

CASE REPORT

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A Middle-Aged Female Serial Killer

ABSTRACT: The case of a 48-year-old woman accused of killing at least 12 elderly women and attempting to kill another one during the last 3 years is presented. Extensive neuropsychological, electrophysiological, and neuropsychiatric testing showed no evidence of a DSM-IV-TR Axis I diagnosis, but a decrease in executive functions and abnormalities in the processing of affective stimuli were found. Behavioral and psychophysiological studies revealed dissociation between knowing how to behave and actually behaving in socially acceptable ways. According to the woman, killing was just her response to “humiliating situations.” Two potentially significant conditions in her past history are found: (i) childhood abuse; and (ii) multiple head injuries. It is conjectured that the nature of her crimes, paranoid and personality traits, a probable frontal brain dysfunction, as well as a specific demographic and social context represent unusual factors accounting for her violent behavior.

KEYWORDS: forensic science, serial killer, neuropsychological test, event-related potentials, EEG

Serial killing represents a most intriguing type of murder not only from a legal standpoint but also from a psychological one. Currently, there is no consensus regarding the definition of a serial killer in the psychiatric or criminological literature. Nonetheless, serial homicides are committed as a result of a compulsion that in many, but not all cases, have roots in the killer’s often dysfunctional youth, as opposed to those motivated by financial profit (e.g., contract killers, burglary) or ideological/political motivations (e.g., terrorism, genocide).

According to Kraemer et al. (1) the definition of a serial killer should include three elements: (i) the number of victims must be at least three, (ii) the killings occurred at different times and locations, and (iii) typically, the motivation is either sexual or an internal psychological gratification. Furthermore, several characteristics of serial killers are frequently mentioned in the literature, including a psychopathic personality (2–4), a history of abuse during childhood (5), sexual sadism, and autism spectrum psychopathology (6–8). A significant variability is observed not only with regard to personal history and the individual sexual interests, but also with respect to age, alcohol/substance abuse, ethnicity, gender, circumstances of the murders, and the victim’s distinctive characteristics.

It is often assumed that serial killing is a manifestation of an antisocial personality disorder (9), a mental disorder associated with a group of personality traits that predispose affected individuals to crime. The fourth edition of the Diagnostic and Statistical Manual of Mental Disorder of the American Psychiatric Association, text revision (DSM-IV-TR) (10), defines antisocial personality disorder as a pervasive pattern of disregard for and violation of the rights of

others occurring since 15 years of age, associated with various anti-social traits that persist after adolescence.

An association between serial killing and psychopathic behavior has been proposed. Stone (11) reviewed 279 biographies of different types of murderers; out of 63 biographies involving serial killers, 61 fulfilled the clinical criteria for psychopathy. Psychopathy represents a personality disorder defined by a cluster of affective, interpersonal, and behavioral characteristics, including egocentricity, excessive manipulation, deceitfulness, shallow affect, lack of empathy, guilt, or remorse, as well as propensity to violate social and legal expectations and norms (12). It has been postulated that psychopaths suffer from abnormalities in semantic and affective processing. According to Kiehl (1999, 2006) (13,14) the emotional components of cognition are disturbed and poorly integrated. Although a great deal is known about the assessment of psychopathy, little is understood about the potential brain disturbances associated to psychopathy.

Serial killing is frequently associated with young adults. Although it tends to be more common in perpetrators in their thirties or forties, serial killing has also been reported in children and adolescents (12). Reports of middle-aged serial killers, however, are found less frequently than in younger age groups. Clearly, an uneven gender distribution is also observed (1,15). Despite the finding that the overwhelming majority of serial murderers are men, female serial killers have also been reported (4,9,16).

Beasley (5) analyzed interviews of seven serial killers. A significant variability in the profiles of the seven offenders was found: the age of the killer when s/he first committed murder ranged from 16 to 32 years of age; a psychopathic personality was found in four participants; the primary motive was classified as sexual in four cases, while in the others profit/emotion seeking was the main driving force; a history of drug/alcohol abuse was found in only four; and finally, all offenders had a criminal history, with four scoring “extensive” and three “minimal.”

Kraemer et al. (1) compared single and serial homicide offenses using a large database of serial homicide offenders (157 offenders,

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608 victims). They found that 95% of serial homicide offenders were males, 68% were Caucasian, and the mean age was 31 years. The mean level of education was 11.51 years. Thirty-one percent were married at the time of the offense and 16% had been married in the past. Serial homicide victims, on the other hand, were most likely females (67%) and Caucasian (71%), whose mean age was 33 years old. Most victims were strangers to their offenders (67%), followed by acquaintance (21%), and relatives (5%). Over half of the victims were killed for sexual purposes. Eighteen percent were killed for profit, 17% for emotional reasons, 17% were unclear, and 4% of the killings were motivated by the offender's own psychosis.

Victims of serial killing are usually relatively young adults. On the other hand, older individuals are easy targets for burglary and other related crimes. Killing seniors seems to represent a special subtype of serial murdering. The killing of terminally ill and very old hospitalized patients, sometimes in nursing homes, has been reported (17). This particular type of murder may involve nurses and other healthcare professionals.

Finding a specific profile of serial killers is not a particularly easy task. Some neurological dysfunctions associated with serial killing have been mentioned, particularly complex partial seizures (18). Pontius (19) proposed the possibility of a limbic system dysfunction in serial murderers, specifically, a limbic psychotic trigger reaction, which may include: (i) a transient psychosis (hallucinations and/or delusions), (ii) autonomic hyperactivation (e.g., loss of bladder control, nausea, ejaculation), (iii) motiveless, out-of-character, unplanned, and well-remembered homicidal acts, (iv) committed with a flat affect (not emotionally or impulsively provoked), (v) typically involving a stranger who happened to provide an objectively harmless and only subjectively important stimulus; and (vi) an individualized stimulus that triggered a repeated memory revival of a painful experience.

The case of a middle-aged woman presented here displays some remarkable characteristics: (i) in spite of the harsh living conditions and the traumatic childhood of the offender, there was no background of personality disorders by the time she began her serial killings; (ii) personality testing did not reveal any evidence of psychiatric impairment; and (iii) electrophysiological measures revealed alterations in affective processing and a dissociation between knowing how to behave and actually behaving in socially acceptable ways.

Case Presentation

Background Information

JB is a 48-year-old right-handed woman, born in Pachuca de Soto (state of Hidalgo, Mexico). Her family moved to Mexico City when she was 3 months old. Her father abandoned the family when she was born, and her mother went to live with another man. JB has one half-brother and one half-sister. Her mother worked as a housemaid and was a heavy alcohol-abuser; her stepfather worked as a handyman. The family was extremely poor and lived in a small, unfurnished house. JB took care of her two younger half siblings, never attended school, and was not allowed to go out. She never had toys or friends to play with, and her mother was extremely aggressive (both physically and verbally) to her. In general, JB's stepfather was more protective towards her than her own mother. JB reports that when she was about 12 years old she was given away to an unfamiliar man (reportedly, her mother traded her for three bottles of beer). Allegedly, during their first night, JB was tied up and raped. She continued

living with this man for 15 months in an abusive relationship, where she was repeatedly raped. She later had a son outside this relationship. Soon after, JB was found by her step-uncle, who took her and her baby back to her family. JB considered that the interaction with her mother was minimal, despite living in the same house. However, she maintained a good relationship with her stepfather, who continued caring for JB and her son until his death, when she turned 30.

JB's medical history is positive for a hiatal hernia, bronchitis, and pneumonia. Other than some scars on her left hand and left eyebrow, which are possibly the result of her wrestling, JB exhibits no physical signs suggestive of any genetic disorder related to her female appearance. She reports no history of alcohol or drug abuse.

JB worked for some time selling candy on the streets at approximately 12 years old, and later on in a shoe store. She married when she was 28 years old. Her husband was initially "a good man," as she declared, but he became progressively abusive (both physically and psychologically) toward her. JB had a daughter with this man at approximately 30 years of age, and left him 3 years later. At 34 years of age she went to live with another man and had two more children. As with her first husband, they initially had a harmonious relationship, but he progressively became verbally and physically abusive to her. At 45, she abandoned her partner and decided to live independently with her two younger children because her older daughter was married and her eldest son was killed in a street fight when he was 24 years old (JB was 38 at the time of his death). JB raised all of her three children, supporting her family by working on the streets selling candy and washing other people's clothing.

JB lived around the corner from a wrestling arena and, given her height, a trainer asked her if she wanted to be a wrestler (JB is relatively tall for a Mexican woman, about 5'11"). JB decided to work in the professional wrestling business on weekends in order to make some extra money. Her wrestling name was The Silent Lady (*La Dama del Silencio*). When asked why the nickname, she responded, "I have always been a quiet person, and I only speak when spoken to." Furthermore, JB pointed out that when she was a wrestler, she belonged to the "rough or rude team and not the technical group because" according to her, "the rude follow rules during competition, as opposed to the technical." When she turned 43, after 13 years in wrestling, JB stopped participating as a wrestler and began working as an organizer of wrestling competitions. Previous to her current incarceration, no criminal record was found, although witnesses have accused her of being a housebreaker.

Serial Killing History

JB is accused of killing at least 12 elderly women and attempting to kill another victim. According to police reports, at least six of the murders have been associated to burglary.

JB is known to the police and to the mass media as the *Mataviejitas* ("The killer of elderly women"). Initially, she confessed and described three of the crimes; however, on trial, she pled guilty only to the last one, when she was caught committing the murder. The first murder attributed to the *Mataviejitas* was dated on November 17, 2003. The authorities and the press have given various estimates as to the total number of the killer's victims, with totals ranging from 24 to 49 deaths. In at least 12 of the cases, fingerprint evidence has been linked to JB. Witnesses, when asked to provide a description of the serial killer, weren't sure if JB was a man or a woman.

The last killing was committed on January 25, 2006. According to the offender's report, JB approached an 82-year-old woman outside her home and proposed to be hired as her laundry lady. Once in the house, the aged woman offered to pay an amount of money that JB considered too low: 23.00 pesos per twelve laundry pieces (approximately U.S. \$2). She asked for a higher payment, to which the lady answered in an insulting way, "*these bitches, they're illiterate, but still want to make a lot of money!*" JB killed her with the rubber cord of a stethoscope that was on the victim's table. JB was caught when a young man who was renting a room in the old woman's house came in unexpectedly. She tried to run away, but the young man chased her and two policemen managed to arrest her.

During the initial interrogation JB admitted to killing another old lady around 3 years back. Reportedly she met an old woman on the street; they talked for about an hour and a half, and JB escorted the old woman to her home. Once inside, JB asked her for a job. The lady purportedly responded that she was not used to having poor, dirty people in her house. JB responded that it was not fair to be judged in that manner, and strangled the lady with a stocking. She was accused of taking 4,000 pesos (approximately U.S. \$380) she found at the old lady's house.

JB also declared that about 1 year prior to her arrest, she met another aged woman, for whom she used to work doing laundry by hand. JB used to call this lady "grandma." At some point during her working relationship, JB was broke and asked to borrow money from "grandma." The lady yelled at JB, who responded by killing her with a handkerchief.

These are the three murders for which she acknowledged responsibility, and for which JB provided details during her initial interrogations. According to JB's report, she used to observe her potential victims while they were shopping. She only selected old women that were alone. Initially, she approached them in a friendly way in order to win their confidence to such a point as to having the ladies extend an invitation to JB into their homes.

From 2003 to 2006, nine additional elderly women were strangled in Mexico City within a relatively close geographical area. In some of the cases, burglary was thought to be the motive. Mexican policemen suspect that JB was the killer in all the cases.

On interrogation by one of the examiners (FO) about the wrongness of killing people, JB recognized that she behaved inappropriately, because she knew the social rules, she was aware of the basic meaning of the law, and also "*knew that killing people is by all means unacceptable.*" But, on the other hand, JB states that her actions were justified, because she felt victimized by the older women when they humiliated her on the basis of her social status. JB admits to easily losing control and patience when she is judged and offended so unfairly.

Testing Procedure

Testing was carried out at the Reclusorio Santa Martha Acatitla (Mexico, D.F.).

Two different types of testing were used: (i) Neuropsychological and Neuropsychiatric Assessment, and (ii) Electrophysiological Studies.

Neuropsychological and Neuropsychiatric Assessment—Neuropsi. Brief Neuropsychological Battery Test for Spanish-

speakers (20). Includes the evaluation of: (i) Orientation; (ii) Attention and concentration; (iii) Coding verbal and nonverbal stimuli; (iv) Language; (v) Reading; (vi) Writing; (vii) Conceptual functions; (viii) Motor functions; and (ix) Delay Recall of verbal and nonverbal material. Norms for the Neuropsi battery test were obtained in 1617 Mexican participants ranging from 16 to 85 years with zero to 24 years of formal education.

Frontal Lobe Battery Test (21). This battery of tests evaluates several executive functions related to different frontal systems. It includes 12 tests: (i) Maze test, (ii) Stroop test, (iii) Self-ordered pointing task, (iv) Card test, (v) Inverse sequencing test, (vi) Card-sorting test, (vii) Verbal working memory, (viii) Viso-spatial working memory, (ix) Verbal fluency, (x) Semantic classification, (xi) Abstraction, and (xii) Metacognition. Norms were obtained in 250 Mexican participants ranging from 6 to 50 years.

Depression and anxiety were assessed with the Beck Depression Inventory (22) and the Beck Anxiety Inventory, respectively (23). Both measures are validated for Mexican populations (24,25).

Psychopathy was assessed by using the Hare's Psychotherapy Checklist-revised Scale (PCL-R) (26,27). This is a clinical rating scale with 20 items. Each of the items is scored on a three-point (0, 1, 2) scale (maximum score = 40) according to specific criteria through file information and a semi-structured interview. The items are then summed up in order to obtain a total score. Factor analytic studies have demonstrated that the scale has a two-factor structure: Factor 1 described affective and interpersonal style and Factor 2 an antisocial lifestyle.

Electrophysiological Studies—EEG analysis. EEG was recorded during 10 min with eyes open and 10 min with eyes closed. A computerized system (Neuroscan 4.2, Charlotte, NC) recorded the EEG. Activity was recorded from electrodes placed in 32 different locations on the scalp according to the extended and standardized International 10–20 system. Analysis was performed with the computerized system and also visually by an experienced physician. EEG abnormalities were coded according to a scheme that includes focal abnormalities and nonfocal abnormalities such as diffuse slowing of background rhythm, intermittent theta or delta slowing, and paroxysmal activity.

Event-related potentials (ERPs) were recorded while JB was viewing pictures of emotionally charged unpleasant scenes with and without moral content as well as emotionally pleasant and neutral pictures. Two hundred and forty colored pictures were used. All the stimuli were previously standardized in our laboratory (28–31) according to four categories, (i) unpleasant pictures with moral content (e.g., physical assaults, war scenes), (ii) neutral (e.g., household objects, people), (iii) unpleasant pictures without moral content (e.g., body mutilations, dangerous animals), and (iv) pleasant pictures, including scenes of people and landscapes. Sixty different pictures of each category (pleasant, unpleasant without moral content, neutral, and unpleasant with moral content) were projected using a random sequence.

*Behavioral Data—*JB scored each one of the 240 stimuli. Three scoring dimensions are used: valence (pleasant-unpleasant), activation (excited-calm) and moral content (low-high), each one with nine different levels. Figure 1 illustrates this scale (adapted from Lang, Greenwald, Bradley, and Hamm [31]).

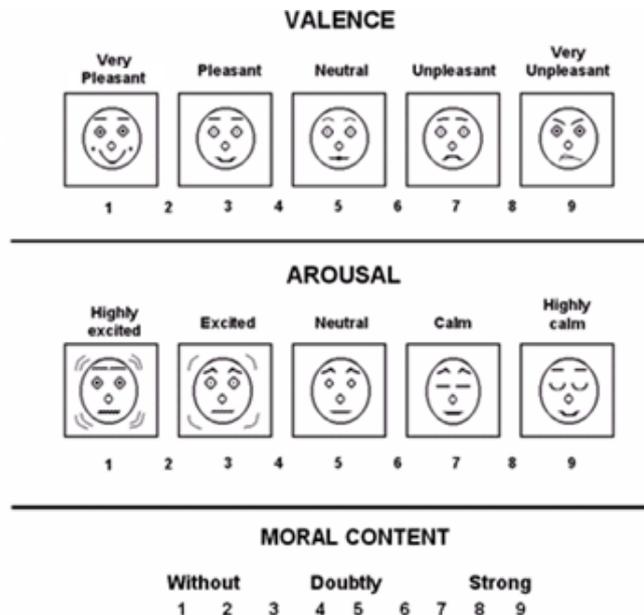


FIG. 1—Scale used for scoring two dimensions of the visual stimuli: valence (pleasant-unpleasant) arousal, (excited-calm) and moral content (without-strong) (Adapted from Lang, Greenwald, Bradley, and Hamm [31].)

TABLE 1—General results in the different neuropsychological and neuropsychiatric tests.

Test	Score	Normative Scores	Remarks
<i>Neuropsychological tests</i>			
Neuropsi	80.5	68–94	Normal general cognitive function
Frontal Lobe Test Battery	42.0	1–35	Defects in executive functioning: motor planning, alternate movement and motor sequences
<i>Neuropsychiatric tests</i>			
Beck Depression Inventory	10	0–63	Slight depression
Beck Anxiety Inventory	9	0–63	Slight anxiety
Hare's PCL-R	25	0–40	Psychopathic tendencies: higher scores on affective/interpersonal factor

Testing Results

Table 1 presents the results in the different tests that were administered.

Neuropsychological and Neuropsychiatric Assessment Results—Neuropsi, and the Frontal Lobe Battery Test. JB's general cognitive functioning fits into a normal range given her age and education. Her verbal understanding is normal. She can correctly recognize passive and active sentences. Attention and memory (verbal and nonverbal) correspond to a normal range for her age and education. Remote memory is well preserved; she can recall historical events and correctly describes her own life. The Frontal Lobe Battery Test scores were abnormally elevated consistent with a frontal brain dysfunction. For example, some motor difficulties were noted such as alternating movement with both hands, more evident on the right hand; she also experienced difficulties with Opposite Reactions test.

In the Beck Depression Inventory and the Beck Anxiety Inventory, she scored for slight depression and anxiety.

Hare's PCL-R. JB obtained a score of 25 (out of a possible 40 points). Although she did not reach the cut-off point of 30 established for psychopaths (3,26,27,32,33), some clear

psychopathic tendencies may be assumed. JB displayed significantly higher scores on all the items that loaded on Factor 1 (affective interpersonal), than lower scores on Factor 2 (antisocial measures).

Electrophysiological Studies—EEG Results. Background activity consists of well-developed, well-organized 8–9 Hz mid-voltage activity predominating posteriorly, with activation of the alpha rhythm with eye closure. The alpha rhythm is fairly well sustained during the course of the electroencephalogram. Occasional sharp focal activities are seen in the left fronto-central regions. This is matched at some lesser frequency by similar activity in the right hemisphere as well. However, such sharply contoured activity is far more frequent in the left hemisphere. Nonetheless, this slightly irritative activity in and of itself, does not suggest the diagnosis of a seizure disorder.

Also, a diffuse slowing consisting of 1–4 Hz, delta and 4–7 Hz theta activity is seen predominating over fronto-temporal and central areas of the left hemisphere. There are no significant additional asymmetries.

Event-Related Potentials—ERPs Data. Average ERPs from a normal subject (same age and gender) and from JB are presented in Fig. 2 for the four experimental conditions. In the normal

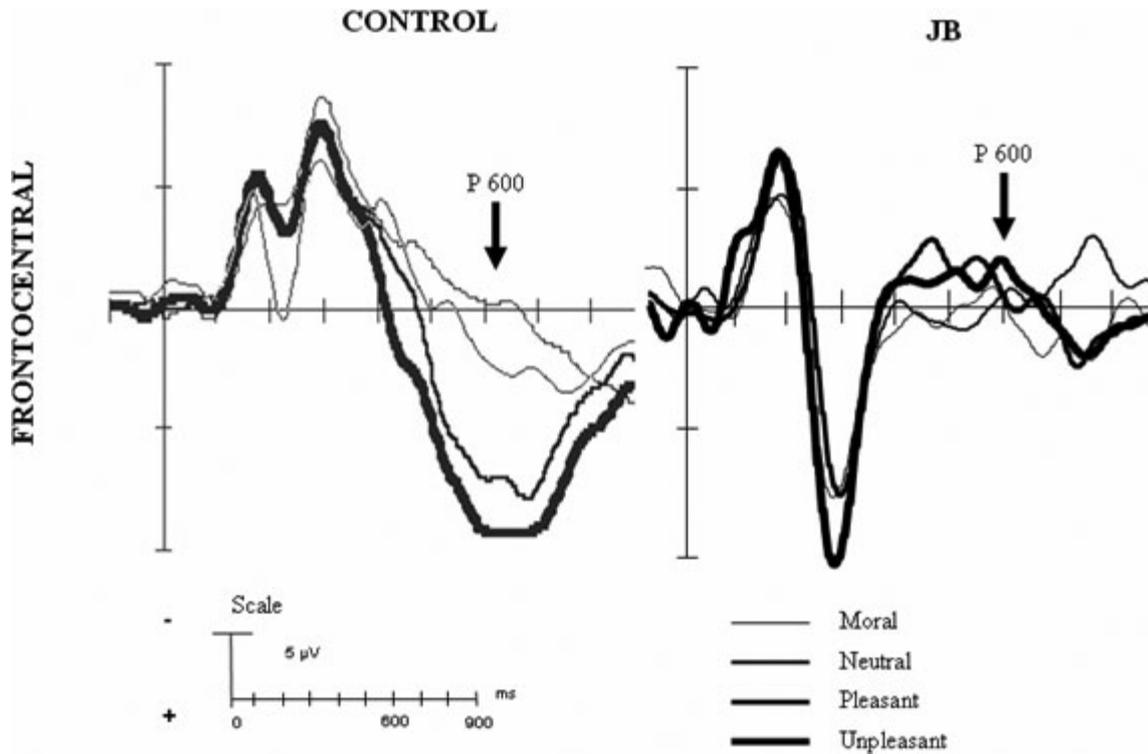


FIG. 2—Average ERPs from a normal subject (same age and gender) and from JB for the four experimental conditions. In the normal subject a larger late positive potential (LPP) between 400 and 650 ms was observed to the emotional pictures (pleasant and unpleasant with and without moral content). In JB the LPP to the four types of stimuli was relatively small and brief.

subject, the emotional pictures (pleasant and unpleasant with and without moral content) evoked a larger late positive potential (LPP) between 400 and 650 ms, than neutral stimuli mainly in centro-parietal areas of both hemispheres. The amplitude and the latency of this component were earlier for the unpleasant pictures without moral content. These results have been replicated in over 50 neurologically intact subjects (29).

Unlike the normal matched control, JB did generate differences in the amplitude of the LPP between the neutral and the stimuli with emotional content. The LPP to the four types of stimuli was relatively small and brief, suggesting that JB processed all stimuli (neutral, pleasant and unpleasant with and without moral content) differently than the normal participant.

Behavioral Data—During the classification task, JB tended to score neutral stimuli as stimuli with emotional content. She also over-scored unpleasant stimuli. For instance, she scored a trashcan as pleasant with a moral content because “it is used to keep order and cleanliness.” JB only used extreme scores, that is, no intermediate values were recorded.

Discussion

The two most unusual elements in this serial killer case are the age of the offender and the absence of any criminal history. Sociopathic and psychopathic personality traits tend to decrease with age (34–37), and it seems difficult to understand that JB’s first criminal activity remained dormant and did not emerge until she turned 45 (or just a few years earlier if she is indeed responsible for some of the murders attributed to her that occurred in the late 1990s).

Two elements in her personal history are of special interest. (i) On one hand, JB had a long and significant history of abuse, not only from her mother, but also from her husband and other partners she lived with. (ii) She wrestled for 13 years, potentially exposing herself to head injuries. However, no major injury is reported during this time in her life, and JB retired because of her age, not because of any specific physical or neurological condition. In any case, wrestling can account for some brain abnormalities (38).

While there is evidence that most people who have been abused do not become violent criminals, abuse does appear to be a frequent feature in the history of violent individuals. As Pincus (39) points out, it may take enormous energy and an intact nervous system to overcome the tendency towards violence that results from consistent, long-term abuse delivered by parents or tutors at a young age. When the impulse to violence provoked by abuse is accompanied by brain abnormalities, the affected individual may be at a higher risk for engaging in violence due to compromised impulse control.

The EEG abnormalities found in JB may reflect some nonepileptogenic central nervous system changes. The presence of some dysfunction within the limbic system can lead to personality disturbances that may in turn lead to antisocial behavior (14,40). Head trauma also produces frontal and temporal lesions, and reduces the threshold of impulsive behavior and violence which may be reflected in EEG abnormalities. The EEG findings indicate that brain dysfunction is common among violent offenders (see Pillman et al. [41] for a review) and in many cases the limbic system is the site of neurological abnormalities. Using neuroimaging studies to compare brain activation of criminal nonpsychopaths and noncriminal control participants during

affective processing, Kiehl et al. (40) found that criminal psychopaths showed significantly less affect-related activity in the amygdala/hippocampal formation, parahippocampal gyrus, ventral striatum, and in the anterior and posterior cingulate gyri. Psychopathic criminals also showed evidence of over-activation in the bilateral fronto-temporal cortex for processing affective stimuli. These data suggest that the affective abnormalities so often observed in psychopathic offenders may be linked to deficient or weakened input from limbic structures.

It has been reported (38,42,43) that individuals with defects in impulse control associated with immoral behavior may present a frontal lobe dysfunction; dissociation between social cognition and moral cognition has been observed in these cases. As a result, individuals suffering from this type of dysfunction lack an understanding of moral rules that is congruent with their immoral behavior. Also, in a series of studies on acquired sociopathy it has been shown that affected individuals may be "cognitively within normal limits." However, their abilities to use cognitive information regarding the nature of morality appear compromised, implicating the ventro-medial and orbito-frontal areas. In addition, Koenigs et al. (43) has shown that patients with focal bilateral damage to the ventro-medial prefrontal cortex (VMPC), a brain region necessary for the normal generation of emotions and, in particular, social emotions, produce an abnormally "utilitarian" pattern of judgment for moral dilemmas that pit compelling considerations of aggregate welfare against highly emotionally aversive behaviors (for example, having to sacrifice one's person's life to save a number of other lives). In contrast, they found that the VMPC patients' judgments were normal in other classes of moral dilemmas. The authors point out that the VMPC is critical for normal judgment of right and wrong. Recent neuroanatomical evidence suggests that frontal neural networks are involved in moral processing and empathy (44).

It is noteworthy to point out that both neuropsychological and electrophysiological (EEG) findings revealed frontal abnormalities in JB. Furthermore, in the battery of emotional stimuli with and without moral content, JB clearly stated what is correct and incorrect, and what types of behavior are socially acceptable. In classification tasks directed to evaluate her affective processing, a tendency to classify neutral stimuli as emotional and to over-score unpleasant stimuli was found. However, the electrophysiological (ERPs) analyses revealed clear abnormalities in affective processing. No differences in her evoked potentials to positive and negative stimuli were observed; evoked responses were brief, with low amplitude, suggesting that JB processes these types of stimuli differently than has been found in normal individuals. It may be suggested that as in acquired sociopathy, at an intellectual level she can distinguish "good" from "bad," but at an emotional level, this distinction is nonexistent. JB's abnormal LPP in ERP study could reflect her difficulty in processing emotional stimuli (41). This finding is consistent with the proposed suggestion that psychopaths have a dysfunction in specific forms of emotional processing (13,14,40), and could account for the high scores she obtained in the interpersonal/affective items of Hare's PCL-R, including her lack of empathy, her lack of remorse or guilt, her shallow affect, the pathological lying, and her failure to accept responsibility for her own actions.

Although an overt psychopathic personality is not necessarily found in serial killers (5), the question of JB's potential

psychopathic traits has to be further considered. When arrested, JB confessed to having committed three murders, expressing slight feelings of remorse, and even posing to the cameras, showing how she strangled her victims. During this interview, and based on her recorded chronicle, she displayed several traits of psychopathy. These included pathological lying, lack of empathy, lack of remorse or guilt, manipulation, shallow affect, failure to accept responsibility for her own actions, superficial charm, impulsivity, and promiscuous sexual behavior.

Research has consistently found psychopathy to be more common in male than female populations. The base rate of psychopathy in female correctional samples is typically found to be 10–15%, compared to 25–30% in similar male samples (29). Several researchers have proposed that the construct of psychopathy may differ in some aspects as a function of gender. Not only is the base rate of psychopathy lower in females, but psychopathic traits, particularly antisocial behavior, are also found to be less common in female populations (15). JB displayed significantly higher scores on all the items that loaded on Factor 1 (affective/interpersonal), than lower scores on Factor 2 (antisocial measures). Cultural as well as gender factors could explain why symptoms of psychopathy are expressed differently in women than in men.

JB's social history revealed a diversity of potentially significant factors, such as: (i) her mother's alcohol abuse history and limited prenatal and postnatal care, (ii) physical, psychological, and sexual abuse during childhood, (iii) lack of affective and social support; and (iv) extreme poverty. It is difficult to isolate how significant each one of these factors was in developing JB's distinctive behavior.

Nonetheless, JB's general behavior is governed by certain ethical principles. She can state what is socially correct and what is incorrect. According to her peculiar way of thinking, there are some valid reasons to commit crimes. She can establish some relationship with her victims but there is no emotional empathy. Interestingly, her criminal behavior appears in a relatively coincidental way with her retirement from wrestling. She reports that wrestling was a relaxing activity for her. It can be speculated that wrestling represented a strategy to direct her aggression, and when she gave it up, her aggression level increased.

Electrophysiological studies suggested that JB perceived the world in "black and white" without the capacity to differentiate nuances. JB mentioned several times that she distinguishes two groups of people: "good people and people who humiliate." Killing was frequently associated with humiliating comments from the victim; the first killing occurred when the lady stated that she was not used to having poor, dirty people in her house.

From the point of view of brain dysfunction, the specific brain areas that ought to be involved are a deficient or weakened input from limbic structures along with frontal lobe dysfunction (probably ventro-medial and orbito-frontal areas). JB's neuropsychological testing revealed some difficulties in frontal-lobe tests, and EEG findings revealed some slow frontal activity.

Based on these findings and following Blair's neurocognitive model of psychopathy (45) we can postulate that in JB, genetic and/or environmental experience (e.g., childhood abuse) disrupted the functioning of the amygdala, leading to her psychopathic impairment in emotional processing (as revealed in the ERP data) and to the problematic behaviors identified through factor

1 of the PCL-R (e.g., a lack of guilt, empathy and pathological lying). Since there are considerable interconnections between the amygdala and the orbital frontal cortex (Carmichel and Price [46]), the orbital/ventrolateral frontal cortex dysfunction is likely to be related to JB's elevated levels of reactive aggression that emerged when she felt humiliated, thus killing the elderly ladies.

A confluence of abuse history during childhood, paranoid personality traits, some brain dysfunction, plus a specific and unfavorable context, resulted in a significant increase in JB's propensity for violent behavior.

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