

Cognitive Mechanisms involved in Judgment Making: An Integrative Paper

Devangi Maheshwari^{1*}

ABSTRACT

An integration of two papers, provides a holistic understanding of the cognitive mechanisms that take over when an overpowering emotional response conflicts with the ability to make utilitarian judgements. The findings of two papers delve deeper into how different emotions influence whether we uphold deontological or consequentialist judgements. More importantly, it examines the alternate cognitive route that moral judgment can take – namely one involving emotion rather than rational thought. Finally, it answers the question of whether utilitarian judgements can be upheld in the face of strong emotional and moral dissonance.

Keywords: *Cognitive Mechanisms, Judgment Making*

The social world is dynamic and full of complexities. Our thoughts, behaviors and decisions are constantly determined by what we believe is right or wrong. As we go about our daily life, we are constantly forced to use our moral cognitive abilities to make judgements and decisions and form our opinions on various topics. Although morality is influenced by one's learning and experience, it is largely innate and forms a core aspect of human behavior. Even as children we tend to look at the world in terms good and bad and correct or wrong (Hamlin, 2013). Moral cognition involves the neural mechanism that determines the moral judgments we make and takes into account our rationalizations, emotion, reasons, biases, heuristics and many other such components (Reese et al., 2020). Thus, moral cognition forms one of the most important aspects of our social cognitive skills and shapes our motivations and actions.

The two papers under study focus on the domain of moral cognition, specifically moral judgment. A well-established theory of moral cognition proposes dual brain processes that are utilized by us to make moral judgements. These papers focus on one of the two paths – the intuitive emotional response – that helps us make moral judgments in response to certain social situations and stimuli (Greene, 2007). The first paper investigates how emotional blunting, a symptom of frontotemporal dementia, affects the way people make moral judgements in emotionally charged situations (Mendez et al., 2005). The second paper focuses on how emotional judgment is shaped by manipulating the emotional context in which the situation is presented (Valdesolo & DeSteno, 2006).

¹Tufts University, India

*[Corresponding Author](#)

Received: November 16, 2023; Revision Received: November 25, 2023; Accepted: November 28, 2023

Cognitive Mechanisms involved in Judgment Making: An Integrative Paper

When engaging in moral thought – specifically utilitarian moral judgements – there are two different modes of processing associated with two outputs. One involves hedonic, automatic processing resulting in deontological judgements while the other involves controlled, effortful processing leading to utilitarian judgements (Kahane, 2012). Most of the time, these two processes work together to guide decisions, considering both socially adaptive outcomes as well as the more individual and abstract, internal moral principles. However, sometimes the goals of these two processes conflict with one another when evaluating certain moral dilemmas. In some situations, we are required to go against our instinctual emotional response in order to make a utilitarian judgment. This paper seeks to establish a link between perceived emotional load experienced while making the judgment and the resultant moral judgment.

Contrary to popular belief, moral judgements don't rely solely on rational thought and often heavily rely on the emotional aspect too. Various neuroimaging-based studies show that making moral judgements activates brain regions engaged in emotional processing. The ventromedial prefrontal cortex (VMPC) is neuronally linked to the brainstem and the basal forebrain—both responsible for emotional responses, especially social emotions. Additionally, VMPC neurons determine the emotional value assigned to sensory stimuli (Koenigs et al., 2007). Koenigs and colleagues studied patients with damage to their VMPC. They found that patients reached an unexpected utilitarian moral decision on questions that offered the choice of a highly emotional aversive outcome that was better for the greater good. Their answers were excessively utilitarian as compared to their neurotypical counterparts. However, in other classes of moral judgment, their answers followed the typical trend.

This paradoxical finding resulted in the theorization of the dual process model of moral judgment. According to this theory, situations that evoke a prepotent, negative emotional reaction conflict with moral approval. Alternatively, in situations that do not involve a negative emotional response people quickly choose the utilitarian path. When there is a clash between an emotionally aversive option and the utilitarian one, additional cognitive control is required for the utilitarian option to be chosen (Greene, 2007). When the immediate intuition is followed i.e., emotional factors are accounted for, deontological reasoning prevails. But, when this emotion can be overridden or cognitively controlled, a contrary utilitarian conclusion is reached (Kahane, 2012).

'Personal' actions or those that involve direct interaction trigger an emotional response. This usually gives rise to a deontological judgment. These are those judgements that align with what one considers rights and duties and are more abstract. On the other hand, 'Impersonal' actions trigger moral reasoning. This line of thought allows for consequentialist judgements that are considered with the greater good and aim to benefit the largest number of people (Guglielmo, 2015).

Each component of this proposed process manifests in a different brain region. As mentioned earlier, the negative emotional response is identified and managed by the VMPC (Koenigs et al., 2007). Contrarily, utilitarian responses are promoted by the dorsolateral prefrontal cortex. The conflict between these emotionally charged and utilitarian reasoning is recognized by the anterior cingulate cortex. From here neural impulses project to other cognitive centers initiating additional cognitive control (Greene et al., 2004).

Cognitive Mechanisms involved in Judgment Making: An Integrative Paper

The limbic system is responsible for emotional and behavioral regulation. Using fMRI evidence, it was observed that the limbic system is activated in response to moral dilemmas prior to the activation of the frontal areas. It was also found that the anterior cingulate cortex had a significant role in detecting the conflict and reducing the limbic system response, thus allowing the frontal areas to take over and subvert the limbic response (Reese et al., 2020).

Other studies support this emphasis of emotion in moral judgment. Using fMRIs brain areas associated with emotion and working memory were identified. It was found that the moral-personal condition had significant effect as compared to the moral-impersonal and non-moral conditions. All the areas that showed heightened activity in response to a moral personal question were functionally linked with emotion processing. The behavioral data involving response time too supported this. The moral-personal condition correlated with higher reaction times implying emotional interference leading to a prolonged judgment making period. Another important finding was that the mental activity involved in making non-personal moral decisions resembled the mental activity involved in making non-moral decisions more than they did personal moral decisions. This is important as it shows that emotional engagement in moral judgment manifests in a separate capacity and must involve a separate route (Greene et al., 2001).

To further understand these opposing processes, two moral dilemmas are utilized, each targeting a specific pathway of moral judgment. The emotionally laden or 'personal' moral scenario is known as the footbridge problem. This is set up as follows: Five people's lives can be saved by sacrificing the life of another individual. However, to do this, one must push a large person off a footbridge onto the path of the trolley to stop it - killing the man but saving the others. The 'impersonal' dilemma serves as a control and involves flipping a switch to divert a trolley - killing one person and saving five. The footbridge dilemma involves a prepotent negative response. The thought of pushing and thereby causing their death is extremely emotionally aversive and is normally morally disapproved. The trolley problem doesn't elicit such an emotional response as it is a more detached judgment. The two dilemmas work together as the trolley dilemmas is logically-equivalent to the footbridge one and involves the same line of reasoning. They differ in their capacity to elicit a utilitarian outcome as the footbridge dilemma involves an internal conflict between moral standing and emotional discomfort.

It may seem surprising that a utilitarian judgment is often infrequent in certain cases despite being more logical. This can be attributed to the increased activation of brain regions responsible for deliberation. These centers must exercise cognitive control over the emotional reaction and must disregard the intuitive negative reaction. So, it might seem like the ultimate responsibility for these decisions is that of the individual's capacity to analyze the situation in a controlled manner but that is not the case. The suggested dual-process theory offers a second route that the chosen papers provide evidence for (Valdesolo & DeSteno, 2006).

The first study I chose aimed to understand what was causing abnormal moral judgments in patients with frontotemporal dementia (FTD) (Mendez et al., 2005). FTD is a neurodegenerative disorder that alters the patient's personality and social behavior. It is characterized by a loss of awareness of social norms and expected behavior and can even lead to sociopathic tendencies in extreme cases. Patients with FTD especially struggle with maintaining socially acceptable moral behaviors and following rules. Central to FTD symptoms is emotional blunting or the complete inability to empathize with others and

Cognitive Mechanisms involved in Judgment Making: An Integrative Paper

appraise feelings. This directly translates into an inability to understand how their behavior relates to the consequences of it. For patients with FTD, multiple causes could lead to atypical morality. It could be a consequence of ‘moral agnosia’ – the inability to tell right from wrong or from not being able to rationalize and use reason to come to conclusions in moral situations. Lastly, it could be because, due to their cognitive deficit, moral dilemmas are unable to elicit an emotional reaction from them. We are concerned with the latter.

The participants were all chosen by convenience sampling through undergoing treatment for dementia at clinics. The patients were moderately impaired. This was evaluated by a series of tests that evaluated their neurobehavioral functioning, a laboratory assessment, and MRIs. None of the patients in the study were on antipsychotic medications and didn’t have any other psychiatric disorders. Three sets of 26 participants were chosen: an FTD group, a group of AD patients and a neurotypical group.

All FTD patients presented with similar symptoms. They all had significant changes in social behavior and social and personal conduct. They failed to recognize their disease and had emotional blunting. Their diagnosis was based on Consensus Criteria for FTD and was confirmed using a CT or PET Scan. The participants with AD served as a comparison group. Each met the clinical criteria that deemed them as AD patients post an evaluation. Both the patients with FTD and AD had early age onset of their respective disorders. The second comparison group comprised 26 normal individuals that were mostly spouses of the patients. This was done so that there was similarity between age, gender, background, and environment of the other patients. None of the control group patients had any neurologic or psychiatric disease.

Prior to the experiment, several tests were administered to the people in the FTD and AD groups to determine the extent of their impairment amongst other things. These included, but were not limited to, the CERAD, Boston Naming Test and memory tests. A six item Frontal Assessment Battery was also administered.

The main experiment consisted of two parts. The first one aimed to test the general morality of the groups. This was done by administering the Moral Behavior Inventory. This is a 24-item questionnaire in which answers are given on a 4-point Likert scale. The test is created to control for religious and cultural differences amongst participants. The items were read out to the participants and read out if necessary. The second part of the experiment involved presenting the participants with the two moral dilemmas discussed above. Again, the vignettes were read out and clarification and repetition were permitted. After the vignette was read out to them, participants were asked to explain the prompt back to the experimenter to ensure that they understood the prompt. The participants were then asked to come up with a “yes” or “no” response for each.

In terms of general morality, as per the MBI, there were no statistically significant differences among the three groups. However, the second part of the experiment revealed an interesting distinction between FTD patients and the other groups. While answers across the three groups were consistent in response to the trolley problem with most answering that they would pull the switch, when it came to the footbridge dilemma this was not the case. A majority of patients in the FTD group chose to push the large individual onto the tracks to save the others, but relatively few people in the other groups agreed to do the same. Nearly 58% of participants in the FTD group made this choice while approximately 23% and 19% of people chose to in the other groups, respectively. Participants were also asked for the

Cognitive Mechanisms involved in Judgment Making: An Integrative Paper

rationalization for their choices. Most who answered “yes” justified it by saying they were able to save more lives. Those that answered “no” attributed it to feeling like it was not okay and wrong. It is imperative to note that FTD patients did not reveal any emotional distress while making any choice.

This study provides support for the idea that there may be a second route to moral cognition that is driven by emotion. The moral discrepancy in FTD patients did not extend to all domains of moral judgment and was restricted to “personal” moral dilemma. In all other domains, the answers of participants in all 3 groups were similar. The FTD patients were able to utilize their moral knowledge and apply it to impersonal dilemmas so that their answers fit within the constraints of acceptable social norms and behaviors.

FTD patients experience moral discrepancy early in the onset of their dementia. There was also an apparent inability to regulate behavior leading to patients acting out in socially unacceptable ways. Sociopathic and antisocial tendencies were observed too. It could be true that their lack of emotional understanding could be the root cause of their abnormal behavior.

MRIs show that “impersonal” moral judgements require other cognitive abilities such as working memory and abstract thought to weigh in. Thus, if there is dorsolateral frontal damage, impairment of this type of morality is also seen. Impaired responses to the footbridge dilemma, which involves “personal” judgements, were correlated to damage in the ventromedial prefrontal cortex. The idea of pushing a complete stranger and causing their death triggers a potent emotional response that is not triggered by the more indirect consequence as in the switch situation. Since the responses are different for each of the two situations, there must be an emotional component to moral cognition.

The ventromedial frontal system functions such that it replicates the same emotional and mental state that they assume others are experiencing, in themselves. For example, in the case of the footbridge dilemma, one would experience what it would feel like for the large individual to be pushed off a footbridge to their death. These emotional reactions could be learnt or innate. There are a few theories that explain these. A prominent one posits that perceiving other’s moods and feelings activates one’s own mental representation of those same feelings. Unless an active effort is made to repress them, they will influence the way we approach a moral dilemma.

Now that we have considered a situation in which lack of negative emotion can motivate a utilitarian judgment, it raises the question whether positive emotion can do the same. Furthermore, how is this affected when we consider environment-dependent emotions? The second paper aims to answer these questions. This study involved 79 participants that were induced with a positive or neutral emotion, following which they were presented with both the dilemmas along with some distraction questions that did not require moral cognition. Positive effect was induced by showing participants a funny clip. Those in the neutral group were shown a documentary. Their positive mood was confirmed by having them select an option from a 7-point descriptor that assessed it. Participants were shown the dilemmas along with different courses of action and were made to label them as appropriate or inappropriate within a period of 15 seconds.

Those in the positive affect group who had viewed the positive clip did indeed have a more positive affect with a mean of 4.57. Comparatively, the neutral effect group had a mean of

Cognitive Mechanisms involved in Judgment Making: An Integrative Paper

2.77. Results from the moral judgment test too aligned with the prediction that the participants in the positive affect group were more likely to choose the utilitarian course of action in response to the footbridge dilemma. Contextual effect did not affect the trolley dilemma. It was also shown that longer response times meant that it was more likely that the participants would select the expected response but only for the footbridge dilemma. There was no correlation of affective state between response time and the footbridge or trolley dilemma.

These results too, support the presence of an emotion-based component to moral judgements. It also adds on to our prior knowledge and shows that the causal efficacy of emotion as a determinant of moral judgements is not exclusive to the internal reaction caused due to the moral dilemma but also includes contextual effect. Therefore, relevant affective cues, imbibed from the environment, can serve as a precursor to taking the moral decision. As a corollary, manipulating the environmental cues can in turn change the judgements people make. For contextual affect to be able to change the way we process and weigh our options, there must be an emotion driven cognitive pathway that is being utilized. Positive emotion increases the likelihood that a utilitarian or consequentialist decision is reached. Affective states provide instantaneous information about our surroundings and can be realized in various ways. Due to this, emotions invoked by environmental factors -- despite being independent and different from those invoked by the moral dilemma -- can alter the judgment being made. When these emotions are experienced either simultaneously or in rapid succession, the negative emotion caused by the moral dilemma may be disturbed. This disturbance can affect the direct link between the prepotent emotional response consequent of the dilemma, and the choice made. Thus, positive feelings induced by environmental factors may counteract the negative emotions caused by dilemmas involving 'personal' actions therefore reducing the dissonance felt due to personal moral violation and increasing the potential for utilitarian responding.

Taking stock of both our papers, one thing is amply clear -- there is irrevocable support for an alternate, emotion-based pathway when it comes to making moral judgements. The first paper looked at the case of 'emotional blunting' and how that affected the moral judgements we make. Previous studies have shown that in normal individuals, a perceived negative emotion leads to less utilitarian judgements. This can be attributed to the fact that pushing someone off a footbridge ignites a visceral emotional response which overpowers the perceived gain from the lives saved. However, due to emotional blunting people aren't able to fully understand emotions, especially those relating to social situations. They also lack the ability to empathize -- an integral aspect when considering whether to cause harm to someone else or not. These culminated in patients with FTD opting for a more utilitarian response. This meant that they weren't as opposed to causing harm to others for the sake of common good. As they weren't able to experience the negative response elicited by the thought of pushing someone to their death, they were able to look at the situation more rationally. Those in the control group consisting of neurotypical individuals and those in the comparative group consisting of individuals with AD both followed the expected trend and showed disapproval for the footbridge dilemma involving personal actions but rather readily approved of the trolley dilemma with impersonal actions.

When viewing this from the lens of the Greene (2007) dual process theory, the findings of paper one fit well within it. In the case of the non-FTD patients, their emotional intuition led them to believe that harming another individual was wrong. This conflicted with the idea that more lives were being saved overall. Therefore, their utilitarian judgment was inhibited.

Cognitive Mechanisms involved in Judgment Making: An Integrative Paper

Thus, the personal action was followed by an intuitive emotional response ultimately ending in a deontological judgment. Contrarily, although the FTD patients were faced with a situation involving a personal action, their emotional blunting meant that they were unable to have and consider an intuitive response. This forced them to go down the path of moral reasoning which ended in them making consequentialist or utilitarian judgments.

On the other hand, the second paper examined how contextual affect influenced moral cognition. If a negative emotional response resulted in deontological judgements, it questioned whether induced positive emotion would counteract it leading to a utilitarian response. The results of the study supported this hypothesis. It was found that when a positive emotion was induced in the participants, a utilitarian judgment was deemed appropriate. This too fits within the dual process model proposed by Greene. When the participants were faced with a situation demanding a personal action, they experienced the intuitive negative emotion. However, the induced environmental positive emotion neutralized it. Because of this participants were able to look at the problem more rationally and thus came to a utilitarian judgment.

Utilizing the findings of both papers, we can delve deeper into the emotion-based route as well. The following mechanism can be assumed. When one is faced with a personal situation that draws a negative response, they will make a deontological judgment. When faced with an impersonal situation participants have the opportunity to carefully examine the situation and make a rational judgment which is usually utilitarian. Utilitarian judgements are clouded by emotion. But when the emotion is not allowed to interfere, a logical decision can be reached. Inducing a positive emotion allows one to do that by preventing the negative emotion from interfering with the objective judgment. A negative emotion leads to a deontological judgment while a positive emotion or lack of negative one leads to a consequentialist or utilitarian judgment. Depending on how the situation is presented it evokes the corresponding emotional response resulting in the respective judgment.

To summarize, deontological judgements are consequent of emotional processing, but utilitarian judgments are consequent of cognitive processing. Each pathway is realized independent of one another and is triggered by the type of emotional response the question entails.

In spite of the seeming sturdiness of the dual process model, there are a few criticisms that can be raised. A common claim attributes these utilitarian judgments to “reduced prosocial moral sentiments” that stem from an integration instead of conflict between the emotional and cognitive centers. (Moll & de Oliveira-Souza, 2007). This argument is based on the assumption that utilitarian judgements can actually be self-serving at times thus prompting patients with frontal lobe damage to engage in them. However, this claim can be refuted using the information gathered by integrating the findings of these two papers. Seemingly, patients with reduced emotional awareness may be the most prosocial of us all. Both patients with FTD as well as in those participants in whom positive emotion was induced were supportive of utilitarian judgements. These utilitarian judgments, in response to the footbridge dilemma discussed above, are not linked to selfish ideals but are, in fact, motivated by the idea of doing a greater good.

Although the studies were valid, there were a few limitations and confounding variables that need to be mentioned. Primarily, the first study didn't account for the fact that a number of other cognitive deficits that were directly caused by the FTD could have hampered the

participant's ability to provide an accurate answer. This could include impairments in their understanding of the Theory of Mind which could have prevented them from understanding others' perspectives. Other deficits could have also obstructed their performance on the vignettes. Furthermore, the study only looked at damage to the ventromedial frontal cortex and disregarded other brain parts like the dorsolateral frontal gyrus, amygdala etc. that play important roles in moral cognition.

Further research would be required to determine whether this model is solely applicable to utilitarian judgements or if it can be applied to other domains of moral thought. It would also be interesting to study the reasonings given for the decisions reached in order to understand if they are consistent with our proposed model. Finally, research must be conducted to study whether results remain consistent when conducted with participants from different cultures as well.

Overall, these papers provide sufficient evidence for the presence of a moral cognitive route alternative to one that involves rational thought. Using the findings from both studies, there is enough evidence for this proposed alternate route to be one that is based on and guided by emotions. The papers have also allowed us to trace this pathway and look at how different situations alter and influence the outcome. There is a distinct connection between emotions and our moral cognition, especially those concerning utilitarian judgements. Future research can help make this relationship more explicit.

REFERENCES

- Greene, J. D. (2007). Why are VMPFC patients more utilitarian? A dual-process theory of moral judgment explains—ClinicalKey. *Trends in Cognitive Sciences*, 11(8), 322–323.
- Greene, J. D., Nystrom, L. E., Engell, A. D., Darley, J. M., & Cohen, J. D. (2004). The Neural Bases of Cognitive Conflict and Control in Moral Judgment. *Neuron*, 44(2), 389–400. <https://doi.org/10.1016/j.neuron.2004.09.027>
- Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI Investigation of Emotional Engagement in Moral Judgment. *Science*, 293(5537), 2105–2108. <https://doi.org/10.1126/science.1062872>
- Guglielmo, S. (2015). Moral Judgment as Information Processing: An Integrative Review. *Frontiers in Psychology*, 6. <https://doi.org/10.3389/fpsyg.2015.01637>
- Hamlin, J. K. (2013). Moral Judgment and Action in Preverbal Infants and Toddlers: Evidence for an Innate Moral Core. *Current Directions in Psychological Science*, 22(3), 186–193. <https://doi.org/10.1177/0963721412470687>
- Kahane, G. (2012). On the Wrong Track: Process and Content in Moral Psychology. *Mind & Language*, 27(5), 519–545. <https://doi.org/10.1111/mila.12001>
- Koenigs, M., Young, L., Adolphs, R., Tranel, D., Cushman, F., Hauser, M., & Damasio, A. (2007). Damage to the prefrontal cortex increases utilitarian moral judgements. *Nature*, 446(7138), 908–911. <https://doi.org/10.1038/nature05631>
- Mendez, M., Anderson, E., & Shapira, J. (2005). An Investigation of Moral Judgement in Frontotemporal Dementia. *Cognitive and Behavioral Neurology: Official Journal of the Society for Behavioral and Cognitive Neurology*. <https://doi.org/10.1097/01.wnn.0000191292.17964.bb>
- Moll, J., & de Oliveira-Souza, R. (2007). Moral judgments, emotions and the utilitarian brain. *Trends in Cognitive Sciences*, 11(8), 319–321. <https://doi.org/10.1016/j.tics.2007.06.001>

Cognitive Mechanisms involved in Judgment Making: An Integrative Paper

- Reese, M., Bryant, D., & Ethridge, L. (2020). Biomarkers for moral cognition: Current status and future prospects for neurotransmitters and neuropeptides. *Neuroscience & Biobehavioral Reviews*, *113*, 88–97. <https://doi.org/10.1016/j.neubiorev.2020.03.009>
- Valdesolo, P., & DeSteno, D. (2006). Manipulations of Emotional Context Shape Moral Judgment. *Psychological Science*, *17*(6), 476–477. <https://doi.org/10.1111/j.1467-9280.2006.01731.x>

Acknowledgment

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author(s) declared no conflict of interest.

How to cite this article: Maheshwari, D. (2023). Cognitive Mechanisms involved in Judgment Making: An Integrative Paper. *International Journal of Indian Psychology*, *11*(4), 1672-1680. DIP:18.01.150.20231104, DOI:10.25215/1104.150