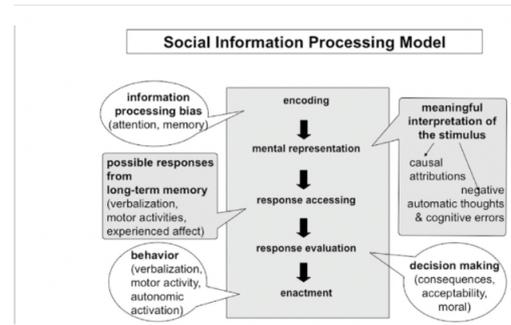


The antisocial personality type is a particular type that is full of mysteries, but with the assistance of more advanced technology, and the exploration of this personality type, more knowledge upon it is slowly being gained. It is known that the diagnosis of this personality type is more common in males than it is in females, “total prevalence rate of 4.5% in community samples” (Fitzgerald, 2007). There is so much more to this personality type than what the media presents, and by exploring the brain science behind the antisocial type, more equipped decisions to help these individuals can be made before unfortunate events occur. The antisocial personality type is also closely tied with the legal system, and for years has been causing turmoil upon individuals and their families; whether the individual themselves have this personality type or they themselves have been affected by someone who has this personality type. This personality type “stems from brain abnormalities” and has a lot to do with “dysfunctions in select parts of the brain” according to the research suggested in the article, The neuropsychology of antisocial personality disorder (Fitzgerald, 2007). The antisocial personality type has a lot to do with the genetics and the biological aspect of oneself, but when tied with ‘nurture’, the making of a dangerous individual can be amplified. Treating individuals with the antisocial personality type can be difficult as they themselves do not have the desire to change, most probably due to their lack of empathy when inflicting pain upon others. Although change can be brought upon these individuals; through the exploration of the antisocial personality type in terms of the neurological as well as the psychological aspect, a more deep understanding of this personality type can be gained, which in turn can help eradicate the chaos and destruction that this personality type brings into society as well as save the lives of those experiencing this personality type.

The development of the child plays a significant role in the emergence of the antisocial personality type. It is actually considered normal for children to express aggression and certain antisocial behavior when they are young, because they have yet to get a sense of the world around them, and understand what is socially appropriate and what is not. For example, a young child may take another child's toy and not give it back, but they do not know that this is not appropriate. Contrary to that, this becomes a problem when aggression and antisocial behavior prospers long term. There tends to be signs at an early age with what type of turnout will come about the child; as an infant these individuals have a more ‘difficult temperament’ (Rudolph, 2022). Then as they progress to preschool, they may be more prone to throw tantrums, be more stubborn as well as more physically aggressive. Onward to their childhoods, they may engage in

fighting, bullying, while also having academic and social difficulties, but a big give away can be showing signs of animal cruelty. Then as they develop into their adolescence they continue on with these behaviors on a bit of an extreme scale. Finally the problem can lead to adulthood and this is when the individual becomes more involved with the legal system, while juggling a chaotic life, which may include broken relationships, psychiatric problems, unable to parent well, etc. (Rudolph, 2022).

These children tend to process social information differently compared to the majority of the children. According to the Social Information Processing Model carried out by psychologist Ken Dodge, a scenario was given to some of the children in order to determine the social processing steps the individual with a more aggressive nature went through. The scenario consisted of the child at a cafeteria, who had milk spilled over them, but prior to that when the child was waiting in line they had two children behind them, one making a goofy face and one smiling at them. When asked to explain what had happened to the child, the child with the personality disorder viewed the actions of the other children as purposefully malicious. This relates to the hostile attributional bias - the tendency for the child to interpret the behaviors of others to have malintent towards them - where the child is asked how they would want to react to this, and they say that they will get back at the other kid. This child is not afraid of the consequences, and they do not feel fear at the normal level that an average person would. So fulfilling a hostile goal in order to either assert dominance and/or get revenge does not require much doubt. These kids think that there will be a positive outcome to this and think they are going to be good at this. The child is not able to think of all things that could go wrong, and they are unable to see this as an accident, as they have internalized it.



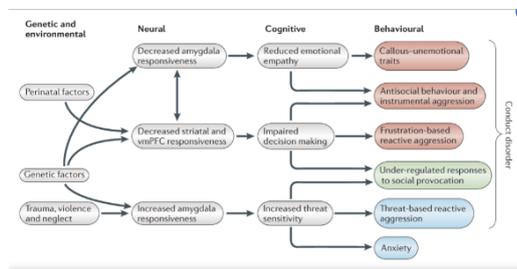
Dodge's Social Information Processing Model (1993)

Geared towards hostile behaviors, (Verhoef, 2021)

Figure 1.



This type of development involves not only the neurological aspect within the individual but the family/environment plays a huge role in fueling these behaviors. First of all, it can be genetically passed down from a family member which can result in a more negative temperament. Adding onto that, the parenting style that these individuals have grown up with can play a big factor; there can be a 'power assertion' where one of the parents makes the child feel unimportant, with punishments involved. Another parenting type can be the low monitoring parent, one that practically neglects the child, leading the child to be more deviant. Although, parenting is not the only cause for these behaviors. A child is at school for most of their lives, so if the child experiences peer rejection either due to academics or social reasons, the child may steer from the normative group of children and become more involved in a deviant group of children, or isolate themselves. This only leads to more of a feeling of ostracism, and this coupled with early genetic deficits as well as neurological/cognitive deficits results in the child to go down a more deviant pathway.



Framework of Conduct Disorder - Child shows antisocial behavior (Blair, 1970)

Figure 2.

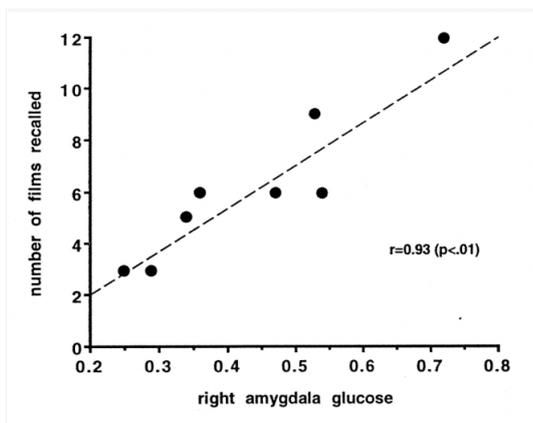
An individual born into a low socioeconomic family can also facilitate antisocial personality traits. When exposed to neighborhood violence at a young age, the child does not know any better than from what they have seen and experienced. At a young age, they seem to understand that this is normal for them. They also become 'desensitized to violence' (Rudolph, 2022). The parent may also not be so involved in their lives because they are busy handling multiple jobs or are not in a state to provide much for their child. All this can lead the child to partake in deviant activities with deviant peers and find a sense of belonging even though it is not safe for them. A lot of this can be avoided if the schools the children attended facilitated them into being more busy and involved within the community, but these institutions themselves are lacking in resources to provide. The schools either do not have enough funding to support the children or they do not have enough extracurriculars for the children to get involved in, which only leaves the children to pass time in their neighborhood. If these children already are biologically prone to the antisocial personality disorder, this sort of environment will only facilitate them towards the direction of atypical behavior within the community, which may result in delinquent activities.

Empathy and callousness play a prominent role in the development of an individual with the antisocial personality

disorder. Empathy relates to the ability for one to put themselves in the place of another, and callousness is the opposite where the individual is insensitive to the feelings of others. By exploring the neural and peripheral physiology of an individual with the antisocial personality disorder, more insight upon the significance that empathy and callousness holds upon these individuals will be revealed. Empathy plays a significant role in promoting prosocial behavior, without it the connection between individuals is lost, causing disconnect and isolation amongst an individual, when paired with callousness and unemotional traits (CU), which are "traits related to maladaptive social information processing" (Shirtcliff, 2009). The development of psychopathy emerges, which is closely affiliated with the antisocial personality type. Alterations in the neural circuitry as well as the limbic system plays a huge role in relation to empathy and CU traits. The amygdala, an almond-shaped region within the brain, allows for emotions and arousal to be detected within the individual. This region is critical when it comes to responding to outside stimuli relating to arousal, and stress; low levels of it can indicate indifference to the outside environment. Individuals with high levels of the CU traits 'often show reduced amygdala activation' which suggests amygdala hypo-responsivity; this affiliates closely with the 'neurobiology of callousness.' A study upon this has been conducted by Marsh and colleagues according to Shirtcliff as mentioned in her article. The study required the observation of youths with CU traits in comparison to youths without the CU traits. What was found through this study was that, "youth with high levels of CU traits showed similar [reduced] amygdala activation to fearful, angry or neutral faces while healthy comparison or youth with ADHD displayed the typical enhancement of amygdala activation in response to fear" (Shirtcliff, 2009). These findings conclude that those with amygdala hypo-responsivity to emotional stimuli are associated with the antisocial personality type. The amygdala not only is associated with emotions but stores memories acquired through emotions. The amygdala usually does not go hand in hand with memory but it does get involved when it is 'activated by emotional arousal'. Without this function, it is hard to understand how to go on about combatting a situation similar to a previous situation in the future. This is supported by an experiment performed by Cahill where he performed a procedure similar to Nielson and Jenson: psychologists from another study, in order to determine whether the amygdala is correlated with long-term memory by showing 12 slides with narrations to human individuals being tested. At this step of the procedure he found that, "emotional arousal did not enhance long-term memory in a subject with bilateral degenerative lesions of the amygdala" (McGaugh, 1996). This finding indicates that damage to the amygdala impairs memory dealing with certain emotional events. He then goes onto a third study using a positron-emission tomography scan in order to assess for 'cerebral glucose metabolism in healthy volunteers' in which one session consisted of viewing emotionally arousing film clips, while the other session consisted of the individuals watching an emotionally neutral film clip. Three weeks had gone by and then memory of the clips they had seen was recalled and tested for.



It was found that, the glucose metabolic rate of the right amygdala was “induced by viewing the emotional film clips, [it] was highly correlated (+0.93) with the number of films recalled” (McGaugh, 1996). It is therefore concluded by this study that the amygdala is in correlation with emotional memory storage. So those that have a healthy functioning amygdala are able to understand social cues and recognize emotions in others in comparison to those that do not. Supporting the idea, healthy individuals are able to reduce the distress of others by following through with actions learned in the past, but those with low activation of the amygdala are unable to reduce another’s distress because they themselves are unable to feel the distress of the situation. Helping another individual relates to moral decision making. When an individual has poor amygdala activation, they are also unable to make moral decisions which is associated with the impulsivity of those with the antisocial personality type.

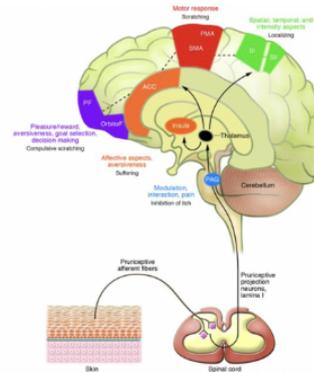


The role of the amygdala in long-term memory, specifically its correlation to emotional memory recall (McGaugh, 1996)

Figure 3.

Not only does the amygdala play a key role in the empathy/callousness aspect of the antisocial personality type, but so do certain other factors such as the anterior cingulate cortex as well as the insular cortex which are considered to be a part of the paralimbic system. Both of these cortices are regions of the medial pain system which play a trivial role regarding empathy (Medford, 2010). The ACC and insula are activated across a range of emotion-related tasks (Shirtcliff, 2009). It was found by Sterzer and colleagues that there is a reduction of insular gray matter in children with low levels of empathy and high levels of aggression. This reduction indicates the inability to understand social emotions, which reduces the human-to-human connection. A study was conducted which detected the activation of the ACC and insula in fear conditioning. It was found that “control participants activated the insula and the ACC as they paired neutral faces with pain, but psychopathic patients did not” (Shirtcliff, 2009). This is a big indication that those with the antisocial personality type are unable to feel empathy the way others can. Through the inability to feel empathy towards others and heightened callousness, a physical and emotional connection between individuals is lost. This loss of connection breeds individuals

who are unable to digest the consequences they are to face when deciding to thrust themselves upon impulsive and aggressive tasks. Understanding the paralimbic and limbic systems and their relation to empathy and callousness helps those wanting to make an impact understand the basis of where the antisocial personality type stems from. Through digesting the main roots affiliated with this personality type, more research can be conducted upon this, and with the aid of new knowledge, more steps can be taken to prevent these individuals from causing chaos in our society while also helping them live a more suitable life.



Importance of Insula and ACC in relation to empathy and callousness (Paus, 2006)

Figure 4.

The antisocial personality disorder has a lot to do with brain dysfunctions and impairments, whether it be genetic or due to a traumatic event. There are many types of psychopathic qualities that have emerged innately. The frontal lobe dysfunction theory speaks of an impairment in the executive functioning system. The damaging of the frontal lobe can lead to “distractibility, lack of guilt, periodic mood disorders, and increased sensitivity to alcohol” (Fitzgerald, 2007). These are all characteristics of an individual with the antisocial personality type; they are rash and execute plans that have uncertain outcomes. The dysfunctioning of the frontal lobe is possibly innate or it can occur in individuals later in life. Take the case study of Phineas Gage: he was known to be an energetic and a good businessman but after damaging his frontal lobe due to a railroad incident, his persona entirely shifted. He “became impulsive, irresponsible, profane, indifferent to social properties, childlike in intellectual capacity, and behaved more primitively following the accident” (Fitzgerald, 2007). The hard blow that his head took completely molded his brain another way, and those regions affiliated with decision making and impulsivity changed drastically, developing in him the antisocial personality type. In this case, the brain impairments Gage went through were not innate but happened due to the brain suffering from trauma. Another factor that is associated with the antisocial personality type is the impairment of the amygdala. This is highly associated with the risk of aggressive behavior as “lesions in the amygdala have



been shown to impair the effects of aversive classical conditioning, lower automatic response to cues that predict shock, and impair passive avoidance learning' (Fitzgerald, 2007). This is very common amongst those with the antisocial personality disorder; they are not able to feel the fear and arousal of what the environment has to present, making it easier for them to act as predators because they see what they want, and go after it, and afterwards carry on to do the same without remorse. Those with high or low attention tasks associate well with the risk that they take when plotting a risky venture. In the gambling task done by Bechara, it was found that inmates in prison that had poor attention "performed poorly and made more risky choices more frequently," not thinking about the consequences that they would have to face when caught (Fitzgerald, 2007). The inmates were more likely to get prison time and get caught than those with high attention, who are also associated with the antisocial personality disorder but are not caught so easily. The amygdala as well as the frontal lobe play a huge role with the development of the antisocial personality disorder, and with new and improved technology, we may be able to repair some impaired portions of the brain, allowing for these innate born individuals to live a life that we all live.

The antisocial personality type in itself can be dangerous, but when paired with a difficult development into adulthood, the psychopathy of the individual is heightened. It all starts when the individuals are still infants, even though the child is unable to remember their youth and the treatment they received. The neurobiology of the children captures the treatment the children received at a young age. It was found in this study reported by Hane and Fox that "maternal sensitivity and intrusiveness [affects] infants' social interactions," so when this is lacking, the infants show "less interest" in social interactions (Frazier, 2010). This embarks their isolation and doubts upon trusting others. The children's neurological differences are well associated with their neurobiology during a critical point in development. There seems to be a biological association with neglect in association with the neurotransmitter dopamine. According to the analysis done by Pruessner et al., it was reported that there is "increased dopamine and cortisol release during stressful situations in individuals who reported low-quality relationships with caregivers in childhood" (Frazier, 2010). This increase in dopamine results in an individual being more aggressive and competitive; these are traits found more intensively in individuals with antisocial personality disorder. Along with that, another critical aspect of development occurs in the right hemisphere during the first 3 years of development, which is involved in emotional and social processing. Furthermore, longitudinal and cross-sectional brain imaging studies chronic stress, deprivation, or maltreatment in the first 3 years of life have been shown to cause brain volume reductions and significant brain development abnormalities in affected 3-year-olds" (Frazier, 2010). These developing abnormalities due to one's environment results in these children to begin adulthood not knowing what it means to be cared for, and their genetic predisposition of the development of the antisocial personality type prolongs into adulthood.

The antisocial personality type in specific is one that has many circulating questions, but through experiments, and the use of the technology we are given, the mysteries of this personality type can be gradually uncovered. This personality type has many factors that affect not only its developmental, but more so neurological and physiological impairments and also include the environment that one is born in. Those with a low socioeconomic status are more likely to strengthen this personality type. Through learning about this personality type, the lives of these individuals can be saved as well as the others that may be a victim to these individuals.

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