

The evolutionary roots of psychopathy

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Abstract

There is a growing interest in the study of psychopathic traits from an evolutionary framework; however, there is a lack of comprehensive reviews regarding this issue. To address this gap in the literature, the current paper examines the evolutionary roots of psychopathy by reviewing previous research on this topic. Specifically, the potentially adaptive role of psychopathic traits during human evolution through the lifespan is highlighted. Key areas covered include the evolution of the brain (“old brain, new brain” and the emotion-logic lag), emotion regulation, aggression and its potential adaptive function, and emotions specific to psychopathy including anger and shame/dishonor. This paper (mainly in the light of the Adaptive Calibration Model) discusses how psychopathic features can be seen as a useful heritage, especially for people who have grown in harsh psychosocial backgrounds. The implications of an evolutionary approach for the comprehension and treatment of children, youth, and adults with psychopathic traits are suggested, along with directions for future research.

Keywords: psychopathy; evolutionary approach; anger; shame/dishonor; Adaptive Calibration Model.

1. Introduction

Psychopathy is a controversial (e.g., Silk, 2008) yet important psychopathological construct that can be characterized by a set of affective, interpersonal, and behavioral deviant characteristics (Cooke & Michie, 2001; Hare, 2003). Moreover, psychopathy could be seen as a developmental disorder (Lynam, Caspi, Moffitt, Loeber, Stouthamer-Loeber, 2007; Lynam & Gudonis, 2005) that gets worse with age (e.g., Kubak & Salekin 2009; Lee, Salekin, & Iselin 2010; Lynam, 2010), and becomes less responsive to treatment, which suggests the need for early screening and intervention efforts (Caldwell, McCormick, Wolfe, & Umstead, 2012; Ribeiro da Silva, Rijo, & Salekin, 2013; Salekin, 2002, 2010; Salekin, Tippey, & Allen, 2012).

Some authors highlight that no particular risk factor (genetic, dispositional, neurobiological, neurochemical, neurocognitive, and environmental) has been shown to be exclusive in the etiology and maintenance of psychopathic traits. This means, that like other psychiatric conditions, psychopathy is probably a multicausal phenomenon (e.g., DeLisi & Piquero, 2011; Ribeiro da Silva, Rijo, & Salekin, 2012; Viding & Larson, 2010). Other researchers also highlight the importance of an evolutionary approach to explain the development and maintenance of psychopathic traits (Ferguson, 2010; Gilbert, 2005; Glenn, Kurzban, & Raine, 2011; Ribeiro da Silva, Rijo, & Salekin, 2012, 2013; Salekin & Lynam, 2010).

Evolutionary sciences expanded very quickly over the past two decades and, despite some criticism (e.g., Gould, 1991), these models offer a great potential in the comprehension of human nature (Gangestad & Simpson, 2007; Gilbert, 2010; Krebs, 2007). Evolutionary psychology argues that human mind and behavior evolved in response to ancestrally-based problems to the extent that fitness was enhanced. In contemporary environments, some of these traits may or may not be adaptive (Gangestad & Simpson, 2007; Gilbert, 2009, 2010; Nairne & Pandeirada, 2010; Tooby & Cosmides, 1990). Evolutionary psychology is an adaptationist approach (i.e., a method for discriminating which features are adaptations and which are likely by-products of selection), being

far from biological determinism, since it does not ignore the tremendous influence of culture and social environment (Gangestad & Simpson, 2007; Gilbert, 2009, 2010; Krebs, 2007). In this sense, psychopathy can be understood not exclusively as a psychopathological disorder, but also as an adaptive strategy to deal with hostile psychosocial environments or as a strategy that is based on traits and tradeoffs (Del Giudice, in press; Del Giudice & Ellis, in press; Del Giudice, Ellis, & Shirtcliff, 2011; Del Giudice, Ellis, & Shirtcliff, 2013; Ellis, Del Giudice, & Shirtcliff, 2013; Ferguson, 2010; Gilbert, 2005; Glenn et al., 2011; Mealey, 1995; Ribeiro da Silva et al., 2012, 2013; Salekin & Lynam, 2010). However, we must stress that an adaptive response, in an evolutionary point of view, does not necessarily mean psychological well-being or socially valued outcomes. Moreover, the fact that children can adapt to harsh rearing environments or adopt a strategy that is not communal, obviously, does not imply that such conditions should be passively accepted as inevitable facts of life (Del Giudice et al., 2011).

This paper addresses the insights of Evolutionary Theory in explaining the origin and development of psychopathic traits during evolution, reviewing data since the origin and evolution of species to the most recent and accurate research studies. Although there are different developmental pathways that probably lead to psychopathy, this paper focuses mainly on psychopathic subjects who have grown in harsh psychosocial backgrounds. Implications of this theoretical understanding for the comprehension and treatment of psychopathy will be outlined.

2. The Human Brain

2.1. Evolution, Brain and attachment

At birth, humans are neurobiologically immature, being neurons designed to be reactive and change in response to external and internal environments (Perry, Pollard, Blakley, Baker, & Vigilante, 1995). The immaturity of the newborn requires extended maternal care which, at the same time, places the developing brain in a unique mother–infant social context (Bowlby, 1969; Gilbert, 2010; Keverne & Curley, 2008; Linden, 2007, Wang, 2005). For the developing infant, the mother (or a significant attachment figure) provides the most significant environmental influence,

shaping brain development by producing long-term epigenetic modifications (non-heritable) to neural and behavioral phenotypes (Bird, 2007; Gilbert, 2005, 2010; Jablonka & Lamb, 2005; Keverne & Curley, 2008; Tollefsbol, 2010; Zhang & Meaney, 2010).

Genetic and epigenetic inheritance (ways of providing variance) are complex, inter-dependent, and their interactions are central to human evolution and behavior (Jablonka & Lamb, 2005; Tollefsbol, 2010; Zhang & Meaney, 2010). In this sense, some authors argue that psychopathy is actually an extreme version of some personality traits, which are affected by genes triggered in early hostile or resource limited environments (Glenn et al., 2011; Salekin, Leistico, Trobst, Schrum, & Lochman, 2005). In a different (evolutionary) perspective, other authors argue that psychopathy exists and is adaptive at a low frequency (thrive by exploiting others) and represents a shift to a “fast” life-history strategy (focused on mating rather than parental efforts, on gaining immediate rather than long term advantages) that can be beneficial to the individual especially in some particular harshly contexts (Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011, Mealey, 1995). In fact, the systematic association between toxic experiences in infancy and an increased psychopathic response in adulthood is shown in several studies (e.g., Gao, Raine, Chan, Venables, & Mednick, 2010; Salekin & Lochman, 2008; Saltaris, 2002). In summary, psychopathy seems to be more prevalent in specific rearing scenarios, probably because genes associated with it may be more advantageous in those particular environments (Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011; Salekin et al., 2005).

2.2. Old brain, new brain: the emotion-logic lag

Darwin (1859/2009), on his emblematic work *On The Origin Of Species*, points out that evolution can not go back, what explains why all species share the same body systems (e.g., digestive, cardiovascular), and all brains have the same basic functions.

Neurobiologically, beyond the neocortex (exclusive to mammals) and *corpus callosum* (exclusive to placental mammals), the human brain contains all of the parts of simpler brains

(Striedter, 2005), i.e., ancient systems that may no longer serve the purposes for which they evolved (Gilbert, 2010; Linden, 2007).

According to MacLean (1990), human brains can be divided into three parts, which constitutes the “Triune Brain”: a) the “reptilian brain” (related to the brainstem and cerebellum); b) the “paleomammalian brain” (related to the limbic system); and c) the “neomammalian brain” (related to the neocortex). The first two components represent “old brain” parts, while the last one represents “new brain” areas (Gilbert, 2005, 2009, 2010; MacLean, 1990).

Humans share the so called “old brain” (more primitive, linked to reptilian strategies) with many other animals. The “reptilian” component controls our motives and instinctive behavior (e.g., sex, aggression, power), even in deep sleep (Gilbert, 2009, 2010; MacLean, 1990). These interests in defending, reproducing, and acquiring resources can not be classified as bad or good, because, to some extent, they are fundamental to self-preservation/survival and to gene-preservation/reproduction across generations (Gilbert, 2009, 2010, MacLean, 1990). So, we can assert that humans have a “reptilian” brain, filled with ancestral memories that evolved over millions of years. However this “reptilian” brain is not deleted; actually it is in charge of our more basic processes and emotions, i.e., our most primitive instincts of survival and reproduction (Gilbert, 2009, 2010; MacLean, 1990).

Our “old brain” also contains a “paleomammalian” component that appeared and evolved with the first mammals about 120 million years ago. This area facilitates care-eliciting and care-giving, and is extremely important for the survival of the immature newborn, especially in the case of human beings (Cracraft & Donoghue 2004; de Duve, 2002; Gilbert, 2010; Keverne & Curley, 2008; Linden, 2007; MacLean, 1990; Wang, 2005). The “paleomammalian brain” is also responsible for enhancing emotion, motivation, learning, and memory; and gives more flexibility to behavior (MacLean, 1990). Shortly, from an evolutionary point of view, our “old brain” emotions, motives and desires (related to both “reptilian” and “paleomammalian” brain) were and continue to be crucial to human evolution (Gilbert, 2005, 2009, 2010, MacLean, 1990). These “old brain”

regions are linked to “new brain” areas (“neomammalian brain”), which give us unique abilities, like observe, reflect, plan, think, communicate, fantasize, play, become self-aware, and form a self-identity (Gilbert, 2009, 2010; MacLean, 1990).

As Damasio (1999, 2006) highlights, the conscious mind results from the fluid articulation between several brain areas, and many psychological problems arise in the way our “old” and “new” brain interact. In fact, logic (linked to “new brain” areas) and emotion (related to “old brain” areas) can be, and frequently are, in conflict (Haidt, 2001), especially when we feel, in a way or another, that we (or those we care about) are threatened (Gilbert, 2009, 2010; MacLean, 1990). On these occasions, our “old brain” commands our emotional experience, cognitions, and behaviors (Gilbert, 2009, 2010; MacLean, 1990). Damasio (1999, 2006) goes further and argues that most of our actions or choices are not deliberated; instead, they operate below the threshold of awareness, guided by unconscious processes.

Although the “triune brain” conceptualization represents an interesting hierarchical organization of the brain from an evolutionary perspective, advances in neuroscience research have shown some flaws of this approach. Namely, we must keep in mind that the emergence of the neocortex certainly involved several highly specific changes in brain anatomy, making mammal brains not just reptile brains scaled up or down (Striedter, 2005). Nevertheless, this conceptualization remains interesting for the study of psychopathy from an evolutionary point of view, since it brings insights from the evolution of instincts, emotions and reasoning – central to human evolution and to the conceptualizations of psychopathy itself.

3. Emotion-regulation systems

As Gilbert (2010) proposes, “We are made up of many different talents, abilities, social motives, emotions, and so on, and coping with their various pushes and pulls is no easy matter” (p. 31). Our different motivations are regulated by emotions, and recent research shows that our brains contain negative (the threat and self-protection system) and positive (the incentive and resource-seeking, drive-excitement system; and the soothing, contentment and safeness system) emotion-

regulation systems, which operate interdependently, controlling our different motivations and behaviors (Depue & Morrone-Strupinsky, 2005; Gilbert, 2005, 2009, 2010; LeDoux, 1998, 2003). As the author points out, “the term system is not meant to imply a separate system existing some place in the brain, but rather a mode or modes of functioning” (Gilbert, 1995, p. 139). Genes, childhood experiences, life events, and brain training affect the maturation and balance of our emotion-regulation systems (Gilbert, 1995, 2005, 2009, 2010; Perry et al., 1995).

3.1. The threat system

Accordingly to Gilbert (1995, 2005, 2009, 2010), the threat and self-protection system (shortly, “threat system”) is a protection system, shared by all living beings, which alerts and protects us from a potential threat, danger, or harm (real or even imagined, e.g., predators, competitors, frustrations, unfamiliar situations, but also unfavorable thoughts about the self).

The threat system (Gilbert, 2005, 2010) is designed to detect and pick up on different kinds of threats quickly, process those threats, select an emotional reaction (e.g., anxiety, fear, anger, disgust), and an appropriate behavioral response (e.g., freeze, fight, flight, submission), similar to Cannon’s (1915) proposal. Alternatively, some authors (Schauer & Elbert, 2010; Spitzer, Barnow, Freyberger, & Grabe, 2006) suggest a coherent sequence of six fear responses (“Freeze-Flight-Fight-Fright-Flag-Faint”) to a threatening event. The initial freezing response facilitates a “stop-look-listen” perception of the threat. Then, humans (and mammals in general) generally flee, or if they are unable to successfully flee, they will fight (Schauer & Elbert, 2010; Spitzer et al., 2006)

From a neuroscience perspective, it seems that specific brain areas, like the amygdala, the medial pre-frontal cortex, and the hypothalamic-pituitary-adrenal axis (Bishop, 2008; Joseph et al., 2011; LeDoux, 1998, 2003; Murrough et al, 2011), and serotonin regulation (Caspi & Moffitt, 2006; Joseph et al., 2011; Murrough et al., 2011) help to shape individual differences to threat environmental sensitivity and reactivity. Different areas of the brain control and coordinate mental and physical functioning through threat continuum (“Freeze-Flight-Fight-Fright-Flag-Faint”), and the more threatened the person feels, the more “primitive” becomes the style of thinking and

behaving (Bishop, 2008; Gilbert, 2005, 2009, 2010; Joseph et al., 2011; LeDoux, 1998, 2003; Mikulincer, Shaver, Gillath, & Nitzberg, 2005; Murrough et al., 2011; Perry et al., 1995; Schauer & Elbert, 2010).

When a person activates the threat mode (e.g., in the presence of a phobic trigger, or in a shameful situation), all aspects of mind can become threat focused, just concerned about protection and safety (Gilbert, 1995, 2005, 2009, 2010). All of these mechanisms operate rapidly, almost in an automatic way, and (at least at the beginning) beyond our awareness (Gilbert, 2005, 2010). Therefore, as stated, this is considered a negative affect regulation system (related to anger, fear, anxiety, and disgust), with ancient roots, easily triggered, and not designed for complex thinking, but rather for rapid actions (Gilbert, 2005, 2010).

Some studies (e.g., Horstmann & Bauland, 2006; Pinkham, Griffin, Baron, Sasson, Gur, 2010) find that threatening or angry faces are detected more efficiently among a crowd than happy or nonthreatening faces. These findings are rooted in evolutionary arguments, proposing a fitness advantage for processing threatening in comparison to nonthreatening environmental stimuli (Bishop, 2008; Horstmann & Bauland, 2006; Pinkham et al., 2010).

All of these data corroborate the idea that the threat system is a protection system oriented to a “better safe than sorry” strategy, being over-sensitive and over-estimates threats and danger (Gilbert, 2005, 2009, 2010; Perry et al., 1995). Despite their frailties (e.g., over-reaction in a nonthreatening situation), we should not forget that this system is extremely important to survival (Gilbert, 2005, 2010; Perry et al., 1995; Schauer & Elbert, 2010; Spitzer et al., 2006). Furthermore, functioning in a “better safe than sorry” strategy could as well be adaptive, especially in hostile backgrounds (Gilbert, 1995, 2005, Perry et al., 1995; Ribeiro da Silva et al., 2012, 2013; Schauer & Elbert, 2010; Spitzer et al., 2006). On the other side, when a person (child or adult) functions in a threat mode most of the time, he/she becomes hypervigilant, with little space for other activities. This could be the source of numerous psychological disorders, many related to attachment difficulties (Bowlby, 1969; Burnette, Taylor, Worthington, & Forsyth, 2007; Irons, Gilbert,

Baldwin, Baccus, & Palmer, 2006; Mills, Arbeau, Lall, & De Jaeger, 2010; Perry et al., 1995; Pinto-Gouveia & Matos, 2011; Porges, 2007; Wang, 2005).

We must also point out that the Threat System conceptualization resembles, at least partially, the scope and functioning of the Stress Response System (SRS), a fundamental system to the comprehension of the Evolutionary Theory. The SRS (which encompasses the integrate functioning of the autonomic nervous system and the hypothalamic–pituitary–adrenal axis) has three main biological functions: “to coordinate the organism’s allostatic response to physical and psychosocial challenges; to encode and filter information from the environment, thus mediating the organism’s openness to environmental inputs; and to regulate a range of life history-relevant traits and behaviors” (Ellis et al., 2013, p. 259). We must also highlight that life histories can vary along a slow–fast spectrum. In the slower extreme, we have subjects who display slow development, low reproductive rates, and a long lifespan. In the faster extreme, we have individuals who show rapid development, high reproductive rates, and shorter lives (Del Giudice, in press; Del Giudice & Ellis, in press; Del Giudice et al., 2011, 2013; Ellis et al., 2013). Moreover, the calibration of stress responsivity and life histories can shift toward a different trajectory especially in some developmental periods (prenatal and early postnatal development, juvenile transition, and puberty), and/or in some particular rearing scenarios (Ellis et al., 2013).

Accordingly to the Adaptive Calibration Model (an evolutionary model, built on Life History Theory and on Developmental Biology), human evolved to survive and ultimately reproduce in a variety of contexts (stressful/supportive). Consequently, different patterns of stress responsivity (regarding competitive risk-taking, learning, self-regulation, attachment, affiliation, and reproductive functioning) and life history strategies (e.g., sexual maturation, fertility, risk-taking, and parenting styles) are mainly seen as adaptations rather than pathologies (Del Giudice, in press; Del Giudice & Ellis, in press; Del Giudice et al., 2011, 2013; Ellis et al., 2013).

The Adaptive Calibration Model proposes four prototypical patterns of stress responsivity: I (sensitive), II (buffered), III (vigilant), and IV (unemotional). These patterns of responsivity are

conceptualized in a dimensional way, developed under the interdependent effects of genetic and environmental factors. Moreover, these patterns are considered fairly stable, although not fixed (Del Giudice et al., 2011; Ellis et al., 2013). We will focus mainly on the unemotional pattern, marked by low stress responsivity, since it has a great overlap with the construct of psychopathy (Del Giudice et al., 2011; Ellis et al., 2013; Frick & Morris, 2004).

The unemotional pattern lies at the fast extreme of the life history spectrum (associated with the principle - “live fast, die young”, i.e., rapid development, early sexual maturation, high reproductive rates, shorter life expectancy) and can be adaptive in harshly stressful contexts, as a way to maximize the fitness benefit/cost ratio (Del Giudice et al., 2011; Ellis et al., 2013). This phenotype is characterized by a persistent pattern of markedly reduced SRS basal responsivity and by low serotonergic and dopaminergic activity. The unemotional pattern, and psychopathy itself, are also associated with inhibition of social learning, low sensitivity to social feedback, low empathy, high impulsivity, could be linked to risk-taking (by blocking information about threats), and aggressive behavior (mostly, but not exclusively, instrumental/proactive type) (Del Giudice et al., 2011; Ellis et al., 2013).

There are two mainly developmental pathways that probably lead to psychopathy or to an unemotional responsivity pattern: the first is highly related to extremely harsh environmental factors and the second one is largely associated with a genetic predisposition (Del Giudice et al., 2013; Ellis et al., 2013; Glenn et al., 2011; Lykken, 1957, 2006). Several authors argue that some toxic experiences in early childhood (with recurrent and intense SRS activation - signaling extrinsic morbidity–mortality and environmental unpredictability) may trigger a shifting toward a faster life history strategy, facilitating the emergence of psychopathic traits (Del Giudice et al., 2013; Ellis et al., 2013; Glenn et al, 2011). In fact, in severely harsh social contexts, engaging in high levels of risk taking (e.g., antagonistic competition, impulsivity) can be the more adaptive response (i.e., fitness-maximizing) from an evolutionary perspective. Low stress responsivity may also help individuals to reinforce their resilience to internalizing disorders in stressful environments and to

maintain calm and vigilance during hostile interactions. These strategies require an unresponsive SRS, or a higher threshold to threats, dangers, and social feedback, which is an advantage for the extreme risk-taker and for an exploitative person (Del Giudice et al., 2011; Ellis et al., 2013).

To some extent, these data point toward a potential evolutionary root for psychopathy, i.e., the development and maintenance of psychopathic traits, and the low stress responsivity behind those traits could be seen as a possible adaptive strategy to deal with highly threatening environments. Nevertheless, as stated, an adaptive response and reproductive success is not equivalent to psychological well-being or socially valued outcomes. Furthermore, although psychopathy could have some benefits to the individual itself, it is indeed a condition with many societal and individual costs that, therefore, signals a need for intervention.

3.2. The Drive System

The drive, seeking acquisitions focused system (shortly drive system) is designed to give us a sense of well-being (Berridge & Kringelbach, 2008; Depue & Morrone-Strupinsky, 2005; Gilbert, 2005, 2009, 2010). This system is considered to be a positive affect regulation system, that motivates and allows us to seek out, consume and achieve nice things (e.g., food, sex, friendship, status, and recognition), making us feel happiness and pleasure (Gilbert, 2005, 2009, 2010).

From an affective neuroscience perspective, it seems that the brain's mesolimbic system ("reward system" - linked to dopamine pathways) is crucial to the functioning of the drive system, regulating the pleasure response, i.e., the hedonic impact of the stimuli (Berridge & Kringelbach, 2008; Blum et al., 2008; Depue & Morrone-Strupinsky, 2005; Esch & Stefano, 2004). Further, it has been suggested that some genetic variations are also important in the function of the reward system, especially when linked to certain environmental experiences (Blum et al., 2008).

All of these data indicate that natural pleasing activities are essential for survival and prosperity, acting on reward pathways, promoting behavioral flexibility, satisfaction of biological needs (e.g., food, sex and reproduction), and rewarding relationships (e.g., friendship, status, recognition) (Blum et al., 2008; Esch & Stefano, 2004). However, an impairment of the

mechanisms involved in these natural processes (e.g., a genetic hypodopaminergic activity of the brain) predisposes individuals to seek artificial stimulants and/or pleasure-seeking behaviors that will overcome this hedonic state by triggering dopaminergic centers, creating an artificial state of pleasure (Blum et al., 2008; Esch & Stefano, 2004). The chronic abuse of substances or the systematic display of thrill seeking behaviors can be seriously detrimental, and according to some researchers may lead to the inactivation of the brain reward system - Reward Deficiency Syndrome (Blum et al., 2008; Blum et al., 2012; Esch & Stefano, 2004).

When balanced with the other systems, the drive system is a clearly advantage, guiding us toward important life goals (Depue & Morrone-Strupinsky, 2005; Gilbert, 2005, 2010). However, pathological losses of pleasure may be a central component of many affective and substance use disorders (Berridge & Kringelbach, 2008; Depue & Morrone-Strupinsky, 2005; Gilbert, 2005, 2010). Furthermore, when our drive and threat systems are activated at the same time, this leads to anxiety, frustration, and even anger, making people engage in aggressive behavior more easily (Gilbert, 2005, 2010).

Although we do not know of any research that directly relates psychopathy with the drive system, there are different studies pointing out that psychopathy could be, somehow, related to an unbalanced drive system. In detail, psychopathic traits are frequently linked with thrill seeking behaviors (Frick & Dickens, 2006; Frick & White, 2008; Patrick, Fowles, & Krueger, 2009) and with “fast” life history strategies, characterized by short-term mating effort, early sexual maturation, large number of offspring, little investment in parental care, less focus on planning for the future, increased risk-taking, reduced self-control, and a selfish disposition (Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011; Mealey, 1995). In other words, it seems that some individuals scoring high on psychopathic measures tend to have a high motivation to seek out risky but somehow rewarding activities. These findings lead us again to the unemotional pattern (similar, although not totally equivalent to the construct of psychopathy) conceptualized in the Adaptive Calibration Model. Specifically, some psychopathic traits (e.g., callousness, unemotional,

impulsivity, thrill-seeking), could be understood as design features of psychopathic strategy, adaptive initially in stressful or resource limited contexts as a way to maximize the fitness benefit/cost ratio (Del Giudice et al., 2011; Ellis et al., 2013; Glenn et al., 2011).

3.3. The Soothing System

The contentment, soothing and affiliative focused system (shortly soothing system) is also a positive affect regulation system, linked to attachment, designed to bring peacefulness and soothing when a person is no longer threat-focused or focused on seeking resources. Conditioning, negative emotional memories, dysfunctional beliefs, a higher drive and/or threat focusing, parental neglect, criticism, relational trauma, and abuse may fail to help the soothing system mature, causing problems in brain maturation (Perry et al., 1995; Schore, 2001, 2009).

The soothing system helps to restore our balance, mainly because it regulates threat and drive (Gilbert, 2005, 2010; Gilbert, McEwan, Mitra, Franks, Richter, & Rockliff, 2008; Porges, 2007). It is when children (and adults) are soothed that they can finally shut down the threat system and relax (passive safeness) or explore (active safeness) (Bowlby, 1969; Porges, 2007).

Attachment is one of the most important aspects in mammalian evolution in general and in human evolution in particular (Bowlby, 1969; Gilbert, 2010; Keverne & Curley, 2008; Linden, 2007; Wang, 2005). As an altricial species (i.e., a species born needing parental care), for humans, the immediate initiation and maintenance of social bonds is a survival requirement and a fundamental human quality and need. From birth, children are highly sensitive to interpersonal signs, and the sense of safeness is not created merely in the absence of threat; instead, it is rooted in caretaking and stimulated via-warmth and affection (Bowlby, 1969; Gilbert, 2005, 2010; Mikulincer et al., 2005; Perry et al., 1995; Wang, 2005).

Several authors (e.g., Bowlby, 1969; Burnette et al., 2007; Gilbert, 2005, 2010; Mikulincer et al., 2005) established the significance of a secure attachment, especially in the first years of life with the maternal figure, to the emotional and social development of children. Caring signals and behaviors (e.g., holding, stroking, touching, facial expressions, and voice tone), related to the

“Caregiving Behavioral System” (Bowlby, 1969), evolved as natural stimuli that activate, from birth, the soothing system, promoting clear calming effects, also affecting brain maturation (Gilbert et al., 2008; Mikulincer et al., 2005; Perry et al., 1995; Porges, 2007; Wang, 2005). In turn, human infants also born with an evolutionary repertoire of behaviors (“Attachment Behavioral System”) that interacts and complements the “Caregiving Behavioral System” (Bowlby, 1969). Proximity seeking and a sense of attachment security are seen as primary inborn strategies for affect regulation (e.g., in a distress situation or in the presence of a threatening event), evolutionarily important for survival, and for future reproduction (Bowlby, 1969; Mikulincer et al., 2005; Perry et al., 1995).

A young person who has a secure attachment style, was soothed, and loved can easily recall these feelings and memories, which help to regulate the threat system by a self-soothing mechanism (Gilbert, 2010; Wang, 2005). Attachment security is related to lower indices of psychopathology (Gilbert et al., 2008; Schore, 2001, 2009), provides a natural basis for care-oriented feelings and caregiving behaviors (Mikulincer et al., 2005), reduces angry rumination, and promotes forgiveness (Burnette et al., 2007). A secure attachment style (with occasional and low-intensity activation of the SRS) generally promotes the development of “slow” life history strategies, oriented to high somatic efforts and parental investment (Del Giudice, in press; Del Giudice & Ellis, in press; Del Giudice et al., 2011, 2013; Ellis et al., 2013).

On the other hand, a child who has an insecure attachment style is more likely to develop a hyper-reactive threat system and a toned down or suppressed soothing system (Gilbert, 2010; Wang, 2005). A lack of secure attachment experiences early in life is also one of the most common causes of psychopathology (e.g., Burnette et al., 2007; Gilbert, 2005, 2010; Irons et al., 2006; Mills et al., 2010; Perry et al., 1995; Schore, 2001, 2009), affects or suppresses compassionate caregiving behavior (Mikulincer et al., 2005), enhances angry rumination, and reduces forgiveness (Burnette et al., 2007). Highly threatening environments (with frequent and intense activation of the SRS) can also shift life history strategies toward the fast end of the life history spectrum (Del Giudice, in

press; Del Giudice & Ellis, in press; Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011).

Some studies in the neuroscience arena (e.g., Baumgartner, Heinrichs, Vonlanthen, Fischbacher, & Fehr, 2008; Delgado, 2008; Heinrichs & Domes, 2008; Panksepp, 1998; Porges, 2007; Schore, 2001, 2009) point out that caring and warmth are related to profound changes in central and peripheral nervous systems, enabling threat processing regulation (moderating defensive emotions like anger, anxiety, and sadness; and inhibiting fight/flight), promoting a sense of safety, social interest, interpersonal closeness, and affiliation, and also decreasing psychopathology.

Oxytocin seems to play a major role in the balancing of the soothing system, since much of its biological functions turns around relational events. Oxytocin may bias humans toward prosocial ends, promoting social connectedness and safeness (Depue & Morrone-Strupinsky, 2005; Heinrichs & Domes, 2008; Kirsch et al., 2005; MacDonald & MacDonald, 2010; Wang, 2005), trust (Baumgartner et al., 2008; Delgado, 2008), and feelings of well-being. Oxytocin can also be released in something as simple as a social touch (Delgado, 2008). This neuropeptide could also alter physiological pain thresholds, impact on the immune system, and on threat processing, reducing amygdala activation (of fear, anxiety, and stress), and promoting an anxiolytic effect (Baumgartner et al., 2008; Delgado, 2008; Depue & Morrone-Strupinsky, 2005; Heinrichs & Domes, 2008; Kirsch et al., 2005; MacDonald & MacDonald, 2010).

Although we are unaware of any study relating psychopathic traits with the soothing system, several authors (e.g., Cleckley, 1941/1988; Cooke & Michie, 2001; Frick & Dickens 2006; Frick & White, 2008; Hare, 1993) indicate that psychopathic individuals are characterized by a set of affective and interpersonal features (e.g., lack of empathy, callous-unemotional traits, social detachment), which echoes an underbuilt soothing system. Moreover, some authors suggest that certain environmental risk factors, above all psychosocial ones, play a significant role in the etiology and maintenance of psychopathy (Farrington, Ullrich, Salekin, 2010; Gao et al., 2010; Pardini, Lochman, & Powel, 2007; Salekin & Lochman, 2008; Saltaris, 2002). In an evolutionary

perspective, insecure attachment styles and extremely severe rearing environments commonly lead to the development of “fast” life strategies, focused on mating, with a little investment in interpersonal relationships and in parenting (Del Giudice, in press; Del Giudice & Ellis, in press; Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011). On addition, the unemotional pattern present in individuals with psychopathic traits mirror those characteristics of a “fast” life-history strategy, being also associated with inhibition of social learning, sensitivity to social feedback, and low empathy (Del Giudice, in press; Glenn et al., 2011; Mealey, 1995). All of these studies and perspectives point out, to some extent, that individuals with psychopathy most likely present an inoperative or inappropriately reinforced soothing system marked by (among others) detachment, coldness, callousness, and an unemotional relational pattern.

4. The adaptive role of aggression

There is a long debate whether humans are innately competitive or cooperative (Fuentes, 2004). On one side, Neo-Darwinian theory defends that natural selection acts by competition, understood as the primary driving force in evolutionary change (Alexander, 1989; Dawkins, 1976/2006). Some authors defend that despite the decline in aggressive behaviors, which have accompanied modern civilizations, the human mind is still designed for ancestral environments, where strength, anger, aggression, and fighting abilities were crucial for competition (e.g., status, territory, and resources), survival, and reproduction (Anderson & Bushman, 2002; Gangestad & Simpson, 2007; MacLean, 1990; Nairne & Pandeirada, 2010; Sell, Hone, & Pound, 2012; Tooby & Cosmides 1990). As Anderson and Bushman (2002) point out, “perhaps the anger-aggression linkage is one that humans are evolutionarily prepared to learn” (p. 44), being competition and potential for aggressive behavior present in humans (Alexander, 1989; Anderson & Bushman, 2002; Beck, 1999; Cashdan & Downes, 2012; Darwin, 1874; Dawkins, 1976/2006; Flinn, Ponzi, & Muehlenbein, 2012; Krebs, 2007; Sell et al., 2012; Wrangham & Glowacki, 2012).

Other authors (MacDonald & MacDonald, 2008; Panksepp, 1998) contend that natural selection most likely privileged the development of a variety of socially-oriented neural circuits that

bias mammals to reflexively and actively orient themselves towards prosocial behaviors. Several authors (Beck, 1999; Fuentes, 2004; Gilbert, 2005; Smith, 2006; Sussman, Garber, & Cheverud, 2005; Trivers, 1971) argue that prosocial behavior, empathy and morality are fundamental human features, and that human cooperative social interactions form the fabric of society. We can see the impact that groups have on their environment and how cooperation within and between groups may also be one important human adaptive pattern (Fuentes, 2004; Reysen, Talbert, Dominko, Jones, & Kelley, 2011). Cooperation combined with rapid behavioral plasticity and innovation is probably what allowed humans to successfully construct their niche and evolve with it (Fuentes, 2004). Moreover, data suggest that all primates (including humans) engage in relatively little aggressive behavior and that most social interactions are actually affiliative and altruistic (Beck, 1999; Fuentes, 2004; Sussman et al., 2005).

Despite these positions, we should move beyond dichotomous thinking, accepting that competition and cooperation had a role, and are not mutually exclusive, in our evolutionary past (Fuentes, 2004; Trivers, 1971). Actually, humans cooperate in a wide range of situations, including altruistic and prosocial (Beck, 1999; Fuentes, 2004; Gilbert, 2005; Smith, 2006; Sussman et al., 2005; Trivers, 1971), as well as aggressive ones (Cashdan & Downes, 2012; Flinn et al., 2012; Wrangham & Glowacki, 2012). Moreover, we must not forget that there are many potential routes to reproductive success in our species, some more cooperative and some more aggressive (Del Giudice, in press; Del Giudice & Ellis, in press; Del Giudice et al., 2011, 2013; Ellis et al., 2013).

On this basis, some authors (Anderson & Bushman, 2002; Cashdan & Downes, 2012; Sell et al., 2012; Wrangham & Glowacki, 2012) believe that despite the fact that aggression has evolutionary roots, shaped in our ancestral environment, that does not mean that humans are predestined to behave violently. On the contrary, humans actually need and usually balance their instinctive desires to defend (inherited agonistic tendencies related to aggression, individuality, territoriality and hierarchy) with their instinctive desires to bond (inherited hedonic tendencies related to mutual support and egalitarianism) (Gilbert, 2009, 2010)

Although some authors still debate the question of the inclusion of aggressive behavior as an inherent feature of psychopathy or its product (Cleckley, 1941/1988; Cooke & Michie, 2001; Salekin, Brannen, Zalot, Leistico, & Neumann, 2006; Skeem & Cooke, 2010), research shows that at least in some individuals, psychopathy is related with the most early, severe, and chronic forms of antisocial behavior (DeLisi, 2009; DeLisi & Piquero, 2011; Leistico, Salekin, DeCoster, & Rogers, 2008; Vaughn, Howard, & DeLisi, 2008), thus sustaining that psychopathic individuals probably present more agonistic than hedonic tendencies. Psychopathy is also associated with faster life history strategies, marked by a set of agonistic traits and behaviors, like increased risk-taking, reduced self-control, a selfish disposition, short-term mating effort, early sexual maturation and reproduction, large number of offspring, and little investment in social and parental care (Mealey, 1995). This “fast” life strategy, present in individuals with psychopathic traits, generally is adaptive (i.e., a route to reproductive success – more aggressive in this case) in highly stressful environments (Del Giudice et al., 2011; Ellis et al., 2013). Besides, some studies found an association between psychopathic traits and a pattern of precocious sexuality, promiscuity, and sexual coercion (Del Giudice, in press; Glenn et al., 2011; Mealey, 1995). However, we must stress out that not all individuals who present psychopathic traits display aggressive behavior, and not all individuals who present antisocial behavior or even Antisocial Personality Disorder (APA, 2013) show psychopathic features (e.g., Cleckley, 1941/1988; Viding & Larson, 2010). Moreover, as stated, although psychopathy could be seen as an adaptive strategy, with some benefits to the individual, including reproductive success, it is a condition with various society and individual costs (Del Giudice et al., 2011; Ellis et al., 2013; Glenn et al., 2011).

5. Emotions and psychopathy

Emotions evolved due to their adaptive value and our emotional states in different scenarios are influenced by our ancestral past, but also by our own life history (Damasio, 1999, 2006; Darwin, 1872/1965; Ekman, 1999; Izard, 2007; Panksepp, 1998; Plutchik, 1980; Tooby & Cosmides, 1990; Tomkins, 1962/1991). Accordingly to Damasio (1999, 2006), emotions have two basic functions:

they give rise to a quick and specific reaction according to the situation (e.g., fight, flight); and regulate the body internal state, so that it can be prepared for a specific reaction (e.g., increase the heart rate, breathing rate). Emotions are also crucial to the development, maintenance, and regulation of interpersonal relationships, being capable of influencing our thoughts, decision making, and actions (Damasio, 1999, 2006; Ekman, 1999; Izard, 2007).

Following the nomenclature of Damasio, emotions can be divided into universal (also called primary, pure or basic) and social (also called secondary or self-conscious; Damasio, 1999, 2006; Ekman, 1999; LeDoux, 1998, 2003; Lewis, 1992, 2001; Plutchik, 1980).

Universal emotions (joy, fear, anger, sadness, disgust, surprise) are unlearned, automatic, and predictable, are also characterized by their early appearance (until 6 or 8 months), and by having universal facial expressions across cultures and other animal species (Damasio, 1999, 2006; Darwin, 1872/1965; Ekman, 1999; Lewis, 1992, 2001). The universality of these emotions does not imply a genetic or an evolutionary determinism, i.e., the brain mechanism of emotions is similar across individuals, but the emotional responses are idiosyncratic, influenced by the sociocultural environment of the subject (Damasio, 2006). The limbic system (especially the amygdala and the anterior cingulate) has a key influence in the operation of universal emotions (Damasio, 1999, 2006; LeDoux, 1998, 2003).

Social emotions (e.g., pride, shame, guilt, and compassion) appear later in life (at about 3 years of age), after the child acquires meta-representation, self-awareness, and additional cognitive abilities (Lewis, 1992, 2001). These emotions are triggered in social situations, induced by self-reflection and self-evaluation (implicit or explicit, conscious or unconscious), and play a key role in socialization, moral and ethical conduct of the individual, functioning as an emotional barometer (Damasio, 2006; Tangney & Dearing, 2003; Tangney, Stuewig, & Mashek, 2007; Tangney & Tracy, 2012). Thus, these emotions can impact on social and moral choices and behaviors by providing critical feedback concerning both anticipated behavior and actual behavior (Haidt 2001; Tangney & Dearing, 2003; Tangney et al., 2007; Tangney & Tracy, 2012). Social emotions are a

more recent product of evolution than universal ones, and some social emotions (like certain varieties of compassion) are exclusive to humans (Damasio, 2006). The social emotions processing is supported by the limbic system and also by the prefrontal and somatosensory cortices (Damasio, 1999, 2006).

Positive emotions, both universal (like joy) and social (like compassion) ones are related to prosocial, affiliative and altruistic behavior (Damasio, 2006; Gilbert, 2005, 2010; Schultz, Izard, & Bear, 2004). On the other side, negative universal and social emotions (like hostility or shame) are frequently involved in aggressive behavior and in psychopathy itself (Baumeister et al., 1996; Frick & Morris, 2004; Gold, Sullivan, & Lewis, 2011; Heinzen, Koehler, Smeets, Hoffer, & Huchzermeier, 2011; Lotze, Ravindran, & Myers, 2010; Morrison & Gilbert, 2001). While the ability of psychopathic individuals to detect emotions has been investigated, few studies have looked at positive and negative emotions in psychopathic individuals. Thus, next, we present a brief review regarding some emotions that may play a role in psychopathy, i.e., anger and shame, giving a special emphasis to shame/dishonor.

5.1. The role of anger on psychopathy

Anger-prone individuals usually have an anger-perception bias (perceiving neutral cues as challenging or hostile), problems in emotional regulation (both under or over-regulation), difficulties in the access to higher-level cognitive processes (especially those used in decision making, moral reasoning and judgment), being more likely to engage in aggressive behaviors, including, antisocial ones (Frick & Morris, 2004; Heinzen et al., 2011; Schultz et al., 2004).

There are some studies and theories regarding the association between anger, aggressive behavior (reactive and/or proactive), and psychopathy (e.g., Burt, 2012; Cale & Lilienfeld, 2006; Frick & Morris, 2004; Heinzen et al., 2011; Marsee & Frick, 2007; Schultz et al., 2004).

Psychopathy seems to be present as unpathological and over-controlled with respect to anger.

Psychopathic individuals deny the anger experience (anger is avoided, not consciously experienced), and publicly are sociable, compliant, and free of anxiety (Blackburn, 1971, 1993).

Antisocial offenders who score high in psychopathic measures tend to exhibit more proactive aggressive behaviors, and are often motivated by sadistic interests and thrill seeking (Frick & Dickens, 2006; Frick & White, 2008; Marsee & Frick, 2007; Patrick et al., 2009). These subjects, on the other hand, can also display anger and aggressive behavior in response to ego threats (Baumeister et al., 1996; Cale & Lilienfeld, 2006).

However, we must highlight that some authors have questioned this traditional assumption - anger causes aggression (e.g., Geen 2001). In this regard, it seems that self-conscious emotions, particularly shame/dishonor, play a role in the regulation of anger and aggression (e.g., Gilbert, 2005, 2009, 2010; Gold et al., 2011; Morrison & Gilbert, 2001; Tangney et al., 2007; Tangney & Tracy, 2012). This idea raises questions about the role of shame or dishonor in psychopathy.

5.2. The role of shame/dishonor in psychopathy

Shame and dishonor are negative self-conscious emotions that can comprise a negative evaluation of the global self. Shame and dishonor can be focused on several aspects of the self (body, feelings, fantasies, desires, thoughts, behaviors, and personal attributes), creating feelings of being inferior, undesirable, devaluated, unwanted, inadequate, defective, and worthless or feeling that others feel this way about oneself (Gilbert, 2009, 2010; Lewis, 1971; Tangney et al., 2007; Tangney & Tracy, 2012). According to the Evolutionary and Biopsychosocial Model of Shame (Gilbert, 2009, 2010), since birth, all humans share the need to create positive feelings (e.g., be wanted, cared, and valued) about the self in the mind of others. The way we experience our interpersonal relationships early in life (especially with our family, but also with peers, and teachers) has a key influence on our shame/dishonor experience and shame/dishonor proneness, or on factors like ego threat tolerance and tolerance for being dishonored (Gilbert, 2005, 2009, 2010; Gold et al., 2011; Harper 2011; Pinto-Gouveia & Matos, 2011). Whether shame or dishonor are felt or bypassed (Lewis, 1971; Lewis, 1992), people can cope with these emotions in two different ways (safety strategies/defenses): internalizing or externalizing the shame/dishonor experience (Gilbert, 2005, 2009, 2010). When the individual internalizes the shame/dishonor experience, usually makes

internal attributions, adopts a submissive strategy, feels inferior, devalued, depressed, and anxious (Gilbert, 2005, 2009, 2010). When the individual externalizes the shame/dishonor experience, usually makes external attributions, adopts a dominant/aggressive strategy, enhancing the need to humiliate and devalue others. This last strategy is often linked to anger, revenge, and psychopathy (Gilbert, 2005, 2009, 2010).

If we take a close look, the mechanisms for dealing with these negative emotions mirrors the poles of the compass in Nathanson's theory (1992). Nathanson (1992) proposed a model that describes shame-management coping styles, triggered in reaction to a dishonoring experience, and by which shame and/or dishonoring is enhanced, reduced, or ignored. Nathanson (1992) bases his model on the Tomkins's script theory (1962/1991), naming it as the Compass of Shame Model. The author considers four poles of the compass, mainly maladaptive, related to different affects, cognitions, motivations, and behaviors: Attack Self, Withdrawal, Attack Other, and Avoidance. There is also one adaptive way to cope with shame/dishonor, related to self-reassurance and/or to the reestablishment of relationships (Ellison, Pulos, & Lennon, 2006; Harper, 2011; Nathanson, 1992). The poles of the Compass of Shame Model can be seen from both a state (situational) and a trait (dispositional) perspective. However, the poles are not necessarily independent, and the individual can use (in everyday life and even in the same situation) different coping styles to deal with shame and/or dishonoring experiences (Ellison et al., 2006; Harper, 2011; Nathanson, 1992).

The four poles of the compass can be divided into two main groups, according to the recognition of the shame/dishonor experience: Attack Self and Withdrawal; Attack Other and Avoidance (Ellison et al., 2006; Harper, 2011; Nathanson, 1992). Attack Self and Withdrawal poles are frequently found in internalizing disorders (Elison et al., 2006; Gilbert, 2005, 2009, 2010; Nathanson, 1992). In both of these poles, the individual identifies the shame/dishonor experience as negative and valid, but not necessarily as shame/dishonor. The major differences can be observed in motivations and behaviors: at the Attack Self pole, the person supports shame/dishonor in order to maintain relationships with others (but turns anger inward); while at the Withdrawal pole the

individual cannot bear or be willing to tolerate the shame/dishonor experience and moves away from others and/or may also not be aware of, or take on the emotion of shame, at a conscious level (Ellison et al., 2006; Harper, 2011; Nathanson, 1992).

Avoidance and Attack Other scripts share the narrow awareness and minimization of shame and/or dishonor (not accepting the shame's message as valid), and a tendency to externalize the negative experience, being frequently found in externalizing disorders (Ellison et al., 2006; Harper, 2011; McWilliams, 1994/2011; Nathanson, 1992). The major differences are in the phenomenological experience (neutral/positive versus negative), and in behavior (distract versus attack). The Avoidance pole is the most likely to work outside consciousness, and can be seen as more adaptive than the other three maladaptive copying styles. However, Avoidance can have other costs, like addictions or narcissism (Ellison et al., 2006; Harper, 2011; Nathanson, 1992), and has been linked to psychopathy - along with the Attack Other pole (Nyström & Mikkelsen, 2012; Paulo, da Motta, Ribeiro da Silva, & Rijo, 2013).

*** Insert table 1 about here ***

However, we must highlight that shame/dishonor, as a temporary emotional experience, is universal, mostly adaptive, and could serve different important purposes like the development of personal identity, socialization, interpersonal success, and even survival (Harper, 2011). On the other hand, shame-proneness is mostly maladaptive, rooted in dominant-submissive strategies, and linked with numerous psychopathological problems (Gilbert, 2010; Harper, 2011; Mills et al., 2010; Pinto-Gouveia & Matos, 2011; Tangney & Tracy, 2012). Besides, as Ellison, Pulos, and Lennon (2006) point out, it seems that it is not the experience of shame/dishonor *per se* that is maladaptive, but rather the way shame/dishonor is handled by the individual.

There is a considerable amount of research focused on the role of shame/dishonor or ego threats in internalized disorders (e.g., Gilbert, 2010; Harper, 2011; Mills et al., 2010; Pinto-Gouveia & Matos, 2011; Tangney & Tracy, 2012). In comparison, there is little research focused on the role of shame in violence (e.g., Gold et al., 2011; Tangney et al., 2007), and even less focused on the

link between shame/dishonor and psychopathy-related personality traits (Campbell & Elison, 2005; Holmqvist, 2008; Morrison & Gilbert, 2001; Nyström & Mikkelsen, 2012; Paulo et al., 2013).

In this regard, some authors contend that psychopathy is associated with a lack of shame (Cleckley, 1941/1988; Hare, 2003), while others (Campbell & Elison, 2005; Holmqvist, 2008; Morrison & Gilbert, 2001; Nyström & Mikkelsen, 2012; Paulo et al., 2013) claim a positive association between psychopathic traits and shame or some dishonoring event(s). It is quite possible that there are multiple pathways to psychopathy one of which involves dishonoring and potentially feelings of shame. Although it is likely that psychopathic individuals encounter shaming events, either they are oblivious to the shaming/dishonoring event, or they may defend against it by attacking the person or group/society that is attempting to shame and/or dishonor the individual. This defensive responding occurs because the ego threat is distasteful to the psychopathic individual who views him or herself as superior to the rest of the community/society.

According to this last perspective, shame/dishonor is often linked to attempts to deny, avoid, or side step the shame or dishonor-inducing situation, promoting defensiveness, interpersonal separation, distance, and a lack of empathy (Gilbert, 2010; Tangney & Dearing, 2003; Tangney et al., 2007; Tangney & Tracy, 2012), which reflects some of the affective and interpersonal features of psychopathy (Cleckley, 1941/1988; Cooke & Michie, 2001). Moreover, according to Nathanson (1992), the interpersonal and affective features of psychopathy (e.g., callous-unemotional, grandiosity, manipulation) are only superficial, and serve to side step (from others and from the self) initially shameful, or dishonoring, feelings. In fact, shame and/or dishonor management in psychopathy seems to be conducted mostly at an unconscious level (Avoidance and Attack Other strategies), leading to minimal internalization of the shame/dishonor message (Campbell & Elison, 2005; Harper, 2011; Holmqvist, 2008; McWilliams, 1994/2011; Nathanson, 1992; Paulo et al., 2013). And, after some time of denying these emotional experiences, the psychopathic individual may evidence brain changes that reduce the likelihood that they will process these negative emotions.

Other authors (Baumeister et al., 1996; Meloy, 1988) also argue that subjects with psychopathy avoid a broad range of unwanted emotions. Baumeister et al. (1996) go further, pointing out that, it is when the individuals with psychopathic traits fail to avoid unpleasant emotions that they tend to attack. “By focusing on his or her hostility toward the evaluators, the person avoids the dismal cycle of accepting the feedback, revising his or her self-concept, and experiencing the dejected feelings about the self” (p. 11).

According to the Adaptive Calibration Model (Del Giudice et al., 2011, 2013; Ellis et al., 2013), the low stress responsivity, the exploitative interpersonal style, and the unemotional pattern (to threats, to social feedback, and to social context) present in psychopathy, despite its weaknesses (for the self and for the society), seems to protect the individual from social rejection, criticism, and from unpleasant emotions. In other words, in line with these authors, psychopathic strategy shields the individual from hostile emotions, seeming to be adaptive, especially in hostile and abusive psychosocial environments (Del Giudice et al., 2011, 2013; Ellis et al., 2013) or in environments where they might be socially excluded. And, like any behavior and style, these defensive styles, after practicing it for some time, it eventually becomes part of one’s personality (e.g., feeling of superiority, superficial charm, grandiosity).

Briefly, on one side, classical authors advocate a negative association between psychopathy and shame/dishonor (Cleckely, 1941/1988; Hare, 2003), while on the other side different authors claim a positive association between psychopathic traits and these emotions (Campbell & Elison, 2005; Holmqvist, 2008; Morrison & Gilbert, 2001; Nyström & Mikkelsen, 2012; Paulo et al., 2013). These contradictory points of view, resulting from different conceptual approaches, represent a difficult problem requiring clarification, since it can contribute to alter the comprehension and, consequently, the treatment approach of psychopathic subjects. We hypothesize that these contradictory results can derive from different theoretical backgrounds regarding the conceptualization of shame/dishonor and from different methodologies employed in the studies, as well as possibly different ways in which psychopathy can come about for individuals, with the

shame and dishonor connection being one potential mechanism that in combinations with other factors may lead to psychopathy. In other words, we think that future research should, accurately, shed light on the association between psychopathy and negative emotions (like shame and dishonor) that can prompt the psychopathic condition in some individuals.

Discussion

Evolutionary Psychology proposes remarkable insights into human behavior based on our long evolutionary past, not ignoring culture and psychosocial influences (Gangestad & Simpson, 2007; Gilbert, 2009, 2010; Krebs, 2007). In the specific case of psychopathy, we could track the adaptive role of some features of the disorder, both along the human evolution as throughout the lifespan of a particular individual. Indeed, some authors (Del Giudice et al., 2011, 2013; Ellis et al., 2013; Gao et al., 2010; Glenn et al., 2011; Salekin et al., 2005) contend that psychopathy is more predominant in specific developmental backgrounds, probably due to a fitness-advantage of those traits (and associated genes) in such environments.

Homo sapiens are a recent product of evolution, a combination and a reorganization of new and ancient systems (Cracraft & Donoghue 2004; Damasio, 1999, 2006; Darwin, 1859/2009; de Duve, 2002; Gilbert, 2010; MacLean, 1990; Striedter, 2005). As animals, humans share the same brain functions (related to the “reptilian brain”) and the so called drive and threat system with other animals (Damasio, 1999, 2006; Gilbert, 2005, 2009, 2010; MacLean, 1990). Although there is a lack of research focused on these precise issues, it seems that psychopathy is associated with an unbalanced drive and threat systems (Del Giudice et al., 2011; Ellis et al., 2013; Frick & Dickens, 2006; Frick & White, 2008; Patrick et al., 2009). However, low fear (Lykken, 1957, 2006), thrill-seeking behaviors (Del Giudice et al., 2011; Patrick et al., 2009), and a hypoarousal response (Del Giudice et al., 2011, 2013; Glenn et al., 2011) – what seems to be the case of subjects with psychopathic traits – could represent a strong advantage, especially when the psychosocial environment is highly hostile. Supporting this data, there is a considerable amount of research indicating a low association between psychopathic traits and reactive aggression (Burt, 2012; Cale

& Lilienfeld, 2006; Frick & Morris, 2004; Heinzen et al., 2011; Marsee & Frick, 2007; Schultz et al., 2004) and a high association between psychopathy and risk-taking behaviors (Patrick et al., 2009; Del Giudice et al., 2011). Moreover, the Adaptive Calibration Model argues that, in severely harsh psychosocial backgrounds, environmental cues (e.g., unpredictability, high rates of mortality and morbidity) can shape the Stress Response System (SRS) in ways that support a shifting towards the development of a “fast” life-history strategy, and towards an unemotional pattern (frequently present in individuals with psychopathic traits) - more adaptive in those contexts (Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011; Mealey, 1995).

As eutherians, humans share some basic functions (related to the “paleomammalian brain”) with other placental mammals (MacLean, 1990). Besides, the human being presents a particular sensitivity to the psychosocial environment, mainly in the first years of life (Bird, 2007; Bowlby, 1969; Gilbert, 2005, 2010; Jablonka & Lamb, 2005; Keverne & Curley, 2008; Tollefsbol, 2010; Zhang & Meaney, 2010). Therefore, the soothing system is evolutionarily crucial not just for reproduction, but also for survival of the species and of the individual itself (Gilbert, 2005, 2009, 2010). Although there is a lack of research focused on this topic, it seems that subjects with psychopathic traits present an immature soothing system, reflected into the affective and interpersonal features of the disorder. Moreover, an hostile psychosocial background, that hampers the development of the soothing system (Gilbert, 2005, 2010), is probably crucial in the etiology and maintenance of psychopathy (Farrington et al., 2010; Gao et al., 2010; Pardini et al., 2007; Salekin & Lochman, 2008; Saltaris, 2002). From an evolutionary perspective, highly hostile developmental environments (that, from early ages, frequently and intensely activate the SRS, sending information about extrinsic morbidity–mortality and environmental volatility) usually tend to shift life history strategies toward the fast end of the life history continuum – “live fast, die young”. This seems to be the case of (at least some) individuals with psychopathy, which develop an unemotional pattern (e.g., inhibition of social learning, insensitivity to social feedback, low empathy), low stress responsitivity, and “fast” life strategies, focused on mating, risk-taking, high

rates of reproduction, with little investment in interpersonal relationships and parenting (Del Giudice, in press; Del Giudice & Ellis, in press; Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011). In summary, psychopathy, comprises a detached, cold, and callous-unemotional personality (Cleckley, 1941/1988; Cooke & Michie, 2001; Hare, 2003), that echoes an underdeveloped soothing system, that is adaptive at a low frequency (thriving by exploiting others) and represents an alternative strategy (a “fast” life-history strategy) that can be beneficial/adaptive to the individual in some contexts (Del Giudice et al., 2011; Ellis et al., 2013; Glenn et al., 2011, Mealey, 1995).

If Lombroso’s theory of atavism (1895/2004) advocates that criminal subjects were defects of evolution, recent research sustains the contrary, i.e., it seems that cooperation, but also competition and a potential for aggressive behavior play key roles in the human evolution, being present until current times (Beck, 1999; Cashdan & Downes, 2012; Flinn et al., 2012; Fuentes, 2004; Gilbert, 2005, 2009, 2010; Smith, 2006; Sussman et al., 2005; Wrangham & Glowacki, 2012; Trivers, 1971). Moreover, some pathways to reproductive success actually include competition and aggressive behavior (Del Giudice et al., 2011, 2013; Ellis et al., 2013). Thus, the aggressive behavior present in a great percentage of subjects with psychopathy could be explained, at least partially, by these assumptions. But what about the affective and interpersonal features, considered by several authors the cornerstone of psychopathy?

As previously explained, primary emotions are shared by several species, indicating that emotions were crucial in the history of evolution, and evolved with it (Damasio, 1999, 2006; Darwin, 1872/1965). Emotions are affected by our ancestral past, but also by our own rearing experiences (Damasio, 1999, 2006; Darwin, 1872/1965; Ekman, 1999; Izard, 2007; Panksepp, 1998; Plutchik, 1980; Tooby & Cosmides, 1990; Tomkins, 1962/1991). Prosocial and altruistic behavior, as well as a secure attachment style is linked to positive emotions (Damasio, 2006; Gilbert, 2005, 2010; Schultz et al., 2004); while violent behavior, psychopathic traits, and

attachment difficulties are related to negative emotions (Baumeister et al., 1996; Frick & Morris, 2004; Gold et al., 2011; Heinzen et al., 2011; Lotze et al., 2010; Morrison & Gilbert, 2001).

Psychopathy is historically associated with a lack of emotional and affective experience (Cleckley, 1944/1981; Hare, 2003); nevertheless, some authors argue that individuals with psychopathy may not have a lack of emotional experience; but a tendency to over control it, deny/avoid it, and/or to minimize it self-awareness (Blackburn, 1971, 1993; Nathanson, 1992). This line of research points out that some self-conscious or possibly even unconscious emotions, particularly shame/dishonor, can play a major role in the regulation of anger and aggression (e.g., Geen 2001; Gilbert, 2005, 2009, 2010; Gold et al., 2011; Morrison & Gilbert, 2001; Tangney et al., 2007; Tangney & Tracy, 2012), and that shame/dishonor, more than anger, has a key influence in the development and maintenance of psychopathic traits (Campbell & Elison, 2005; Holmqvist, 2008; Morrison & Gilbert, 2001; Nathanson, 1992; Nyström & Mikkelsen, 2012; Paulo et al., 2013).

According to the theory that shame or dishonor might prompt or exacerbate psychopathy in some individuals, some studies indicate that shame/dishonor, and other unpleasant emotions, are handled by subjects with psychopathic traits mostly at an unconscious level, with recourse to Avoidance and Attack Other strategies as preferred coping strategies (Campbell & Elison, 2005; Harper, 2011; Holmqvist, 2008; McWilliams, 1994/2011; Nathanson, 1992; Paulo et al., 2013). Consequently, it seems that individuals with psychopathy may actually go through the experience of shame and/or dishonor at times, but they tend to cope with these emotions (and other unwanted emotions) differentially, minimalizing the internalization of the shame, dishonor, or ego-threatening message: bypassing/avoiding it or, in the worst scenario (e.g., when avoidance is impossible), attacking (Baumeister et al., 1996; Blackburn, 1971, 1993; Cale & Lilienfeld, 2006; Campbell & Elison, 2005; Holmqvist, 2008; Morrison & Gilbert, 2001; Nathanson, 1992; Nyström & Mikkelsen, 2012; Paulo et al., 2013). These coping strategies can protect the individual with psychopathy from having to experience negative emotions. However, on the dark side, these

psychological management strategies can contribute to the eventual development, maintenance, and intensification of psychopathic traits.

The insights of Evolutionary Theory, especially of the Adaptive Calibration Model, can enlighten this apparent paradox. This model argues that severely harsh environments can lead to a shift to a “fast” life-history strategy, and to the development of an unemotional pattern (reliably associated with psychopathy). For several reasons, in those psychosocial contexts, an unresponsive SRS (as it seems to be the case of subjects with psychopathic traits) is highly adaptive (Del Giudice et al., 2013; Ellis et al., 2013; Glenn et al., 2011). First, the unemotional pattern is frequently associated with faster life strategies (focused on mating rather than parental efforts, on gaining immediate/risky rather than long term advantages) that can be fitness-maximizing to the individual in these specific scenarios (Del Giudice et al., 2013; Ellis et al., 2013; Glenn et al., 2011, Mealey, 1995). Second, low stress responsivity helps to protect individuals from a set of overwhelming feelings they would have to deal if they experience the majority of emotions that this kind of environment is continuously inputting. In other words, in extremely severe and unpredictable rearing scenarios, filter massively the hostile information, with the support of an impassive SRS, seems the best adaptive approach for the subject itself (Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011). Third, low stress responsivity may also improve the individual strengthen to negative physical/mental health outcomes, making them more resilient. Fourth, an unemotional pattern helps the individual to maintain calm and vigilance during aggressive/hostile interactions, sending a message to their opponents of invulnerability and fearlessness (Del Giudice et al., 2011, 2013; Ellis et al., 2013; Glenn et al., 2011). Finally, an unresponsive SRS is also an advantage for the extreme risk-taker and for the psychopathic individual itself, since “adopting an exploitative/antisocial interpersonal style requires one to be shielded from social rejection, disapproval, and feelings of shame” (Del Guidice et al., 2011, p. 1578).

In summary, there is a considerable amount of research that presents a different interpretation of the historical conceptualizations linking psychopathy with a lack of emotional

experience (Cleckley, 1941/1988; Hare, 2003). This line of research argues that psychopathy, or at least some variants of psychopathy, may, in fact, be positively associated with unpleasant emotions, but also with a predisposition to over control, deny/avoid, minimize the self-awareness of the emotional experience (Blackburn, 1971, 1993; Campbell & Elison, 2005; Harper, 2011; Holmqvist, 2008; McWilliams, 1994/2011; Nathanson, 1992; Paulo et al., 2013), and/or to a tendency to display an unemotional pattern, marked by low stress responsitivity (Del Giudice et al., 2013; Ellis et al., 2013; Glenn et al., 2011, Mealey, 1995). Besides, “it is plausible that early environmental factors may act via the SRS to shift some individuals toward a faster life history strategy, facilitating the emergence of psychopathic traits” (Glenn et al., 2011, p. 375).

Psychopathy is a complex enough disorder, with several costs for the society and for the subject itself (DeLisi, 2009; DeLisi & Piquero, 2011; Leistico et al., 2008; Vaughn et al., 2008), which *per se* sustains the need of further study. The aforementioned theories and studies should be considered and explored as one potential mechanism, since they could contribute to adjust the way we conceptualize, prevent, and treat psychopathy. Regarding treatment, psychotherapeutic programs focused on the balance of the three emotion-regulation systems and on shame/dishonor (like Compassion-Focused Therapy; Gilbert, 2005, 2010), may be a promising approach for treating psychopathic disorder.

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