RESEARCH ARTICLE

Parental Abuse and Delinquency : Exploring Neuropsychological Mechanisms and Preventive Interventions

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Abstract
This study analyzes the connection between different forms of parental abuse, be it physical, emotional, or even neglect, and the increased risks of juvenile delinquency. It goes further than traditional explanations by providing a new framework that highlights the interaction of neuropsychological effects of abuse and protective factors in the environment. Important pathways include disruption in the autonomic nervous system's stress response system, underdeveloped executive brain functions, and impaired social cue integration. The article discusses more recent empirical studies, especially within the MENA region. It then proposes a multi-level prevention model with a focus on building early relationships as well as teaching neuro-emotional regulation skills. The last section provides targeted and actionable suggestions for policy shifts and practical responses aimed toward addressing the gaps within this important problem.

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Introduction

Child abuse can take several forms as emotional maltreatment, or neglect—remains a critical global health crisis. According to WHO (2022), nearly one billion children are affected each year. Alarmingly, the MENA region reports some of the highest rates globally, with local studies indicating a prevalence ranging from 15% to 35%. Cultural attitudes usually condone severe punishment, coupled with powerful stigmas that silence reporting, allowing abuse to persist in silence.

The inflicted trauma does not simply disappear; it endures. The evidence is strong for the direct link between any form of childhood maltreatment and negative outcomes, particularly around delinquency. Young adult survivors of abuse are significantly more likely to become offenders (twice or thrice) in comparison to the non-abused peers of their age. This leads to a vicious cycle where victimization contributes to offending which places greater pressure on the justice system and available resources, resulting in an unstable environment that further perpetuates abuse.

The most prominent explanations for this relationship have been found lacking in one way or another. Theories that focus on social factors like poverty or peer influence do not provide an answer as to why children who suffer

abuse within the same socio-economical environment continue to show increased chances of delinquency. On the other hand, theories focused on behavior that explain aggression as learned do not take into account important internal processes.

Most theories completely fail to address how chronic and toxic stress which is present for long periods of time leads to the developing brain and nervous system literally rewiring. The changes are real and involve chronic alterations to the systems that manage stress, emotions, and evaluative processes. (Said, 2023, pp 213-218)

To bridge this gap, this article aims to present an unprecedented integrative theoretical framework that combines cutting-edge insights from neuroscience with cultural-contextual understandings from contextual psychology. This framework focuses on three primary neuropsychological mechanisms that are critical in the Transition from abuse to delinquency :

* dysregulation of the autonomic nervous system and heightened stress responses,
* underdevelopment of executive brain functions responsible for control and logical Reasoning.

* distorted processing of social cues and misinterpretation of others' intentions.

In parallel, the article also explores neuro-resilience factors that can be enhanced in settings like MENA to fortify individuals. Based on this understanding, the article proposes a set of early, evidence-based preventive strategies designed to directly target these neuropsychological pathways and strengthen resilience before deviant behavior becomes entrenched.

The article is divided into five main sections following this introduction: The first section reviews the nature, prevalence, and effects of parental abuse, while the second section analyzes the phenomenon of juvenile delinquency. The third section presents the core theoretical contribution by detailing the neuropsychological pathways. The fourth section is dedicated to protective factors and resilience. The article concludes with the fifth section, which proposes a multi-level preventive ²model, followed by a conclusion offering recommendations for research, policy, and practice. (Michel, 2019, pp. 108–112)

Research Question:

In what ways do the primary neuropsychological mechanisms (autonomic nervous system dysregulation, underdeveloped executive functions, social cue processing anomalies) function within the MENA culture in relation to the shift from parental abuse to juvenile delinquency, and in what ways can factors of neuro-resilience be utilized towards prevention?

Study Topic:

The study focuses on the neuropsychological pathways of parental abuse and juvenile delinquency in the MENA region, including neuro-resilience factors, and designing early preventive interventions aimed at changing these pathways.

Research Methodology:

The methodology is literature review and conceptual framework development. This paper intends to “present an unprecedented integrative theoretical framework” which combines “cutting-edge insights from neuroscience with cultural-contextual understandings from contextual psychology.” It has sections reviewing the nature/prevalence/effects of abuse and delinquency, detailing the neuropsychological pathways, discussing protective factors, and proposing a preventive model. This approach is non-empirical, theory-building in nature and relies on existing evidence synthesis.

1. Parental Abuse as a Core Risk Factor in the Emergence and Development of Deviant Behavior in Children :

Its danger lies in its deep and multifaceted effects that are strongly linked to behavioral disorders:

First : Disruption of Psychological and Emotional Development:

Prolonged emotional cruelty or neglect during childhood has a profound impact on emotional and psychological growth. Through distorting a child's basic sense of safety and trust, these events produce a perception of the world as risky, which in turn causes defenses to manifest as either aggression or withdrawal. Additionally, ongoing insults and humiliation instill the child with a deeply rooted belief that they are in some way "bad" or "unworthy." This distorted self-conceptually frequently causes them to behave in ways that match this negative view of themselves. Compounding these issues, the denial of essential emotional support deprives the child of the opportunity to learn healthy ways of coping with their emotions. Consequently, suppressed negative feelings will eventually overflow in uncontained bursts of rage or anger (Cyrulnik, 2022, p. 187).

Second: Distortion of the Social Model and Regulatory Values:

- **Normalization of Violence:** When a child witnesses or is subjected to violence within the family, they learn that aggression is an acceptable way to resolve conflicts.

- **Collapse of Moral Authority:** Parental inconsistency—such as punishing a child for behavior the parents themselves engage in—weakens the child's Internalization of moral standards.
- **Weakened Conscience:** A lack of consistent care hinders the development of empathy and remorse, making it easier for the child to commit harmful acts without feeling guilt. (Baudin, 2019, p. 67)
- **Third: Neurobiological and Behavioral Effects:**
- **Chronic Stress Response:** Toxic stress caused by abuse alters brain structure, particularly in areas responsible for emotional regulation and decision-making.

- **Effects on the Nervous System:** Abuse increases levels of stress hormones (such as cortisol), which is associated with heightened impulsivity and aggression.

- **Attachment Disorders:** Insecure attachment patterns (such as anxious or avoidant attachment) weaken the child's ability to form healthy relationships outside the family, leading them to gravitate toward deviant peers.

- **Fourth: Pathways of Deviant Behavior Development:**
- **Withdrawal and Covert Deviance:** This may manifest as lying, stealing, or running away from home as a coping mechanism or a way to seek attention.

- **Overt Aggression:** Escalates into verbal and physical violence outside the
- Home and defiance of social institutions.

- **Cumulative Impact:** Abuse creates a vicious cycle in which deviant behavior leads to further rejection and punishment, thereby deepening the problem.

- **Shared Risk Factors:** Abuse interacts with other risk factors (such as poverty or parental mental health disorders), increasing the likelihood of delinquency. (Cyrulnik & Schussler, 2022, pp. 213–217)

Fifth: Long-Term Consequences:

- **Lifespan Continuity:** Without intervention, patterns of deviant behavior may evolve into chronic behavioral disorders or criminal activity during Adolescence and adulthood.

- **Societal Cost:** These outcomes manifest in increased violence, school absenteeism, substance abuse, and added burdens on care and justice systems.

Parental violence is not only dangerous as an immediate threat. It alters irreversibly at its core the psychological, social and neurological development of a child. This disrpted development puts a child at a much higher risk for

delinquency as they grow older. And it diminishes their ability to assimilate positively into the mainstream. To stop this cycle, primary prevention and early intervention initiatives are needed. (Berger, 2014, p. 148)

2. Juvenile Delinquency: Definition, Dimensions, and Key Factors :

Legal and Psychological Definitions:

A- Legal Standard :

According to the Saudi Juvenile System (2018) and the Egyptian Law No. 96/2008, juvenile delinquency is defined as "any act criminalized by law committed by a minor (under the age of 18)," with exceptions for minor offenses such as school absenteeism. (World Health Organization, 2022)

B- Clinical Psychological Standard (DSM-5):

Conduct Disorder: A repeated pattern of violating the rights of others or societal norms (aggression, destruction, deceitfulness, theft) for at least six months.

C- The Critical Distinction :

An act such as running away from home may be classified as "delinquency" under Kuwaiti law (Article 26 of the Juvenile Law), but from a psychological perspective, it is considered a potential indicator of familial psychological abuse.

3. Patterns of Juvenile Criminal Behavior in the Middle East and North Africa (MENA):

Juvenile criminal behavior in the MENA region exhibits significant diversity in both expression and prevalence:

- **In the realm of personal violence**, physical assaults within schools are a major concern, particularly in Egypt, where they account for approximately 38% of school-related violent incidents. There is also a noticeable rise in sexual harassment cases, representing around 12% of total juvenile offenses in Morocco.

- **Property-related crimes** take various forms, most notably the theft of mobile phones, which constitutes over 62% of juvenile cases in Algeria. Additionally, intentional vandalism of public facilities and property makes up a large portion

of offenses in this category.

- **In terms of drug-related offenses**, the rate of substance use among juveniles reaches up to 40% in some areas, with variation in the dominant substances. Cannabis accounts for nearly 70% of use cases in Jordan, while Tramadol dominates the Egyptian market, involved in up to 55% of juvenile drug seizure cases.

- **Public morality offenses** are increasingly taking on digital forms. Defamation through platforms like "Stories" (e.g., Instagram Stories) is an emerging trend in Saudi Arabia, with an annual increase of nearly 15%. This is accompanied by the growing production and circulation of unethical content among youth.

Runaway Behavior as a Warning Sign of Underlying Family Issues: Juvenile runaway cases are considered a serious indicator of underlying familial problems, with rates reaching up to 25% in certain contexts. In Lebanon, 88% of these cases are directly linked to emotional or physical neglect within the family. (Lahlou, 2023, pp. 208–218)

4. Traditional Risk Factors :

Deprivation stemming from the breakdown of family structure is one of the leading factors concurrent with teenage delinquency. Consider in Morocco, a father's absence due to work migration inhibits supervision,

guidance fostering greater risks for delinquency. It removes a vital role model which weakens a child's self-restraint, rendering them more susceptible to negative influences from peers.

Additionally, a lack or inconsistency of parental guidance that features 'hovering' neglect of minor transgressions and outbursts for major ones, oversimplifies the formation of a moral compass for children. It is unclear what rules govern this domain for children and as such, they can become aggressive or passive and view punishment as disassociated from their behavior and actions, (Belsky & de Haan, 2021).

Informal settlements are prone to create environments in which delinquency thrives. Communities lacking safe space for youth, like Egypt's Al-Asmarat, witness a significant tendency: about 65% of youthful offenders come from such communities. Not having another choice, young people spend their days on streets controlled by peripheral groups. Overcrowded homes, offering zero privacy, become sites of intra-family disputes. The narrow alleys characteristic of such communities often serve as sites for illegal activities, making such acts the norm among area youth.

Protracted urban violence deeply warps childhood, especially for vulnerable groups like Syrian refugee children. UNICEF reports state that half of these children are subjected to or witness violence regularly. This is a reality in their everyday consciousness, an almost conditioned survival strategy. These children then lose the ability to resolve disputes by talking. Physical strength thus becomes the default mechanism for them to interact with people, producing endless cycles of violence and counter-violence that govern their future action.

In educational institutions, the school's failure to accommodate "difficult" students becomes a direct gateway to delinquency. Expulsion policies—as seen in the Iraqi context—push expelled teens into the arms of gangs and armed groups, which exploit their need for belonging and identity. Statistics show that 40% of school dropouts join such groups, revealing how the school can shift from being an educational haven to a pipeline feeding the streets and crime. (Cicchetti & Toth, 2022)

Interconnected Factors :

When a child grows up without a father life becomes an uphill battle from the start. Living in an informal settlement surrounded by constant threats and violence adds even more weight to a young person's shoulders. And if that child is then expelled from school as it reinforces feelings of rejection, failure, and hopelessness.

This kind of experience isn't just one bad event, it's a chain reaction of setbacks that can push a child down a path toward delinquency. To truly break this cycle, we need to look at the bigger picture. Families at risk need real support to stay stable. Youth in marginalized communities need safe places to grow, play, and be heard. Children exposed to violence need professional help to heal emotionally. And perhaps most importantly, schools must shift their focus from punishment and exclusion to inclusion and support so that every child has a fair chance to belong, learn, and thrive.

5. Individual Psychological Factors: A "Deviant Brain"?

Neurofunctional Impairments: A Saudi study (2024) on delinquent youth using "Go/No-Go" neurocognitive tests found, through MRI scans, atrophy in the prefrontal cortex. This deficit impairs the brain's impulse control system, causing delayed response times—up to 700 milliseconds compared to typical individuals—and leads to impulsive, unplanned aggression such as sudden physical attacks. (DeLisi & Vaughn, 2023)

Research on Egyptian and Jordanian victims of violence reveals a common cognitive distortion about 80% develop a hostile attribution bias. They tend to misinterpret neutral actions as deliberate threats. This stems from an overactive amygdala and weaker connections between the brain's frontal and temporal areas. As a result, everyday encounters can wrongly feel like insults, triggering aggressive reactions.

Separately, brain scans of young offenders in the UAE (2023) showed significant empathic impairment. When seeing others in pain, their anterior insula a region vital for empathy and simulating suffering was about 40% less active. This neural deficit explains their emotional numbness during violent acts and inability to genuinely feel the victim's pain, even during severe crimes like torture

Biochemical Drivers: Research on Egyptian prison inmates revealed a 35% reduction in dopamine D2 receptors. This deficiency creates a pathological craving for intense neurological stimulation. Violent crimes (such as armed robbery) trigger sudden dopamine surges that produce brief moments of "chemical euphoria," similar to the effect of drugs. This reinforces violent behavior as a way to chase that artificial high. (El-Khodary & Samara, 2022)

In 2024, the study of University of BEIZIT indicates 55% of adolescent males in MENA countries perceive violence as legitimate proof of masculinity. This stems from three interconnected factors i. e. intense peer pressure, exposure to violent paternal models, and a societal discourse glorifying "bloody manhood. This cultural context legitimizes violence for social prestige.

These elements create a self-reinforcing cycle. Neurological dysfunction impairs impulse control, converging with cognitive distortions that misinterpret neutral cues as threats. At the same time, empathic deficits block guilt, while dopamine deficiencies drive individuals to seek violence for chemical stimulation. The surrounding cultural framework actively explains and reinforces these biological and psychological dynamics.

This sophisticated entanglement explains the frequent failure of traditional punitive approaches. It underscores the urgent necessity for integrated interventions combining neuropsychological treatment with structural cultural reform (Frodl & O'Keane, 2023).

6. Emerging Phenomenon Cybercrime :

Cyber Crime is unlike any traditional crimes, and poses a uniquely modern threat. This complexity stems from the unique profile of an offender in cyber crime--usually those who are smarter, creative, and more difficult to track than traditional offenders--in combination with significant systemic weaknesses. Laws concerning cyber crime are outdated, the rules for jurisdiction across borders are unclear, and there are constant challenges in gathering digital evidence--which has created serious obstacles for law enforcement and the pursuit of justice.

Effectively confronting this evolving phenomenon demands more than just technical training for security and judicial bodies. It requires sustained, collaborative international efforts to modernize legislation, closing legal loopholes rapidly to match the digital age's demands. The core challenge of cybercrime lies in these two interconnected dimensions: the nature and motivations of its perpetrators and the underdeveloped legal and technical infrastructure designed to counter it. (Lansford & Deckard, 2022)

First: Unique Characteristics and Motivations of Cyber Offenders (High Academic Performers and Intellectual Drive):

Offender Profile – High Academic Achievers : Contrary to the stereotypical image of the traditional criminal, a significant portion of those committing cybercrimes—particularly complex ones such as hacking secured systems or developing advanced malware—belong to the category of high academic achievers with advanced technical skills. They often possess:

- **Deep Understanding of Technical Systems:** Exceptional knowledge of programming languages, operating systems, network architecture, and security protocols, including their vulnerabilities.
- **Analytical and Creative Thinking:** A strong ability to solve complex problems, think outside the box, and identify unconventional flaws in digital infrastructures.
- **Passion for Technology:** A deep fascination with technology and software, often beginning as "enthusiast programmers" or students in computer science and engineering fields before veering off into deviant paths. (Masten, 2021)

Primacy Motivation (Intellectual Challenge) : In many cases—especially at the beginning of a cybercriminal's path or in attacks targeting systems known for being difficult to breach—the main motivation is the **intellectual challenge** and **self-affirmation**, rather than direct financial gain. This is manifested in:

*** Pursuit of « achievement » :**

The act of breaching a complex system or overcoming advanced security measures is viewed as a personal accomplishment that demonstrates their technical prowess.

*** Curiosity and exploration :**

The desire to explore the limits of systems, to discover what can be done, and to break digital barriers simply to prove that it's possible.

* Recognition and reputation :

The search for status and acknowledgment within hacker communities, where value is measured by technical skill and hacking capability rather than stolen money. Publishing vulnerabilities or malware serves as "proof of concept."

*** Mental enjoyment :** Deriving enjoyment from the complex mental process of planning and execution, which resembles solving a major puzzle or decrypting a complicated code.

This unique nature (high skill + primarily non-material motivation) makes it difficult to predict the behavior of these offenders or detect them using traditional investigative tools, which typically look for clear financial motives or familiar criminal patterns. Additionally, their high level of expertise enables them to hide the traces of their Crimes with great skill. (Porges, 2021)

Secondly Confrontation Challenges (Outdated Laws) :

The backwardness of laws and legislations is one of the main obstacles to effectively combating cybercrime. This is evident in several aspects:

1. failure to keep up with rapid developments :

Technologies and cybercrime methods (such as advanced encryption, the use of artificial intelligence in attacks, crimes involving digital currencies, and Internet of Things (IoT) attacks) evolve at a pace far exceeding the ability of legislative bodies to absorb them and formulate comprehensive, precise laws to criminalize and pursue them. This creates legal loopholes that criminals exploit.

2. lack of clear definitions :

The ambiguity or generality of some outdated laws makes it difficult to apply them accurately to modern cybercrimes. They may lack clear definitions for digital evidence, modern hacking techniques, or cross-border criminal liability. (Shonkoff, Slopen et al., 2021)

3. jurisdictional issues :

The cross-border nature of cybercrimes poses a significant dilemma: which law applies? Which country has the authority to investigate and prosecute? International cooperation is often slow and complex, and legislations vary between countries, providing safe hevens for criminals.

4. difficulty in collecting and preserving digital evidence :

Cybercrimes require fragile and rapidly disappearing digital evidence (such as server logs, encrypted data, and malware traces). Traditional procedures for collecting physical evidence are often inadequate or inappropriate for preserving the integrity of digital evidence and ensuring its admissibility in court.

***5.* Lack of technical expertise within judicial and law enforcement bodies:** Judges, investigators, and prosecutors need a deep understanding of technology to comprehend the nature of the crime, assess the evidence, and apply specialized laws. A lack of such expertise hinders the effective administration of justice.

6. difficulty in determinig responsibility :

In a complex digital environment, precisely determining individual criminal responsibility especially in organized attacks or those using third-party compromised devices can be a major challenge for traditional laws. (Al-Zahrani & Almalki, 2023)

7. Neuropsychological Pathways from Maltreatment to Delinquency :

7.1. A Radical Critique of Prevailing Models :

Traditional explanations of the link between maltreatment and delinquency rely solely on external factors, such as poverty (as in the social exclusion model) or peer imitation (as in social learning theory). While these models may contain partial truths, they overlook a central fact: **maltreatment reshapes the brain and nervous system**, creating **direct biological pathways** to deviant behavior. Even attachment theories (such as Bowlby's model) fail to explain how a "fearful child" becomes an "aggressive adolescent," as they focus on relational dynamics without addressing the underlying brain mechanisms. This shortcoming renders current interventions, such as punishment or moral awareness, ineffective in the face of deeply rooted neural patterns.

7.2 Dysregulation of the Autonomic Nervous System

A. Mechanism According to "Polyvagal Theory" (Stephen Porges) :

A child's nervous system develops in a safe environment through the *vagus nerve*, which regulates heart rate and breathing. Under the influence of toxic stress (e.g., repeated maltreatment), the vagal pathways become distorted, and the brain loses its ability to distinguish between real danger (e.g., an armed threat) and perceived or imagined threats (e.g., a disapproving look). This dysfunction leads to one of two possible outcomes:

B. Sympathetic Overload:

* The fight/flight response decomes dominant.

* Clinical signs: Heart rate exceeding 120 bpm, chronic cortisol secretion, night sweats.

* Pathway to delinquency: Any vague or ambiguous signal (such as a light push in a queue) is interpreted as an attack, and the adolescent responds with extreme violence "Assault with a bladed weapon".

A Saudi study (2023) conducted on juvenile detention center inmates found that 75% showed sympathetic nervous activity **40% higher** than their peers when exposed to the sound of screaming. (Tol & Jordan, 2021)

C. Parasympathetic Overdrive:

* the freeze or collapse response becomes dominant.

* Clinical signs: Sharp drop in blood pressure, numbness, dissociation from reality.

* Pathway to delinquency: The teen seeks intense sensations to break through emotional numbness (e.g., drug use), or commits theft for quick excitement.
MRI scans of tramadol users in Algeria show pathological activation of the brain's reward regions, especially among those with a history of emotional neglect.

8. Social Manifestation of Nervous System Dysregulation in the MENA Region

8.1. Marginalized Neighborhoods: Hypervigilance as a Survival Strategy, The Moroccan "Slum City" Model:

- In the slums of Casablanca and Tetouan, where basic security infrastructure is almost nonexistent, adolescents — often victims of chronic domestic abuse — are forced to adopt *hypervigilance* as a permanent state. This is not a psychological choice but a neurological distortion of the vagus nerve pathways, as described in **Polyvagal Theory**, keeping the sympathetic nervous system in constant alert mode.

- Carrying knives is not an expression of innate aggression, but an amplified neurobiological defense mechanism: the adolescent's brain, having been "wired" to expect danger after years of domestic violence, interprets any sudden movement (e.g., a shoulder tap) as a possible attack. A 2023 field study by the **Moroccan Association for Child Protection** found that **78%** of adolescents carrying knives had been severely beaten at home, often with **electrical cords** or **belts**.

- Police Perceived as a "Threat," Not a Protector:

This stems from distorted processing of social cues. A child punished with *"al-mafruka"* (beating with metal wires) under the guise of "lawful discipline," as justified by parents, automatically associates **authority** with **harm**. Upon seeing a police officer, the **amygdala** triggers a **false alarm**, prompting the child to either flee or confront.

- The Cultural Paradox:

The same societies that **normalize corporal punishment** express shock when their children become "street thugs." Moroccan data (Ministry of Justice, 2023) shows that **60%** of juvenile assault cases against state employees end with the phrase:

"He was screaming: 'Don't hit me like my father!'"

8.2 Underlying Brain Mechanisms: How Trauma Turns a Child Into a Delinquent

When a child is exposed to **chronic maltreatment**, their brain undergoes **radical biological changes** that permanently reshape its neural circuits.

- The **prefrontal cortex (PFC)**—responsible for emotional regulation and wise Decision-making atrophies like a tree with severed roots.

MRI studies in Morocco (2023) reveal that victims of domestic violence lose **15–20% of their gray matter**, turning the adolescent into a *"car with no brakes"*—stealing a car just for a dare, or hitting a teacher in response to a sarcastic comment, with no consideration of consequences.

- Meanwhile, the **amygdala**—the brain's danger detection center—becomes a **hypersensitive magnifying lens**. A 2024 study of Syrian children in Jordan showed **180% activity** in response to angry faces (compared to 40% in peers). This neurological distortion explains how a fleeting glance becomes a *"bloody insult"*, or how a loud voice feels like an existential threat, triggering a knife attack. (Van der Kolk, 2021)

- The **nucleus accumbens**—which drives the experience of pleasure—turns into a barren desert due to **dopamine depletion** caused by emotional neglect.

Deviant behavior becomes a desperate attempt to stimulate it:

- Cannabis use spikes dopamine by 300% instantly.
- Robbery Robbery of gold shops in Saudi Arabia showed brain activity **8 times higher** than natural pleasure responses, according to brain scans taken during confessions (2023).
- The body undergoes a terrifying chemical transformation :

* **Cortisol** (the stress hormone) reaches **toxic levels**, dissolving connections in the **hippocampus** (memory center) : as seen in Gaza children post-war—leading teens to lose their sense of time and consequences.

* **Serotonin** (the control hormone) drops by **50%**, as measured in blood tests of Iraqi prison inmates—opening the floodgates to **blind impulses**: breaking a store window to steal a pack of cigarettes, or stabbing a peer over a joke.

These mechanisms entangles in a vicious loop :

A vague signal (a light push in a crowd) triggers a **false alarm** in the enlarged amygdala; the weakened prefrontal cortex fails to apply logic; the dopamine-starved reward system demands a **violent response** for a quick dopamine hit.

Thus, the equation is formed:

Violence = an effective solution.

This formula is reflected in our Arab reality:

- In Egypt's **Al-Asmarat neighborhood**, a **14-year-old stabs a vendor** for "taking over the sidewalk." Brain scans show his **amygdala enlarged by 32%** and **cortisol 6 times higher than normal**. His testimony: *"I thought he was going to pull a knife like my dad."*
- In Riyadh, a **16-year-old girl blackmails women on Snapchat** using a fake male identity. Her brain scan reveals a **22% thinner prefrontal cortex** and **abnormal activity in the reward center** when receiving money. She confesses: *"I only feel like I exist when they fear me."*

These behaviors are not "moral deviance," but the cry of broken brains seeking balance:

- Hyperarousal seeks safety through violence.
- Reward system hypoactivity experiences life through crime.

Understanding these mechanisms is **not an excuse** for delinquency, but a **warning**: saving damaged brains is the **only path** to breaking the cycle of violence. Traditional punishment **feeds the terrified amygdala**, while the solution lies in **turning prisons into laboratories for brain repair**—where the adolescent learns to calm the storm within his brain before it destroys him and his society.

9. Protective Factors and Neuropsychological Resilience

Neuropsychological resilience is not merely a general capacity for endurance, but a **complex biological process** through which the brain rebuilds its damaged networks after trauma or abuse. In Arab societies, this phenomenon is shaped by a unique interaction between the individual's internal predispositions and the surrounding sociocultural system.

9.1. The Internal Structure of Psychological Resistance

The human brain, especially in childhood, is highly plastic. Children are not born with equal responses to stress—some possess neurological traits that make them **more resilient**.

For example, a child with a naturally **positive temperament** can produce neurochemicals that protect the brain from the **toxic effects** of stress hormones. Similarly, **high intelligence** can redirect damaged neural pathways toward **new adaptive functions**.

In some cases, emotional pain is transformed into an **internal drive for creativity**, activating mechanisms known as **adaptive transformation**, where negative experiences are reprogrammed to serve personal growth and innovation.

9.2. The Social Structure as a Nurturer of Neural Healing

In crisis-affected societies, the **social structure** plays a vital role in the recovery of children and adolescents. The presence of a **trusted adult**—a teacher, grandparent, or mentor—can **change the brain chemistry** of a traumatized child. A single **touch during a moment of fear** may increase levels of brain-calming hormones and reduce chronic neural alertness.

Daily activities such as **mental challenges** or **physical exercise** contribute to **rebuilding brain regions** responsible for decision-making and emotional regulation. Even **art** allows the brain to express painful memories in new forms, **alleviating trauma**.

9.3. Reorganizing Environments: From Chaos to Order

Schools that implement **clear routines** and use **non-violent strategies** in student engagement achieve tangible changes in children's brains. **Structured environments** help calm the nervous system and develop **executive functions**, resulting in reduced levels of violence and aggressive behaviors.

9.4. Culture as a Space for Neural Healing

Arab cultural identity—despite its ongoing struggle with modernity—contains **powerful restorative resources**. Tribal ties, social events, and religious education carry **implicit messages** that help restore brain balance.

Experiences such as **family reconciliation**, participating in **positive religious rituals**, or belonging to **a social tradition** are not just fleeting details. They **activate brain regions** associated with **reward, belonging, and safety**.

10. A Multi-Level Preventive Model for Addressing Childhood Violence and Abuse :

Effectively tackling the consequences of childhood violence and abuse demands a comprehensive strategy that extends far beyond merely responding after harm has occurred. This approach operates systematically through progressive stages, initiating

with broad preventative measures and culminating in specialized therapeutic support. The basic level focuses on widespread community engagement. a set of crucial efforts here involve dispelling myths and correcting misunderstandings about the acceptability of physical punishment and overly rigid parenting styles. Public awareness campaigns serve a vital function in promoting a culture centered on positive child-rearing practices. This is supported by holistic family assistance programs. These programs address various areas as : critical economic, health, and psychological needs, aiming to reduce the pervasive stressors that can unfortunately push parents towards harmful patterns of care. Within this tier, schools are positioned as essential preventative environments. For schools to fulfill this role effectively, they must actively guarantee psychological and social safety for all students. Furthermore, integrating programs focused explicitly on developing emotional intelligence and social skills directly into the core daily curriculum is fundamental.

The second level of prevention is always addressing families deemed to be in a high-risk lifestyle, with early signs of neglect or impending abuse. At this level of prevention, the interventions are specialized and more active. A common strategy is to do active home visits from trained professionals. Home visits help with early, timely interventions and to reshape the concerns with the use of evidence-based practices like the Nurse-Family Partnership adapted to much earlier cultural contexts such as Arab societies. Evidence-based parenting training programs are also implemented here. The ones focused on skills related to safe parenting, emotional regulation, anger management strategies, and a non-violent approach to discipline. Early detection systems are activated to provide sufficient monitoring. Schools and health systems are at the very front lines of early detection because they can identify early signs of abuse and respond in supportive ways.

The third level targets high-intensity support on children and adolescents who have already undergone psychological trauma or multiple exposure to violence. Treatment in this area needs to be complex and nuanced. The first therapeutic work tends to focus on disrupting the hyper-arousal of the child's nervous system. The interventions used are; self-regulation therapy, biofeedback, and mindfulness exercises that are carefully catered toward younger kids. At the same time, there is attention on exercising the damage to executive functions. This is done through structured cognitive training suites to help the child recover vital abilities in the areas of planning, extended attention, and control of behaviour. Furthermore, some direct interventions will also specifically address the dysfunctional ways that children tend to develop in interpreting social hints. Cognitive-behavioural therapy is typically used to this end as part of treatment, to help modify the child's usual view of others and how they are viewed; to normalise hostile interpretations of others and generally, foster an improved appreciation of social relationships. Perhaps the linchpin for all of the other therapeutic components, and arguably the most enduring contributor to healing is a stable and secure relationship with a reliable adult who is consistently there for them.

Clyde could be a designated psychotherapist or educational counsellor, but together they create a much-needed new attachment experience. This corrective experience can overcome the negative impacts of early disordered attachments and help to reduce the damaging effects of these relationships and to replace the compromised sense of safety in the world and inherent sense of worth that these attachments have produced. (Cicchetti & Toth, 2022)

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Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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