

Importance of Emotions in Human Cognition and Rationality

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CS 3790: Introduction to Cognitive Science

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November 26, 2023

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Emotions play an essential role in the tapestry of everyday human life and the diverse situations that individuals encounter. The human emotional landscape is complex and diverse, encompassing a wide range of feelings that influence our interactions with others and the world around us. At times, it can feel like our emotions take the driver's seat in our lives, guiding the direction people take. The emotions we experience at any given moment significantly shape the decisions we make, the actions we take, and the way we perceive the world around us. Beyond their immediate impact on decision-making, emotions also act as crucial players in our cognitive processes, affecting how we gather, process, and apply information in our day-to-day lives. When you combine all of these emotional reactions, actions, and cognitive functions, you get a more complete picture of human cognition. Emotions aren't just important; they represent integral threads in the tapestry of the human cognitive experience.

This research project endeavors to explore the depth of the complex relationship between emotions and human cognition, seeking to understand the profound significance these emotional states hold in shaping cognitive processes. Through an extensive research initiative and a meticulous review of existing knowledge, the aim is to reveal the intricate connections that tie emotions to cognitive functions, explaining the pivotal role they play in sculpting the human experience. This exploration strives to uncover not only the overarching importance of emotions but also the subtle nuances that define their impact on the complicated landscape of human thought and action.

The Issue

This project will examine this research issue in addition to the impact of emotions on reasoning. People's perspectives on making decisions while being emotional vary widely. Some

argue that emotional decision-making can lead to more authentic and personally meaningful choices. Emotions are seen as valuable sources of information, providing insights that rational analysis might overlook. On the other hand, it's often advised against acting only on feelings while making decisions. According to critics, increased emotions might impair judgment and cause people to make rash or foolish decisions. Emotional decision-making is sometimes associated with increased vulnerability to bias, as strong feelings might skew perceptions and priorities. The indecisive opinion on whether emotions positively or negatively affect a person from making a thoughtful and rational decision is another issue this research is trying to resolve. The goal of this project is to determine the degree to which people are more or less reasonable due to their emotions. In this study, the topic of Emotions and their effect on cognition and rationality will be studied. In order to determine how much emotions affect our capacity for reason and whether they have a positive or negative effect on it, a variety of research articles and journals examining various facets of how emotions affect human cognition and rationality will be reviewed.

To understand the relationship between emotions, cognition, and rationality in-depth, instead of five research questions, two to three research questions will be focused on. Once these research questions are answered, the rest of the research questions will be focused.

1. Do different environmental settings and situations affect emotions that affect human cognition and rationality?
2. What is the relationship between emotions and rationality?
3. Does the effect in cognition due to emotions result in an effect on rationality?

Alternatives

For conducting a meta-analysis of existing research papers and studies, the possible answers that could be reached for the first research question could be that it is true that specific environments might evoke emotions, which in turn impact cognition and rational decision-making. The other possible answer could be that there is a significant correlation between environmental settings and emotions, suggesting that it cannot be concluded if emotion, cognition, and rationality are all connected or if cognition and rationality are connected to environmental settings. The final possible answer is that the relationship could be context-dependent, where environmental settings affect emotions, which in turn affects cognition and rationality. Still, the positive or negative effect depends on the individual characteristics and experiences.

For the second research question, one of the possible answers is a positive correlation, where heightened emotional states enhance certain aspects of rational decision-making. Then, there is a negative correlation, where intense emotions negatively affect cognitive functions and lead to less rational decision-making or the conclusion that emotions and rationality do not correlate. Finally, a possible answer would be a complex relationship, where certain emotions facilitate rationality in specific situations and impede it in others.

Similar to the possible outcomes provided for the previous research questions, the third research question is also expected to have similar answers. The first conclusion could be that cognition influenced by emotions does result in an effect on rationality, indicating a direct impact of emotional states on rationality. Another possible conclusion would be that the relationship differs depending on individual differences, as every person has different emotional regulation skills, mental strength, views, and beliefs. This could result in rationality being influenced by

cognition and emotion for some individuals and not for others. The other answer to the research question would be that there is a degree of independence between the effect on cognition due to emotions and rational decision-making.

Evidence

Research Question 01: Do Different Environmental Settings and Situations Affect Emotions That Affect Human Cognition and Rationality?

The research conducted by Amutha et al. focuses on the human cognition and emotion of soldiers. They mention in their paper that the different information people gain is stored in different parts of the brain in multiple different formats. Also, "the brain uses various voltage levels and timing signals for storing this information (Amutha et al., 2015)." Together, they convey that the emotions of humans change with changes in environmental parameters. As this paper focuses on the aspect of the environment's effect on emotion, this assists in answering the research question, "Do different environmental settings and situations affect emotions that affect human cognition and rationality?" In addition, they inform that "If the memory part of the brain accommodates the right information in the right place, there is no mismatch and mental disturbance. Otherwise, it leads to psychological disturbance (Amutha et al., 2015)" This informs that when a person is in an environment that is suitable for them. The correct information is conveyed, and they will be filled with positive emotions, which in turn results in no mental disturbance, which could be considered a positive impact on cognition and rationality as it results in avoiding physiological disturbance.

As an output of Amutha et al.'s observation and research, they note that an increased heart rate means an increase in negative emotion, arousing wrong behavior and leading to wrong decisions, which provides evidence that emotions affect rationality and cognition. As their

observation, they inform that "When the soldier cooperates after counseling, environment change will provide him a better working atmosphere to work enthusiastically (Amutha et al., 2015)." This shows that the environment affects emotions, which in turn affects cognition and rationality, as it says soldiers feel better in a better environment as it improves their emotions, resulting in improved cognition and working enthusiastically. Expanding on this idea, the relationship between environmental conditions and emotional states is not confined to military settings alone. The concept resonates across various contexts, such as workplaces, educational institutions, and everyday life. A conducive environment, characterized by positive elements and supportive conditions, has the potential to enhance emotional well-being, fostering a more optimistic and constructive mindset. This, in turn, can contribute to heightened cognitive abilities, including improved focus, problem-solving skills, and overall enthusiasm in approaching tasks.

When discussing the influence of an environmental setting on emotions, people often think of significant changes such as relocating or moving to a different area, involving specific alterations like adjusting lighting, rearranging items in a room, or interacting with different people. However, the study conducted by Ko et al. directed its attention to something seemingly straightforward: the effects of the view from a window on emotions, thermal comfort, and cognitive performance. In this research, positive emotions are said to be happy or satisfied, and negative emotions are said to be sad or tired. The results of the study were that "In the space with versus without windows, the thermal sensation was significantly cooler (0.3 thermal sensation vote; equivalent to 0.74 °C lower), and 12% more participants were thermally comfortable. Positive emotions (e.g., happy, satisfied) were higher and negative emotions (e.g., sad, drowsy) were lower for the participants in the window versus the windowless condition. Working memory and the ability to concentrate were higher for participants in the space with versus

without windows, but there were no significant differences in short-term memory, planning, and creativity performance. (Ko et al., 2020)" The results of Ko et al.'s study offer strong evidence in favor of the theory that various environmental settings—especially those with or without windows—have a significant influence on the psychological and physiological components of the human experience.

In addition to having a considerable impact on thermal comfort—participants reported feeling much cooler and more comfortable—windows also had a significant emotional impact. Participants seated in spaces with windows reported higher levels of positive emotions, such as happiness and satisfaction, coupled with lower levels of negative emotions, including sadness and tiredness, compared to those in windowless conditions. The study also looked at the cognitive domain and found that windows in the surrounding environment had a positive impact on working memory and concentration. This emphasizes the significance of taking into account how the environment affects mental processes and raises the possibility of a relationship between the visual components of the environment and cognitive function.

Interestingly, there were no appreciable changes in short-term memory, planning, or creative ability, even though working memory and focus showed notable gains. From the above analysis, it can be noted that emotion and cognitive performance have a proportional relationship. When the participants experienced positive emotions, their working memory and ability to concentrate were higher. It is often claimed that when a person feels happy, their body becomes warmer, and this study supports and proves the claim true. With this study, there is a significant and positive response to the research question about how various environmental settings affect emotions and, in turn, affect cognition. The study emphasizes how emotional well-being can be influenced by the physical environment, as perceived through windows or not. In

particular, the study shows that when people are placed in environments with windows, they experience a warmer thermal sensation in conjunction with positive emotions like happiness and satisfaction. Significantly, an improvement in cognitive abilities coincides with this positive emotional state, highlighting the complex relationship between emotions, the environment, and cognitive function.

Research Question 02: What is the Relationship Between Emotions and Rationality?

In search of the answer to the research question, "What is the relationship between emotions and rationality?" a research paper by Brosch et al. focuses on the impact of emotion on perception, attention, memory, and decision-making. In this paper, they have mentioned that "Emotional cueing may not only lead to faster detection times, but also directly augment our perceptual capacity by increasing contrast sensitivity for the subsequent target (Brosch et al., 2013)," which is a piece of clear evidence that emotions have a connection with cognition as said in the quote, emotions increase the perceptual capacity, which is connected to cognition. As this shows that cognition and emotion are related, it is necessary to know if cognition has an effect on rationality due to the effect of emotions. Also, they inform that emotions modulate perception and attention through emotionally relevant stimuli. Attention and perception are required to make rational decisions. The research findings illuminate emotions' profound impact on various aspects of our mental landscape, including perception and affection. It is evident that emotions have the capacity to directly mold and influence the content of our perceptions and awareness. When we experience intense emotions, our world can appear differently to us, as if colored by the emotional lens through which we view it. This transformation of perception can indirectly contribute to our rationality by guiding our thoughts and decision-making processes. For

instance, a person experiencing fear may perceive a dark alley as more dangerous than it actually is, leading to the rational choice to avoid it.

Furthermore, emotions can also influence our affections and emotional responses. This transformation of perception can indirectly contribute to our rationality by guiding our thoughts and decision-making processes. For instance, a person experiencing fear may perceive a dark alley as more dangerous than it actually is, leading to the rational choice to avoid it. Furthermore, emotions can also influence our affections and emotional responses—additionally, the paper talks about the impact of emotion on decision-making. As an answer to the research question mentioned, whether there is a relationship between emotions and rationality, Brosch et al. state that recent research has shown emotion to be a critical factor in decision-making, which can be viewed as rationality. As mentioned in the paper, with the use of the Iowa Gambling Task and conducting a neuroimaging study investigation, they have reached the conclusion that emotions play a vital role in rationality as they conclude by saying that "These "emotional" responses can be more "rational" than decisions purely based on (economic) reason (Brosch et al., 2013)."

In addition to the previously provided evidence, Clore's research paper dives into the complex connection between emotion and rationality, providing an in-depth exploration of their interrelation. Clore navigates through various sections, including but not limited to "Rationality as Process" and "Rationality as Outcome." Within these sections, the paper engages in discussions containing cognition, moral beliefs, judgments, and the subtle ways in which emotion is intricately linked to these cognitive processes.

A piece of evidence that guides towards the answer to the second research question is, "In the 1960s, Nobel prize-winner Herbert Simon proposed the concept of "bounded rationality," and noted that emotion plays an important role in judgment and decision-making. (Clore, 2011)" It is

essential to note what "bounded rationality" means as it will assist in understanding how this evidence answers our research question. Herbert Simon's concept of bounded rationality challenges the traditional view that individuals always make decisions in an entirely rational and objective manner. Bounded rationality suggests that individuals are not always able to make entirely rational decisions due to cognitive limitations, time constraints, and information processing constraints. In this context, emotions are seen as integral to the decision-making process. It follows that our emotional states affect how we perceive information, weigh risks, and ultimately make decisions. Emotion is acknowledged as a crucial component of judgment and decision-making. In circumstances where an entirely rational analysis is impractical or impossible, emotions can serve as a guide or heuristic. They can offer prompt situation assessments, assisting people in navigating challenging environments where decisions must be made. This evidence supports the idea that emotions and rationality are interconnected and that a purely rational model of decision-making may not capture the complexity of human behavior.

Another crucial evidence is, "This evidence supports the idea that emotions and rationality are interconnected and that a purely rational model of decision-making may not capture the complexity of human behavior. (Clore, 2011)" The research question explores the relationship between emotions and rationality, and based on the evidence provided, it suggests that emotions play a crucial role in enforcing rational standards. As discussed at the beginning of the paper, there is a widespread belief that emotions might hinder rational thinking. The evidence suggests that emotions serve to reinforce rationality. The above sentence is one of the conclusions from Clore's research paper, and according to the statement, people are motivated to change their thoughts to be more rational and logical by emotions, solid ones that result from unreasonable ideas and beliefs. In other words, emotions act as a curative mechanism, prompting

individuals to address and rectify instances of irrationality. From the above evidence, it can be concluded that emotions and rationality are not necessarily opposing forces; instead, emotions contribute to maintaining and improving rational standards. This perspective suggests a symbiotic relationship between emotions and rationality, where emotions serve as a feedback mechanism that encourages individuals to align their thoughts and beliefs with logical principles.

In addition, from the previous evidence, Nobel Prize winner Herbert Simon's concept of "bounded rationality" and the role of emotion in judgment and decision-making was mentioned. It can be concluded that this evidence supports the idea that emotions and rationality are interconnected and that a purely rational model of decision-making may not capture the complexity of human behavior. The conclusion from Clore's study suggests that acknowledging the role of emotions in decision-making is essential for a more comprehensive understanding of how individuals navigate the challenges of making choices within the constraints of bounded rationality.

Apart from these studies, another study on Emotion and Decision Making by Lerner et al. also provides detailed information regarding how emotions influence rationality. Their study emerged with eight central themes of scientific inquiry related to emotions and decision-making. All of the themes convey how emotions affect decision-making. One of the themes is "Integral Emotions influence decision-making." In this theme, they discuss how integral emotion, "a type of emotion that strongly and routinely shapes decision making (Lerner et al., 2015)," can be a beneficial guide, like using anger to respond to injustice. Also, integral emotion causes bias in decision-making, like opting for driving instead of flying due to fear of flying when driving has a higher death rate. They added, "Integral emotions can be remarkably influential even in the presence of cognitive information that would suggest alternative courses of action (Lerner et al.,

2015)," which clearly shows that emotions influence rationality and cognition. As stated in the above sentence, an emotion influences rationality even though cognitive information is present. This shows how powerful emotions influence decision-making.

Along with guiding one to make the right decisions, emotions cause bias, clouding rationality. This study covers various aspects of how emotions affect rational decision-making. This research paper by Lerner et al. provides excellent support and answer to the question, "What is the relationship between emotions and rationality?" Though it cannot be labeled as a positive or negative relationship, with this paper's assistance, we can conclude that there is a relationship between emotions and rationality, and emotions influence rationality positively and negatively.

Research Question 03: Does the Effect in Cognition Due to Emotions Result in an Effect on Rationality?

Schwarz's research paper, which has conducted a meta-analysis of the existing research paper, provides insightful information that answers the third research question of whether cognition is affected by emotions, which in turn affect rational decision-making. To begin with, this sentence, "moods and emotions can profoundly influence cognitive processes. (Schwarz 2000)" provides a clear indication that emotions have an impact on cognitive function or cognition. In this context, the statement implies that the emotional states or moods experienced by individuals can go beyond subtle influences and profoundly shape or alter various cognitive processes. Then, this sentence, "individuals are more likely to recall information from memory that is congruent rather than incongruent with their current feelings ... individuals may use their apparent affective response to a target as a basis of judgement. (Schwarz, 2000)" illustrates how the human mind recalls information from memory depending on an individual's current emotional state. This connection implies that emotions play a role not only in encoding

memories or information but also in retrieving them as well. This showcases the intertwining of cognition and how it is affected by emotions. The second part of the sentence shows how this retrieval of information or memory is then used as a basis for judgment. This indicates that emotions not only influence cognition but also shape the evaluative and decision-making aspects of cognition and rationality. In other words, individuals rely on emotions or moods to guide their rational decision-making process. From the above sentence, the ideas can be combined to conclude that emotions influence the information that needs to be retrieved, in other words, influencing cognition, and this retrieved information serves as a foundation for judgment, in other words, affecting rationality or rational decision-making.

Further evidence that provides a positive answer to the research question is that "individuals in a happy mood tend to overestimate the likelihood of positive, and to underestimate the likelihood of negative outcomes and events, whereas the reverse holds for individuals in a sad mood. (Johnson & Tversky, 1983)." The sentence illustrates how a positive emotion, happiness, tends to think of positive outcomes and events compared to adverse outcomes, and when the individual is sad, a negative emotion, the reverse is experienced. When individuals are in a happy mood, they tend to employ a top-down processing strategy known as heuristic processing, where they rely heavily on pre-existing knowledge structures and pay little attention to details.

On the other hand, when the person is experiencing a negative emotion, they employ a bottom-up processing known as a systematic processing strategy, where they rely a little on pre-existing knowledge structures and pay more attention to the details at hand (Schwarz, 2000). This analysis demonstrates how emotions influence cognition, which in turn assists in making rational decisions with the information retrieved depending on the emotion or mood. Rationality

is being able to use reason and logic to make rational decisions. When matters at hand and previous experiences are not used coincidentally, and the person relies on one or the other more when making judgments, it means that reasonable judgments or reasoning is not being made, affecting rationality. Overall, this shows the interconnectedness between emotions, cognition, and rationality. It suggests that the emotional environment in which cognitive processes take place has an impact on rationality or the process of reaching reasoned conclusions.

Furthermore, Robinson et al.'s research paper provides excellent evidence that delivers a robust and reliable answer to the research question. They mentioned in the paper that "Current mood, anticipatory, and anticipated emotions are such influences. Anticipatory emotions are emotional reactions experienced in the present brought about my thinking of the future. Anticipated emotions, on the other hand, are primarily cognitive expectations about future emotions without actually experiencing them in the present. (Robinson et al, 2013)" The authors showcase different dimensions of emotions by differentiating them between current mood, anticipatory emotions, and anticipated emotions. By illustrating this, they show that human emotions can be linked not only to the present but also to past and future events. This acknowledgment of emotions across different timings emphasized the connection between cognitive processes and emotional experiences.

These different emotions, anticipatory and anticipated, trigger thoughts about the future and past and influence decision-making along with the current emotions. This relationship suggests that emotions, including those associated with future events, influence the cognitive processes that go into making decisions, which may have an impact on how rationally people make decisions. With this evidence, the complex interaction between cognition or cognitive processes and their being influenced by emotional states, together contributing to rationality, is

shown to answer the research question that the effect in cognition due to emotions does result in an effect on rationality.

CONCLUSION

The current observations, meticulous analysis, and ongoing research endeavors have led to making some noteworthy progress in formulating answers to the pivotal research questions at the core of the investigation.

The explorations have revealed that environmental settings and specific situations have an impact on emotional states. These emotions can significantly mold a person's thinking and decisions in a cascading effect. The research study conducted by Amutha et al. has yielded valuable insights into this relationship, showing the importance of strengthening our findings with a broader array of references. Relying solely on a single source for a question of such significance may leave room for a more dependable understanding. Therefore, to make the research findings credible, a commitment is made to expanding our scope and engaging in a more extensive review of existing literature to fortify our conclusions. By doing so, we aspire to gain a more comprehensive perspective on how diverse environmental contexts and situations influence emotions and, in turn, the cognitive processes of individuals.

The comprehensive study undertaken by Brosch et al. has provided us with in-depth insights into the intricate understanding between emotions and rationality, especially concerning decision-making. In addition, the resource-filled paper by Clore, Lerner et al., and other researchers provides detailed and robust support to the research question regarding the relationship between emotions and rationality and the claim that emotions have an impact on rationality. The quest for knowledge extends to considering multiple viewpoints and drawing from various sources to enhance the reliability of our findings. In summary, while the initial

research has illustrated the path toward answering these pressing research questions, it is necessary to diversify the sources used as references to ensure a well-rounded and credible outcome.

Research papers by Robinson et al., Schwarz, and other researchers are filled with meta-analyses of existing research papers and studies that primarily focus on the impact of emotions on cognition and rationality, sincerely assisting in finding a positively conclusive answer to the research question of whether the impact of emotions on cognition leads to an influence on rationality. Their papers showed how positive emotions make a person overestimate the likelihood of positive events and outcomes and vice versa when experiencing negative emotions. These recalls of events relate to cognition, and these events are used as a basis for judgment. This shows us how complex and in-depth cognition, rationality, and emotions are and how they are intertwined.

Different research papers, studies, and journals were considered for this research. All this intense and in-depth research has led to the selection of the positive possible answers for each research question from the different alternatives provided in the Alternatives section of this paper. For the first research question, this research shows that certain environments evoke specific emotions, impacting cognition and rational decision-making. Then, for the second research question, the pieces of evidence from multiple papers support the answer that there is a positive correlation that heightened emotional states enhance rationality or specific aspects of rational decision-making. Finally, for the final research question, the basis of evidence guides us to see that the best answer from the different alternatives is the first answer, which states that emotions affecting cognition have an impact on rationality.

References

- Amutha, B., Kurian, B., Nanmaran, K., Parvathi, N., Sivagami, G., & Balasubramanian, M. (2015, November). *Human Cognition and Emotion using Physio - ProQuest*. [Www.proquest.com](https://www.proquest.com/docview/1764140997?pq-origsite=primo). <https://www.proquest.com/docview/1764140997?pq-origsite=primo>
- Bouffard, J. A. (2002). The influence of emotion on rational decision making in sexual aggression. *Journal of Criminal Justice*, 30(2), 121–134. [https://doi.org/10.1016/s0047-2352\(01\)00130-1](https://doi.org/10.1016/s0047-2352(01)00130-1)
- Brosch, T., Scherer, K., Grandjean, D., & Sander, D. (2013). The impact of emotion on perception, attention, memory, and decision-making. *Swiss Medical Weekly*, 143(1920). <https://doi.org/10.4414/smw.2013.13786>
- Chater, N., Felin, T., Funder, D. C., Gigerenzer, G., Koenderink, J. J., Krueger, J. I., Noble, D., Nordli, S. A., Oaksford, M., Schwartz, B., Stanovich, K. E., & Todd, P. M. (2017). Mind, rationality, and cognition: An interdisciplinary debate. *Psychonomic Bulletin & Review*, 25(2), 793–826. <https://doi.org/10.3758/s13423-017-1333-5>
- CIAN, L., KRISHNA, A., & SCHWARZ, N. (2015). Positioning Rationality and Emotion: Rationality Is Up and Emotion Is Down. *Journal of Consumer Research*, 42(4), 632–651. <https://www.jstor.org/stable/26570234>
- CLORE, G. L. (2011). PSYCHOLOGY AND THE RATIONALITY OF EMOTION. *Modern Theology*, 27(2), 325–338. <https://doi.org/10.1111/j.1468-0025.2010.01679.x>
- Gray, J. R. (2004). Integration of Emotion and Cognitive Control. *Current Directions in Psychological Science*, 13(2), 46–48. <https://doi.org/10.1111/j.0963-7214.2004.00272.x>

- Johnson, E. J., & Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal of Personality and Social Psychology, 45*(1), 20–31. <https://doi.org/10.1037/0022-3514.45.1.20>
- Kirman, A., Livet, P., & Teschl, M. (2010). Rationality and emotions. *Philosophical Transactions of the Royal Society B: Biological Sciences, 365*(1538), 215–219. <https://doi.org/10.1098/rstb.2009.0194>
- Ko, W. H., Schiavon, S., Zhang, H., Graham, L. T., Brager, G., Mauss, I., & Lin, Y.-W. (2020). The impact of a view from a window on thermal comfort, emotion, and cognitive performance. *Building and Environment, 175*, 106779. <https://doi.org/10.1016/j.buildenv.2020.106779>
- Larue, O., West, R., Rosenbloom, P. S., Dancy, C. L., Samsonovich, A. V., Petters, D., & Juvina, I. (2018). Emotion in the Common Model of Cognition. *Procedia Computer Science, 145*, 740–746. <https://doi.org/10.1016/j.procs.2018.11.045>
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). Emotion and decision making. *Annual Review of Psychology, 66*(1), 799–823. <https://doi.org/10.1146/annurev-psych-010213-115043>
- Pham, M. T. (2007). Emotion and Rationality: A Critical Review and Interpretation of Empirical Evidence. *Review of General Psychology, 11*(2), 155–178. <https://doi.org/10.1037/1089-2680.11.2.155>
- Phelps, E. A. (2006). Emotion and Cognition: Insights from Studies of the Human Amygdala. *Annual Review of Psychology, 57*(1), 27–53. <https://doi.org/10.1146/annurev.psych.56.091103.070234>

- Robinson, M. D., Watkins, E. R., & Harmon-Jones, E. (2013). Handbook of Cognition and Emotion. In *Google Books*. Guilford Press.
- [https://books.google.com/books?hl=en&lr=&id=3K1BzZ67azsC&oi=fnd&pg=PA252&d
q=emotion+cognition+and+decision+making&ots=sPtTIOVSqR&sig=nz7vSk7qDWxAi
sWIkJugOYhUegM#v=onepage&q&f=false](https://books.google.com/books?hl=en&lr=&id=3K1BzZ67azsC&oi=fnd&pg=PA252&dq=emotion+cognition+and+decision+making&ots=sPtTIOVSqR&sig=nz7vSk7qDWxAisWIkJugOYhUegM#v=onepage&q&f=false)
- Scherer, K. R. (2011). On the rationality of emotions: or, When are emotions rational? *Social Science Information*, 50(3-4), 330–350. <https://doi.org/10.1177/0539018411411018>
- Schwarz, N. (2000). Emotion, cognition, and decision making. *Cognition & Emotion*, 14(4), 433–440. <https://doi.org/10.1080/026999300402745>