

Attention and Responses to Emotional Stimuli in Psychopathy: A Review

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Abstract

Social stigma surrounding psychopathy has painted individuals with this disorder as unemotional, evil beings. While many psychopaths have a hard time connecting emotional value to complex stimuli, they show normal emotion and fear processing with simple stimuli. Further research indicates that attentional deficits play a role in psychopaths' shallow affect rather than emotional deficits. This review explores several studies on emotional and attentional deficits seen in psychopaths in hopes of better understanding the mental processes involved in this disorder and of reducing the "evil" stigma surrounding it.

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Psychopathy is a personality disorder marked by traits such as arrogance, glib charm, lack of empathy, and shallow affect (Hare, 2003). There is a lot of misinformation surrounding psychopathy, with the public often seeing portrayals of psychopaths as murderous villains on their favorite crime television shows such as *Criminal Minds* and *Prodigal Son*. However, psychopathy is far more complex than these television shows might have audiences believe. While presence of the disorder does increase the risk of violence (DeLisi & Fox, 2019), not enough research has been done to determine if psychopaths have genuine apathy towards violence and emotional content or if other factors are at work.

A common symptom of the disorder is shallow affect, which implies dulled emotional responses to emotional stimuli. This deficit has been studied through emotional processing tasks and startle-reflex paradigms, with many psychopaths showing reduced emotional

picture recall and slower responses to emotional words, as well as slower or non-existent startle responses to aversive stimuli compared to healthy individuals (Christianson et al., 1996; Flor et al., 2002; Patrick et al., 1993; Williamson et al., 1991). While these studies suggest potential emotional processing deficits in relation to shallow affect and fearlessness in psychopathy, the impact of selective attention on shallow affect was not considered.

Both attention and emotion modulate memory, a necessary component of proper fear conditioning and emotional memory recollection (Baskin-Sommers et al., 2011). With MRI and EEG research becoming more common, brain activity associated with attention can better be recorded during stimulus tasks. Brain studies have shown that those with psychopathy often have attentional deficits in non-emotional, divided attention tasks, especially during the early stages of task perception (Anderson et al., 2015; Krusemark et al., 2016; Pham et al., 2003). This means that attention to important stimuli after exposure is often inhibited when distracted by visual

complexity or a separate stimulus. Interestingly, more recent studies addressing attention and emotion in psychopaths only find abnormal emotional stimulus reactions when the participant is distracted before exposure to a conditioned stimulus (Baskin-Sommers et al., 2011) or when the emotional stimulus is complex rather than simple (Glass & Newman, 2009; Sadeh & Verona, 2012). Emotional stimulus processing in psychopaths seems normal for simple emotional stimuli to which full attention can be given. These findings indicate that selective attention may play a key role in decreased emotional reactions to emotional stimuli in psychopathy.

Though there are few studies on psychopathy investigating purely the interaction between attention and emotion, there are many studies exploring one or the other. This review has included the most recent research investigating emotional memory recollection in relation to attention in psychopaths (Baskin-Sommers et al., 2011; Glass & Newman, 2009; Sadeh & Verona, 2012), and general attention deficits within the disorder (Anderson et al., 2015; Krusemark et al., 2016; Pham et al., 2003). To explore the interaction between attention and emotion, brain-based studies are needed. More research must be done to explore how these two factors interact to produce shallow affect seen in many psychopaths.

General Attention Deficits in Psychopathy

Attentional irregularities with non-emotional stimuli are found in those with psychopathy (Anderson et al., 2015; Krusemark et al., 2016; Pham et al., 2003). A study by Pham et al. (2003) administered six separate attention and executive function tests to psychopathic and non-psychopathic prisoners. Psychopaths consistently illustrated an inability to control selective

attention when being misled by distractors. However, all other cognitive abilities tested seemed intact, indicating no obvious cognitive deficits (Pham et al., 2003). These results show selective attention deficits in psychopaths even in the absence of emotional stimuli, indicating that attentional abnormalities may contribute to abnormal results found in emotional memory tasks.

It is important to explore whether this attentional deficit arises simply from environmental distractors like those in the study above, or if attention is allocated somewhere with a personal goal in mind. That is, do the internal goals of those with psychopathy facilitate this attentional bias? Through the examination of EEG (electroencephalogram) event-related potential (ERP) recordings, it appears that this may be the case (Anderson et al., 2015; Krusemark et al., 2016).

ERPs are responses in the brain related to cognitive, sensory, or motor events. In an auditory oddball detection task in which participants respond to infrequent target pitches while being exposed to standard, secondary pitches, those with psychopathy showed reduced ERPs (lower brain responses) to the standard, secondary stimuli compared to controls (Anderson et al., 2015). Results also showed stronger early selective attention to the target stimuli with higher resistance to the standard, secondary stimuli. These findings indicate that in those with psychopathy, far more attention was allocated to the target stimulus (that which was associated with the primary task, and therefore a personal goal) compared to the standard, secondary stimuli (those that had no relation to the primary task, and therefore, no personal goals). Controls showed a greater ability to shift attention from the standard, secondary stimuli to the primary stimulus without blocking out the

secondary stimuli. This indicates that psychopaths' strong fixation on achieving a primary goal may correlate with selective attention deficits.

Abnormally strong attentional allocation toward a simple primary goal was also seen in a study by Krusemark et al. (2016). They administered a color task in which prisoners rated as having high, intermediate, or low psychopathy indicated the orientation of a target, in this case, a red rectangle out of grey rectangles. A size task in which the target was the smallest rectangle out of all grey rectangles was also administered. The color task provided set-congruent cues, meaning the color of the target was consistent throughout the trials. The size task, on the other hand, provided set-incongruent cues because of the varying sizes of the target rectangles. It is important to note that the average person can have psychopathic tendencies, but this does not make them a psychopath. Because of this, those with low psychopathy scores are often considered controls while those with high psychopathy scores are considered "psychopaths".

Responses to the set-congruent cues of the color task by those with high psychopathy were both faster and more accurate than those to the set-incongruent cues of the size task, whereas those with low and intermediate psychopathy scores showed similar responses in both tasks. Furthermore, those with high versus low and intermediate psychopathy scores showed stronger activation of an electrophysiological marker of selective attention in response to pre-target set-congruent cues compared to set-incongruent cues (Krusemark et al., 2016). These key findings suggest that simple personal goals play a greater role in early perceptual processing leading to deficits in selective attention in those with more severe psychopathy.

Attention Deficits to Emotional Stimuli in Psychopathy

If psychopaths' attention is allocated based on personal goals, this could explain intact emotional stimulus responses to simple emotional tasks in which full attention can be given, and decreased responses to complex stimuli without connection to a set goal. Lesser than normal responses to emotional stimuli have been found in those with psychopathy only when participants were already distracted or when the stimulus was visually complex (Baskin-Sommers et al., 2011; Glass & Newman, 2009; Sadeh & Verona, 2012).

Distraction

In psychopathy, if attention is misdirected before presentation of an emotional stimulus, the conditioned response to the stimulus will decrease (Baskin-Sommers et al., 2011). In Baskin-Sommers et al.'s (2011) conditioning paradigm, those with high psychopathy did not show decreased general fear responses to fear cues like those in other studies. Instead, significant reductions in fear response only occurred under the early alternative focus condition in which they had their attention focused on an unconditioned cue before the threat cue arose. This shows that lesser attention correlates with diminished fear responses in psychopaths, meaning attention is not automatically directed towards fearful stimuli like it is in participants low on psychopathy. Instead, attention was allocated to the primary stimulus (the unconditioned cue) and failed to address the peripheral stimulus (the conditioned cue) even when it was important. These findings indicate a change in expected outcome and personal goal of the participant when misled by a stimulus with no definite, important outcome (Baskin-Sommers

et al., 2011). Compared to the average person, someone with psychopathy may be more easily misled by distractions involving a personal goal despite having other important social and emotional obligations to attend to. With attention so easily allocated to and from traditionally emotional situations, those with this trait may present as callous and unemotional.

Stimulus Complexity

An emotional word recall study by Glass and Newman (2009) found that adding context or visual complexity to an emotional stimulus decreases emotional memory recollection in psychopaths. Low-anxiety psychopaths and low-anxiety control participants were asked to recall as many words as they could from a presentation of positive, negative, and neutral words. There was little difference between the groups in word recall without context, showing that emotional words (positive and negative) did facilitate word recollection in psychopaths when that was the sole stimulus of focus. However, when context was added in the form of either a yellow or blue rectangle around the word or a change in word color (yellow or blue), emotional word bias decreased in psychopathic participants while it increased in control participants. This reflects a limitation in attentional response to emotional information, but not necessarily an inability to process emotional stimuli. With the distraction of the rectangles and colors, emotional words were no longer the obvious focus or goal of the experiment and far less attention was given to emotional variations (Glass & Newman, 2009).

Psychopathic Trait Differences

This selective attention deficit could be related to certain traits found in psychopathy (Sadeh & Verona, 2012). ERPs from a study by Sadeh and Verona (2012) found that in those with

high affective-interpersonal traits such as lack of empathy, manipulativeness, and superficial charm, greater attentional resources were needed to process complex unpleasant pictures compared to simple pictures. This was shown through a negative correlation between complexity of unpleasant images and fear-potentiated startle responses. With greater attention needed to process complex emotional stimuli, normal fear responses were reduced (Sadeh & Verona, 2012). Impulsive-antisocial psychopathic traits such as antisocial behavior, impulsivity, and lack of goals, surprisingly showed no interaction with picture complexity, suggesting only those with high affective-interpersonal traits allocated attention to the processing of simple or complex images. Furthermore, interpersonal traits of psychopathy have been uniquely linked to reduced right uncinate fasciculus (UF) integrity, which is the major white matter path between the amygdala, prefrontal cortex, and other limbic regions (Wolf et al., 2015). This could indicate abnormalities in stimulus-outcome associations through lesser connections between the amygdala and prefrontal cortex, ultimately affecting which stimuli are viewed as worthy of allocated attention. However, more research must be done on brain abnormalities in psychopaths and attention's role in their emotional responses to support this statement.

Conclusion

General selective attention deficits have been found in those with psychopathy during exposure to non-emotional stimuli (Anderson et al., 2015; Krusemark et al., 2016; Pham et al., 2003). Though no cognitive dysfunction has been found, psychopaths seem to struggle with selective attention to important stimuli when being misled by distractors (Pham et al., 2003).

Overallocation of attention to a general personal goal rather than important stimuli could account for these deficits (Krusemark et al., 2016; Anderson et al., 2015). It seems these personal goals modulate attention in psychopaths rather than emotional connections like in healthy controls (Baskin-Sommers et al., 2011; Glass & Newman, 2009; Sadeh & Verona, 2012). Attention modulates emotional responses and emotional recollection, but differences in psychopathic traits could play a role in the extent to which this happens (Sadeh & Verona, 2012; Wolf et al., 2015).

If attention is allocated to a psychopaths' primary goal, variations in emotional responses in psychopaths could be related to whether they view certain emotional stimuli as relating to primary goals, rather than simply feeling a motivational connection as seen in non-psychopaths (e.g., Baskin-Sommers et al., 2011). Furthermore, decreased connections between the amygdala and prefrontal cortex in psychopaths indicate potential stimulus-value association and selective attention abnormalities which may alter primary goal-associations in psychopaths (Wolf et al., 2015).

Limitations and Directions for Future Research

Many of the studies included in this review only involved male psychopaths in prisons. With much psychopathy research involving males, it is unclear whether the majority of psychopaths tend to be male or if females may have less noticeable traits and therefore go undetected. Females with psychopathy tend to possess more negative self-views and hysteria compared to the grandiosity found in males (Smith et al. 2018). Trait differences between the sexes may alter findings regarding shallow affect, attention and emotion, and should be further explored.

Current data could still help direct future research on attention and emotion in psychopathy towards exploring variations of attention and

emotional responses within the disorder. Future research should investigate how these findings on attention and emotion translate to real-world situations by including simple and complex real-world emotional situations or videos. Recording brain activity during tasks will also incorporate attentional feedback into emotion research, helping researchers better understand the interaction between attention and emotion in psychopathy. With more focus placed on attention's role in shallow affect and how the brain responds to complex and simple emotional stimuli in psychopathy, more could be understood about emotional processes involved in the disorder and surrounding stigma could be reduced.

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