

A CRITICAL REVIEW OF LU AND MENARD'S ARTICLE THE INTERPLAY OF MAOA
AND PEER INFLUENCES IN PREDICTING ADULT CRIMINAL BEHAVIOR.

The Interplay of MAOA and Peer Influences in Predicting Adult Criminal Behavior

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As technological advances continue to evolve, the link between human biology and human psychology becomes easier to observe. The ability to find and measure these biological influences has resulted in a variety of complex interactions within the current literature. For instance, the discovery of the elusive MAOA gene and its polymorphic traits has led to a multitude of studies adding to the compilation of knowledge within the field of psychology. But is this gene's effect causal or is it merely a facet in the complex web of human behaviourism and individual psychology?

Researching the complex relationship between genotypes and behavioral outcomes is important to add to the ever expanding literature on criminality, its predictors and precursors. The ability to identify predictors and risk factors of criminality will evolve the way one can mediate these tendencies. Therefore, ideally leading to a drop in criminality and criminal behaviour in the future. Within Yi-Fen Lu and Scott Menard's study, *The Interplay of MAOA and Peer Influence in Predicting Adult Criminal Behavior*, the main goal was to find a significant link between a variant of the MAOA gene and the development of delinquent peer groups as a predictor of illegal and antisocial behaviours in adulthood. Lu and Menard's objective was to answer two specific questions. First, if there was a direct influence on the development of antisocial peer networks exerted by the MAOA gene. Second, whether exposure to antisocial

peers and peer groups would moderate the influence of the MAOA gene on illegal and antisocial behaviours in adulthood. (Lu et al., 2016)

The researchers drew data from the National Youth Survey Family Study, which was a longitudinal study conducted in 1976. It is a compilation of data taken from 1725 American adolescents with ages ranging from 11 to 17. There were 12 waves of data; the first five waves were collected annually between the years 1977 and 1981. The next 4 waves of data, Waves 6-9, were collected every three years. In addition, 3 waves of data were collected between 2002 and 2004. Eleven waves of data were collected by the original participants, with Waves 1 and 11 being collected by their parents; as well as Waves 11 and 12 being collected by their children. At Waves 10 and 11 participants were asked to contribute a DNA sample. (Lu et al., 2016) Only 569 male participants' data was selected from the original pool of 1725. This is because inferences cannot be made regarding the MAOA gene in women, as the MAOA gene resides on the X-chromosome. (Ozelious et al., 1998.) Women have two X-chromosomes, therefore, there are multiple possibilities regarding the variance of the MAOA gene making it difficult to know if the high-activity or the low-activity variant is in play.

At Wave 11 participants were given a survey which measured adult criminal behaviour and its frequency. For example, participants disclosed how frequent criminal acts were committed by them in the past year. These items ranged in severity. This included joyriding, hitting parents, petty theft, threats of harm to others, and damaged property. Additional scales were added to measure more serious criminal activity such as thefts greater than \$100, attempted or committed sexual assault, attacking someone with intent to kill or seriously harm, and gang fights/involvement. Data regarding delinquent peer involvement was collected via an eight point

measure. The purpose of this measure was to obtain information on the respondents' peer networks in regard to antisocial and delinquent behaviours, as well as the prevalence within the past year of these behaviours. The items were coded on a scale from 1 to 5, with 1 meaning no involvement and 5 meaning high/all involvement. Items from this measure include cheating on taxes, breaking into homes or vehicles, drug usage, the selling of hard drugs such as heroin or cocaine, and theft. Higher scores on this scale suggest high delinquent and antisocial peer association. (Lu et al., 2016.)

As previously mentioned, during Wave 10 DNA was taken from the participants via a non-invasion buccal swab. After genotyping, it was revealed that there were five allele possibilities. Two of these coded for the high-activity MAOA allele and the other three coded for low-activity, therefore MAOA was dichotomous within this study. The data was then analyzed via a least-square regression to determine the effect of MAOA on association of peer networks of delinquent nature. Secondly, a gene/environment interaction was added to the regression model to test for significant effects. Though association with delinquent peers was significant in predicting minor offending behaviours in adulthood, MAOA's influence on said association was not proven to be statistically significant. However, there was a negatively significant interaction between the MAOA gene variant and association with delinquent peers as a predictor of serious offending behaviours during adulthood. (Lu et al., 2016.)

One criticism of Lu and Menard's study would be the homogeneity of their sample. Since their data was derived from the National Youth Survey Family Study, their sample pool of only 569 participants may not be fully representative of the population. Also their sample consists only of men/boys due to the inability to gather data on women in regards to the MAOA gene.

Therefore, it is not representative of the population, as half of the population is female. In addition, the race/ethnicities of the adolescent participants was not mentioned within the article. If there is not a balanced representation of races and ethnicities within the responder pool the study would not be representative as well. Especially since this study is American, where those of many ethnic backgrounds reside.

Secondly, the respondent pool where they drew their data from was from the late 1970's and early 1980's. American culture has since then changed. Especially with technological advances such as the internet and mobile devices. Adolescent culture has also evolved, therefore one may question whether this data would be applicable in predicting criminal and antisocial behaviours of current day teens. However, the National Youth Survey Family Study was a longitudinal study which is a positive as longitudinal studies usually yield the most accurate information regarding life outcome data. Another limitation of this study would be the use of a survey. Surveys are wonderful for collecting personal data but since this a survey about criminal behaviours and antisocial peers respondents may withhold accurate answers. Even in the presence of a confidentiality agreement. In addition, the survey did not cover any trigger events that would lead to criminal behaviour. Only criminal behaviours and antisocial peer networks were surveyed. Resorting to criminal behaviour is usually in the presence of a trigger event such as lack of money, traumatic situations, and relationship problems.

Another criticism of this study would be Lu and Menard's failure to include other aspects of socialization in regards to the precursors of criminality. One facet of socialization that Lu and Menard have failed to mention would be parental influence. Peers are not the only social aspect that children and adolescents mimic. Many aspects of parenting can affect and mold adulthood

behaviours. One aspect of parenting that shapes behavior would be attachment style. There are four main attachment styles: Secure, Preoccupied, Dismissing/Avoidant, and Fearful/Disorganized. (Ainsworth et al., 1979.) Secure attachment is deemed as a healthy attachment style, while Preoccupied, Avoidant, and Fearful attachments are seen as unhealthy attachment styles. Those with a Secure attachment style had parents/caregivers who were consistently sensitive to their needs. Those with a Preoccupied attachment style had parents/caregivers who were inconsistently sensitive to their needs. Those with an Avoidant attachment style had parents/caregivers who were consistently insensitive to their needs. While those with a Fearful had parents/caregivers who were never neglectful or abusive. Secure attachment in early childhood is linked to positive behavioural outcomes such as healthy bonding and intimacy in adulthood, effective friendships, scholarly curiosity, and heightened emotional control and expression. (Hayslett-McCall et al., 2002., Greenberg, et al., 1997., Sroufe, et al., 1983.) Matured emotional control can mediate the risk factors of criminal behaviours as impulsivity and aggression are precursors to such behaviors. If one has the ability to withhold their aggressive and impulsive thoughts and actions, they will be less likely to commit crime. Moreover, they may think through their decisions more deeply as a form of emotional control. One can infer that parental closeness reduces the likelihood of incarceration. Insecure attachment in early childhood is linked to negative behavioural outcomes such as externalizing negative emotions, immature coping mechanisms, behavioural issues, increased aggression, emotional indifference, and antisocial behaviours. (Hayslett-McCall et al., 2002., Sroufe, 1990., Weber et al., 1992.) In addition, poor attachment is related to lack of empathy and seeing situations from someone else's point of view, an important milestone of morality. (Fonagy et al., 1997.) The lack

of empathy is a precursor of criminal and psychopathic behaviour. If an individual has no understanding of the negative emotions they inflict on others, how would they know if and/or when to stop? Especially when this is combined with impulsivity and heightened activation of the Sympathetic Nervous System. A study done by Kolvin in 1988 found that substandard parental care was linked to more offences in adolescence and adulthood. (Kolvin et al., 1988.) Inmates committed for serious offences had poorer reflective functioning were linked to Preoccupied and Disorganized attachment styles. (Fonagy et al., 1997.) The addition of a parental closeness and attachment scale would aid in predicting criminal behaviour in adulthood.

Another facet of parenting that is predictive in regards to criminal behaviour would be parenting style. There are four types of parenting styles: Authoritarian, Authoritative, Permissive, and Absent. Authoritarian involves a combination of high control and low warmth. Authoritative involves a combination of high control and high warmth. Permissive involves a combination of low control and high warmth. While Absent involves no control and no warmth as the parent is not present. Similar to attachment style, parenting style has a major impact on future behaviour. Authoritative parenting is linked to higher levels of self control, higher levels of self efficacy, prosocial behaviors, and higher levels of empathy within Western societies. (Burt et al., 2006.) All of which of protective factors of criminality and psychopathy. While, actions consistent with Authoritarian parenting such as, low warmth, harsh punishment, and parental rejection have been linked to antisocial behaviour in adulthood. (Verona et al., 2005.) Harsh physical punishment demonstrated by parents encourages and reinforces violent and aggressive behaviour in children. Additionally, actions consistent with Permissive parenting such as, inconsistency, low levels of supervision, lack of boundaries, and disengagement have also

been linked to antisocial behaviours. Permissive parenting was also linked to lack of empathy. (Schaffer et al., 2009.) This makes logical sense as a lack of engagement and supervision opens up the opportunity to succumb to delinquent behavior. Adolescents tend to be more risk taking and impulsive, as they lack the executive functioning the prefrontal cortex offers. If they lack supervision and support they may develop unhealthy and antisocial coping mechanisms such as, isolation, externalizing behaviours, drug use and abuse, sexual promiscuity, and violence. Especially when the parent is still high in warmth, only reinforcing the delinquent behaviour further without any knowledge of it due to disengagement. If a parent is disengaged in the lives of their offspring they are not passing down as those core values and lessons that many learned from their caregivers. This leaves the child victim to these negative coping mechanisms and poor self regulation. As previously mentioned, antisocial behaviours and lack of empathy are precursors to criminal behaviour. Therefore, one can infer that a Permissive parenting style is a risk factor to criminality in adulthood. The addition of survey questions concerning parenting styles would help paint a more accurate picture about the predictors of criminality and the influence of the MAOA gene on offending behaviour.

Lu and Menard also failed to cover the complex relationship between previous parental convictions and criminality in their offspring. 40% of sons born to criminal fathers were found to go on and obtain their own criminal record compared to those not fathered by criminals. (Osborn and West, 1979.) Having an incarcerated parent may act as an environmental trigger for young children and adolescents causing underlying emotional issues. An incarcerated parent limits social interactions with them therefore straining the social bond and closeness between parent and child, which also acts as a risk factor to criminality; especially in those who already have a

biological predisposition such as the low-activity variant of the MAOA gene (Booth et al., 2010.) Having a parent behind bars also adds a lack of supervision, which is a risk factor regarding criminality in adulthood. Parents with a criminal record may also have a positive attitude towards offending behaviour, reinforcing and encouraging similar behaviours in their children. This risk is amplified when a child has two offending caregivers. There was also a positive association between paternal offending the severity of offence within their child. (Nijhof et al., 2009.) Additionally, criminality rates among those who have had convicted parents may be so elevated because that is the only example they have. They may hold their parents' life outcome as a predictor of their own. If they already have been exhibiting delinquent, impulsive, and antisocial behaviours people such as peers and teachers may begin to label them. Children may succumb to this labeling and act the part, which is known as the self-fulfilling prophecy. Therefore completing this vicious cycle of learning, labeling, and sabotaging. Simply asking if the participants came from homes with offending parents may have drawn a more accurate conclusion regarding criminality.

A biological factor Lu and Menard failed to consider would be the presence of high testosterone levels and its effects on aggression levels, as high aggression levels is linked to offending behaviours. High levels of released testosterone within adolescent boys was found to cause a plethora of assertive and aggressive responses. This relationship was found to elicit impulsive and irritated feelings, as well as lower frustration tolerance. (Olweus et al., 1988.) In addition, testosterone was also found to interact with the release of cortisol, the stress hormone. Popma and colleagues found that testosterone in the presence of low cortisol levels lead to high levels of overt aggression. Shockingly, they found no significant correlation between testosterone and

high levels of cortisol. (Popma et al., 2007.) This was surprising as one would think that high levels of the stress hormone in combination with high levels of testosterone would lead to high levels of aggression as well. However, low levels of cortisol may be displayed during aggression as those who act aggressively become desensitized to their actions. Lu and Menard could've gauged this affected by attempting to collect saliva samples from the participants after playing a violent and competitive video game.

Lastly, another criticism of Lu and Mendard's study would be their neglect to include the role of abuse and trauma as risk factors of aggressive, antisocial, and offending behaviours. Trauma during childhood and adolescence predicted behavioural and interpersonal problems such as externalizing emotions, higher levels of aggression and impulsivity, isolation from peers, substance use and abuse, and stipulations regarding mental health. (Wolf et al., 2012.) These problems lead to lowered availability of healthy social capital which is a protective factor of criminality and psychopathy in adulthood. It has been reported that two thirds of convicted men, out of a sample of 301, experinced phyiscal and sexual abuse within their childhood. (Weeks et al., 1998.) Male prisoners that disclosed higher levels of trauma in childhood had significantly higher levels of aggression than prisoners who did not report childhood trauma. Childhood trauma in females that abused drugs was positively correlated with convictions and criminal activity as well. Traumas such as adoption and being put into foster care was linked to sexual deviant behaviours such as sex work. While serve trauma such as losing a loved one or being assaulted by a close relative was linked to violent crimes in adulthood. (Grella et al., 2005.) Severe childhood trauma was also predictive of repeated offences, conviction during adolescence, and violent behaviour within a prison setting. Childhood trauma also predicted

violent and aggressive behaviour after release from prison. (Sarchiapone et al., 2009.) According to Driessen's study, 50.4% of inmates reported at least one instance of moderate to severe maltreatment during their childhood. (Driessen et al., 2006.) This makes sense as trauma and maltreatment serve as an example to those who experience it. When it's all one has ever known how to they remove themselves from that schema of life. Abuse and maltreatment also leads to lower self esteem. A low self esteem is linked to antisocial behaviour and aggression, the main determinants of criminality. (Donnellan et al., 2005.) In addition, multiple instances of childhood trauma, based on severity, was linked to PTSD in male prisoners. This heighten their risk for drug usage, antisocial behaviors, and aggression. (Wolf et al., 2012.) Childhood trauma was also linked to the development of personality disorders in adulthood. (Bandelow et al., 2005.) This data is relevant as 65% Of 1,300 inmates recorded a personality disorder, with 47% of them having antisocial personality disorder. (Fazel et al., 2002.) Antisocial personality disorder is marked by feelings of apathy, egotism, diluted empathy, manipulative tendencies, and a high need for sensation. This makes sense as high levels of empathy is negatively associated with criminality. Childhood trauma in combination with poor attachment style also may be to blame for the prevalence of personality disorders within our prison systems.

In conclusion, criminality is a multifaceted issue that requires a multifaceted approach to measure it and its predictors. Though the presence of the low-activity MAOA allele serves as a risk factor to criminal and antisocial behaviours in adulthood, it is not causal. Moreover, the MAOA was not fully predictive of delinquent peer association in both adolescence and adulthood. Criminality can be predicted by examining one's previous experiences and how they molded them as an individual. Furthermore, poor attachment style, permissive parenting

techniques, parental incarceration, high testosterone levels, and childhood trauma all contribute to outcomes of criminality and offending behaviour.

References

1. Ainsworth, M. S. (1979). Infant–mother attachment. *American psychologist*, 34(10), 932.
2. A. Popma, R. Vermeiren, C.A.M.L. Geluk, T. Rinne, W. van den Brink, D.L.Knol, ..., T.A.H. Doreleijers. Cortisol moderates the relationship between testosterone and aggression in delinquent male adolescents. *Biological Psychiatry*, 61 (2007), pp. 405-411.
3. Bandelow, B., Krause, J., Wedekind, D., Broocks, A., Hajak, G., & Rüther, E. (2005). Early traumatic life events, parental attitudes, family history, and birth risk factors in patients with borderline personality disorder and healthy controls. *Psychiatry research*, 134(2), 169-179.
4. Booth, A., Scott, M. E., & King, V. (2010). Father residence and adolescent problem behavior: Are youth always better off in two-parent families? *Journal of Family Issues*, 31, 585-605.
5. Burt, C. H., Simons, R. L., & Simons, L. G. (2006). A longitudinal test of the effects of parenting and the stability of self-control: negative evidence for the general theory of crime. *Criminology*, 44(2), 353-396.
6. Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., Moffitt, T. E., & Caspi, A. (2005). Low self-esteem is related to aggression, antisocial behavior, and delinquency. *Psychological science*, 16(4), 328-335.
7. Driessen, M., Schroeder, T., Widman, B., Schonfeld, C., Schneider, F., 2006. Childhood trauma, psychiatric disorders, and criminal behavior in prisoners in Germany: a comparative study in incarcerated women and men. *Journal of Clinical Psychiatry* 67,1486–1492.
8. Fazel, S., Danesh, J., 2002. Serious mental disorders in 23000 prisoners: a systematic review of 62 surveys. *Lancet* 359, 545-550.
9. Fonagy, Peter, Mary Target, Miriam Steele, Howard Steele, Tom Leigh, Alice Levinson and Roger Kennedy (1997) ‘Morality, Disruptive Behavior, Border- line Personality Disorder, Crime, and Their Relationships to Security of Attachment’, in Leslie Atkinson and Kenneth J. Zucker (eds) *Attachment and Psychopathology*, pp. 223–74. New York: The Guiliford Press.
10. Greenberg, Mark T., Michelle DeKlyen, Matthew L. Speltz and Marya C. Endriga (1997) ‘The Role of Attachment Processes in Externalizing Psycho- pathology in Young Children’, in Leslie Atkinson and Kenneth J. Zucker (eds) *Attachment and Psychopathology*, pp. 196–222. New York: The Guiliford Press.

11. Grella, C. E., Stein, J. A., & Greenwell, L. (2005). Associations among childhood trauma, adolescent problem behaviors, and adverse adult outcomes in substance-abusing women offenders. *Psychology of Addictive Behaviors*, 19(1), 43.
12. Hayslett-McCall, K. L., & Bernard, T. J. (2002). Attachment, masculinity, and self-control: A theory of male crime rates. *Theoretical Criminology*, 6(1), 5-33.
13. Kolvin, I., F.J.W. Miller, M. Fletting and P.A. Kolvin (1988) 'Social and Parenting Factors Affecting Criminal-Offense Rates. Findings from the Newcastle Thousand Family Study (1947–1980)', *British Journal of Psychiatry* 152: 80–90.
14. Lu, Y. F., & Menard, S. (2017). The interplay of MAOA and peer influences in predicting adult criminal behavior. *Psychiatric quarterly*, 88(1), 115-128.
15. Nijhof, K. S., De Kemp, R. A., & Engels, R. C. (2009). Frequency and seriousness of parental offending and their impact on juvenile offending. *Journal of adolescence*, 32(4), 893-908.
16. Olweus D., A. Mattsson, D. Schalling, H. Low. Circulating testosterone levels and aggression in adolescent males: A causal analysis. *Psychosom Med*, 50 (1988), pp. 261-272
17. Osborn, S. G., & West, D. J. (1979). Conviction records of father and sons compared. *Brit. J. Criminology*, 19, 120.
18. Ozelius, L., Hsu, Y. P. P., Bruns, G., Powell, J. F., Chen, S., Weyler, W., ... & Conneally, P. M. (1988). Human monoamine oxidase gene (MAOA): chromosome position (Xp21-p11) and DNA polymorphism. *Genomics*, 3(1), 53-58.
19. Sarchiapone, M., Carli, V., Cuomo, C., Marchetti, M., & Roy, A. (2009). Association between childhood trauma and aggression in male prisoners. *Psychiatry research*, 165(1-2), 187-192.
20. Schaffer, M., Clark, S., & Jeglic, E. L. (2009). The role of empathy and parenting style in the development of antisocial behaviors. *Crime & Delinquency*, 55(4), 586-599.
21. Sroufe, L. Alan, Nancy E. Fox and Van R. Pancake (1983) 'Attachment and Dependency in Developmental Perspective', *Child Development* 54(6):1615–27.
22. Sroufe, L. Alan, Byron Egeland and Terri Kreutzer (1990) 'The Fate of Early Experience Following Developmental Change: Longitudinal Approaches to Individual Adaptation in Childhood', *Child Development* 61(5): 1363–73.
23. Weber, C.A., J. Reid Meloy and Carl B. Gacono (1992) 'A Rorschach Study of Attachment and Anxiety in Inpatient Conduct-Disordered and Dysthymic Adolescents', *Journal of Personality Assessment* 58(1): 16–26.

24. Weeks, R., Widom, C., 1998. Self-reports of early childhood victimization among incarcerated adult male felons. *Journal of Interpersonal Violence* 13, 346–361
25. Wolff, N., & Shi, J. (2012). Childhood and adult trauma experiences of incarcerated persons and their relationship to adult behavioral health problems and treatment. *International journal of environmental research and public health*, 9(5), 1908-1926.
26. Verona, E., & Sachs-Ericsson, N. (2005). The intergenerational transmission of externalizing behaviors in adult participants: The mediating role of childhood abuse. *Journal of Consulting and Clinical Psychology*, 73(6), 1135-1145.