# The Relationship between Empathic Deficits and Risk of Antisocial Personality Disorder

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**Abstract**. Individuals with antisocial personality disorder (ASPD) account for 2-3% of the overall population, jeopardizing society by violating the laws, mistreating others with disregard, and even more severe attacks. Though with abundant research investigating the etiology of ASPD, empathy, as a critical feature of people with ASPD, has been neglected. Empathy, broadly referring to the ability to perceive others' feelings and thoughts, plays a vital role in social interactions. Lack of empathy might lead to less prosocial functions and reinforce antisocial behaviors. Hence, the present review sorted the previous studies regarding the relationship between empathetic traits and the development of antisocial personality disorder from the aspects of different dimensions of empathy, direct causation, and neural activity. In general, one dimension of empathy—empathetic concern was found related to the formation of ASPD. Prosociality and parental behaviors are indirectly related to ASPD by affecting empathetic abilities. Innate empathy deficit in toddlerhood also accounts for the ASPD. From the neural aspect, activities in the amygdala, anterior insula, and connectivity between the bilateral amygdala and PCC and precuneus are found to correlate with ASPD while processing emotional cues. Though the relationship between empathy and ASPD is determined, future investigation should focus on other empathy dimensions, detailed findings for different levels of CU traits, and better reliability through assessment. In general, this review might contribute to the prevention and intervention of ASPD by attaching more importance to empathetic traits and parental guidance.

**Keywords:** Antisocial Personality Disorder; antisocial behavior; empathetic deficits.

## 1. Introduction

Antisocial personality disorder (ASPD) includes the violation of laws in adulthood and disregard for others. As the precedent for ASPD, conduct problems (CP) could be diagnosed in children. However, how to precisely define the concept of ASPD is still under debate. One behavioral model describes the diagnostic criteria for ASPD as repeatedly arrestable performance, lying, fights, disregard for others' safety, consistent work or school failure, and mistreatment of others. The alternative model focuses on how personality traits construct antisocial behaviors, including the discovery of manipulativeness, callousness, egocentrism, etc. Usually, individuals with ASPD lack empathy (i.e., the capacity to understand others' feelings, emotions, and thoughts) for others, and have great deficits in their social functioning (i.e., people's capacity to fulfill their role within society). Regardless of the acceptance of which model, ASPD was reported as 2-3% of the overall population, jeopardizing social welfare [1]. Hence, a great emphasis has been put on investigating the formation and prevention of ASPD. The etiology of ASPD could be generalized from two perspectives: biological, and environmental factors. Biological factors comprise genetic traits, physiological traits, and neurobiological factors. For the genetic part, a previous sibling study provided great evidence of how genes explained a great proportion of variance in antisocial behaviors with childhood onset and stability in adulthood [1]. Several genes such as synaptosomal-associated protein 25 (SNAP25) and A1 allele of the DRD2 gene were found in relation to different types of antisocial behaviors.

Furthermore, the development of brain imaging techniques facilitated the investigation of neurobiological factors of ASPD. Several prospective longitudinal studies for young children suggested the role of brain abnormalities in the development of ASPD. One renowned experiment proposed the contribution of attenuated volume and abnormal function in the prefrontal cortex [1].

The difference between grey matter volume in orbitofrontal and middle frontal brain regions further explains the gender difference in antisocial behaviors [1]. Additionally, reduced reactivity (i.e., decoupling) was found between rest mode (i.e., default mode network) and attention mode in antisocial individuals [1]. The default mode network was involved in the process of emotional regulation, introspection, and future planning. Hence, decreased functioning in this network may cause impairments related to ASPD symptoms. Though with a high contribution of gene factors, the environmental factors explain a large proportion of the formation of ASPD as well. Domestic violence, lack of parental warmth, and less supervision might increase the risk of developing intimate violence and hence the potential for antisocial behaviors [1]. Parents' antisocial personalities (i.e., antisocial, borderline, or narcissistic traits) might result in the prelude of children's abnormal behaviors in preschool age [1]. Psychosocial deprivation and abuse in childhood were frequently found in patients with ASPD. Aside from the domestic factors, one 26-year span longitudinal study suggested that exposure to a violent context was also significantly related to the diagnosis of ASPD and further criminal conviction. Without the proper guidance from parents, children might simply imitate what they've watched. In addition to the direct effect, environmental factors influenced the symptoms of ASPD by interacting with gene factors. Several studies found out how the environment affects gene expression, hormone level, and in turn, brain functioning would result in influences on the development of ASPD. In a previous neural experiment, a deficit was found in the thalamus (i.e., a brain region being in charge of sensory information) in patients who have experienced psychosocial deprivation [1]. With impairments in filtering sensory information, patients might experience difficulties in suppressing intrusive memories and thoughts.

Although a substantial amount of research concluded previous factors that might affect ASPD, room for exploration of other causing factors remained. For instance, as one of the most critical symptoms of ASPD, empathy is greatly involved in daily social functioning. Empathy has been defined by several models. One multidimensional approach for empathy is the Interpersonal Reactivity Index, measuring empathy on four scales. First, perspective-taking refers to the ability to adopt others' spontaneous psychological views. The empathetic concern is the tendency to experience sympathy and compassionate feelings in response to others' unfortune. Personal distress defines the experience of discomfort or extreme distress in others. Fantasy, finally, acts as the imaginative transposition of oneself in fictional situations [1]. Another prevalent classification separated empathy into two systems—cognitive empathy and affective empathy. Cognitive empathy refers to the understanding of others' perspectives while emotion is perceived by affective empathy [2]. People who cannot take others' perspectives might be less tolerant of others' opinions and in turn, be prone to have conflicts with others. Deficits in empathetic concern and sympathy for others might contribute to less sense of guilt after hurting others. One with previous personal distress might either deduce how others feel after suffering from a similar experience and hence avoid treating them in the same way, or show less altruistic behaviors to gain more personal welfare. Hence, whether and how empathy might relate to ASPD require more investigation. This paper aims at providing a literature review of studies investigating the link between empathetic traits and ASPD through the aspects of how several dimensions affect the ASPD respectively, causal relationship, and neural activities. For future prevention and intervention for ASPD, this paper might give some insights by concluding the recent investigation on how empathy contributed to ASPD in different ways.

## 2. The Association between Empathy and ASPD Symptoms

### 2.1 The Correlation between Dimensions of Empathy and ASPD

As previously mentioned, dimensions of empathy contribute to social activities from different aspects. However, whether each of them is directly related to antisocial behaviors should be discovered. It is vital to have research on this topic since more detailed interventions could be applied in targets.

Through the review, only one dimension--empathetic concern has been verified as influential, while perspective taking, personal distress, and fantasy remain for further evidence. In the study investigating how empathy would affect antisocial personality disorders in emerging adulthood, Marzilli et al. found that empathetic concern was significantly negatively related to ASPD [3]. In other words, adults with less sympathy and compassion for unfortunate others predicted a higher risk of developing antisocial personalities. Moreover, parental behavior control also exerts an important effect in predicting ASPD. Results determined that children with more parental control in terms of parental warmth through distress and supervision through inappropriate behaviors done by children would prevent antisocial behaviors. Aside from the direct relation, parental guidance mediates ASPD by predicting higher levels of empathetic concerns as well. In detail, children with higher parental control in adolescence are more likely to internalize the guidance they received and apply it to future social situations.

Since empathy is developed in early phases, the detection of empathy deficit might be deemed as a symptom of conduct problem. A study by Goulter and McMahon further targeted the relationship between parental harsh punishment in the early stages and Conduct Disorder (CD) symptoms, and the association between parental warmth and Callous-Unemotional (CU) traits in adolescence [4]. Parental warmth was assessed by direct observation while parental punishment was evaluated by self-reports by parents and children. In line with Marzilli's study, results found that CU traits (i.e., especially in Grade 7) were positively associated with parental harsh punishment and negatively associated with parental warmth. CU traits such as a lack of empathy for others would indirectly account for the relationship between parental warmth and antisocial behaviors in adulthood. Parental harsh punishment was found positively correlated to the ASPD symptom, and parental warmth was found negatively related to the CU traits, which in turn reduced the ASPD symptoms.

Previous results deduced that posterior guidance might affect the formation of ASPD both directly and indirectly through influence on empathetic traits. Except for the empathetic concern for others, perspective-taking greatly influences the social relationship with others as well. Normally, people who cannot take others' perspectives would be stubborn and be more likely to negatively evaluate people with opposite opinions with them. To force others to adopt their voices, physical and verbal conflict might happen. The relationship between perspective taking was examined by Sahin et al., in the study discovering what might predict the social functioning in people having ASPD [5]. Patients with ASPD were tested in terms of several predictors: experimental avoidance, cognitive fusion, symptom severity, and perspective-taking. Results found that symptom severity, self-as-context (i.e., the ability for introspection), and cognitive fusion would predict social functioning, whereas perspective-taking and experiential avoidance would not. This experiment provided a complementary result for Marzilli's study by extending another dimension of empathy (i.e., perspective taking) from previous empathic concerns. Lack of perception of others' intentions and thoughts is not directly related to social functioning in patients with ASPD. By combining and comparing the results, it can be inferred that only one dimension of empathy is key to the etiology of ASPD. With the determination of the correlation between dimensions of empathy and ASPD, whether there is a direct causal relationship is further explored.

### 2.2 The Causal Relationship between Empathy Related Traits and ASPD

Proposed by Lahey and Waldman, the developmental propensity model posited that prosociality, negative emotionality, daring, and low cognitive abilities played a critical role in predicting future anti-social behaviors [6]. As previously discussed, social behaviors are highly correlated with empathetic traits. In real-life situations, lower empathy is in relation to lower prosociality and higher disregard for others. Lack of understanding of others' emotions and opinions might contribute to less guilt after treating others in a bad way, and further reinforce antisocial behaviors. Hence, a lack of empathy might indirectly cause the formation of ASPD via less prosocial activities. To understand the causal relationship, Lahey et al. conducted a 10-15 year-span longitudinal test to determine whether cognitive ability in 10-17 years youth would lead to future antisocial symptoms in adults 22-

31 years of age. Results suggested that higher ratings by both youth and parents on children's negative emotionality and lower scores on children's prosociality by both would predict ASPD symptoms.

However, empathy is not only latently learned through society. The innate empathetic traits might emerge at a very early age. Hence, in the study conducted by Rhee et al., whether toddlerhood (i.e., age after 14 months) empathy deficits were a propensity for ASPD in adulthood (i.e., age before 23 years) was investigated [7, 8]. Observation at 14, 20, 24, and 36 months was applied for measuring concern and disregard for others. The scale for assessment was probed by the record of the infant crying and simulated vocalization of pain by mothers and the examiners. After infants heard those records, scores were rated by observers in aspects of infants' intentions to help them, concerns for them, attempts to understand their distress, and physical proximity to them. Another assessment done by mothers through interviews rated children's disregard and concern for others. Results found a significant association between higher disregard for others (i.e., especially at 24 months) by showing less and higher levels of ASPD symptoms. Moreover, results suggested that early empathy deficits would relate to less aggression control, further increasing the possibility of developing ASPD. To conclude, empathy deficits might emerge in toddlerhood. Ever since the detection of this trait, parents' proper guidance could be applied immediately throughout their growth for preventing the development of ASPD.

## 3. Atypical Neural Processing Underlying Emotion and Empathy in ASPD Symptoms

Aside from the behavioral investigation, inborn neural abnormality might be an earlier predictor of antisocial behaviors. The intervention in neural aspects will provide more radical and effective solutions, in combination with behavioral treatment. For instance, stimulating the brain activities in the brain region in charge of empathy might lead to a higher level of empathy. Since empathy is stimulated mainly by receiving others' social cues, processing facial expressions would be an effective way to arouse empathy. In one neural research conducted by Viding et al., the Masked Fear Task was applied [9]. Children were presented with either calm or fearful faces for 17 ms, with immediate backward peaceful faces by a different actor. Participants' brain response to negative emotional stimuli was immediately recorded. Reduced neural activities were found in the amygdala (i.e., a brain region mainly involved in emotional processing) and anterior insula of children with CP/HCU—the areas associated with affective empathy, compared to CP/ LCU children.

In addition to brain activity, connectivity through brain regions is found to account for the ASPD. In previous research by Dotterer et al., the correlation between amygdala reactivity and connectivity in processing social-emotional cues and antisocial behaviors (AB) was examined. African American adolescents were tested by identifying faces with fearful, sad, angry, and happy emotions [10]. The brain activity in response to each emotion would be detected during the fMRI acquisition. Bolstering the results of Viding's, AB was positively related to bilateral amygdala activity in response to all emotions. However, challenging to the Viding's, CU traits were found not to be directly related to amygdala activation. Instead, it played a vital role in moderating the relationship between AB and amygdala activity, such that the association in response to anger, sadness, and happiness was only found at a lower level of CU traits.

In terms of brain connectivity, stronger positive connectivity between the amygdala and regions of PCC and precuneus with negative emotional cues (i.e., sad and fearful) was found associated with AB, in contrast to a weaker positive one for happiness. Furthermore, AB was correlated to weaker positive amygdala-vmPFC connectivity during all conditions. Results reflected that the disruptions of bilateral amygdala reactivity and its connectivity with PCC and precuneus while processing emotional cues might relate to antisocial behaviors with a low level of CU traits. Though the evidence for reduced neural activities and connectivities has been provided, whether the neural activity is abnormal in processing other's emotions, one's own emotions, or the difference between these two should be further examined. An fMRI study regarding the empathetic processing in boys 11-16 years

of age having CP with different levels of CU Traits was accordingly conducted [11]. Three conditions involved in empathic responses to others: one's own feelings, other's emotions, and one's own feeling for other's emotions were separately tested by first picturing oneself in a fear-inducing condition, further picturing others in a fear-inducing condition, and finally introspecting when hearing others in a fear-induing situation.

Compared to the neutral condition, a reliable differentiation in AI and ACC/mPFC which are correlated with empathy processing, and a growing activation in the occipital cortex was detected in the fear scenario for Typically Developed children. However, those patterns of neural activation were absent either in children having CP/HCU or children with CP/LCU. Reduced occipital activity in either group of children having CP was suggested by the between-group comparisons. By comparing all previous neural studies, similar results indicated the vital role of the amygdala and anterior insula in performing empathy. Attenuated activities in those brain regions were usually found in patients with ASPD or conduct problems in childhood. However, paradoxical ideas remained for different levels of CU traits. Accordingly, whether CU traits would affect brain activity should be further investigated.

## 4. Conclusion

In conclusion, the relations between empathy and ASPD were found with empirical evidence from several aspects. Deficits in one affective dimension within empathy: empathetic concern would lead to a higher possibility of developing ASPD. Perspective-taking was found not related to social functioning in patients having ASPD directly. While the rest two—fantasy and personal distress required future investigation. Direct causation was then found by several longitudinal studies. Results demonstrated that lack of empathy in early toddlerhood in terms of high disregard for others, the deficit in empathetic traits caused by high parental punishment, more negative emotionality, and less prosociality would all account for the development of ASPD. Those results emphasized the importance of parental education and social influence in addition to the innate empathy deficit. For the neural investigation, several brain regions such as the amygdala, anterior insula, and other regions related to affective empathy are found activating in patients with ASPD or children with conduct problems. Brain connectivity between amygdala and PCC and precuneus while processing emotional cues would be in relation to antisocial behaviors, while only with low CU traits.

Though with abundant evidence of the relationship between empathy and ASPD, several aspects could be further improved. Previous studies only focused on a small group of people with limited representability. Regarding the correlation between various dimensions of empathy and ASPD, previous studies only focused on empathetic concern and perspective-taking. Future studies should investigate how the other two dimensions—personal distress and fantasy contribute to the formation of ASPD. Furthermore, in the study measuring parental performance, the reliability of the measurement should be doubted due to the appliance of different measures—observation for parental warmth and self-reports for parental punishments. Hence, a uniform measurement should be applied in future probes. For neural studies, whether the level of CU traits would affect the brain activity in processing emotional cues should be investigated. Overall, this review concluded the correlation between empathetic traits and antisocial personality disorder by first examining the relationship between different dimensions of empathy and ASPD, additionally determining the direct causal relation through longitudinal studies, and finally discussing the neural activities and connectivities. This review can provide some guidance to the prevention and intervention of ASPD in the future, by improving children's empathetic traits through parental guidance and neural interventions.

## References

[1] Andrea Glenn, Alexandria Johnson, Adrian Raine. Antisocial personality disorder: a current review. Current psychiatry reports, 2013, 15(12): 1-8.

[2] Simone Shamay-Tsoory. The Neural Bases for Empathy. The Neuroscientist, 2011, 17(1): 18–24.

[3] Eleonora Marzilli, Luca Cerniglia, Silvia Cimino. Antisocial personality problems in emerging adulthood: The role of family functioning, impulsivity, and empathy. Brain sciences, 2021, 11(6): 687.

[4] Natalie Goulter, Robert McMahon, Dave Pasalich, et al. Indirect effects of early parenting on adult antisocial outcomes via adolescent conduct disorder symptoms and callous-unemotional traits. Journal of Clinical Child & Adolescent Psychology, 2020, 49(6): 930-942.

[5] Oktay Sahin, Ahmet Nalbant, Kaasim Fatih Yavuz. Predictors of social functioning in people with antisocial personality disorder. Journal of Psychiatry and Neurological Sciences., 2022, 2(35): 93-100.

[6] Benjamin Lahey, Quetzal Class, David Zald, et al. Prospective test of the developmental propensity model of antisocial behavior: from childhood and adolescence into early adulthood. Journal of Child Psychology and Psychiatry, 2018, 59(6): 676-683.

[7] Soo Hyun Rhee, Kerri Woodward, Robin Corley. The association between toddlerhood empathy deficits and antisocial personality disorder symptoms and psychopathy in adulthood. Development and psychopathology, 2021, 33(1): 173-183.

[8] Paul Frick, Essi Viding. Antisocial behavior from a developmental psychopathology perspective. Development and psychopathology, 2009, 21(4): 1111-1131.

[9] Essi Viding, Nathalie Fontaine, Eamon McCrory. Antisocial behaviour in children with and without callous-unemotional traits. Journal of the Royal Society of Medicine, 2012, 105(5): 195–200.

[10] Hailey Dotterer, Rebecca Waller, Tyler Hein, et al. Clarifying the link between amygdala functioning during emotion processing and antisocial behaviors versus callous-unemotional traits within a population-based community sample. Clinical Psychological Science, 2020, 8(5): 918-935.

[11] Arjun Sethi, Elizabeth O'Nions, Eamon McCrory, et al. An fMRI investigation of empathic processing in boys with conduct problems and varying levels of callous-unemotional traits. NeuroImage: Clinical, 2018, 18: 298-304.