

Running Head: BIOLOGICAL AND BEHAVIORAL DIFFERENCES BETWEEN MEN AND
WOMEN WITH ANTISOCIAL PERSONALITY DISORDER

Biological and Behavioral Differences between Men and Women with Antisocial Personality
Disorder: A Literature Review
Victoria Sierra
University of California, Merced
November 16, 2017

Abstract

This literature review highlights research completed to investigate the biological and behavioral abnormalities found with men and women with Antisocial Personality Disorder (ASPD), antisocial behaviors, and psychopathic traits. Evidence that suggests imbalances of the neurotransmitter serotonin and imbalances between the hormones cortisol and testosterone have been linked to aggressive and antisocial behaviors. There are also studies that suggests that abnormalities in the autonomic nervous system and in the corpus callosum may be linked to ASPD. However, most findings do not apply to women in particular, therefore emphasizes the need for gender-specific research in order to find potential causalities in both males and females with these mental disorders.

Literature Review

Psychopathology is the scientific study of mental disorders. Psychopathy is another term for mental illness or disorder, an example of which are the class of personality disorders. Personality disorders are characterized by “an enduring pattern of inner experiences and behaviors that deviates markedly from the expectations of the individual’s culture according to the American Psychiatric Association (APA, 2014). A form of psychopathy is Antisocial Personality Disorder, ASPD or sometimes referred to as APD. ASPD is characterized by long-term patterns of a lack of empathy, disregard for others, risk taking behaviors, and cruelty toward animals and people (APA, 2014). Individual’s diagnosed with ASPD tend to show aggressive, violent, risky behaviors, which may cause harm to themselves or others. The prevalence of ASPD is 3% in men and 1% in women, categorical differences such as the intensity of aggression and risk-taking behaviors in symptomatology (Hall & Steiner, 2013).

Although there is a growing body of research on ASPD, it tends to generalize findings in relation to both men and women, which may be troublesome since ASPD may manifest itself differently in each of the genders. For instance, “women with ASPD present higher rates of aggression and irritability but less violent antisocial behaviors” (Algeria et al., 2013). Higher rates of

aggression but less violent antisocial behaviors suggest that women with ASPD tend not to act upon their aggression in social spheres. Women also tend to report higher rates of victimization, great impairments, and lower social support than men (Algeria et al., 2013).

Although it may be the same mental disorder, there may be biological and behavioral differences between men and women with ASPD. Despite limited research on women with ASPD, there have been biological studies conducted to find the similarities between psychopathic men and women in comparison to non-psychopathic populations. Few studies have attempted to further understand biological similarities and differences in men and women with ASPD specifically. However, there have been numerous studies aimed at understanding the symptoms of ASPD, most notably aggression and antisocial behaviors, such as the studies conducted by Glenn and Raine in 2008, Sylvers et al. in 2014, and Welker et al in 2014. These studies have examined aggression and antisocial behaviors in men and women. Aggression can be defined as “hostile, injurious or destructive behavior often caused by frustration” (Siever, 2008). Antisocial behaviors refers to acts that are characterized by hostile and internal aggression toward others either covertly or overtly.

Antisocial behaviors also tend to be found in individuals who commit crimes such as assault and theft, although it is critical to take into consideration that individuals who display antisocial behaviors may not be diagnosed or classified as having ASPD. Deviate behaviors can have a variety of contributing factors much like mental disorders, contributing factors could include low socioeconomic status and peer influence.

Like any other mental disorder, ASPD can be caused by a series of factors both biological and environmental with biological factors being the focus of most research. Trying to find the direct causes is like trying to deconstruct a jigsaw puzzle that is detailed, nuanced and difficult to envision as a whole as well as piece together. There are a variety of

Serotonin as a Potential Cause for Antisocial Behaviors Overall and Differences in Males and Females

Serotonin, a neurotransmitter, is involved in several biological and behavioral functions such as regulating appetite, sleep, cognition and aggression. Serotonin (5-HT) facilitates prefrontal region functions that are involved in modulating and often suppressing the emergence of aggressive behaviors (Siever, 2008). This neurotransmitter has been identified as being important in the onset of many psychiatric disorders, in particular, mood and anxiety disorders. An imbalance of the neurotransmitter serotonin has been found to be linked with impulsive and aggressive behavior. According to Glenn and Raine in “The neurobiology of psychopathy” (2008), psychopathy was associated with an increased ratio between

biological pieces that contribute to the overall disorder but it is difficult to tell how exactly those pieces fit together. The questions then are the following: what are the pieces and what do they look like? how does every piece fit together? These factors that could contribute to the development of ASPD could include biological abnormalities that could cause antisocial behaviors. In terms of biological abnormalities linked to ASPD, there could be several contributors: imbalances in serotonin, hormones, as well as abnormalities in the autonomic nervous system and in the corpus callosum in comparison. The results of brain imagining studies suggest that chemical imbalances and abnormal brain functioning could also cause antisocial behavior, such as discussed in a literature review by Hall and Steiner.

dopamine metabolite HVA and the serotonin metabolite 5-HIAA. The increased ratio suggests there tends to be more serotonin and dopamine in the brains of psychopaths. Therefore, the increase in serotonin can lead to more aggressive, impulsive behaviors. However, there is evidence that low levels of serotonin and high levels of testosterone also increase the rate and intensity of aggression. In the literature review “Serotonin and female psychopathology” by Hall and Steiner (2008), the authors reviewed a study on monkeys which revealed that there is a link between serotonin functioning and aggression, but it appears that central serotonin 5-HT indicators are negatively correlated with aggression while

peripheral concentration of 5-HT is positively correlated with aggression. The correlation suggests that an imbalance in serotonin within the central nervous system tends not to affect aggression but imbalances in peripheral nervous system outside of the brain have been linked to higher rates of aggression. However, the “peripheral makers have been correlated positively with aggression in males but not in females (Hall and Steiner, 2013).

Although a link found between serotonin and aggression, it may not necessarily apply to females with ASPD or other forms of psychopathy. The study reviewed by Hall and Steiner (2013) suggests that there may be a serotonergic imbalance in the minds of individuals with ASPD. Unfortunately, the possibility of serotonergic imbalance can only be assumed to apply to both men and women

Autonomic Nervous System and Antisocial Behaviors in Men and Women

The autonomic nervous system (ANS) is the part of the nervous system that is responsible for controlling the body’s unconscious functions. Functions such as respiration, heart rate, and digestion. The ANS is divided into two systems: the sympathetic and parasympathetic nervous systems. The sympathetic nervous system prepares the body for intense physical activity. This is also known as the flight-or-fight response. The parasympathetic nervous system does the opposite of the sympathetic nervous system, as it calms the body after intense physical activity or arousal returning the body to homeostasis. Some studies suggest that there may be abnormalities in the ANS of individuals

due to the mixed-gender samples used. Most studies include samples of participants that are both male and female in which the results were indicated to only applied to the males. More research is needed to find if serotonergic imbalances also cause aggression in females specifically. It is critical to be sure that there is a correlation for both men and women with imbalances so that it could be used as a diagnostic tool to assess aggression and other potentially dangerous behaviors associated with a serotonergic imbalance. Since men and women express aggression differently as well, is difficult to use behavior alone as a diagnostic tool. Antisocial behaviors could have a number of biological causes such as hormone imbalances and abnormalities in the autonomic nervous system.

who have ASPD or display antisocial behaviors.

The study “Gender Differences in Autonomic Indicators of Antisocial Personality Disorder Features” conducted by Sylvers, Brennan, Lilienfeld and Alden (2010) sought to investigate the physical responses to negatively valenced slideshows to determine the relationship between as electrodermal activity (EDA), pre-ejection period (PEP) and respiratory sinus arrhythmia (RSA). The results found that males with ASPD exhibited hyporeactivity, under responsiveness, in electrodermal activity to negatively valenced, emotionally negative, slideshows related to control. ASPD features in women predicted RSA but not

in men. Also PEP hyperreactivity in men but not women, to threatening images. These findings suggest that dysfunctions in the parasympathetic nervous system in women predicts ASPD features versus dysfunctions in the sympathetic nervous system in men.

The findings in the Sylvers et al. study suggest that although males and females are diagnosed with ASPD it does not mean that they have similar responses to the same threatening stimuli (2010). This further stresses the idea that research

Cortisol-Testosterone Imbalance in Males and Females with Psychopathic Traits

It has been proposed that the emotional deficit found in psychopathic individuals may be due to an imbalance in cortisol and testosterone (Glenn & Raine, 2008). Cortisol is a hormone essential for providing the body with energy in times of stress. Cortisol is released by the activation of the hypothalamic-pituitary-adrenal (HPA) Axis. Cortisol is also involved in the state of fear, sensibility to punishment and withdrawal behavior (Glenn & Raine, 2008).

Testosterone, however, is produced by the hypothalamic-pituitary-gonadal (HPG) Axis, which has been associated with approach-related behaviors, reward sensitivity and fear reduction.

Testosterone and cortisol have been found to have antagonistic properties (Glenn & Raine, 2008). Testosterone inhibits the HPA Axis and cortisol inhibits the activation of the HPG Axis.

In the study “Testosterone, Cortisol, and Psychopathic Traits in Men and Women” conducted by Welker, Lozoya, Campbell, Neumann, and Carre (2014), it was found

on ASPD should to be gender specific resistance of skin to small electrical currents or as the electrical potential between the different parts of the skin (Critchley and Nagia, 2013). The study also uses PEP which measures cardiac contractility, and RSA which tests heart rate synchrony with respiration. All of which are linked to differences in physiology and biology of the participants. Demonstrating that the need for gender specific.

that although testosterone and cortisol are related to psychopathic traits in men, cortisol moderated the relationship between testosterone and psychopathic traits. When cortisol levels were high, the relationship between testosterone and psychopathic traits was positive, but the relationship was negative when cortisol levels were low. This finding suggests that the mutual-inhibition effects of HPA and HPG Axes may not occur when males have higher levels of psychopathy, further suggesting that testosterone and cortisol imbalances may increase the likelihood of psychopathy or psychopathic traits such as aggression in men.

However, although the relationship between cortisol, testosterone, and psychopathic traits was found to be significant in males, there was a weak relation in females. Although the Welker et al. study used a large female and male sample size, the study found a weak, positive relationship between testosterone and psychopathy across both genders. Other finds between cortisol levels and

women displaying signs of symptoms of ASPD were not significant. More research is needed to find if in fact cortisol levels influences psychopathy in females as it

Corpus Callosum Abnormalities as a Potential Sign for ASPD in Females

Conduct Disorder (CD) is “a heritable disorder of neural development, associated with a wide range of negative outcomes through adolescence and adulthood” (Linders et al., 2016).

Negative outcomes such as persistent antisocial behaviors, academic failure, low socioeconomic status, criminal involvement, and mental or physical disorders. In adulthood, CD could manifest itself into ASPD. CD affects approximately 7% of females in the United States (Linder et al., 2016). CD tends to have a lower prevalence rate in males than in females. In females, “the age of onset is later, the developmental courses differed, there is also differences in symptom display with less aggressive behavior among females than males” (Linder et al., 2016). There could be a number of contributing developmental factors that could cause the onset of CD such as biological abnormalities.

Abnormalities of the corpus callosum have been reported among boys and girls with CD, adult males with ASPD, and males who presented CD by the age of 15 (Linder et al., 2016). The corpus callosum abnormalities found in males who have had CD and then developed ASPD raises the question of whether women who were diagnosed with CD may also develop ASPD as adults. The abnormalities found in males are related to the integrity of the white

matter in the corpus callosum, but there had not been studies to find white matter abnormalities in adult females with CD until the study “Conduct disorder in females is associated with reduced corpus callosum structural integrity of comorbid disorders and exposure to maltreatment” conducted by Linder and colleagues in 2016.

Though their research on women with previously diagnosed CD compared to healthy women, Linder and colleagues found that young women who presented CD as adolescents displayed a widespread reduction in axial diffusivity, diffusion of water parallel between axonal bundles to assess the statuses of the axons and myelin sheets. The reduction in axial diffusivity was found primarily in the frontotemporal region of the brain relative to healthy women. This suggest that there is disruption between the neurons in the frontotemporal region of the brain. The results of the study and previous findings confirmed that CD in females is also associated with abnormalities of the corpus callosum and that these abnormalities are present in adulthood, even in the absence of a diagnosis of ASPD (Linder et al., 2016). The similar abnormalities in the corpus callosum in both males and females with previous CD serve to prove that it is necessary to fill in the gaps in research. By filling the gender gaps in research, the disorder ASPD

may in males. This finding also poses the question as to what other brain abnormalities have an influence on ASPD and psychopathic traits.

could be better understood and biological diagnostic tools could be created that

would be accurate across the two genders.

Conclusion

Although there is research that looks at specific biological abnormalities in individuals with ASPD or individuals who display antisocial behaviors and psychopathic traits, the studies tend to include data gathered from collected male and female subjects. Linder and Colleagues emphasize the fact that little was known about females who had CD until the study in 2013 on sex differences in antisocial personality disorder and the more recent study in 2016 on corpus callosum abnormalities in women who had CD. Previous studies tended to focus on the male samples rather than the females in the sample population, which occurs in other studies that investigate neurotransmitter and hormone imbalances in men and women with ASPD or antisocial behaviors.

The current literature on the biological and behavioral differences between ASPD in men and women reveals that much of the research

indicated the results that were significant to the men in the sample population but not necessarily women. In the case of abnormalities in the corpus callosum, there were similarities between men and women, but the behavioral expression of the disorder tended to be different. Overall, it is also critical to take into consideration the social and environmental factors that get thrown into the mixing pot to create ASPD. Psychologists may look for biological tools to use to supplement a reliance on the behavioral expression of the disorder, which could be more open to interpretation, given differences between genders and their behavioral expressions of ASPD.

References

- Alegria, A. A., Blanco, C., Petry, N. M., Skodol, A. E., Liu, S., Grant, B., & Hasin, D. (2013). "Sex differences in antisocial personality disorder: Results from the national epidemiological survey on alcohol and related conditions". *Personality Disorders, 4*(3), 214-222. doi:10.1037/a0031681
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA. American Psychiatric Publishing.
- Critchley, P.D.H. & Nagai, D.Y. (2013). "Electrodermal Activity (EDA)". *Encyclopedia of behavioral medicine*. 666-669.
- Glenn, A.L., & Raine, A. (2008). "The neurobiology of psychopathy". *Psychiatric Clinics of North America*. 31, 463-475 doi: 10.1016/j.psc.2008.03.004
- Hall, E. & Steiner, M. (2013). "Serotonin and female psychopathology". *Women's Health; London*. 9(1), 85-97. doi: 10.2217/WHE.12.64
- Lindner, P., Savic, I., Sitnikov, R., Budhirajam M., Liu, Y., Jokinen, J., . . . Hodhings, S. (2016). "Conduct disorder in females is associated with reduced corpus callosum structural integrity of comorbid disorders and exposure to maltreatment". *Translational Psychiatry*. 6(1) e714. doi: 10.1038/tp.2015.216
- Siever, L.J. (2008). "Neurobiology of Aggression and Violence". *Am J Psychiatry*. 165(4), 429-442. doi: 10.1166/appi.ajp.2008.07111774
- Sylvers, P., Brennan, P.A., Campbell, J.A., Neumann, C.S., Carre, J.M. (2014). "Gender Differences in Autonomic Indicators of Antisocial Personality Disorder

Features” *Personality Disorders: Theory, Research and Treatment*. Vol 1, No.2, 87-96.
Welker, K.M., Lozoya,E., Campbell, J.A., Neumann, C.S., Carre, J.M. (2014). “Testosterone,
Cortisol, and Psychopathic Traits in Men and Women”. *Physiology and Behavior*. 129, 230-236. Doi:
10.1016/j.phybeh/201