therefore, in order to improve outcomes, clinicians must address personality factors during AUD treatment (Soundararajan et al., 2017).

REVIEW OF LITERATURE

Metacognition and Alcohol Use

Spada et al. (2005), revealed that alcohol use were found to be positively and significantly correlated with metacognitions. Improvisato et al. (2024), further showed that metacognitive beliefs is the most reliable predictors of alcohol addiction. They contribute to the initiation and maintenance of alcohol intake (Hamonniere et al., 2020). Wherein, negative metacognitive beliefs about alcohol consumption had a higher overall score than positive beliefs, and that metacognitive beliefs had an impact on the onset and maintenance of emotional dysregulation (Ottonello et al., 2019). Men and early drinkers consumed more alcohol, and reported higher psychological distress which further contributes to alcohol-related harm and may explain the influence of early drinking onset on alcohol use patterns (Ruiz et al., 2020).

Empathy and Alcohol Use

Kumar et al. (2022), demonstrated that patients with alcoholism have lower empathy wherein, older people have greater deficits. This was supported by Nachane et al. (2021) study, revealed that alcohol addicts had lower cognitive, emotional, and overall empathy. Martinotti et al. (2009), also found that alcohol-dependent patients had considerably lower levels of empathy. As alcohol dependency has deleterious effects on empathy ability, and cognitive and emotional functions which can improve with abstinence (Almila et al., 2016). In contrast, Maurage et al. (2011), concluded that alcoholism is not associated with a general empathy deficit when psychiatric comorbidities are controlled for; rather, it is associated with a dissociated pattern that combines impaired affective empathy and preserved cognitive empathy.

Psychoticism and Alcohol Use

Psychoticism trait were shown to have average emotional stability, acquire severe AUD, and begin drinking alcohol at a young age (Reddy et al., 2020). Sher et al. (2000), also found out that alcohol dependence was specifically predicted by psychoticism. Müllera and Weijersb et al. (2008), further demonstrated that psychoticism is a usable predictor for the risk of relapse in alcohol-dependent patients. However, alcohol dependence was associated with being in at least the 75th percentile on the EPQ psychoticism scale in men, but not in women (Heath et al., 1997). Rankin et al. (1982), also indicated that the Clinical Alcohol Personality was associated with high Psychoticism in men which may indicate stable predisposition. In contrast, Mulder (2002), determined that personality variables account for only a minor portion of the risk of alcohol dependence. An alcoholic personality does not exist, nor are there personality measures that are tailored to the risk of developing alcohol dependence in the future.

Rationale of The Study

Understanding metacognition and empathy are essential components of therapeutic interventions for AUD. Alcoholism is linked to empathy and metacognition, although their combined impact on AUD remains unknown. In order to address this gap, this study investigates the complex interplay between these cognitive-emotional processes, with an emphasis on the modulation of these interactions by personality traits such as psychoticism and the impact of alcohol consumption on their onset. The mechanisms by which psychoticism influences interactions between metacognition and empathy remain unknown; however, this study addresses this theoretical gap. The distinction between early-onset and late-onset AUD is significant as it may exhibit different cognitive-emotional profiles. The comprehension of these relationships could facilitate the development of personalized treatment protocols that cater to the cognitive-emotional vulnerabilities of various AUD subgroups, thereby enhancing treatment outcomes in this clinical population.

METHODOLOGY

Objectives of the Study

- To assess the levels of metacognition, empathy, and psychoticism among early- and late-onset patients with AUD.
- To study the relationship between metacognition and empathy among early- and late-onset patients with AUD.
- To examine the moderating effect of psychoticism on the relationship between metacognition and empathy among early- and late-onset patients with AUD.

Study Design

The study employed a cross-sectional design to examine the moderating role of psychoticism in the relationship between metacognition and empathy among early- and late-onset patients with AUD.

Sample

Based on G-power analysis, study included a sample population of 80 individuals diagnosed with AUD. Through purposive sampling method, participants were recruited from various rehabilitation centres based in Delhi- NCR receiving treatment for AUD. The sample was divided into two groups: Early-onset AUD (>25 Years) and Late- onset AUD (<25 Years).

Selection Criteria

Inclusion Criteria

- Individuals aged 18-50 years diagnosed with AUD, encompassing only male participants.
- Patients who were stable and capable of providing informed consent.

Exclusion Criteria

- Patients already diagnosed with any severe psychiatric disorders (e.g., schizophrenia, bipolar disorder).
- Patient using any other substances (other than alcohol, except nicotine).
- Patients with any cognitive impairments.
- Those under the influence of alcohol or other substances during data collection.

Instruments

1. **Socio Demographics Questionnaire** Participants were asked to report their name (optional), age, education qualifications, socio-economic status, marital status, religion, any history of psychiatric or medical illness and age of onset of alcohol use.
2. **Montreal Cognitive Assessment (MoCA)** (Dr. Ziad Nasreddine, 1995) is a 30-point screening tool used to detect mild cognitive impairments. It assesses skills like attention, focus, executive functioning and short-term memory. It has high test-retest reliability and internal consistency. For example, a study found that the MoCA had a test-retest reliability with ICC value of 0.912 and a Cronbach's alpha of 0.867.
3. **Alcohol Use Disorders Identification Test (AUDIT)** (WHO; Babor, de la Fuente, Saunders, & Grant, 1992) is a 10 items questionnaire that screens for hazardous and harmful alcohol consumption to assess severity of alcohol-related problems. It has demonstrated high internal consistency across various populations, with Cronbach's alpha values ranging from 0.80 to 0.95. It has good test-retest reliability, studies have shown reliability coefficients typically above 0.80 after short intervals (e.g., 2 weeks). The test has good content, construct and criterion validity and has been reported to have high sensitivity (around 0.80-0.90) and specificity (around 0.80-0.85).
4. **The Positive Alcohol Metacognitions Scale (PAMS)** (Spada and Wells, 2008) is a 12- item scale assessing positive metacognitions about alcohol use. It consists of two factors: (1) about emotional self-regulation; and (2) about cognitive self-regulation. Participants are asked to indicate how much they agree with each of the statements when they begin drinking.
   The Negative Alcohol Metacognitions Scale (NAMS) (Spada and Wells, 2008) is a 6-item scale assessing negative metacognitions about alcohol use. It consists of two factors: (1) about uncontrollability; and (2) about cognitive harm. Participants are asked to indicate how much they agree with each of the statements when they have stopped a session drinking. Both scales have demonstrated good internal consistency in various studies. The PAMS has reported Cronbach's alpha values between 0.85 and 0.91, and the NAMS has values between 0.87 and 0.92. The scales have also shown satisfactory test-retest reliability, good convergent and discriminant validity.
5. **Empathy Quotient Short Scale (EQ-28)** (Baron-Cohen & Wheelwright, 2004) is a 28-item version commonly used for quicker assessments to measure empathy. The shorter version retains the reliability and validity of the full scale while being more efficient to administer. It has overall good validity and scale reliability (Cronbach's $\alpha = 0.89$) with good consistency and good test–retest reliability across a time spans of 15 months.
6. **The Eysenck Personality Questionnaire Revised Short Scale (EPQ-RS)** (Eysenck, Eysenck, and Barrett, 1985) consists of 24 items, for assessment of the fundamental personality trait of psychoticism and a validity scale (lie scale). It shows satisfactory internal consistency, with Cronbach's alpha values typically around 0.50–0.70 (the P scale tends to have lower reliability across studies due to the heterogeneity of the construct) and for Lie (L): 0.70–0.80. Studies have shown moderate to high test-retest reliability across all scales, ranging from 0.70 to 0.90 over short intervals along with good convergent and discriminant validity.

Statistical Analyses

The collected data was analysed using SPSS 30.0 software version, applying various statistical methods: Descriptive statistics to summarize demographic and psychological variables. Shapiro-Wilk test to assess the normality and Independent samples t-tests to compare early onset and late onset AUD groups across all the research variables. Pearson Correlation were conducted separately for early onset and late onset AUD groups to examine relationships between metacognition, empathy, psychoticism, and AUD followed by Moderation analysis using Hayes' PROCESS macro (Model 1) to examine the moderating effect of psychoticism on the relationship between metacognition and empathy among early and late onset AUD patients.

Procedure

After obtaining confirmation of the synopsis from the research ethical committee, the individuals fulfilling the criteria were taken for the study. An informed consent was signed and only then we proceeded with the collection of data. After that, the six self-report questionnaires were filled, collected and interpreted according to their norm and scoring table in accordance with the latest APA guidelines.

RESULTS

Demographic Characteristics of Participants

The socio-demographic profile of the sample (N = 80) revealed an equal distribution of early and late onset of alcohol use disorder, with 50% each. The mean age of the sample was 36.8 years with ages ranging from 18 to 50 years. The education qualification distribution reveals a well-educated sample with 63.7% of participants hold higher education qualifications (graduate or post-graduate). In terms of religious affiliation, Hinduism was predominant (78.8%). Most respondents resided in urban areas (70%). Marital status data showed that 65% were married, with the remainder being unmarried (11.3%), divorced (10%), separated (5%), or single (8.8%). Socioeconomic status was primarily middle class (52.5%), with 28.7% in the upper and 18.8% in the lower strata. None of the participants reported any history of psychiatric or mental illness.

Descriptive Statistics

Descriptive statistics were computed for all study variables comparing early and late onset AUD groups, with each group containing 40 participants. The early onset group demonstrated slightly higher AUD (using AUDIT) severity scores (M = 27.50, SD = 6.15) compared to the late onset group (M = 26.60, SD = 7.33), though both groups showed similar variability. Metacognitive beliefs showed minimal differences between groups, with PAMS scores being slightly higher in the early onset group (M = 5.50, SD = 0.88) versus the late onset group (M = 5.12, SD = 0.83), while NAMS scores remained nearly identical across groups (early: M = 14.50, SD = 5.93; late: M = 14.53, SD = 5.29). Empathy scores were slightly higher in the late onset group (M = 30.75, SD = 8.29) compared to the early onset group (M = 29.65, SD = 9.07). EPQ-R (Psychoticism) scores were nearly equivalent between groups, and mean score of MoCA for early-onset group is M=28.28 (SD=1.281), while the late-onset group showed a slightly lower mean score of M=27.80 (SD=1.344). The distribution characteristics revealed similar variability between groups, with early-onset MoCA scores ranging from approximately 26.0 to 30.0 and late-onset MoCA scores spanning 25.5 to 29.1 based on ±1 SD from the mean. All skewness and kurtosis values fall within acceptable ranges (±2.0) for normal distribution assumptions within each onset group, which supports the use of parametric statistical analyses for subsequent group comparisons.

Table 1. Descriptive Statistics by Onset Age Groups

Variable	Early Onset (n = 40)		Late Onset (n = 40)	
	M	SD	M	SD
PAMS	5.50	0.88	5.12	0.83
NAMS	14.50	5.93	14.53	5.29
EQ-28	29.65	9.07	30.75	8.29
EPQ-R (Psychoticism)	1.74	0.43	1.72	0.50
AUD	27.50	6.15	26.60	7.33
MoCA	28.28	1.28	27.80	1.34

Note. PAMS = Positive Alcohol of Metacognition Scale; NAMS = Negative Alcohol of Metacognition Scale; EQ-28 = Empathy Quotient-28; Psychoticism = EPQ-R Psychoticism Scale; AUD = Alcohol Use Disorder severity; MoCA = Montreal Cognitive Assessment.

Independent sample t-test Analysis

Independent samples t-tests were conducted to compare early onset (n = 40) and late onset (n= 40) AUD groups across metacognition, empathy, and psychoticism. Levene's test for equality of variances was non-significant for all variables, indicating homogeneity of variance assumptions were met. Results revealed no statistically significant differences between groups on any measured variables. The PAMS showed the largest difference, approaching significance ($t(78) = 1.963$, $p = .053$, Cohen's $d = .439$). NAMS scores were virtually identical between groups ($t(78) = -.020$, $p = .984$, Cohen's $d = -.004$). Empathy scores showed minimal differences ($t(78) = -.566$, $p = .573$, Cohen's $d = -.127$). Psychoticism scores were nearly equivalent across groups ($t(78) = .169$, $p = .866$, Cohen's $d = .038$). Effect sizes were generally small to negligible, suggesting that onset age does not substantially differentiate these psychological constructs in AUD patients.

Table 2. Independent t test of variables

Variable	t	df	p	F	Sig	Cohen's d
PAMS	1.963	78	.053	0.614	.436	.439
NAMS	-0.020	78	.984	0.514	.476	-.004
EQ-28	-0.566	78	.573	0.084	.773	-.127
EPQ-R (Psychoticism)	0.169	78	.866	1.089	.330	.038

All Levene's tests for equality of variances were non-significant ($p > .05$).

Correlation Analysis

Correlation analyses were conducted separately for early onset (n = 40) and late onset (n = 40) AUD groups to examine relationships between positive and negative metacognitive belief (PAMS and NAMS), empathy (EQ-28), psychoticism (EPQ-R), and AUD severity(AUDIT). In the early onset group, a significant strong positive correlation emerged between negative metacognitive belief and AUD severity ($r = .465$, $p = .003$). For the late onset group, two significant correlations were identified: a strong positive correlation between negative metacognitive belief and AUD severity ($r = .502$, $p < .001$) and a moderate negative correlation between empathy (EQ-28) and AUD severity ($r = -.387$, $p = .014$).

Table 3. Correlation Analysis of Metacognition, Empathy and Psychoticism among early onset patients with Alcohol Use Disorder (n = 40)

	PAMS	NAMS	EQ-28	AUD	EPQ-R
PAMS	1	.283	.020	.259	.255
NAMS		1	-.056	.465**	.122
EQ-28			1	-.166	-.096
AUD				1	-.039
EPQ-R (Psychoticism)					1

**p<0.01. *p<0.05.

Table 4. Correlation Analysis of Metacognition, Empathy and Psychoticism among late onset patients with Alcohol Use Disorder (n = 40)

	PAMS	NAMS	EQ-28	AUD	EPQ-R
PAMS	1	.205	.001	.026	-.213
NAMS		1	-.229	.502**	-.143
EQ-28			1	-.387*	-.010
AUD				1	.138
EPQ-R (Psychoticism)					1

**p<0.01. *p<0.05.

Moderation Analysis: Psychoticism as Moderator among early onset patients with AUD

Table 5. Moderation Analysis: Psychoticism as Moderator among early onset patients with AUD (n = 40)

Outcome	Predictor	B	β	SE	t	p
PAMS	Constant	5.50	_	0.13	41.86	< .001
	AUD Severity	0.04	.218	0.02	1.96	.057
	EPQ-R (Psychoticism)	0.47	.241	0.32	1.49	.144
	AUD × Psychoticism	0.057	.183	0.05	1.17	.250
NAMS	Constant	14.52	_	0.85	17.02	< .001
	AUD Severity	0.46	.465	0.14	3.24	.003
	EPQ-R (Psychoticism)	1.67	.112	2.05	0.82	.419
	AUD × Psychoticism	0.226	.124	0.32	0.71	.482
EQ-28	Constant	29.70	_	1.45	20.49	< .001
	AUD Severity	0.284	.178	0.24	1.17	.251
	EPQ-R (Psychoticism)	-2.50	-.092	3.48	-0.72	.477
	AUD × Psychoticism	0.502	.087	0.54	0.93	0.359

Moderation of Metacognition (PAMS) by Psychoticism (EPQ-R) among early onset patients with AUD

A moderation analysis using Hayes' PROCESS macro (Model 1) was conducted to examine whether psychoticism moderated the relationship between AUD severity and positive metacognitive beliefs (PAMS) among early onset AUD patients. The overall model was not statistically significant, $F(3, 36) = 2.43$, $p = .082$, $R^2 = .17$, indicating that AUD severity, psychoticism, and their interaction accounted for 16.8% of the variance in PAMS scores. Neither the main effect of AUD severity (B = 0.043, β = .218, p = .057) nor psychoticism (B = 0.47, β = .241, p = .144) reached statistical significance, and the interaction term was also non-significant (B = 0.057, β = .183, p = .250).

Moderation of Metacognition (NAMS) by Psychoticism (EPQ-R) among early onset patients with AUD

The moderation analysis for negative metacognitive beliefs (NAMS) in the early onset AUD group revealed a statistically significant overall model, $F(3, 36) = 3.73$, $p = .020$, $R^2 = .24$, with the predictors explaining 23.7% of the variance in NAMS scores. AUD severity was a significant positive predictor of NAMS (B = 0.464, β = .465, p = .003). However, neither psychoticism (B = 1.67, β = .112, p = .419) nor the interaction term (B = 0.226, β = .124, p =.482) were significant.

Moderation of Empathy (EQ-28) by Psychoticism (EPQ-R) among early onset patients with AUD

For empathy (EQ-28), the moderation model in early onset AUD was not statistically significant, $F(3, 36) = 1.00$, $p = .534$, $R^2 = .06$. AUD severity (B = 0.284, β = .178, p = .251), psychoticism (B = -2.50, β = -.092, p = .477), and their interaction (B = 0.502, β = .087, p =.359) all failed to reach significance.

Moderation Analysis: Psychoticism as Moderator among late onset patients with AUD

Table 6. Moderation Analysis: Psychoticism as Moderator among late onset patients with AUD (n = 40)

Outcome	Predictor	B	β	SE	t	p
PAMS	Constant	5.09	_	0.13	39.15	<.001
	AUD Severity	0.008	.067	0.02	0.43	.668
	EPQ-R (Psychoticism)	-0.43	-.235	0.27	-1.61	.116
	AUD × Psychoticism	0.068	.281	0.04	1.60	.119
NAMS	Constant	14.45	_	0.73	19.68	<.001
	AUD Severity	0.387	.502	0.10	3.82	<.001
	EPQ-R (Psychoticism)	-2.44	-.210	1.51	-1.61	.116
	AUD × Psychoticism	0.150	.108	0.24	0.62	.539
EQ-28	Constant	30.80	_	1.27	24.21	<.001
	AUD Severity	-0.447	-.385	0.18	-2.55	.015
	EPQ-R (Psychoticism)	0.834	-.041	2.61	0.32	.752
	AUD × Psychoticism	-0.105	-.047	0.42	-0.25	.802

Moderation of Metacognition (PAMS) by Psychoticism (EPQ-R) among late onset patients with AUD

In the late onset AUD group, the moderation analysis for PAMS was not statistically significant, $F(3, 36) = 1.51$, $p = .228$, $R^2 = .11$. AUD severity (B = 0.008, β = .067, p = .668), psychoticism (B = -0.43, β = -.235, p = .116), and their interaction (B = 0.068, β = .281, p =.119) were all non-significant predictors of positive metacognitive beliefs.

Moderation of Metacognition (NAMS) by Psychoticism (EPQ-R) among late onset patients with AUD

The moderation model for NAMS in late onset AUD was statistically significant, F(3, 36) = 5.28, p = .004, R^2 = .31, with predictors explaining 30.6% of the variance. AUD severity was a strong and significant predictor (B = 0.387, β = .502, p < .001), indicating that greater AUD severity was associated with higher levels of negative metacognitive beliefs. Psychoticism (B= -2.44, β = -.215, p = .116) and the interaction term (B = 0.150, β = .108, p = .539) did not reach significance, indicating no moderation effect.

Moderation of Empathy (EQ-28) by Psychoticism (EPQ-R) among late onset patients with AUD

For empathy (EQ-28) in the late onset AUD group, the overall moderation model was not significant, F(3, 36) = 2.17, p = .108, R^2 = .15. However, AUD severity was a significant negative predictor (B = -0.447, β = -.385, p = .015), indicating that higher AUD severity was associated with lower empathy. Psychoticism (B = -0.834, β = -.041, t = 0.32, p = .752) and the interaction term (B = -0.105, β = -.047, p = .802) were not significant, confirming no moderation effect.

DISCUSSION

AUD is a prevalent and significant mental health problem characterised by excessive drinking that impairs functioning and causes discomfort which affects millions worldwide and has major social, psychological, and bodily effects (APA, 2013). This study examined how psychoticism moderates metacognition and empathy in early- and late-onset AUD patients. This prepares for discussion of their therapeutic implications for improved comprehension and targeted interventions in AUD treatment settings.

It was found that participants with early onset alcohol use disorder (AUD) exhibited a slightly higher degree of AUD severity which is in accordance with the research conducted by Pombo et al. in (2009 and 2015), which suggested that type II alcohol-dependent drinkers who have an early onset of problem drinking and also have severe alcohol-related issues than type I patients. Empathy (EQ-28) scores were slightly higher in the late onset group (M = 30.75, SD = 8.29) compared to the early onset group (M = 29.65, SD = 9.07) which was corroborated by Walsh et al. (2007), who found that empathic deficits were linked to lower age of onset of substance use.

As hypothesised, Independent samples t-tests showed no significant differences in negative metacognition, empathy, or psychoticism between early- and late-onset AUD groups. However, early-onset AUD had a near-significant trend towards higher PAMS scores (p=.053) which supports previous findings that early alcohol use may reinforce positive metacognitive beliefs (e.g., “Drinking reduces anxiety”) about alcohol's role in emotional and cognitive regulation.

As posited, in both groups, negative metacognition (NAMS) strongly correlated with the severity of AUD (r=.465 early, r=.502 late; p<.01) which substantiated the metacognitive model of AUD, which posits that negative beliefs (e.g., "I can't control my drinking") perpetuate dysregulated use (Spada & Wells, 2008; Caselli et al., 2018). Nevertheless, empathy (EQ-28) exhibited an inverse correlation with AUD severity only in late-onset patients (r=−.387, p=.014), indicating that empathy may serve as a protective factor in later-onset AUD, which is in accordance with findings of Kumar et al. (2022) and Martinotti et al.

(2009), that identified generalised empathy deficits in AUD. The lack of a direct link between metacognition and empathy is in contrast to theoretical models, but it is consistent with the findings of Baltariu et al. (2024), who discovered empathy deficits that were specific to behavioural domains in AUD, rather than cognitive or affective domains.

In either group, psychoticism did not significantly moderate the relationships between metacognition, empathy, and AUD severity, as indicated by moderation analyses (Hayes' PROCESS) (all $p > .05$). This is in stark contrast to Reddy et al. (2020) study, which established a correlation between severe AUD and high psychoticism. However, this finding draws similarity with the findings of Sher and colleagues (2000) study, which stressed that personality does not cause alcoholism but rather has many links to it and studying these linkages is complex and requires precise research methodologies wherein, personality must be considered with other aspects to fully comprehend alcoholism, using a variety of scientific models and methods. Additionally, this may be indicative of the EPQ-RS's limited reliability for psychoticism ($\alpha = 0.50–0.701$) as supported by Canals et al. (1997) study, which suggested adding the additional scale to the EPQ-R to better understand addiction-related personality traits. However, EPQ is a key Eysenck's measure because it's widely utilised and consistently linked to substance use (Acton, 2003). Conversely, trait-like vulnerabilities such as metacognitive dysfunction and empathy deficits in AUD may exist independently of personality (Kopera et al., 2018).

The moderation analysis for negative metacognitive beliefs (NAMS) in both AUD groups showed a significant model ($F(3, 36) = 3.73$, $p = .020$, $R^2 = .24$ early; $F(3, 36) = 5.28$, $p = .004$, $R^2 = .31$ late), with predictors explaining 23.7% and 30.6% of variation of NAMS scores respectively which is consistent with Hamonniere and Varescon (2018) study, where negative metacognitive beliefs, can perpetuate or intensify AUD symptoms as a maladaptive coping strategy. Higher AUD severity was linked with decreased empathy in the late onset AUD group ($B = -0.447$, $\beta = -.385$, $p = .015$) independently of psychoticism which is corroborated by Kumar, et al., (2022) study, which discovered that older individuals exhibit more significant empathy deficits and thus being associated with increased alcohol consumption. These findings show that metacognitive belief and empathy are crucial to determining AUD severity across onset groups.

CONCLUSION

In the present study, the roles of metacognition and empathy in patients with Alcohol Use Disorder (AUD) were examined, with a focus on the moderating effect of psychoticism and a comparison of early- and late-onset AUD groups. Although no substantial group differences were identified between early and late-onset participants. This investigation contributes to the comprehension of cognitive-emotional mechanisms in AUD by emphasising the centrality of negative metacognitive beliefs in the severity of AUD across onset groups, thereby corroborating the metacognitive model (Spada et al., 2013). Regardless of the age at which AUD is diagnosed, negative metacognitive beliefs are reliable indicators of its severity. Early- onset AUD exhibited a trend towards more positive metacognitive beliefs, whereas late-onset AUD was associated with excessive drinking and empathy deficits. In contrast to expectations, psychoticism did not moderate these relationships, indicating that metacognitive and empathetic impairments in AUD may be the primary treatment targets, irrespective of personality. The significance of psychoticism in AUD necessitates a revaluation using more sensitive measures. These results emphasise the importance of interventions that are metacognitively and empathy focused personalised treatment that is based on the age at which alcohol use began.

Limitations

Although this research offers valuable insights, it is important to recognise several limitations in order to contextualise the results. First, the capacity to draw causal inferences is limited by the use of a cross-sectional methodology. Second, the results' generalisability is restricted by the exclusive incorporation of male participants. Third, the potential for social desirability and subjective biases may be introduced by the reliance on self-report questionnaires employed in this study. When interpreting the study's conclusions and designing future research, it is important to take these limitations into account.

Implications

The study's findings that negative metacognition predicts AUD severity across onset groups and that empathy's protective role in late-onset AUD has major theoretical, practical, and therapeutic implications. The findings support Spada and Wells' (2008) metacognitive model by showing that AUD is linked to negative metacognition regardless of age. However, early-onset patients have a near-significant rise in positive metacognitive beliefs, suggesting that cognitive mechanisms are controlled by age, requiring theoretical expansion. The inverse connection between AUD severity and empathy in late-onset patients undermines the assumption that AUD patients lack empathy. Without psychoticism's moderating effect, personality-AUD interactions may be trait-specific rather than broad-spectrum, requiring a re- evaluation of personality-pathology models. The evidence proposes to include metacognitive screening in conventional AUD risk assessments to identify vulnerable individuals in community and preventative settings. Clinically, metacognitive interventions and empathy- focused therapies were stressed for AUD treatment. Based on age of onset, personalized methods are promising. These constructs' linkages must be clarified through longitudinal study to improve treatment outcomes. Emphasizing the need for more sensitive personality assessments in clinical practice, such theoretical advances are linked to practical, therapeutic, and public health solutions.

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