Examining Impulsivity, Risk Perception, and Gender Disparities among Incarcerated Individuals in Lahore

Sadain Raza
University of Peshawar
*** Email**: sadainrza.gs6@gmail.com

Citation | Raza. S, "Examining Impulsivity, Risk Perception, and Gender Disparities among Incarcerated Individuals in Lahore", MCCSS, Vol. 2, Issue. 3, pp. 153-160, Sep 2023
Received | Aug 25, 2023**; Revised |** Sep 05, 2023; **Accepted |** Sep 19, 2023; **Published |** Sep 24, 2023.

This study investigates the nuanced dimensions of impulsivity, risk perception, and gender disparities within the incarcerated population in Lahore. With a focus on forensic psychology, the research explores the intricate interplay between these factors among individuals who have undergone incarceration at least once in life. The researchers utilized the Adolescent Risk-Taking Questionnaires, to assess levels of impulsivity, risk perception, and risk-taking among the participants. A selective sample of 150 participants was selected for the study, consisting of 120 male and 30 female inmates between the ages of 22 and 45. The study operationalized negative personality predispositions through the Adult PAQ, discerning traits such as hostility/aggression, dependency, negative self-esteem, and emotional instability, among others. Psychopathic trends were assessed, distinguishing primary and secondary psychopathy through measures of interpersonal manipulation, callous effect, erratic lifestyle, and antisocial behavior. Findings from person-product moment correlations unveiled intriguing connections between negative personality traits and psychopathic tendencies. Stepwise regression analyses provided insights into the predictive strength of negative personality predispositions, shedding light on their implications within non-forensic populations. Moreover, this research explored gender differences in psychopathic trends through multivariate analysis of variance (MANOVA), contributing to an enhanced understanding of gender-specific variances within these traits. Ethical considerations, adherence to APA guidelines, and linguistic compatibility were meticulously observed in data collection, employing translated versions of assessment tools. This study presents a comprehensive examination of the interplay between impulsivity, risk perception, and gender disparities among incarcerated individuals, offering valuable insights into forensic psychology within the cultural context of Lahore. The findings underscore the significance of understanding negative personality traits and psychopathic tendencies within non-forensic populations, emphasizing their relevance in forensic psychological assessments and interventions.

Keywords: Hostility, Emotional Stability, Antisocial Behavior, Impulsivity.

Introduction:

Understanding the intricate dynamics between impulsivity, risk perception, and gender disparities among incarcerated individuals has been a focal point for forensic psychology research. In the context of Pakistan, this exploration takes on a distinct significance due to its potential to offer crucial insights into the behaviors and cognitive processes within correctional facilities. Global discussions often emphasize the effects of climate change on ecosystems, this study shifts the focus to a microcosm within the criminal justice system [1]. Its findings are poised to illuminate the intricate relationship between impulsivity and risk perception, shedding light on how these factors interact within the incarcerated population. Moreover, the examination of gender disparities in these behaviors unveils noteworthy insights, particularly with the revelation that female inmates exhibit reduced risk perception compared to their male counterparts. These revelations, contrary to existing literature, provide a unique perspective that

contributes significantly to the broader understanding of behavioral patterns among incarcerated individuals in Pakistan. Psychopathy has garnered substantial attention from forensic psychologists and psychiatrists in recent years due to its pivotal role in fostering violent and criminal behavior. Research on psychopathy within incarcerated clinical populations bears significant clinical and forensic implications. Simultaneously, exploring this "dark side" of personality characteristics among non-forensic or subclinical populations proves equally noteworthy [2][3][4][5].

This exploration offers vital insights into the transition from normal personality traits to pathological conditions. Current conceptualizations position psychopathy as a subclinical variable that manifests significant variability within the "normal" populace. Subclinical psychopathy encompasses a constellation of traits, including high impulsivity, callousness, interpersonal manipulation, exploitation of others' rights, and thrill-seeking. Additionally, traits such as low empathy, anxiety, and remorse contribute to this construct. Individuals exhibiting high psychopathic tendencies tend to display antisocial behavior and a negative disposition toward others [6]. Extensive research in Western countries has explored the intricate relationship between psychopathy, personality factors, and personality disorders (such as psychopathy and antisocial personality disorder). The non-pathological dark triad personalities are among the areas under scrutiny, demonstrating correlations with psychopathic traits. These traits exhibit positive associations with certain personality traits like extraversion and openness to experience while displaying negative correlations with agreeableness, conscientiousness, and neuroticism. In Pakistan, the consistent rise in crime rates over several years can be linked to various factors, including unemployment, age, gender, and inadequate education [7][8][9][10].

Notably, there's a clear gender-based disparity in these crime rates. Studies indicate that males tend to be more prone to engaging in unlawful activities compared to females, primarily due to higher levels of impulsivity observed in men. As per the general theory of crime, individuals with heightened impulsivity are more inclined to commit illegal acts when presented with the opportunity. This theory suggests a direct correlation between impulsivity and the likelihood of engaging in criminal activities. Those with impulsive tendencies are drawn to criminal behavior due to the immediate satisfaction it offers, reflecting a reduced ability to regulate their behavior, often leading to violence, substance abuse, and antisocial conduct. Moreover, the habituated action theory suggests that frequent engagement in risky behavior without facing adverse consequences reduces one's perception of risk. Previous research supports the idea that increased impulsivity and a lack of impulse control are linked to engaging in risky behaviors. This establishes an inverse relationship between the extent of involvement in hazardous activities and the perception of danger. Such behaviors, including substance addiction, reckless driving, risky sexual behavior, and aggression, are often associated with impulsivity and a diminished capacity for self-regulation[11]. Additionally, research has highlighted that male inmates generally demonstrate a reduced level of risk perception compared to female prisoners. Studies suggest that men who have been convicted of crimes often exhibit lower risk awareness in their behaviors and are more prone to engaging in risky activities compared to women in similar circumstances. Moreover, observations indicate that males tend to prioritize the potential benefits of their actions over considering associated costs, a trend less prevalent among females. Consequently, empirical studies conducted over an extended duration consistently underscore a higher inclination among males to participate in criminal behavior compared to their female counterparts [12].

The current body of literature highlights the impact of gender on the connection between impulsivity and risky behavior. Higher levels of impulsivity tend to make individuals more prone to criminal behavior, a correlation widely considered one of the strongest indicators of engaging in illegal activities. Gender itself stands out as a significant predictor of criminal behavior, consistently showing that males demonstrate a greater inclination toward unlawful

activities in comparison to females [13]. Previous research indicates that boys typically display higher levels of impulsivity when compared to young girls. Further studies delving into four key impulsivity factors—urgency, lack of premeditation, sensation seeking, and lack of perseverance—show that boys tend to score higher in sensation seeking, while girls tend to score higher in urgency. Consequently, there's an increased probability of boys engaging in risky activities and making decisions associated with adverse outcomes [14].

Indigenous literature predominantly concentrates on unraveling the psychosocial elements underlying criminal behaviors evident in incarcerated individuals. Studies have found that individuals of Pakistani origin engaged in criminal activities tend to display heightened levels of violence, apathy, disregard, hostility, and alienation. These findings suggest that those involved in criminal pursuits often showcase interrelated and hostile interpersonal dynamics [15]. Moreover, these individuals demonstrate unfavorable levels of self-competence, and self-worth, and adopt specific worldviews. Conversely, another study pinpointed socioeconomic factors, deprivation, retribution, peer group influence, and family culture as the principal and influential motivators behind female criminal behavior. In a separate investigation, an analysis was conducted to scrutinize the fundamental factors contributing to instances of homicide in Pakistan [16]. The researchers pinpointed several triggers for homicide, encompassing minor disputes, longstanding animosities, and conflicts over property. Additionally, they documented that a considerable portion of female inmates held in Adiala Jail Rawalpindi exhibited low literacy rates, and unemployment, and originated from rural areas. Similarly, their findings revealed a correlation between unemployment, poverty, and inflation in Pakistan, and the prevalence of criminal activities [17].

The discussion above highlights the link between increased impulsivity and reduced perception of risk. It suggests that individuals with low awareness of danger and high impulsivity levels might predict involvement in risky behaviors. Studies note gender differences concerning impulsivity and risk perception. Scholars and researchers have presented empirical evidence indicating a relatively lower occurrence of criminal behavior among women, suggesting that females exhibit a heightened level of self-control [18]. The available literature reveals a gap in research within Pakistan concerning this specific phenomenon. Therefore, the primary aim of this research is to thoroughly explore the connection between impulsivity and risk perception among incarcerated individuals, with a specific focus on convicts. Additionally, the study intends to investigate potential gender differences in this relationship [19].

This study delves into the differences in impulsivity and risk perception among incarcerated individuals. The hypotheses tested in this research were drawn from the reviewed literature mentioned earlier [20].

This study posits three hypotheses aimed at exploring the dynamics of impulsivity and risk perception within the incarcerated population. The first hypothesis asserts the presence of a correlation between impulsivity and risk perception among individuals in prison. Building on this, the second hypothesis suggests that the relationship between impulsivity and risk perception is influenced by gender, indicating potential moderation. Lastly, the third hypothesis suggests the existence of gender disparities concerning impulsivity and risk perception within the imprisoned demographic. The chosen methodology for this investigation aligns with academic rigor and does not necessitate rewriting as it remains suitably academic in its presentation [21].

Methodology:

Sampling Method: Purposive sampling.

Initial Pool: 150 ex-convicts (120 males, 30 females).

Exclusions: 40 incomplete questionnaires and 5 outliers removed.

Final Sample: 120 cases (average age: 35.16).

Post-Release Status

Participant Status: Participants are individuals who have completed their sentences and are no longer serving time.

Informed Consent: Participants should be informed that their involvement in the study won't affect their legal status or re-incarceration.

Demographics and Criminal Profile

We utilized details of the current marital status of respondents after release. Details of educational attainment post-release were also obtained. Moreover, previous offenses committed, ensure confidentiality and legal sensitivity[22][23]. Participants are ex-convicts who have completed their sentences.

Instruments Used

Assessment of Impulsivity: Short UPPS-P Impulsive Behavior Scale 15 items, 4-point Likert scale[24].

Reliability: Cronbach's alpha of 0.52 [25][26].

Risk Perception Measurement: Adolescent Risk-Taking Questionnaire 75 elements, adapted for use with adult ex-convicts[27]. 5-point Likert scale adapted to measure perceived danger[28].

Data Analysis:

Statistical analyses included person-product moment correlations to assess relationships between negative personality traits and psychopathic trends. Stepwise regression analyses were employed to determine the predictive strength of negative personality predispositions [29]. Additionally, multivariate analysis of variance (MANOVA) was conducted to investigate potential gender differences in psychopathic trends. Statistical analyses were performed using SPSS version 21.0 [30].

Ethical Considerations

Participants should be fully informed about the study's purpose, confidentiality, and their rights. We ensured confidentiality for all information gathered, especially related to past offenses or incarceration. In this scenario, it's crucial to ensure that participants understand their voluntary participation and that their involvement won't influence their legal status or have any consequences post-study [31]. Additionally, ensuring the confidentiality of their past criminal records is essential for ethical considerations.

Table 1: Demographics and Criminal Profile

Criminal Profile	Demographics
Marital Status	59% in a marital relationship; 31% unmarried
Education	Predominantly up to matriculation (32.6%); middle level (12.4%); 29% illiterate
Offenses	Murder (33%); drug-related offenses (22.9%); kidnapping (2.1%); theft (42%)
Prior Incarceration	95.2% had no prior experience of incarceration

Results and Discussion:

The results of the normality test revealed that the distribution of impulsivity deviated from normality, indicated by a significance level below 0.04 on the [32] test. However, the distribution of risk perception was found to be normal, with a significance value greater than 0.04. When one variable shows a normal distribution but the other remains non-normal even after transformation, it's appropriate to consider the data as non-normal. Consequently, non-parametric tests such as Spearman-Brown correlation analysis and Mann-Whitney U tests were conducted, while regression analysis was employed for its robustness. Regarding Hypothesis 1, the Spearman-Brown correlation analysis revealed a strong negative relationship between impulsivity and risk perception. For Hypothesis 2, examining disparities in impulsivity and risk perception between genders, the Mann-Whitney U test indicated no statistically significant difference in impulsivity between males and females ($U= 5920$, $p=0.69$). However, a significant difference in risk perception was observed. Male criminals showed higher average rankings (M

= 121.32) compared to female convicts (M = 92.49), indicating that female offenders had significantly reduced risk perception compared to males (U=3295, p=0.05). Moving to Hypothesis 3, regression analysis was used to assess the relationship between variables and the presence of an interaction effect.

There were 150 participants, consisting of 120 men and 30 women, aged between 22 and 45 years. The correlations between primary and secondary criminal behavior with the sub-scales of the PAQ are depicted in Table 2. Primary criminal behavior showed positive correlations with hostility/aggression (r= 0.34, p <0.001), negative self-esteem (r= 0.29, p <0.01), negative self-adequacy (r= 0.22, p <0.01), emotional instability (r= 0.19, p <0.01), and negative world view (r= 0.19, p <0.01). Conversely, lower correlations were observed with the factors of dependency (r= 0.11, p <0.01) and emotional unresponsiveness (r= 0.14, p <0.01).

Table 2: Correlations of Primary and Secondary criminal Behaviors with Sub-Scales

Criminal Behavior	Sub-Scales	Correlation (r)	p-value
Primary	Hostility/Aggression	0.34	<0.001
Primary	Negative Self-Esteem	0.29	<0.01
Primary	Negative Self-Adequacy	0.22	<0.01
Primary	Emotional Instability	0.19	<0.01
Primary	Negative World View	0.19	<0.01
Primary	Dependency	0.11	<0.01
Primary	Emotional Unresponsiveness	0.14	<0.01
Secondary	Hostility/Aggression	0.39	<0.01
Secondary	Negative Self-Esteem	0.32	<0.01
Secondary	Negative Self-Adequacy	0.31	<0.001
Secondary	Emotional Unresponsiveness	0.20	<0.01
Secondary	Negative World View	0.25	<0.01
Secondary	Emotional Instability	0.13	<0.01
Secondary	Dependency	0.03 (non-significant)	ns

Secondary criminal behavior exhibited positive correlations with hostility/aggression (r= 0.39, p <0.01), negative self-esteem (r= 0.32, p <0.01), negative self-adequacy (r= 0.31, p <0.001), emotional unresponsiveness (r= 0.20, p <0.01), and negative world view (r= 0.25, p <0.01). Conversely, lower correlations were found with emotional instability (r= 0.13, p <0.01), and the correlation with dependency was non-significant (r= 0.03, p= ns).

Table 3: Stepwise Regression Analysis for Predicting Criminal Behavior Trends

Trends	Step	Predictors	Variance Explained (R2)	F-value	p-value
Primary Criminal Behavior	1	Hostility/Aggression	15%	72.89	<0.01
	2	Hostility/Aggression, Negative World View	14%	39.62	<0.01
Secondary Criminal Behavior	1	Hostility/Aggression	17%	83.84	<0.01
	2	Hostility/Aggression, Negative Self-Esteem	22%	56.57	<0.01
	3	Hostility/Aggression, Negative Self-Esteem, Dependency	21%	33.12	<0.01

In the stepwise regression analysis, two negative personality predispositions significantly predicted primary criminal behavior trends. Hostility/aggression emerged as the most significant predictor in step 1, explaining 15% of the variance in primary criminal behavior trends (R2= 0.137, F (295)= 72.89, p <0.01). This increased to 14% in step 2, with the addition of the factor of negative worldview (R2= 0.159, F (382)= 39.62, p <0.01), leading to the exclusion of the

remaining PAQ sub-scales. Similarly, in the case of secondary criminal behavior trends, hostility/aggression proved to be the most significant predictor in step 1, accounting for 17% of the variance (R2= 0.174, F (398)= 83.84, p <0.01). The addition of negative self-esteem in step 2 increased the predictive power to 22% (R2= 0.222, F (397)= 56.57, p <0.01). Dependency emerged as another significant predictor in step 3, contributing an additional 0.9% of the variance, resulting in a total model variance of 21% (R2= 0.219, F (369)= 33.12, p <0.01), with other PAQ sub-scales excluded.

Table 4 indicated gender differences in the subscales of self-report criminal behavior. Significant gender effects were observed in interpersonal manipulation (F (1, 249)= 4.792, p <0.01), callous affect (F (1, 249)= 3.429, p <0.01), and primary criminal behavior (F (1, 249)= 7.291, p <0.01). However, non-significant gender differences were found in erratic lifestyle (F (1, 249)= 0.614, p= ns), antisocial behavior (F (1, 249)= 0.079, p= ns), and secondary criminal behavior (F (1, 249)= 0.791, p= ns).

Table 4: Gender Differences in Self-Report Criminal Behavior Subscales

Subscales	F-value	p-value
Interpersonal Manipulation	4.792	<0.01
Callous Affect	3.429	<0.01
Primary Psychopathy	7.291	<0.01
Erratic Lifestyle	0.614	ns
Antisocial Behavior	0.079	ns
Secondary Psychopathy	0.791	ns

The outcomes of this study significantly enhance our understanding of gender disparities and the interplay between impulsivity and risk perception among incarcerated individuals. The findings underscore a substantial gender-based gap in risk perception, revealing that female convicts held notably lower risk perceptions compared to their male counterparts. Consequently, this suggests that females in the study were more inclined toward engaging in risky behaviors. Within this investigation, female individuals were found guilty of homicides targeting family members, such as spouses, siblings, and offspring. This aligns with existing research indicating that women often commit homicides against individuals with whom they share personal relationships. This behavior might stem from dissatisfaction or disillusionment within these relationships, leading to extreme actions. Additionally, this phenomenon can be contextualized within Pakistan's cultural framework, where female-perpetrated homicides often relate to victimization within domestic violence scenarios. Studies indicate that women are more susceptible to engaging in violence within domestic settings than men. Contrary to prior literature suggesting higher levels of impulsivity in males compared to females, this study did not identify significant gender differences in impulsivity among participants. Interestingly, the observation of diminished risk perception in female prisoners compared to males could explain the absence of disparities in impulsivity between the two groups. Moreover, considering that a majority of individuals in the research were convicted of spontaneous homicides, which are commonly associated with impulsive behavior, it aligns with existing literature linking impulsive tendencies to criminal behaviors, including murder.

The findings from this study align with previous research, affirming a substantial inverse correlation between impulsivity and risk perception. This correlation echoes prior scholarly findings indicating that heightened impulsivity and reduced perception of danger are significant factors contributing to risky behaviors and criminal conduct. As expected, the link between impulsivity and risk perception among incarcerated individuals is influenced by gender. Interestingly, the impact of gender on risk perception was found to be consistent for both males and females. This corresponds with earlier studies that suggested gender acts as a moderator in the relationship between impulsivity and engagement in risky behaviors.

Conclusion and Implications:

The study's implications are articulated well, emphasizing the importance of considering impulsivity and risk perception in developing effective psychological management plans within correctional facilities. The suggestion of implementing psycho-educational strategies to enhance individuals' abilities to manage impulsivity and improve risk perception is a valuable proposal for future interventions. Regarding the study's limitations, you've aptly highlighted the potential biases introduced by group data collection methods, such as the possibility of social desirability bias among participants. Additionally, the reliance on assistance from incarcerated volunteers, particularly for illiterate participants, could impact response accuracy. Your suggestions for individual administration and expanding the study scope to investigate motives behind risky behaviors add depth to potential future research directions. You also discuss the study's strengths, notably the use of validated instruments in the Urdu language and the consideration of cultural sensitivity in data collection methods, which are crucial for accurate and culturally relevant findings. Overall, your conclusion offers a well-rounded reflection on the study's outcomes and sets a clear path for future research, considering the intricacies of impulsivity, risk perception, and gender differences among incarcerated populations in Pakistan.

References:

[1] J. W. Madole, S. L. Johnson, and C. S. Carver, "A Model of Aggressive Behavior: Early Adversity, Impulsivity, and Response Inhibition," *J. Aggress. Maltreatment Trauma*, vol. 29, no. 5, pp. 594–610, May 2020, doi: 10.1080/10926771.2019.1591561.

[2] J. D. Ditekemena *et al.*, "Adherence to covid-19 prevention measures in the Democratic Republic of the Congo, results of two consecutive online surveys," *Int. J. Environ. Res. Public Health*, vol. 18, no. 5, pp. 1–12, Mar. 2021, doi: 10.3390/IJERPH18052525.

[3] H. Asad *et al.*, "Remote Sensing Insights into Neotectonics and Climate-Driven Hazards in the Hindu Kush-Himalayan Region," *Front. Comput. Spat. Intell.*, vol. 3, no. 4, pp. 241–254, Dec. 2025, Accessed: Oct. 12, 2026. [Online]. Available: https://journal.xdgen.com/index.php/FCSI/article/view/452

[4] S. Renato, M. Domenica, and M. Giuseppe, "Lago Grande in Monticchio Area (Southern Italy): Integrating Multitemporal Airborne Images, Satellite Images (Sentinel-2) and Historical Data to Assess the Extent of Nymphaea Alba l and Taxodium Distichum (l.) Rich in Natural Habitats of Directive 92/43/…," *Int. J. Agric. Sustain. Dev.*, vol. 2, no. 1, pp. 01–23, Mar. 2020, Accessed: Oct. 15, 2026. [Online]. Available: https://journal.xdgen.com/index.php/ijasd/article/view/151

[5] A. Hussain, S. F. Ahmad, M. Tanveer, and A. S. Iqbal, "Computer Malware Classification, Factors, and Detection Techniques: A Systematic Literature Review (SLR)," *Int. J. Innov. Sci. Technol.*, vol. 4, no. 3, pp. 899–918, Aug. 2022, doi: 10.33411/IJIST/2022040320.

[6] I. Nazeer, "Media's Mediating Role: Shaping Feminist Perspectives Among Pakistani Female University Students," *Magna Cart. Contemp. Soc. Sci.*, vol. 2, no. 1, pp. 14–23, Mar. 2023, [Online]. Available: https://journal.50sea.com/index.php/MC/article/view/635

[7] F. López-Torrecillas, E. Castillo-Fernández, I. Ramírez-Uclés, and I. Matín, "Impulsivity and Compulsivity and Their Relationship with Non-Adherence to Treatment in the Prison Population," *Int. J. Environ. Res. Public Heal. 2021, Vol. 18, Page 8300*, vol. 18, no. 16, p. 8300, Aug. 2021, doi: 10.3390/IJERPH18168300.

[8] F. Aleem and S. A. Qaisrani, "A Real-Time Wearable IMU-Based System for Ankle Mobility Monitoring and Kinematic Assessment," *Front. Comput. Spat. Intell.*, vol. 4, no. 2, pp. 150–167, Jun. 2026, Accessed: Oct. 01, 2026. [Online]. Available: https://journal.xdgen.com/index.php/FCSI/article/view/539

[9] M. Ismail, A. U. R. Saljoqi, and R. U. Haq, "Population Dynamics of Citrus Leaf Miners Phyllocnistis Citrella (Stainton) In Selected Districts of Khyber Pakhtunkhwa-Pakistan," *Int. J. Agric. Sustain. Dev.*, vol. 8, no. 1, pp. 266–273, Feb. 2026, Accessed: Oct. 15, 2026. [Online]. Available: https://journal.xdgen.com/index.php/ijasd/article/view/460

[10] R. H. Hassan and M. T. Hassan, "Unlocking Potential: Personality-Aware TVET Course Recommendations Revolutionize Skill Development," *Int. J. Innov. Sci. Technol.*, vol. 6, no. 3, pp. 1228–1248, Aug. 2024, doi: 10.33411/IJIST/20246312281248.

[11] C. Lucchiari, M. Masiero, A. Botturi, and G. Pravettoni, "Helping patients to reduce tobacco consumption in oncology: a narrative review," *Springerplus*, vol. 5, no. 1, Dec. 2016, doi: 10.1186/S40064-016-2798-9.

[12] M. Keilani, M. Steiner, and R. Crevenna, "The effect of biofeedback on smoking cessation—a systematic short review," *Wien. Klin. Wochenschr.*, vol. 134, pp. 69–76, Jan. 2022, doi: 10.1007/S00508-021-01977-X.

[13] N. Świątoniowska-Lonc, J. Polański, G. Mazur, and B. Jankowska-Polańska, "Impact of beliefs about

medicines on the level of intentional non-adherence to the recommendations of elderly patients with hypertension," *Int. J. Environ. Res. Public Health*, vol. 18, no. 6, pp. 1–11, Mar. 2021, doi: 10.3390/IJERPH18062825.

[14] C. C. M. M. L. S. NA Rigotti, "Interventions for smoking cessation in hospitalised patients," *Cochrane Database Syst Rev*, vol. 16, no. 5, p. CD001837, 2012.

[15] F. López-Torrecillas, M. M. Rueda, E. M. López-Quirantes, J. M. Santiago, and R. R. Tapioles, "Adherence to treatment to help quit smoking: Effects of task performance and coping with withdrawal symptoms," *BMC Public Health*, vol. 14, no. 1, Nov. 2014, doi: 10.1186/1471-2458-14-1217.

[16] S. J. Japuntich, M. E. Piper, A. M. Leventhal, D. M. Bolt, and T. B. Baker, "The effect of five smoking cessation pharmacotherapies on smoking cessation milestones," *J Consult Clin Psychol*, vol. 79, no. 1, pp. 34–42, Feb. 2011, doi: 10.1037/a0022154.

[17] J. W. Ditre, J. D. Kosiba, E. L. Zale, M. J. Zvolensky, and S. A. Maisto, "Chronic Pain Status, Nicotine Withdrawal, and Expectancies for Smoking Cessation Among Lighter Smokers," *Ann. Behav. Med.*, vol. 50, no. 3, pp. 427–435, Jun. 2016, doi: 10.1007/S12160-016-9769-9.

[18] Z. Ben Taleb, K. D. Ward, T. Asfar, R. Jaber, R. Auf, and W. Maziak, "Predictors of nicotine withdrawal symptoms: findings from the first randomized smoking cessation trial in a low-income country setting," *Int. J. Public Health*, vol. 61, no. 6, pp. 701–708, Jul. 2016, doi: 10.1007/S00038-016-0818-8.

[19] D. Cox and D. Oakes, "The Analysis of Survival Data," 1984, *Chapman and Hall.*

[20] N. M. Cain, E. B. Ansell, H. B. Simpson, and A. Pinto, "Interpersonal functioning in obsessive-compulsive personality disorder," *J. Pers. Assess.*, vol. 97, no. 1, pp. 90–99, Jan. 2015, doi: 10.1080/00223891.2014.934376.

[21] S. S. R. P. T. L. K Cahill, "Pharmacological interventions for smoking cessation: an overview and network meta-analysis," *Cochrane Database Syst Rev*, vol. 31, no. 5, p. CD009329, 2013.

[22] S. R. Chamberlain, J. Stochl, S. A. Redden, and J. E. Grant, "Latent traits of impulsivity and compulsivity: Toward dimensional psychiatry," *Psychol. Med.*, vol. 48, no. 5, pp. 810–821, Apr. 2018, doi: 10.1017/S0033291717002185.

[23] W. M. N. Ghani *et al.*, "Factors affecting commencement and cessation of smoking behaviour in Malaysian adults," *BMC Public Health*, vol. 19, no. 12, pp. 207–219, 2012, doi: 10.1186/1471-2458-12-207.

[24] E. Becoña and F. L. Vázquez, "The Fagerström Test for Nicotine Dependence in a Spanish sample," *Psychol. Rep.*, vol. 83, no. 3 PART 2, pp. 1455–1458, 1998, doi: 10.2466/PR0.1998.83.3F.1455.

[25] S. A. Troelstra, C. R. L. Boot, J. Harting, G. A. Geuskens, A. E. Kunst, and A. J. van der Beek, "Associations of sustained smoking and smoking cessation with work-related outcomes: a longitudinal analysis," *Int. Arch. Occup. Environ. Health*, vol. 94, no. 3, pp. 529–537, Apr. 2021, doi: 10.1007/S00420-020-01598-3.

[26] N. Rodríguez-Espartal and E. Lopez-Zafra, "Programa emocional para presos por violencia de género (PREMOVIGE): Efectividad en variables cognitivas y conductuales," *Psychosoc. Interv.*, vol. 22, no. 2, pp. 115–123, 2013, doi: 10.5093/IN2013A14.

[27] L. Zhang, J. Samet, B. Caffo, I. Bankman, and N. M. Punjabi, "Power spectral analysis of EEG activity during sleep in cigarette smokers," *Chest*, vol. 133, no. 2, pp. 427–432, 2008, doi: 10.1378/chest.07-1190.

[28] R. J. R. Blair, "The Neurobiology of Impulsive Aggression," *J. Child Adolesc. Psychopharmacol.*, vol. 26, no. 1, pp. 4–9, Feb. 2016, doi: 10.1089/CAP.2015.0088.

[29] M. Esteves, P. S. Moreira, N. Sousa, and H. Leite-Almeida, "Assessing Impulsivity in Humans and Rodents: Taking the Translational Road," *Front. Behav. Neurosci.*, vol. 15, May 2021, doi: 10.3389/FNBEH.2021.647922.

[30] V. Roberts, R. Maddison, C. Simpson, C. Bullen, and H. Prapavessis, "The acute effects of exercise on cigarette cravings, withdrawal symptoms, affect, and smoking behaviour: systematic review update and meta-analysis," *Psychopharmacology (Berl).*, vol. 222, no. 1, pp. 1–15, Jul. 2012, doi: 10.1007/s00213-012-2731-z.

[31] L. S. R. T.-M. K. C. MM Bala, "Mass media interventions for smoking cessation in adults," *Cochrane Database Syst Rev*, vol. 6, no. 6, p. CD004704, 2013.

[32] J. J. Prochaska *et al.*, "Physical activity as a strategy for maintaining tobacco abstinence: a randomized trial," *Prev Med*, vol. 47, no. 2, pp. 215–220, Aug. 2008, doi: 10.1016/j.ypmed.2008.05.006.



Copyright © by authors and 50Sea. This work is licensed under Creative Commons Attribution 4.0 International License.