OPEN ACCESS

Corresponding author

annerosegregory012@gmail.com

Keywords: Anger, Neuralink, Brain and Behaviour

Published By

Notation Publishing
www.notationpublishing.com

Anger and the Brain, Body, and Decision: Neural and Physiological Effects

Annrose Gregory

St Joseph's University.

ABSTRACT

Anger is an extremely intense feeling with great impacts on neural activity and physiological processes upon the cognitive function, decision-making process, and general health. This paper discusses how anger cues at subliminal levels have effects on lexical decision-making tasks, systolic blood pressure, and activation pattern effects in the brain. Anger primes have also been shown to delay reaction times, increase systolic blood pressure, and activate various areas of the brain involved in attention, visual processing, and arousal. Such effects would lead to capitalizing on action readiness, a cost possibly in terms of reduced cognitive functioning and decision-making quality. A better understanding of how anger works and its health effects allows for improving strategies in emotional regulation that minimize some of the costs associated with this complex feeling

1. Introduction

Emotions influence cognitive processes this way, in how a person perceives, attends to, and responds to their world around them. Anger is one of the most common and intense emotions that may have the capability to influence both adaptive and maladaptive effects. Being an emotion of approach and having negative valence, anger promotes action but, at the same time, diminishes the cognitive function. For instance, anger elicits physiological effects such as increased cardiac activity and blood pressure, preparing the body for action. At the same time, it can impede the cognitive processing and even skew attention, thus compromising decision-making speed. The research in recent times in the domain of cognitive neuroscience suggests that anger is singularly positioned to affect the brain's cognitive control systems, implications of which are broad-ranging concerning both mental and physical health. Other emotions like fear, happiness, and sadness are

thoroughly researched and even categorize well within typical psychological disorders of anxiety and depression. Anger is relatively under researched because it's so well understood to be an aetiology for health issues such as cardiovascular disease. The purpose of this paper is to examine the subliminal influence of anger on physiological activation, neuronal activity, and cognitive function in lexical decision-making using neuroimaging. By observing the neural and physiological mechanisms underlying anger-related impacts on decision-making, we intend to emphasise the general consequences of anger for cognitive functioning and health.

The cognitive process is much influenced by the emotions. So we tend to notice and pay attention to different things in our world. Anger is an emotion that can be helpful as well as destructive at the same time to the individual. This is an approach-related emotion with negative valence which has driving ability to action impairing their cognitive function. It causes physiological changes such as elevated heart rate and blood pressure, which enhance readiness to act. The same responses also diminish cognitive processing, causing attention to be shifted and decision-making to slow down. Recent work by the cognitive neuroscientists indicates that anger is uniquely placed to influence the cognitive control systems of the brain in far-ranging implication both for mental and physical health.

Research has focused extensively on the other emotions, including fear, happiness, and sadness, that typify most psychological disorders, such as anxiety and depression. Anger, however, has been relatively under-studied despite its well-established role in health outcomes, such as cardiovascular disease. In this paper, we examine the effects of subliminal anger on physiological arousal, neural activation, and cognitive functioning using lexical decision-making tasks and neuroimaging techniques. It draws attention to the general implications of anger on cognitive efficiency and health by considering the neural and physiological pathways through which anger affects the decision-making process.

Discussion

Behavioural and Physiological Effects of Anger

Anger can be an independent correlate of cognitive performance, as measured by tasks assessing response times and decision accuracy. For example, in lexical decision tasks, subliminally presented anger primes are associated with significantly longer reaction times than neutral primes such as "RELAX." Such delay suggests that, even with subtly administered affect, anger may top up attentional resources and raise the processing load. The experiment conducted by Garfinkel et al. (2016) indicates that relative to participants presented with subliminal neutral cues, participants presented with subliminal anger cues responded more slowly, and thus the authors' conclusion that

anger impairs processing efficiency when tasks require quick decision-making. This impairment is associated with physiological changes in systolic blood pressure, which tends to increase under anger cues. Anger elevates blood pressure partly because of the autonomic nervous system's preparation for possible confrontation or action. Such autonomic arousal is important in situations where reactions must be made quickly, but in something like decision-making, it merely hampers efficient cognition. For instance, elevated blood pressure and slowed reaction times are simply how anger shifts the body and brain into an arousal state at the cost of cognitive control and efficiency.

Neural Mechanisms Underlying Anger's Effects

Both heightened and lowered brain activity in specific areas was involved in the neural mechanisms of anger. Subliminal anger cues activated the dorsal pons, a brainstem region connected to sympathetic arousal; therefore, anger primes might prepare the body to respond, even before conscious awareness, through physiological arousal. This autonomic readiness corresponds to increased systolic blood pressure; this means anger primes both the body and brain for an approach or confrontational state.

On the other hand, anger cues decrease activity in the occipitotemporal and parietal cortices, areas associated with visual processing and attention. The lower activity in these regions suggests a reallocation of resources from cognitive processes such as attention and detailed visual analysis to action readiness. This diversion of resources might be the reason why subjects respond more slowly to cognitive tasks following anger primes; the brain performs other functions-action-readiness is greater than attentional and perceptual functions-perhaps an evolutionary adaptation to attack what it perceives as danger.

Dissifferences in Response to Anger

While anger impacts cognition and physiology for most people, clearly differences exist between individuals. Individual differences in the trait of anger, a stable personality characteristic, hint that people scoring high respond to anger cues in ways different from those scoring with lesser levels of the trait. For instance, the people with high levels of the rait might have relatively faster response times under subliminal anger cues due to the high level of baseline anger that makes them more attuned or sensitive to anger triggers. Such variability would indicate that individual predispositions modify the effect of anger on cognition and physiology and may be an important source in whether anger has impairing or motivating effects. These individual differences have practical implications, indicating that anger may have different effects on different people. For people who have high levels of trait anger, anger might be a motivating emotion that increases their level of preparedness for action. For low levels of trait anger, impairments to cognition might be

relatively more harmful. Knowing these differences can help tailor methods for controlling anger's influence under the conditions where quick cognitive responses are critical, such as fast-paced, high-stress workplaces or decision-making roles.

Consequences for Health

In addition to the cognitive consequences, anger has profound consequences for physical health, particularly regarding cardiovascular health. Chronic anger has been linked with increased risks for hypertension, cardiovascular disease, and stress-related health problems. The physiological arousal associated with anger and a resultant increased blood pressure and heart rate can lead to cumulative health effects over time, given that anger is a chronic or recurrent state for an individual. In addition, long-established research in psychosomatic medicine has shown that chronic anger and hostility are factors linked with cardiovascular disease, in which episodes of sustained anger lead to autonomic arousal that can strain the heart and vessels.

This link between anger and health thus helps to mark the importance of managing anger not only for psychological health but also for physical health. Anger management practices- cognitive-behavioral therapy, mindfulness, and relaxation techniques-can also be adapted to handle physiological costs of anger. These can also reduce frequency and intensity episodes of anger in an individual thereby reducing risk factors associated with cardiovascular conditions-that is, good mental and physical health outcomes.

Anger as a "Approach" Emotion

While anger is part of the list of negative emotions, it, in many ways, portrays unique characteristics that differentiate it from the other negative emotions. For example, anger is sometimes referred to as an "approach" emotion since it pushes individuals toward action rather than away from it. This ambivalence in the nature of anger—both negative and approach-oriented—means that anger pushes people to encounter threats, difficulties, or other impediments and then regain mastery over the situation. Studies suggest that anger does promote behavior when it is appropriate to make the assertion or confrontation. For instance, anger can energize persistence in the pursuit of desires or as an effort to obtain reparation for some injustice. Yet this approach motivation is dangerous. When anger affects cognitive functions or alters judgments, it makes people and those around them act impulsively without even thinking about the outcome of such decisions. In this way, the motivating characteristics of anger may both build and destroy, depending upon how well the emotion in that person is controlled and managed. An understanding of anger as an approach emotion suggests why it might be both energizing and impairing, emphasizing the need to balance emotional regulation to capture all the motivational effects of anger but avoid its cognitive and health costs.

Conclusion

Anger has a powerful impact on cognition as well as physiological health, influencing decision-making efficiency and posing long-term health risks. Such findings argue that the neural and physiological mechanisms of anger reveal an emotion that reallocate brain and bodily resources toward action readiness, often at the cost of cognitive control and attention. High blood pressure and slowed reaction times constitute the behavioral manifestations of how anger impairs cognition, whereas heightened activation in brain regions associated with sympathetic arousal prepares the body for confrontation. These changes establish anger's dual nature: an action inducer, but also an emotion that may harm cognition when unrestrained. The interventions highlight the factor of emotional regulation techniques in countering anger and its manifestations. Mindfulness, cognitive-behavioral therapy, relaxation training, and other methods are all used as a countermeasure to diminish physiological and cognitive manifestations of anger and thus reduce the risk factors of health jeopardized by chronic anger. The recognition of individual differences in anger response further refines our understanding, this implying that those with high trait anger may experience anger differently from others, with variable implications for cognitive and health outcomes. These mechanisms continue to be further researched for future incorporation into tailored intervention on both cognitive and physical aspects of anger. Understanding the multifaceted influence of anger would enable people and professionals to work more effectively with this mighty emotion, thereby enhancing cognitive functions, decision quality, and health.

References

1. Levytska, S., Akimova, L., Zaiachkivska, O., Karpa, M., & Gupta, S. K. (2020). Modern analytical instruments for controlling the enterprise financial performance. *Financial and credit activity problems of theory and practice*, *2*(33), 314-323.
2. Aristova, I., Zapara, S., Rohovenko, O., Serohina, N., Matviienko, L., & Gupta, S. K. (2021). Some aspects of legal regulation of administrative procedures in Ukraine and the European Union: theory and realities.
3. Kumar, N. S., Kapoor, S., & Gupta, s. K. (2021). Is employee gratification the same as employee engagement?-an in-depth theory perspective. *AD ALTA: journal of interdisciplinary research*, *11*(2).
4. Kumar, V., Mishra, P., Yadav, s. B., & Gupta, S. K. (2023). The role of power dynamics and social status in Indian MNCs in shaping ingroup and out-group

behaviour and its impact on perceived individual performance outcomes. *AD ALTA: journal of interdisciplinary research*, *13*(1).

5. Sinha, H., Mishra, P., Lakhanpal, P., & Gupta, S. K. (2022). Entrepreneur preparedness to the development of probable successors in entrepreneurial organization: scale development and validation. *AD ALTA: journal of interdisciplinary research*, *12*(2).
6. Sinha, H., Mishra, P., Lakhanpal, P., & Gupta, s. K. (2022). Human resource practice types being followed in Indian entrepreneurial organizations with focus on SUCCESSION PLANNING PROCESS. *AD ALTA: Journal of Interdisciplinary Research*, *12*(2).
7. Banka, S., Madan, I., & Saranya, S. S. (2018). Smart healthcare monitoring using IoT. *International Journal of Applied Engineering Research*, *13*(15), 11984-11989.
8. Susmitha, T. S., & Saranya, T. S. (2024). Uncovering Emotions: Using IoT as a Psychodiagnostics Tool. *International Journal of Indian Psychology*, *12*(3).
9. TS, S., Naila, P., & Langam, L. (2023). Managing Premenstrual Symptoms (PMS) Using Cognitive Therapy Interventions: A Systematic Review. *International Neurourology Journal*, *27*(4), 1606-1612.
10. Preetha, D. V., Pratheeksha, P., & Vamshitha, G. (2024). Insta-Tangles: Exploring The Web Of Instagram Addiction, Fomo, Perceived Stress, And Self-Esteem. *Library Progress International*, *44*(3), 14130-14144.
11. Garfinkel, S. N., Zorab, E., Navaratnam, N., Engels, M., Mallorquí-Bagué, N., Minati, L., ... & Critchley, H. D. (2016). Anger in brain and body: the neural and physiological perturbation of decision-making by emotion. Social cognitive and affective neuroscience, 11(1), 150-158.