

Decision Making, Emotion Recognition and Childhood Traumatic Experiences in Murder Convicts Imprisoned with Aggravated Life Sentence: A Prison Study

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ABSTRACT

Introduction: Decision-making and emotion recognition are two fundamental themes in social cognition. Disorders in these areas can lead to interpersonal, psychosocial, and legal problems for the individual and society. The likelihood of consequent aggression and crime makes them foci of forensic psychiatry over time. In this study, two developmental disorders that have a clear relationship with crime, that are antisocial personality disorder (ASPD), and psychopathy are investigated for their relationship with these social cognitive deficits.

Methods: The present study involved 23 male prison inmates who were diagnosed with both antisocial personality disorder and psychopathy, as well as 23 control participants who were matched for age, gender, and level of education. Following the psychiatric interview, Reading the Mind in the Eyes Test (RMET), the Iowa Gambling Test (IGT), Toronto Alexithymia Scale (TAS), Defense Styles Questionnaire (DSQ), Childhood Psychic Trauma Scale (CTQ), Hare Psychopathy Checklist (PCL-R) were administered to all participants.

Results: The results of the study showed that ASPD group performed statistically worse than healthy controls in TAS, CTQ, all items of DSQ, PCL-R Factor 1 and 2, and all the IGT scores ($p < 0.05$). There were no statistically significant difference between in the RMET test performances

Conclusion: These results suggest that ASPD and psychopathy lead to impaired decision-making behaviors due to the inability to recognize one's own emotions and impulsivity, and that these characteristics play a critical role in the criminal behavior of individuals. In addition, contrary to expectations, the results of affective theory of mind assessed with the RMET showed similar characteristics in homicide convicts and healthy controls. These data indicate the need for further research in the field of forensic psychiatry.

Keywords: Antisocial personality disorder, criminality, decision making, forensic psychiatry, psychopathy, social cognition

Cite this article as: Çıkrıkçılı U, Yıldırım E, Buker S, Ger C, Erözden O, Gürvit H et al. Decision Making, Emotion Recognition and Childhood Traumatic Experiences in Murder Convicts Imprisoned with Aggravated Life Sentence: A Prison Study. Arch Neuropsychiatry 2025;62:20–26.

INTRODUCTION

Impairments in social cognitive domains can lead to serious social problems like ostracization and criminal behavior (1,2). Among the different developmental psychiatric disorders, antisocial personality disorder (ASPD) and psychopathy stand out as primary causes of a constellation of problematic interpersonal and social features, including impulsivity, poor emotional recognition of the self (alexithymia), and other (affective empathy and theory of mind) leading to brutality, aggression, violent acts, hence criminality (2–5). These disorders can lead to sociological, legal, and psychiatric complications, which may subsequently cause a series of interrelated issues (6).

Antisocial personality disorder is closely associated with criminal behavior and presents significant challenges to mental health professionals and society regarding prognosis, dynamics, and treatment. The etiology is complex, involving factors such as childhood trauma, genetic, environmental and psychosocial factors, comorbid psychiatric disorders.

Highlights

- Future Myopia is directly related to risky decision-making processes in psychopathy
- Impaired emotion recognition and decision-making behaviour is closely related to crime
- Difficulty in emotion recognition is a common finding in ASPD and psychopathy

Understanding the relationships between defense mechanisms, trauma, emotion recognition, and risk-taking behaviors can help to enhance the information on the development of effective treatments for individuals with these disorders (7).

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Received: 03.04.2024, **Accepted:** 21.08.2024, **Available Online Date:** 20.02.2025

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Psychopathy is recognized as a personality disorder characterized by a multifaceted presentation involving affective, interpersonal, lifestyle, and antisocial features. Despite its estimated prevalence in the general population hovering around 1%, individuals with psychopathy typically exhibit deficiencies in affective processing, including a marked absence of empathy, guilt, or remorse, alongside shallow affect. Interpersonally, they often demonstrate traits of grandiosity, arrogance, and manipulateness.

Closely aligned with Antisocial Personality Disorder (ASPD), psychopathy shares strong associations with criminal behavior, aggression, and developmental disorders, influenced by both environmental and genetic factors. It is noteworthy that a substantial majority (approximately 80–90%) of individuals diagnosed with psychopathy also meet the criteria for ASPD, whereas a smaller proportion (25–40%) of those diagnosed with ASPD would meet the criteria for psychopathy. Consequently, the clinical relationship between ASPD and psychopathy remains characterized by its intricate and multifaceted nature (8). Psychopathy and ASPD exhibit overlapping tendencies in their disregard for societal norms and the rights of others, yet they diverge notably in their clinical presentations. Psychopathy is characterized by a constellation of interpersonal and affective traits, including superficial charm, grandiosity, and a deficit in empathy or remorse. In contrast, ASPD is primarily defined by behavioral patterns such as impulsivity, irresponsibility, and engagement in criminal conduct.

It is important to understand the underlying factors that contribute to the behavior of individuals with psychopathy and ASPD, especially in the context of serious criminal offenses. This study aimed to examine the relationships between defense mechanisms, trauma, emotion recognition (self and others), risk-taking behaviors of individuals with ASPD and psychopathy who had been convicted of murder. Our main hypothesis was that the convicts would perform poorly on emotion recognition process of social cognition.

METHODS

Participants, instruments and data acquisition

The study enrolled 23 male individuals who were incarcerated for murder in the Turkish Ministry of Justice Silivri Penal Institution. All of them had received the maximum possible sentence of life imprisonment according to Turkish penal law. Same number of healthy individuals who did not have any criminal record matched for age, sex, and education was also included. Prisoner lists were prepared by the prison social worker. The interviews were conducted inside Prison No. 7, with only the inmate and the psychiatrist meeting, respecting the patient's privacy. Two security guards were standing outside the room for security reasons. A total of three interviews were conducted with each prisoner and examinations and tests were completed.

The same psychiatrist (UÇ), evaluated the inclusion and exclusion criteria for both groups and the medical histories of the convicts were discussed with the institution's psychiatrist. A detailed sociodemographic form was used during the interviews. Structured clinical interviews were conducted by the same psychiatrist. The scales and tests were administered by the two neuropsychologists (EY and SB).

Inclusion criteria for the patient group (prisoners) were: diagnosis of ASPD using the Structured Clinical Interview/Clinical Version (SCID-I/CV) for DSM-5, a psychopathy score of 25 or above according to Hare Psychopathy Checklist criteria, to be convicted of committing brutal murder according to Turkish Penal Code, age between 18–60, literacy and voluntary participation.

Exclusion criteria were: diagnosis of schizophrenia, schizoaffective disorder, not otherwise specified psychotic disorder, bipolar disorder, generalized anxiety disorder using the Structured Clinical Interview for DSM-V (SCID); diagnosis of major depressive disorder with active treatment; diagnosis of substance/drug addiction during the interviews; intellectual disability; acute or chronic physical disease impairing the general medical condition or a neurological condition affecting mental functioning. Although a total of 35 inmates were examined, 12 were excluded due to exclusion criteria. Three inmates were excluded from the study due to the presentation of symptoms consistent with major depressive disorder, one inmate due to generalized anxiety disorder, and another due to an atypical psychotic disorder. Additionally, other inmates opted not to participate in the interviews voluntarily.

The characteristics of prisoners related to their conviction are summarized in Table 1.

The study was ethically evaluated and approved by the Clinical Research Ethics Committee of İstanbul University İstanbul Faculty of Medicine. (2016-1274). Written informed written consent was obtained from all participants prior to their participation in the study. International code of ethics and agreements signed with inmates and Ministry of Justice officers

Tests and scales

Psychopathy Checklist-Revised (PCL-R)

It is a semi-structured interview consisting of 20 items that assess two factors of psychopathy: Factor 1 (affective/interpersonal features) and Factor 2 (antisocial behaviors). Factor 1 is mostly associated with Narcissistic Personality Disorder, decreased anxiety level, empathy, and risk of suicide, while Factor 2 is mostly associated with Antisocial Personality Disorder, social deviance, seeking sensation, and higher suicidal risks. According to this system, a score of 0–8 is considered very low (Level 1), 9–16 is low (Level 2), 17–24 is medium (Level 3), 25–32 is high (Level 4), and 33–40 is very high (Level 5). In Europe, a cutoff score of 25 is often used for diagnosing psychopathy in prisoners. In Türkiye, a validity and reliability study of the PCL-R was conducted by Tütüncü et al. in 2015, using materials translated into Turkish by Ger et al. (9) Overall, the PCL-R is widely regarded as the gold standard for assessing psychopathy and has been extensively used in research and validated in various populations (10,11).

Iowa Gambling Test (IGT)

IGT is a psychological test developed by Bechara and Damasio in 1994 to measure decision-making abilities in uncertain and risky situations (12). The Turkish validity and reliability study was conducted by İçelliöğlü-Şandor (13). In the computer-based version of the test used in the study, participants are presented with four decks of 100-cards labeled A, B, C, and D, a \$2000 debt, and an earnings display. The cards are characterized such that decks A and B are high-risk/high-reward cards (disadvantageous), while decks C and D are low-risk/low-reward cards (advantageous). The goal of the game is to accumulate as much positive value as possible, and participants are instructed to pay attention to the cards and make their selections accordingly.

Toronto Alexithymia Scale (TAS-20)

The TAS-20 is a self-report questionnaire that evaluates the alexithymia symptoms of the participants, with three subscales that measure difficulties in identifying, describing feelings, and externally oriented thinking. The questionnaire items are scored on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The total TAS-20 score, ranging from 20 to 100, is calculated by summing the scores

of all 20 items, with higher scores indicating more severe alexithymia symptoms (14,15).

Defense Style Questionnaire (DSQ)

The DSQ is a self-assessment scale consisting of 72 items and considers three different factors: Primitive, Neurotic, and Mature defense styles. These defense styles are further divided into 20 specific defense mechanisms. The Mature defenses include *sublimation, humor, anticipation, and suppression*, while the Neurotic defenses include *deconstruction, pseudo-altruism, idealization, and reaction-formation*. The Primitive defenses include *projection, passive aggression, acting-out, isolation, devaluation, autistic fantasy, denial, displacement, division (dissociation), splitting, rationalization, and somatization*. (16–18).

Childhood Trauma Questionnaire (CTQ)

It assesses five forms of childhood trauma, including physical, emotional, and sexual abuse, as well as physical and emotional neglect. The CTQ is a self-reported scale using a five-point Likert-type scale. Three of the 28 questions measure the minimization factor, and scores obtained from positive statements are reversed (20,21).

Reading the Mind in the Eyes Test (RMET)

The RMET consists of 36 items in its original format, each presenting a photograph of an individual’s eyes without the rest of their face visible. Participants are then asked to choose from four responses that they believe best represents the person’s mental state or emotion. The test is designed to measure a person’s ability to infer mental states and emotions from visual cues, particularly the subtle cues conveyed by the eyes. The RMET has been used extensively in research on autism and other conditions that affect social cognition and communication (19,22).

Statistical evaluation

The IBM Statistical Package for Social Sciences (SPSS) program version 22 was used to analyze the statistical findings from the study and methods

used are shown below the tables. We evaluated the suitability of the parameters for normal distribution using the Kolmogorov-Smirnov and Shapiro-Wilk tests. The Student t-test was used for comparisons between two groups for normally distributed parameters, while the Mann Whitney U test was used for comparisons between two groups for non-normally distributed parameters such as time spend in prison, severity and type of crime. Sociodemographic data and results of questionnaires were compared using Fisher’s Exact Chi-square test, Fisher Freeman Halton Exact Chi-square test, and Continuity (Yates) Correction. Multivariate analysis was conducted using linear regression. Pearson correlation analysis was used to analyze the relationships between parameters that conformed to normal distribution like digital Iowa Gambling Test results, questionnaires and IQ test.

Significance was evaluated at p<0.05.

RESULTS

The comparison of the two groups showed no statistically significant differences in terms of mean age, marital status, educational status (p>0.05). These results indicate that the two groups were well-matched in terms of demographic.

Table 1 shows information on the type and nature of the sentences received by the prisoners. There was a statistically significant difference between the two groups in terms of time spent in prison, type and severity of offense, and substance abuse. The antisocial/psychopathic group had a higher rate of substance abuse (p<0.05) and mixed substance use disorder (52.2%) and cannabis use (17.4%). In contrast, the rate of nicotine use disorder was higher in the control group (52.2%). There was also a statistically significant difference in the military service status of the groups, which can be seen in Table 2.

Significant distinctions emerged in the scores of the majority of other scales, consistently demonstrating superiority in favor of the control group. Defense style questionnaire mature, neurotic, and primitive defense mechanism scores (p=0.003; p=0.012; p=0.001).

Table 1. Characteristics of prisoners related to their conviction

		Prisoner group (n=23)
		Mean ± SD (median)
Time spend in prison		90.78±51.57 (84)
Severity of crime	None	-
	Mild violence	1 (4%.3)
	Moderate violence	1 (4%.3)
	Moderate to severe violence	1 (4%.3)
	Very severe violence - tormenting	20 (87%)
Type of crime Leading to prison classification between only single murder to crimes added to murder	None	0 (0%)
	Murder	1 (4%.3)
	Bodily harm	1 (4%.3)
	Multiple crimes (1-4)	9 (39%.1)
	Multiple crimes (5-8)	8 (34%.8)
	More than 8	4 (17%.4)

U: Mann-Whitney U Test; *p<0.05

Table 2. Comparison of sociodemographic characteristics of prisoner and control groups

		Prisoner group (n=23)	Control group (n=23)	U/ χ^2	p
		Mean \pm SD (median)	Mean \pm SD (median)		
Age		37.7 \pm 7.91 (37)	38.78 \pm 7.5 (38)	236.500	0.537
Education level	Primary	5 (21%.7)	7 (30%.4)	0.668	0.943
	Secondary	10 (43%.5)	9 (39%.1)		
	High school	6 (26%.1)	5 (21%.7)		
	University	2 (8%.7)	2 (8%.7)		
Marital status	Married	10 (43%.5)	16 (69%.6)	3.679	0.353
	Single	10 (43%.5)	6 (26%.1)		
	Divorced	2 (8%.7)	1 (4%.3)		
	Widower	1 (4%.3)	0 (0%)		
Pre-prison Employment status	Qualified self-employed	1 (4%.3)	0 (0%)	26.163	0.001*
	Merchant	5 (21%.7)	0 (0%)		
	Manager in the private sector	4 (17%.4)	0 (0%)		
	Civil servant in the private sector	0 (0%)	1 (4%.3)		
	Worker in public sector	0 (0%)	13 (56%.5)		
	Worker in private sector	13 (56%.5)	9 (39%.1)		
Military status	Finished with success	7 (30%.4)	19 (82%.6)	13.690	0.002*
	Exempt for psychiatric reason	3 (13%)	0 (0%)		
	Finished with punishment	6 (26%.1)	1 (4%.3)		
	Exempt (for any reason)	1 (4%.3)	1 (4%.3)		
	Not done yet	6 (26%.1)	2 (8%.7)		
Alcohol consumption Before prison	None	5 (21%.7)	16 (69%.6)	14.612	0.002*
	Social drinker	6 (26%.1)	6 (26%.1)		
	Intermittent reactive	4 (17%.4)	0 (0%)		
	Regularly (2–3 glass/day)	5 (21%.7)	1 (4%.3)		
	Regularly (at least 1 bottle/day)	3 (13%)	0 (0%)		
Drug use (Pre-prison period For prisoners)	None	4 (17%.4)	10 (43%.5)	32.333	0.001*
	Cannabis	2 (8%.7)	0 (0%)		
	Nicotine	1 (4%.3)	12 (52%.2)		
	Mixed	12 (52%.2)	0 (0%)		

Fisher-Freeman-Halton Exact Test; *Fisher's Exact Test; **Continuity (yates) Correction; *p<0.05

Childhood trauma questionnaire physical abuse scores (p=0.009), TAS-20 score (p=0.029) and PCL-R interpersonal and affective, social deviation, and total scores (p=0.001) were higher in the antisocial/psychopathic group. There was no statistically significant difference between the groups in terms of CTQ emotional abuse, sexual abuse, emotional neglect, physical neglect, and total scores (p>0.05).

The study found no statistically significant difference between the antisocial/psychopathic group and the control group in terms of IQ scores, as well as the RMET female, male, negative, positive, neutral, and total scores (p>0.05).

Iowa gambling test 1st block, 2nd block, total money amount, and score-debt scores of the antisocial/psychopathic group were significantly lower than the control group (p=0.008; p=0.032; p=0.009; p=0.001).

PCL-R scores were found to be significantly correlated with Childhood Physical Trauma Exposure, Alexithymia, and DSQ scores, but not with RMET scores. The relationship between the scale total scores and subscale scores of the groups can be seen in Table 3.

DISCUSSION

Our data suggests that individuals diagnosed with ASPD and psychopathy exhibit a significant difference from the control group in terms of alcohol

Table 3. Evaluation of the groups in terms of scale total score and sub-dimension scores

	Antisocial/ psychopathic group (n=23)	Control group (n=23)	t	p
	Mean ± SD	Mean ± SD		
Toronto alexithymia scale	60.91±15.34	52.22±10.32	2.255	0.029*
DMT mature	54.78±11.22	44.83±10.29	3.138	0.003*
DMT neurotic	50.13±12.59	41.17±10.64	2.606	0.012*
DMT primitive	122.17±23.35	88.26±23.62	4.897	0.001*
CTQ emotional abuse	8.91±4.99	7.09±2.37	1.585	0.123
CTQ physical abuse	8.83±5.74	5.35±0.78	2.879	0.009*
CTQ sexual abuse	5.87±2.4	5.13±0.34	1.463	0.157
CTQ emotional neglect	10.7±5.09	11.39±4.55	-0.489	0.627
CTQ physical neglect	9.39±3.75	7.78±2.95	1.616	0.113
CTQ total	43.48±16.63	36.74±6.88	1.796	0.083
RMET woman	8.17±2.42	8.78±2.21	-0.889	0.379
RMET man	12.09±2.43	12.26±2.16	-0.257	0.799
RMET negative	6.39±1.56	6.83±1.7	-0.905	0.370
RMET positive	4.04±1.49	3.83±1.4	0.509	0.613
RMET neutral	9.83±2.33	10.39±2.37	-0.816	0.419
RMET total	20.3±4.18	21.04±3.9	-0.620	0.539
IGT 1. block	-6.96±7.55	-0.61±8.03	-2.761	0.008*
IGT 2. block	-3.22±10.54	3.57±10.17	-2.220	0.032*
IGT total amount of money	-10.17±15.88	2.96±16.57	-2.744	0.009*
IGT score-debt	-1504.78±679.04	-657.17±751.14	-4.014	0.001*
IQ	97.43±22.78	99.35±19.46	-0.306	0.761
PCL-R interpersonal and emotional	10.39±1.56	2.13±1.14	20.510	0.001*
PCL-R social deviant	15.22±2	1.96±1.77	23.816	0.001*
PCL-R total	26.91±2.02	4.52±2.23	35.654	0.001*

t: Student t test; *Fisher's Exact Test; **Continuity (yates) Correction; *p<0.05

and substance use, unemployment, experiencing problems during military service. These findings are consistent with existing literature indicating that such individuals have difficulty maintaining a stable life trajectory, aggressive behavior towards themselves and others, and a disregard for rules and regulations (23,24).

Article 82 of the Turkish Penal Code numbered 5237, defines the murder cases as due to *monstrous feelings* or *killing by torture*. There are two issues that has not been completely agreed-upon issues. Murder with a monstrous feeling is a form of killing based entirely on the motive of the perpetrator. The monstrous feeling is a crime that attracts the public consciousness and moral reaction, exhibits a certain disproportion in quantitative terms, and harbors a brutal and savage evil (25).

Here, a cold-blooded act such as killing just for the sake of killing is understood, while in the act of killing by torture, planning to torment and torturing the person to be killed before the act of killing, inflicting torment on the person to be killed and engaging in brutal practices is understood here. According to the Turkish penal code, the first offense is punished with life imprisonment, while the second offense is punished with aggravated life imprisonment. The Severity of Crime in Table-2 is a legal classification examined accordingly (26).

Upon examining the type and number of crimes committed by individuals with high psychopathy scores, it is observed that 21 individuals have been involved in multiple crimes. This information is associated with both their diagnosis of ASPD and their high psychopathy scores. The data is consistent with the literature that suggests a positive relationship between crime and psychopathy. Furthermore, upon examining the types of crimes committed, it was found that 20 of the convicted murderers used '*extreme violence*' while committing their crimes, which was associated with increased psychopathy scores (27–29). To prevent violence, individual training has been shown to be effective in teaching avoidance of impulsive reactions and developing effective emotion recognition strategies. In addition, the use of low-level defenses is a classic literature finding in individuals diagnosed with ASPD (30).

When examining the DSQ responses in our study, it was observed that the scores of the prisoners for *Primitive*, *Neurotic*, and *Mature* defenses were higher than the control group scores. While the subject group's dominantly use Primitive defenses was an expected, we related the use of other two defense mechanisms to the high psychopathic scores of the individuals (31–34). We concluded that the prisoners with high psychopathy scores tried to manipulate and portray a different personality profile to the examining physician by exhibiting a deceptive behavior (35).

Childhood traumas such as physical and sexual abuse, and exposure to domestic violence are important risk factors for the development of ASPD and psychopathy (36). The physical and psychological effects of these traumas can be seen in adult life. Studies have shown that reactive aggression is related to physical abuse in individuals with ASPD and psychopathy when compared to individuals with ASPD alone and no criminal record. Physical abuse is considered to be one of the factors affecting reactive aggression in high-psychopathy scorers who commit highly repetitive violent crimes, individuals with proactively aggressive behaviors, and children with flattened emotions. The impact of physical trauma on this group is consistent with the literature (7).

The results of the RMET showed that there was no significant difference between psychopathic individuals and normal controls in terms of this affective ToM measure. However, it is interesting to note that psychopathic individuals had difficulty recognizing fearful and sad facial expressions despite performing within normal limits on the test overall (37,38). While the general consensus is that psychopathic individuals do not show any impairment on the RMET and it is not related to their psychopathy scores, a study by Ali and Chamorro-Premuzic found a correlation between RMET scores and inter-personal and affective traits, although no significant correlations were found with psychopathy measures (39).

In any case, the proposition of John and Quay in 1962 that “*The psychopath can thus be said to be the one who knows the words but not the music; the denotative meaning of words and phrase may be intact, but the connotative emotional or motivational component is lost*” generally overlaps with the observed emotional deficit. TAS-20 scores show that the ASPD/ Psychopathy group has impaired emotion recognition function, in line with the literature.

Based on the results of the Iowa Gambling Task, it appears that individuals with both ASPD and psychopathic traits have higher debt and lower scores compared to the control group. This suggests that these individuals may engage in more risky behavior reflecting their impulsive decision-making processes. Based on previous studies, it has been shown that when comparing individuals with alcohol addiction and a diagnosis of ASPD to those without, healthy controls have higher IGT scores (30).

ASPD-diagnosed addicts have a slower and less successful decision-making process, starting with advantageous cards but ultimately shifting towards disadvantageous ones in the final block. This suggests that individuals with impulsive traits struggle to make advantageous decisions and maintain their performance. The difficulty in evaluating, interpreting, and making inferences about the future consequences of current situations, displaying immediate reward tendencies, coined as “myopia for the future,” by Damasio et al., who also developed the IGT (12,40). The IGT was instrumental in the development of Damasio’s “Somatic Marker Hypothesis.”(41). This hypothesis has provided us with important insights into the decision-making processes of Acquired Sociopathy and Developmental Sociopathy. Studies indicate that a significant theorem is that acquired sociopaths lose their guiding somatic markers following damage to the ventromedial prefrontal cortex (vmPFC), whereas developmental psychopaths may never have developed these markers (42,43). These findings contribute to explain the impairment in decision-making processes in Psychopathy and Antisocial Personality Disorder, which are developmental disorders.

As a result the main limitation of this study is the difficulty in working with a challenging group, which can make collaboration and maintaining a long-term relationship with them difficult. Additionally, there may be concerns about the accuracy of information provided by this group, which may require repeated questioning to verify its accuracy. Another limitation is the small sample size, which may not provide a representative picture

of the population under study. Future studies should consider working with larger and more diverse samples to enhance the generalizability of findings. One of the other primary limitations of the study is the absence of a cognitive theory of mind assessment. Future research should incorporate cognitive theory of mind measures, such as faux-pas and false belief tests to provide a more comprehensive understanding of the subject under investigation. The absence of empathy scales is also a limitation.

Based on our study, the main finding is that there is impaired decision-making in individuals who have been convicted of murder and have both ASPD diagnosis and high psychopathy scores. These individuals also have difficulties recognizing and expressing their own emotions, have experienced childhood traumatic events, and use different defense mechanisms, indicating a heterogeneous group. With these findings, it has been shown once again that decision making process is impaired in ASPD, which is a developmental disorder. We believe that conducting a detailed study on individuals diagnosed with Antisocial Personality Disorder who have received life imprisonment and have high psychopathy scores would make a significant contribution to the literature of forensic psychiatry. The fact that such a comprehensive study has not been conducted on this group before would facilitate future detailed research on this topic.

This study suggests that repeating our analyses with a larger sample of patients, with a more comprehensive battery of tests for social cognition, and maybe with the addition of Galvanic Skin Recording could increase the reliability of our findings. This would enable us to better understand these groups, facilitate the implementation of medico-socio-legal measures, and potentially provide new alternatives for treatment when needed.

Ethics Committee Approval: The study was ethically evaluated and approved by the Clinical Research Ethics Committee of Istanbul University Istanbul Faculty of Medicine. (2016-1274).

Informed Consent: Written informed written consent was obtained from all participants prior to their participation in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept- UÇ; Design- UÇ, HG, CG; Supervision- UÇ, BS; Resource- UÇ; Materials- UÇ; Data Collection and/or Processing- UÇ, EY, SB; Analysis and/or Interpretation- UÇ, HG, OE; Literature Search- UÇ; Writing- UÇ; Critical Reviews- HG, OE.

Conflict of Interest: The authors declared that there is no conflict of interest.

Financial Disclosure: The authors whose names are listed immediately below certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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