

## Successful and Unsuccessful Psychopaths: A Neurobiological Model

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**Despite increasing interest in psychopathy research, surprisingly little is known about the etiology of non-incarcerated, successful psychopaths. This review provides an analysis of current knowledge on the similarities and differences between successful and unsuccessful psychopaths derived from five population sources: community samples, individuals from employment agencies, college students, industrial psychopaths, and serial killers. An initial neurobiological model of successful and unsuccessful psychopathy is outlined. It is hypothesized that successful psychopaths have intact or enhanced neurobiological functioning that underlies their normal or even superior cognitive functioning, which in turn helps them to achieve their goals using more covert and nonviolent methods. In contrast, in unsuccessful, caught psychopaths, brain structural and functional impairments together with autonomic nervous system dysfunction are hypothesized to underlie cognitive and emotional deficits and more overt violent offending. Copyright © 2010 John Wiley & Sons, Ltd.**

The past decade has witnessed a significant increase in research on psychopathy. Conspicuously absent from this burgeoning body of research are studies on psychopaths who live relatively successful lives. Indeed, relatively few studies have been conducted on non-incarcerated psychopaths. This review summarizes empirical findings on successful psychopaths, a subgroup of psychopaths who manifest the core psychopathic features of affective and interpersonal deviances, but who manage to stay out of the criminal justice system. We examine five different populations that can bring some knowledge to bear on the etiology of successful psychopathy: a media-recruited community sample, individuals from temporary employment agencies, college students, industrial psychopaths, and psychopathic serial killers.

Based on the limited current knowledge, a theoretical model is proposed to explain the ways in which successful and unsuccessful psychopaths differ from normal controls. We postulate that intact or enhanced neurobiological processes, including better executive functioning, increased autonomic reactivity, normative volumes of prefrontal gray and amygdala, and normal frontal functioning, may serve as factors that protect successful psychopaths from conviction and allow them to attain their life goals, using more covert and nonviolent approaches. In contrast, brain structural and functional deficits, alongside with reduced autonomic reactivity, impaired executive functioning, and risky decision making, predispose the unsuccessful psychopaths to more extreme

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forms of antisocial behavior utilizing more overt and aggressive methods of manipulation. We first begin with a brief overview of psychopathy.

## INTRODUCTION TO PSYCHOPATHY

Psychopathy is a constellation of personality characteristics that include glibness, manipulation, callousness and lack of emotion, irresponsibility, impulsivity, and aggression (Hare, 2003). Since the seminal work by Cleckley providing a description of clinical case studies of male and female psychopaths (Cleckley, 1941, 1988), numerous studies have been conducted to investigate the etiology of this personality disorder. The advent of what today are the most commonly used assessment instruments for psychopathy—the Psychopathy Checklist (PCL) and the Psychopathy Checklist—Revised (PCL-R) (Hare, 1991a, 2003)—has significantly advanced the field by giving researchers a common metric. Two factors were originally proposed to encapsulate psychopathy using the PCL (Harpur, Hare, & Haskstian, 1989). Later a three-factor structure was derived (Cooke & Michie, 2001), consisting of the facets of interpersonal (glibness, manipulativeness, grandiose), emotional (lack of emotion and affect, lack of remorse, recklessness), and lifestyle (lack of planning, irresponsibility) psychopathic features. Then a four-factor structure was proposed, with an additional fourth facet being impulsive and aggressive (aggression, early onset of antisocial behavior, versatility of crimes) (Hare, 2003). It is generally agreed that lack of emotion and remorse is the core characteristic of the psychopathy, whereas there is current debate as to whether criminal behavior is a necessary feature of psychopathy. Specifically, it has been proposed that antisocial behavior is the consequences of the affective–emotional impairments and should not be considered as one of the diagnostic criteria (Cooke & Michie, 2001).

Cognitive and affective–emotional processing deficits associated with brain abnormalities, particularly structural and functional impairments in the amygdala and the orbitofrontal/ventromedial prefrontal cortex, have been found in psychopathic individuals (Blair, 2007; Kiehl et al., 2004; Patrick, 2007; Raine & Yang, 2006). Furthermore, evidence from psychophysiological, neurological, brain imaging, neuroendocrinal, and neuropsychological research also suggested that psychopathy may in part be neurodevelopmentally determined (Gao, Glenn, Schug, Yang, & Raine, 2009; Patrick, 2007). For example, neurobiological deficits, including lower cortisol levels (Loney, Butler, Lima, Counts, & Eckel, 2005), atypical amygdala activation in response to emotional stimuli (Marsh et al., 2008), and reduced electrodermal stress responses (Fung et al., 2005), which are usually observed in adult psychopaths, have also been found in children and adolescents with psychopathic tendencies. In addition, preliminary evidence of early neurodevelopmental abnormalities (e.g. cavum septum pellucidum) has been linked to psychopathic personality in a community sample (Raine, Lee, Yang, & Colletti, manuscript submitted for publication). Taken together, psychopathy may be a neurodevelopmental disorder with an early root in life.

It has long been argued that psychopaths are not necessarily criminal or incarcerated (Cleckley, 1941; Hare, 1978). In his pioneering work, *The Mask of Sanity*, Cleckley documented cases of high-functioning “successful” psychopaths, including businessmen, physicians, and scientists, who are characterized by traits of egocentricity, superficial charm, and irresponsibility, but not by arrests or convictions. Cleckley

viewed such individuals as representing “incomplete manifestations or suggestions of the disorder” (Cleckley, 1988, p. 188). Cleckley explicitly emphasized that psychopathy is a dysfunctional personality style that is prevalent in the general population. For instance, in the case of a physician that Cleckley presented, this successful psychopath was described as being manipulative, conning, lacking emotion, and engaging in promiscuous sexual behavior, but nevertheless was able to be successful in maintaining high social status as a respected physician.

The prevalence of psychopathy is not definitively known, but is estimated at approximately 0.6–1% in general populations (Coid, Yang, Ullrich, Roberts, & Hare, 2009; Hare, 2003) and 3.5% in the business world (Babiak & Hare, 2006). However, given the difficulties in researching successful psychopathy, the majority of studies have focused on incarcerated male offenders, with our knowledge of successful psychopaths remaining limited and incomplete.

Understanding the differences between successful and unsuccessful psychopaths is important in at least three ways. First, our research knowledge based on incarcerated psychopathic offenders may not be generalizable to psychopaths in the general population. This latter group may not only outnumber the institutionalized psychopathic population, but also they may in the long run be more dangerous and destructive to society. Second, studying successful, non-institutionalized psychopaths can contribute to our knowledge on the attributes/etiologies pertaining to psychopathy rather than to criminality (as defined by convictions and incarcerations) or antisocial behavior in general. Third, and importantly, understanding the etiology of psychopaths in the community may shed light on identifying “protective” factors preventing community-dwelling, non-criminal psychopaths from engaging in a criminal lifestyle, shielding them from becoming criminal psychopaths.

In the next section, empirical findings on successful psychopaths are summarized based on five population sources. Of the five populations, four are similar in that they are based on different types of community sample. In contrast, a fifth sample, psychopathic serial killers, is considered “semi-successful” psychopathic, representing an institutional population that may give secondary clues as to the nature of successful psychopathy. It should be acknowledged at the outset that different methods and criteria have been used to define successful versus unsuccessful psychopaths, and this is partly due to different conceptualizations of what constitutes the “successful” psychopathy. As such, differences as well as similarities may be anticipated in the findings of the five categories of studies. We then propose a theoretical model for successful and unsuccessful psychopathy based on the definition that successful psychopaths are psychopathic individuals who have not been convicted for crimes.

## PSYCHOPATHS IN THE COMMUNITY

The first study to examine psychopathic personality in any non-institutionalized population was conducted by Widom (1978), who used newspaper advertisements in Boston to recruit community-dwelling individuals with psychopathic features. The advertisement read “Wanted: charming, aggressive, carefree people who are impulsively irresponsible but are good at handling people and at looking after number one” (Widom, 1978). Of the final sample of 28 male subjects, they were generally from the lower socioeconomic classes, and nearly 25% had some college education. Subjects

scored high on the Psychopathic Deviate (Pd) scale of the Minnesota Multiphasic Personality Inventory (MMPI). Although 64% of the sample had adult arrest records, only 18% had convictions as adults; 21% had received inpatient psychiatric treatment, and 46% had received outpatient psychiatric care. Nearly half of them had both criminal and psychiatric records. Later a similar study was conducted in a suburban area (Bloomington, IN) by the same researchers (Widom & Newman, 1985). They found that psychometric test data in the individuals from a non-urban community ( $N=40$ ) were nearly identical to those of the prior study, with the exception that subjects were more college educated and had fewer arrests (41%). In addition, the authors failed to find in these community psychopaths the delay of gratification deficits found in incarcerated psychopaths (Newman, Patterson, & Kosson, 1987). Although sample sizes were small, these two studies provide evidence that this new methodology is successful in locating non-institutionalized psychopaths among the community.

Belmore and Quinsey (1994) also used the advertisements described in Widom's study (1978) to recruit community-dwelling psychopathic-prone individuals. Subjects were assigned to one of two groups based on a semi-structured interview that was composed of eight items from the PCL and eight items of childhood and adolescent problem behaviors. Compared with those with low psychopathic traits ( $n=15$ ), individuals with high psychopathic traits ( $n=15$ ) were more impulsive and scored lower on the California Personality Inventory Socialization Scale. They also performed worse in a card-playing game, suggesting their proneness to rewards and difficulties in modulating their responses to punishment. However, a large proportion of the subjects (93%) had previously been incarcerated; therefore these findings may not be generalized to successful, non-criminal psychopaths who escape detection.

More recently, using advertisements in local newspapers and flyers posted in the community, Justus and Finn (2007) assessed emotional modulation of the startle response in 99 male and female subjects. Males with high levels of psychopathy assessed by the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996) failed to show the typical increase in the startle response that non-psychopaths showed when exposed to aversive pictures, whereas females did not show this deficit. Furthermore, the association between psychopathy and response modulation was moderated by harm avoidance and anxiety: only psychopaths with low levels of harm avoidance or anxiety failed to show significant responses to aversive pictures. These findings suggest complicated associations between emotional deficits, gender, and personality in non-incarcerated samples. Using a large sample of twin men recruited from community ( $N=353$ ), Benning, Patrick, and Iacono (2005) found that individuals with high trait levels of fearless dominance exhibited attenuated startle potentiation and reduced electrodermal responses to aversive pictures, whereas the impulsive antisociality facet of psychopathy was associated with smaller overall electrodermal activity magnitudes, indicating that the non-incarcerated psychopaths show similar autonomic dysfunction to that shown by incarcerated psychopaths (Patrick, Bradley, & Lang, 1993).

Using the PCL-R, DeMatteo, Heilbrun, and Marczyk (2006) reported that 54 participants from the general population exhibited the personality features of psychopathy (Factor 1) to a greater extent than the behavioral features (Factor 2). They identified 27 highly psychopathic individuals who showed similar levels of psychopathic traits as forensic psychiatric samples, although the PCL-R scores of the sample were lower than those of the prison samples (Hare, 2003). The authors argued that the findings suggest the potential risk of this group engaging in future criminal behavior and the

promise of using PCL-R to measure psychopathy in community samples. Interestingly, about 60% of the sample reported a history of arrests.

In summary, findings from the community-dwelling psychopathic individuals who are recruited through public media are inconsistent. Earlier studies in general failed to find neuropsychological deficits in community psychopaths (Widom & Newman, 1985), although this may be partly due to reduced statistical power. More recent studies seem to suggest that the community psychopaths bear some similarities to incarcerated, unsuccessful psychopaths with respect to biological deficits, including impaired behavioral modulation, attenuated startle potentiation, and reduced autonomic responses to aversive stimuli (Belmore & Quinsey, 1994; Benning et al., 2005; Justus & Finn, 2007). However, with one exception (Belmore & Quinsey, 1994), these more recent studies did not include court records of the participants and as such it is unknown whether they are successful in escaping detection of the criminal justice system; psychopathy–neurobiological deficits among these community psychopaths could conceivably be attributable to an “unsuccessful” psychopathic subgroup.

## PSYCHOPATHS FROM TEMPORARY EMPLOYMENT AGENCIES

Widom, based on her initial data on community-dwelling psychopaths, proposed that the more “successful” psychopaths might be “arrested frequently but convicted infrequently” (Widom, 1978, p. 83), and hypothesized that they would lack the autonomic dysfunction frequently found in institutionalized, unsuccessful psychopaths. To test this hypothesis, some researchers recruited subjects from temporary employment agencies wherein the proportion of psychopaths is theorized to be relatively higher (Gao, Raine, & Schug, in press; Ishikawa, Raine, Lencz, Bihrlé, & LaCasse, 2001; Raine et al., 2004; Yang et al., 2005b). In the series of studies conducted by Raine and colleagues, the PCL-R was used to assess psychopathy and successful psychopaths were defined as those scoring high on the PCL-R but who had never been convicted for any crime based on official criminal records. Compared with unsuccessful psychopaths ( $n = 16$ ), who had at least one conviction, Ishikawa et al. (2001) found *increased* heart rate stress reactivity and *enhanced* executive functioning (Wisconsin Card Sorting Task) in successful psychopaths ( $n = 13$ ). Successful psychopaths even showed significantly *better* executive functioning than the non-psychopathic controls ( $n = 26$ ). In contrast, unsuccessful psychopaths exhibited reduced heart rate stress reactivity and impaired executive functioning compared with the non-psychopathic controls, as observed in criminal psychopaths. The two psychopathic groups did not differ on full scale IQ compared with the non-psychopathic controls. It was argued that enhanced autonomic responding and better executive functioning may protect a sub-group of psychopaths from being detected and arrested, allowing them to perpetrate significant harm to others in the community.

Using the same sample, Raine et al. (2004) reported an exaggerated anterior hippocampal volume asymmetry (right > left) in unsuccessful psychopaths, but not in successful psychopaths or non-psychopathic controls, suggesting a neurodevelopmental basis to unsuccessful psychopaths. Similarly, significant gray matter volume reductions in the prefrontal cortex (Yang et al., 2005b) and amygdala (Yang, Raine, Colletti, Toga, & Narr, in press) have also been found in unsuccessful but not successful

psychopaths. Within the prefrontal cortex, structural impairments in unsuccessful psychopaths are specific to the orbitofrontal cortex and middle frontal gyrus. Using the same methodology but a different sample of temporary employment workers, Gao and colleagues (in press) compared successful psychopaths ( $n=23$ ), unsuccessful psychopaths ( $n=22$ ), and non-psychopathic controls ( $n=23$ ) on P300 amplitudes and latencies recorded during an auditory three-stimulus oddball task. Compared with non-psychopathic controls, unsuccessful but not successful psychopaths showed reduced parietal P300 amplitudes to target stimuli, indicating some neurobiological deficits in this subtype of psychopaths.

Another group of researchers have also directly compared criminal and non-criminal psychopaths. Iria and Barbosa (2009) examined fear facial expression recognition ability among criminal and non-criminal psychopaths in a go/no-go paradigm. The non-criminal psychopaths and non-psychopaths were recruited from local employment centers and the psychopathic and non-psychopathic criminals were recruited from the prisons and police stations. Psychopathy was assessed using the PCL: Screening Version. Compared with non-psychopaths (11 criminal and 13 non-criminal), psychopaths (22 criminal and 16 non-criminal) performed significantly worse on detecting and discriminating the facial expression of fear; the criminal and non-criminal psychopaths did not differ on this task. These findings implicate some cognitive deficits common to both successful and unsuccessful psychopaths, although one limitation is that the authors did not control for duration of incarceration and alcohol and drug use, factors that may confound associations between psychopathy and facial expression recognition ability.

In summary, evidence from employment agency populations seems to suggest that successful and unsuccessful psychopaths share some similarities in terms of fear expression recognition deficits (Iria & Barbosa, 2009), factors that may explain why both successful and unsuccessful groups are psychopathic. At the same time, differences between successful and unsuccessful psychopaths are also apparent in these populations. It is suggested that neuropathological characteristics that include reduced prefrontal gray matter and amygdala volumes and abnormal hippocampal asymmetry, in combination with P300 deficits (Gao et al., in press; Raine et al., 2004; Yang et al., in press, 2005b), may contribute to the cognitive and emotional dysregulation in unsuccessful psychopaths, and consequently render these individuals less sensitive to environmental cues predicting danger and capture. In contrast, enhanced frontal functioning and better executive capability may protect the successful psychopaths from being detected/convicted for the crimes they perpetrate (Ishikawa et al., 2001).

## COLLEGE STUDENTS WITH PSYCHOPATHIC TRAITS

Due to the convenience of recruitment, a majority of studies on non-incarcerated psychopaths have focused on college students who score relatively high on the self-report measures of psychopathic personality. However, although progress on the reliability and validity of the self-report measures of psychopathy has been made (Hare, 1991b; Levenson, Kiehl, & Fitzpatrick, 1995; Lilienfeld, 1998), relatively little is known about the mechanism that underlies these psychopathic traits in this population.

The earliest research on college students was conducted by Sutker and Allain (1983), who identified a sample of “adaptive sociopaths” from medical students based on their MMPI scores. Compared with eight controls matched on age, psychosocial background, and intelligence, the eight adaptive sociopaths showed higher scores on impulsivity as indexed by Porteus Maze Q-scores, sensation seeking, and adolescent antisocial behavior, but lower scores on self-control and socialization. No group differences were observed on empathy or adulthood antisocial behavior. Among the adaptive sociopaths, as many as 88% admitted having been arrested, compared with 25% of the controls. In addition, the adaptive sociopaths tended to disregard social norms more frequently than the controls, particularly with respect to sexual, financial, and reckless behaviors. The authors hypothesized that the strong desire for the rewards associated with respectable professional status may have motivated and sustained continued adaptiveness in these individuals, and inhibited adult forms of behavioral deviance which would be incompatible with their school/career success. The small sample size is inevitably one of the limitations of the study. In addition, Sutker and Allain identified adaptive sociopaths based on MMPI scores, which do not show acceptable associations with psychopathy, especially the interpersonal–affective facet of the disorder (Hare, 1991a).

Since this initial study, evidence has accumulated to support the validity and reliability of self-report measures of psychopathy in predominantly college student populations. In a sample of 70 undergraduate students, Lynam and colleagues (Lynam, Whiteside, & Jones, 1999) reported that psychopathic undergraduates who scored higher on Levenson’s Primary and Secondary Psychopathy scales (LPSP; Levenson et al., 1995) showed deficient passive avoidance and response modulation, as previously observed in incarcerated psychopaths. Specifically, students with high LPSP were less able to inhibit responding in the face of competing reward and punishment contingencies and were less likely to link a cue and punishment. In a recent study, Wilkowski and Robinson (2008) reported that, in a sample of 104 undergraduate students, individuals high in secondary (but not primary) psychopathy as assessed by LPSP failed to slow their behavioral responses following errors, indicating their impairments in behavior modulation. Osumi, Shimazaki, Imai, Sugiura, and Ohira (2007) have found that, compared with undergraduate students with low LPSP scores ( $n = 16$ ), those with high LPSP scores ( $n = 16$ ) showed smaller heart rate reactivity while watching an unpleasant movie and unpleasant slides. This finding is consistent with prior research showing atypical heart rate reactivity among institutionalized psychopaths and indicates affective dysfunction in psychopathic students.

More recently, in a sample of 101 university students (73% female), Mahmut, Homewood, and Stevenson (2008) have found that students with high psychopathy traits, as measured by LPSP, performed significantly worse on the Iowa Gambling Task (Bechara, Damasio, Damasio, & Anderson, 1994), a task sensitive to orbitofrontal cortex dysfunction, even after the effects of IQ and the Trail-Making Test—Part B performance (a task sensitive to general frontal lobe dysfunction) were controlled for. In addition, the high psychopathy group evidenced a lack of empathy. The authors concluded that the non-criminal psychopaths among college students show similar neuropsychological deficits to criminal psychopaths, although the degree of impairment may be less severe.

Taken together, college students with psychopathic traits seem to show similar cognitive and emotional deficits to incarcerated psychopaths, including response modulation deficits, autonomic hyporeactivity, and risky decision making.

## INDUSTRIAL PSYCHOPATHS

Case studies of “successful psychopaths” who display psychopathic personality characteristics in business or working environments, but do not display the typical progression of increasing antisocial behavior and deviant lifestyles seen in incarcerated psychopaths, also echo Cleckley’s theory that psychopaths are not limited to forensic or psychiatric contexts (Cleckley, 1941). Although no systematic empirical research has been conducted on this population, Babiak (1995) has described how individuals with psychopathic traits successfully enter the mainstream workforce and enjoy profitable careers in industry and organizations (especially in large corporations in the midst of rapid growth or chaotic change), by lying, manipulating, and discrediting their coworkers.

In a similar manner, Cangemi and Pfohl (2009) described seven cases of individuals with psychopathic personality in leadership roles in industrial, academic, and non-profit organizational worlds. Although suggestions on how to be aware and defend oneself from these predators are provided, the authors also acknowledged that it is extremely difficult to detect and stay away from the sociopaths/psychopaths in business, no matter how educated or astute one is. While this work again echoes Cleckley’s perspective, these studies are not able to provide any systematic data on etiological factors in this interesting community sample.

The behavioral traits including manipulation, lying, and discrediting coworkers bear obvious similarities with indirect/relational aggression, a type of aggression in which the aggressors do harm to others through purposeful manipulation and damage of their relationships or social status within a group (Crick & Grotpeter, 1995). Empirical studies have in general linked relational aggression with psychopathy, although the findings are varied with instruments used to measure psychopathic personality. For example, one study using PPI reported significant associations between relational aggression and Factor 2 of psychopathy, i.e., antisocial behavior and impulsivity, but not with Factor 1 (Schmeelk, Sylvers, & Lilienfeld, 2008). Another study using LPSP indicated that indirect aggression shows a stronger correlation with primary psychopathy, whereas secondary psychopathy is related to direct aggression (Coynes & Thomas, 2008). Although both studies were conducted among college students, it is possible that the indirect/relational type of aggressive behavior particularly characterizes the successful psychopaths in the business environment.

## PSYCHOPATHIC SERIAL KILLERS

If successful psychopaths are defined as individuals with psychopathic characteristics but who somehow successfully avoid being arrested, do psychopathic serial killers who have escaped detection for a significant period of time after intense police scrutiny potentially give clues on the etiology of successful psychopathy? A serial killer is a person who murders three or more people over a period of more than 30 days, with a “cooling off” period between each murder, and whose motivation for killing is largely based on sexual gratification or internal psychological gratification (Kraemer, Lord, & Heilbrun, 2004). Serial killers are deliberate, premeditated, and lack the interpersonal conflict and provocation that is more frequently seen in single homicide offenders (Kraemer et al., 2004). These hedonistic, instrumental aggressive features bear similarities to the instrumental aggression previously reported in psychopaths (Cima & Raine, 2009).



A qualitative review comparing serial killers and single homicide offenders has revealed that serial killers are predominantly Caucasian males at ages 20–40 years old; they target more women than men, and kill more strangers than family or friends (Kraemer et al., 2004). The crime scenes are claimed to be more organized (Canter, Alison, Alison, & Wentink, 2004), and the serial killers exhibited superior planning by moving the victim or body from one location to another, by using restraints, and by disposing of the body in remote locations (Kraemer et al., 2004). Serial murder and psychopathy are inevitably linked, although not all serial killers display the characteristic traits of superficial charm, intelligence, lack of remorse, impulsivity, and associated psychopathic traits. A review on seven serial offenders has reported that four out of seven were psychopathic (Beasley, 2004), and in an earlier review it was reported that 61 out of 63 male serial killers met PCL-R criteria for psychopathy (Stone, 1998).

The fact that psychopathic serial killers can carefully plan and perpetrate their criminal acts without being detected for sometimes considerable periods of time, combined with their cruel and sadistic acts with no empathy or remorse for the victims, suggests the hypothesis that they constitute a form of “semi-successful” psychopaths. First, they have the capability to identify vulnerable and passive victims including females, children, and elderly seniors. Second, some use their superficial charm and glibness to win the affection of the victim by being apparently loving and considerate. Third, they have the capability to dispose of the bodies in the remote and undetectable locations. Fourth, one study on English serial murder specifically showed that, unlike the single homicide offenders, many serial killers were married with a stable family life, and disconcertingly a good number had been former police officers or security guards (Jenkins, 1988). For example, Ted Bundy attracted kind-hearted, college-aged, attractive females to his car by faking an arm injury and by his seemingly sincere and charming manners. Gary Ridgeway targeted prostitutes knowing that they were vulnerable and that their absence would not cause attention. Serial killers may be capable of engaging in very serious violence without being caught for sustained periods of time because they possess adaptive features (good executive functioning, efficient information-processing, adaptive stress reactivity) that are similar to those of successful psychopaths (Gao et al., 2009; Ishikawa et al., 2001).

## **A NEUROBIOLOGICAL MODEL OF SUCCESSFUL AND UNSUCCESSFUL PSYCHOPATHY**

Summarizing the above five lines of evidence, the limited literature on non-incarcerated psychopaths has produced mixed findings. When psychopathy is studied in the community-dwelling psychopaths, excluding those from temporary employment agencies, psychopaths seem to show the cognitive or emotional deficits, including deficient behavioral modulation, reduced heart rate and electrodermal reactivity, and startle response potentiation impairments, that have been observed in incarcerated psychopaths. In contrast, studies on temporary employment agencies in general suggest intact brain volume and enhanced executive functioning among successful psychopaths. When college students with elevated psychopathic personality are examined, they exhibit similar cognitive and emotional deficits to incarcerated psychopaths, although the impairments may be less severe. The qualitative/descriptive studies on industrial psychopaths suggest that this group may use relational aggressive behavior

rather than physical violence in order to reach their goals. Finally, as one group of “semi-successful” psychopaths, psychopathic serial killers may speculatively show somewhat enhanced cognitive capabilities compared with other apprehended violent offenders, although empirical research is critically needed to test this hypothesis.

As can be seen, the choice of psychopathy measures and study population affects not only how many subjects are considered successful psychopaths, but also other important characteristics. For example, college students are by definition better educated than the general population, but with the exception of one study it is not known whether they escape detection of law enforcement agencies. Indeed, although college students are expected to have more successful professional careers than non-college educated samples, no study to date has demonstrated whether psychopathic students are more occupationally “successful” than non-psychopathic student control groups. In contrast, individuals from temporary employment agencies are older and have lower socioeconomic status than college populations. Given these demographic differences, discrepancies in findings are not entirely unexpected.

Given the limited evidence and mixed findings, there are significant challenges in building a coherent model on the etiology of successful and unsuccessful psychopathy. Consequently, the following theoretical model, while guided in part by prior empirical findings, is very preliminary. It is hoped nevertheless that it can provide a framework for future hypothesis-testing in this under-researched area.

The model of successful and unsuccessful psychopathy is depicted in Figure 1 and outlines differences in risk factors for the two psychopathic groups (top part), risk factors that are common to both (middle), and different manifestations of antisocial behavior in the subgroups (bottom part). Here successful psychopaths are defined as individuals with elevated psychopathic characteristics and who have evaded conviction for their criminal acts.

The different characteristics for the two psychopath groups (Figure 1, top) are outlined at three levels: brain/central nervous system, psychophysiological/autonomic nervous system, and cognition. Initial studies suggest that unsuccessful psychopaths are characterized by reduced prefrontal and amygdala volumes, as well as hippocampal abnormalities (Raine et al., 2004; Yang et al., 2005b; Yang, Raine, Narr, Colletti, & Toga, 2009), areas believed to be involved in higher executive functioning, emotional expression/modulation, decision making, and contextual fear conditioning. These findings are consistent with the brain structural/functional abnormalities observed among criminal incarcerated psychopaths (Raine & Yang, 2006). Unsuccessful psychopaths also show reduced P300 amplitudes (Gao et al., in press), indicating their information processing deficits, and impaired somatic markers as indicated by reduced anticipatory heart rate stress reactivity (Ishikawa et al., 2001). Given that autonomic fear conditioning deficits have been consistently found among incarcerated psychopaths (Hare, 1978), and that the amygdala and hippocampus are critically involved in fear conditioning (Büchel, Morris, Dolan, & Friston, 1998), it is hypothesized that fear conditioning deficits characterize the unsuccessful psychopaths in particular. These neurobiological and psychophysiological deficits may give rise to their impaired executive functioning (Ishikawa et al., 2001) and risky decision making (Mahmut et al., 2008), which eventually predispose these unsuccessful psychopaths to antisocial and violent behavior that leads to arrests and convictions.

In contrast, successful psychopaths do not show the structural and functional impairments of the prefrontal cortex, amygdala, and hippocampus (Raine et al., 2004;

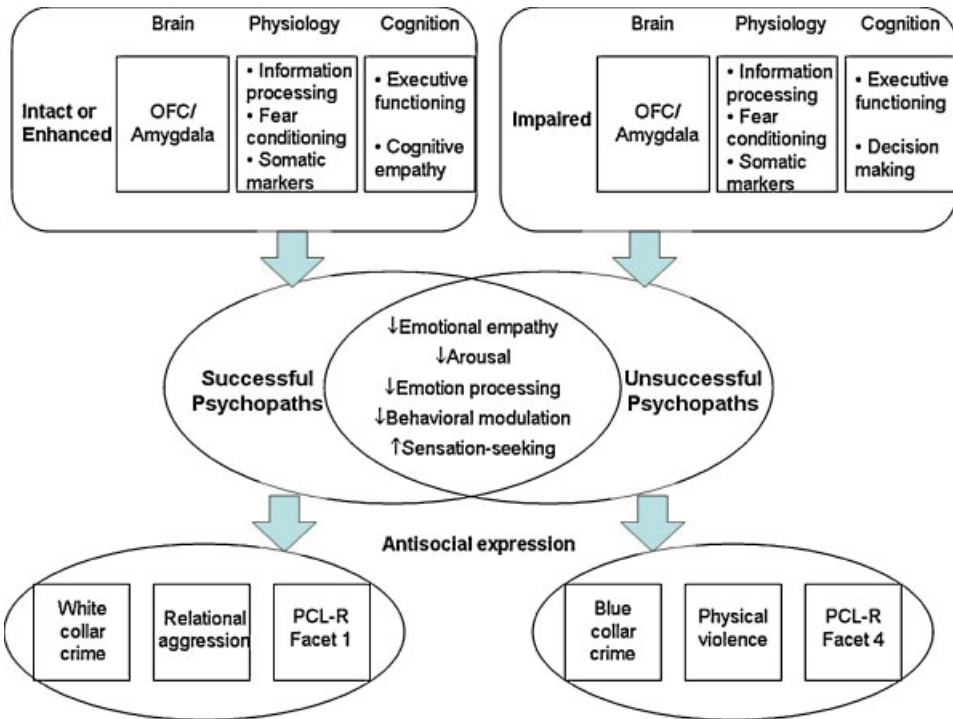


Figure 1. A neurobiological theoretical model on different etiologies (top part) and manifestations (bottom part) of successful and unsuccessful psychopathy, and the similarities between the two subtypes (middle part). OFC, orbitofrontal cortex; PCL-R Facet 1, glib/superficial, grandiose, lying, and conning/ manipulating; PCL-R Facet 4, poor behavior controls, early behavior problems, and criminal versatility.

Yang et al., 2005b, manuscript submitted for publication). They are characterized by intact P300 responses, indicating proficient information-processing (Gao et al., in press). Based on the somatic marker hypothesis (Damasio, 1994), intact autonomic functioning has been observed in one group of successful psychopaths (Ishikawa et al., 2001) and interpreted as making them more sensitive to cues associated with detection in particular and better decision making in general. They are further hypothesized to have relatively intact fear conditioning in contrast to the deficits repeatedly observed in unsuccessful psychopaths. Alongside these intact somatic markers, successful psychopaths have enhanced executive functioning (Ishikawa et al., 2001), a capability hypothesized to promote their ability to lie, con, and manipulate others. It is further hypothesized that successful psychopaths may have superior cognitive empathy—the ability to understand another’s perspective without necessarily feeling any level of emotional empathy. Taken together, the model suggests normal or even above-normal neurobiological functioning in successful psychopaths.

Risk factors shared by the two groups (the “overlap” in the center of Figure 1) lie at the levels of affect, physiology, behavioral, and personality/temperament. Both groups are postulated to have a fundamental impairment in emotional empathy—the ability to experience the pain and sadness that their victims feel. Emotion processing deficits in both groups are indicated by the failure to recognize fearful facial expression (Iria & Barbosa, 2009), reduced emotional modulation of the startle blink response (Benning

et al., 2005; Justus & Finn, 2007) and reduced heart rate reactivity in response to aversive stimuli (Benning et al., 2005; Justus & Finn, 2007; Osumi et al., 2007). The autonomic hypoarousal (low resting heart rate) observed in both groups (Ishikawa et al., 2001) is viewed as driving a sensation-seeking personality (Sutker & Allain, 1983). Behavioral modulation deficits that reflect self-regulation and impulsivity are also common to both groups (Belmore & Quinsey, 1994; Lynam et al., 1999; Wilkowski & Robinson, 2008). Finally, while psychopathic subgroups will show differences on some specific neurobiological functions, they are not thought to differ in terms of IQ.

Moving to the different ways in which psychopathy is expressed at the level of antisocial behavior (bottom part of Figure 1), the intact or even enhanced brain, psychophysiological, and cognitive characteristics of successful psychopaths are viewed as making them particularly prone to pathological lying and deception, conning, and interpersonal manipulation. Their enhanced executive functioning and intact somatic markers (Ishikawa et al., 2001) as well as their hypothesized good cognitive empathy are viewed developmentally as giving some individuals an inherent advantage over others in terms of their ability to con and manipulate. Conceivably, they may be found to have the increased frontal white matter connectivity that has been observed in pathological liars (Yang et al., 2005a), a structural advantage that may promote both the executive functions needed to effectively con and manipulate others, and also the ability to achieve their desired goals without detection. As such, full expression of Facet 1 of psychopathy (glib/superficial, grandiose, pathological lying, and conning/manipulative) is hypothesized to be seen in successful psychopaths, while Facet 4 features of psychopathy (poor behavior controls, early behavior problems, juvenile delinquency, and criminal versatility) are hypothesized to be less in evidence. Instead of giving rise to the classic criminal lifestyle that includes overt physical aggression, successful psychopaths are viewed as more likely to perpetrate relational aggression (Coynes & Thomas, 2008; Schmeelk et al., 2008). With their interpersonal skills and intact neurobiological functioning, we anticipate that they are more likely to express their psychopathic features at the level of white collar crime than the street offending that is more typical of criminal psychopaths.

For unsuccessful psychopaths, brain structural and functional abnormalities, information processing deficits, impaired somatic markers, and poor fear conditioning predispose this subgroup of psychopaths to more risky decision making and less sensitivity to environmental cues predicting danger and capture. These deficits are also hypothesized to make them more prone to poor behavioral controls and antisocial behavior using physical violence, resulting in detection, arrest, and conviction. Their Facet 1 scores are hypothesized to be lower compared with their higher Facet 4 scores, resulting in a predominance of more blue collar (traditional) criminal offending.

In conclusion, preliminary evidence from the limited body of research to date has suggested that better executive functioning, increased autonomic reactivity, and normal frontal and amygdala volumes may serve as factors that protect successful psychopaths from conviction, and allow them to better achieve their life goals. In addition, excessive prefrontal white matter and efficient prefrontal functioning may contribute to the manipulative and superior deceptive behavior, which in turn help them achieve their goals in a relatively more covert and nonviolent manner. We further hypothesize that other characteristics, including relatively intact emotional regulation, better decision-making capability, and intact somatic markers, may also enable the successful psychopaths to succeed in life using more covert non-aggressive strategies rather than

overt aggressive approaches. In contrast, reduced prefrontal gray matter and amygdala volume and reduced heart rate stress reactivity may predispose to the cognitive and affective deficits observed in unsuccessful psychopaths. Finally, fear conditioning deficits and impaired somatic markers are further hypothesized to be implicated in the unsuccessful psychopaths' failure to detect the cues linked to punishment, predisposing to risky decision making, which culminates in arrests and convictions.

## LIMITATIONS AND IMPLICATIONS

Limitations of each category of research should be acknowledged. The early studies among community psychopaths had small sample sizes, and sometimes no control groups. They do however provide initial insight into the similarities and differences between community and incarcerated psychopaths, and more importantly for the first time illustrate a promising approach to studying community psychopaths. In contrast, although studies on college students have allowed researchers to select a convenient sample with elevated psychopathic traits and higher statistical power, this approach also has significant limitations. First, except for one study (Sutker & Allain, 1983), no self-report crime or official criminal record has been collected on participants. Because the study by Sutker and Allain showed that at least 25% have been arrested, one cannot simply assume that undergraduates with elevated psychopathy scores are non-criminal or have not been detected by law enforcement agencies. Criminal heterogeneity within samples of college students may have rendered some unpublished findings non-significant, potentially leading to a selection bias in what has been reported in the literature. Second, most studies on college students have used self-report psychopathy measures, which have significant limitations compared with the PCL-R, which represents a much more intensive and well validated assessment of psychopathy, although the PCL-R has its own limitations in that it was designed for use in forensic settings, with some items being scored primarily on the basis of criminal records and with norms that are not standardized for non-forensic populations.

Despite increasing interest in research on non-criminal, non-institutionalized psychopaths, a number of basic issues have yet to be addressed on successful psychopathy. How are we to best operationalize the definition of successful psychopathy? What psychopathy measures should be used, and is the conceptualization of psychopathy derived from prison populations appropriate in community samples? Although most of the research mentioned above has focused on correlates of successful or non-institutionalized psychopaths, only a few studies from only two laboratories (Gao et al., *in press*; Ishikawa et al., 2001; Iria & Barbosa, 2009; Raine et al., 2004; Yang et al., manuscript submitted for publication; Yang et al., 2005b) appear to have directly compared the two types of psychopaths with normal controls. This approach is of particular importance given that such findings could contribute to our knowledge on the etiology of psychopathy without the confounding effects of criminality or antisocial behavior in general. Future studies should also incorporate self-reported crime and official records for arrests and convictions to further understand the mechanisms differentiating the truly successful (uncaught) psychopaths from unsuccessful psychopaths.

In contrast to the "blue collar crime" hypothesized to be committed by the unsuccessful psychopaths, the "white collar crime" perpetrated by successful psychopaths is

surprisingly under-studied, despite the significant harm these crimes cause to society. Future studies are encouraged to examine the white collar crimes conducted by the psychopathic individuals. Although hard to implement, laboratory tests administered to even small groups of psychopathic serial killers may provide invaluable information for our further understanding of this extreme subgroup of successful psychopaths. Longitudinal studies with non-institutionalized samples would also be invaluable for examining the course and stability of psychopathy among this under-studied population.

There is a growing debate regarding whether psychopathy is better explained as a dimensional or a categorical entity (Edens et al., 2006), and three perspectives on the concept of successful and unsuccessful psychopathy have been proposed (Hall & Benning, 2006). The first conceptual perspective proposes that successful psychopathy may be a “subclinical” version of unsuccessful psychopathy. The second perspective is that successful psychopathy is etiologically distinct from unsuccessful psychopathy. The third perspective considers successful psychopathy as a moderated expression of the psychopathic personality disorder: successful and unsuccessful psychopaths share the etiology and severity of the personality disorder but they differ with regard to moderating factors (for example education, socioeconomic status) that shape the behavioral expression of psychopathy (Hall & Benning, 2006). Research suggests that the distinction between successful and unsuccessful psychopathy may be both dimensional and categorical—or “quasi-dimensional” in much the same way that schizotypy has been conceptualized (Claridge & Beech, 1995). Successful psychopaths are defined as those psychopaths who have no criminal conviction, indicating a categorical distinction. This is also supported by the evidence that successful psychopaths have intact somatic markers in contrast to clear deficits in unsuccessful psychopaths (Ishikawa et al., 2001). However, the evidence that amygdala functioning is impaired in successful psychopaths to a lesser extent than seen in unsuccessful psychopaths (Yang et al., manuscript submitted for publication), and that college students with psychopathic traits show similar neurobiological deficits to criminal psychopaths, although to a lesser degree, suggests that the distinction between successful and unsuccessful psychopathy is partly dimensional. This quasi-dimensional conceptualization embraces clinical conceptions of categories together with dimensional perspectives of personality theorists, and provides a meeting point of competing conceptualizations of psychopathy.

It is worth noting in this model that, although successful psychopaths are hypothesized to have intact or possibly enhanced overall amygdala functioning and fear conditioning, they are proposed to have cognitive empathy deficits as indicated by their failure to recognize facial expressions of fear, as well as reduced emotional modulation of the startle blink responses. This dissociation may be partly explained by the complexity of amygdala functioning. The amygdala can be differentiated into approximately 13 nuclei and each one or cluster of nuclei may have specific function. For example, one recent study has reported structural impairments in the vicinity of basolateral, lateral, central, and cortical nuclei of the amygdala among psychopathic individuals (Yang et al., 2009). Although the functional specificity of the nuclei in the human amygdala remains unclear, it is speculated that in successful psychopaths the nuclei involved in fear conditioning (basolateral nuclei) are relatively intact, whereas those involved in fearful facial expression recognition and/or emotional modulation of the startle blink are more impaired. Conversely, other cortical structures involved in fear conditioning such as the orbitofrontal cortex may be intact in successful psychopaths,

but impaired in unsuccessful psychopaths. Future high-resolution structural brain imaging studies on the two types of psychopaths are clearly needed to further test this hypothesis.

Finally, the model of successful and unsuccessful psychopathy outlined above has to be viewed as initial and preliminary. Furthermore, although the current model focuses on the neurobiological factors, psychosocial and environmental influences may also play a role in discriminating successful and unsuccessful psychopathy. For example, Gao et al. (in press) found that unsuccessful but not successful psychopaths have experienced more childhood physical abuse than the non-psychopathic controls. Nevertheless, this neurobiological model does generate hypotheses open to empirical test. Primary amongst these predictions are that (1) successful psychopaths have relatively intact neurobiological and brain structure/function, (2) the two groups share common personality predispositions (sensation-seeking) and a core emotion defect (reduced emotional empathy), (3) successful psychopaths present with relatively greater Facet 1 than Facet 4 scores and less overt physical violence perpetration, with the converse applying to unsuccessful psychopaths. It is hoped that this model will at least help stimulate further empirical research and discussion on the etiology of successful and unsuccessful psychopathy.

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