

## RATIONALITY AND EMOTIONS IN DECISION MAKING

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### ABSTRACT

Decision making is traditionally viewed as a rational process where reason calculates the best way to achieve the goal. Investigations from different areas of cognitive science have shown that human decisions and actions are much more influenced by intuition and emotional responses than it was previously thought. In this paper I examine the role of emotion in decision making, particularly Damasio's hypothesis of somatic markers and Green's dual process theory of moral judgment. I conclude the paper with the discussion of the threat that deliberation and conscious rationality is an illusion.

### KEY WORDS

philosophy of cognitive science, decision making, emotions, the problem of free will, ethics

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## **INTRODUCTION**

On the one hand, decision making is a process we are quite familiar with, because we often find ourselves in situations which can be described as decision making. For example, at this very moment I am deciding whether to attend a lecture or stay at home and write an article. I weigh my options: on the one hand, I would like to hear the lecture of a colleague I esteem highly and whose lectures are always well-prepared and interesting, but, on the other hand, I am haunted by the feeling of obligation, as – yet again! – I am late with my article and therefore have to finish it as soon as possible. I have to decide between these two choices and soon realize that I will be staying at home in front of my computer. This is my choice, and I feel it to be the final result of conscious deliberation and freewill, because I could have decided otherwise and went to the lecture, while staying up late to finish the article. On some other occasion, I decided to buy a book without any special deliberation, but with the distinct feeling that this was my decision. However, if we take a better look at the matter at hand and are not satisfied with such fairly stereotypical examples, we are faced – as with all other philosophically interesting notions – with a serious task. One does well to remember St. Augustine's often-quoted answer to the question on what is time: St. Augustine responded that, before the question was posed, he had been using the notion with no problems whatsoever, but as soon as he was confronted with the issue, he was dumbfounded.

The investigation of decision making is by no means limited solely to philosophy; it presents a challenge to scientists from a wide variety of disciplines who try to tackle the phenomenon from the third-person perspective (neuroscientists, psychologists, sociologists, economists, computer scientists) as well as to researchers who attempt to solve it with the first-person approaches. In the present article, we will be focusing primarily on the relationship between the conscious (voluntary) and unconscious (automatic) decision making processes. It will be shown how the dominant view in Western philosophy and science, according to which decision making was mainly a process of instrumental rationality, ignored the importance of emotions that often play an important role in decision making on unconscious level. On the other hand, recent investigations in the field of neuroscience have raised doubts as to whether the experience of conscious decision making is not merely an illusion. In my opinion, this conclusion is invalid and can be avoided, although many questions related to the philosophical problem of free will remain open.

## **RATIONALITY**

A common person from the street would probably give a more balanced view on decision making than philosophers and scientist who mainly deal only with the rational part of the decision making (at least until recently). Decision making was from Plato on regarded as a rational process although the influence of emotions was not totally rejected. The role of emotions was in setting the goals and in motivation, whereas in reaching practical decisions, reason and emotion were in opposition. The age of enlightenment and rationalism stressed reason even more and later, as Scheff [1] points out, the requirement that we should act in accordance to reason changed into the statement that we actually do act in accordance to reason, and emotions have slowly disappeared from the serious discussions. The result is overvaluation of the self control and of the awareness of the situation and negation of the other side of human behaviour, i.e. impulsiveness and lack of self control. But as a man from the street could tell us, there are many important decisions in life where we do not deliberate about alternatives and do not think about the consequences.

Nevertheless when philosophers talk about decision making, they usually think about rational decision making. So let us first look at different senses of rationality.

Ronald de Sousa [2; p.7] distinguishes between categorical sense and normative sense. Taking the categorical sense, the contrary of rational is arational. The criterion for the inclusion into the category rational is in the ability to behave because of reasons and the explanation of behaviour refers to goals, norms or values (e. g. example, the behaviour of a person who helps the child to open the door). Arational behaviour is caused neither with choice nor with deliberation and could not be explained on the basis of reasons (e. g. the fall of the rock). Having normative distinction in mind, one can distinguish rational from irrational behaviour. In this case the criterion is the answer to the following question: Is the belief or behaviour appropriately grounded in specific reasons, norms or values. Agent who is not rational in a normative sense could be criticized. Aristotle's characterization of humans as rational animals took categorical sense. Just because humans are rational (in categorical sense) we can sometimes describe their behaviours as irrational (e.g. when we incautiously run across the street).

Second line of the distinction goes with the usage of the notion of rationality and refers to thoughts or actions [2; p.121]. In the first case we talk about epistemic rationality, where the question is in the matter of fitting representation with the world. The goal is to reach the truth and avoid falsity. Epistemic rationality is the concern of logic and epistemology. Second form is strategic rationality where the concern is the fitting of the world and the goals set by the agent's desires and choices. Disciplines dealing with these questions are decision theory and game theory, first is concerned more with individual decision maker and second with decision making in different social groups.

The third distinction is between theoretical and practical approaches. The theoretical approaches include scientific questions as are questions about explanation or prediction. The methods used are impersonal and in principle accessible to everybody. Practical deliberation concerns our individual actions like what should I do or what is the best to do.

Decision theory and game theory are normative theories based on the theory of rational choice. They thus presuppose an idealised rational individual who is informed, with ordered preferences and with the complete inside computer. For her to act rationally is to choose the action for which she computes the maximal utility or satisfies her preferences in the best way [3]. We can see that both decision theory and game theory are concerned with choosing between alternative possibilities and with computing the best outcome. Previous stages of decision making process, for example identification of the problem and obtaining necessary information, which are as important but may be more difficult to compute, are not represented in these theories [4].

Decision theory offers us different models that emphasize strictly rational approach and stress the importance of instrumental reason and the ability to calculate the best choice. But for describing the actual decision making processes these theories based on ideal rationality are not appropriate. Scientists were looking for more realistic approaches and Herbert Simon [5] proposed the notion of bounded rationality and Christopher Cherniak [6] theory of minimal rationality. Empirical investigation of reasoning in everyday situations which are uncertain or risky or require quick answers showed that people use heuristic instead of logical reasoning. These quick and economical processes do not need as much information as conscious reasoning. Some theoreticians take such processes as an origin for "cognitive illusions" [7] that are causes of conclusions and decisions not in agreement with the laws of logic and probability calculus [8]. Gigerenzer [9], in contrast, argues that these intuitive, unconscious processes have an adaptive value and must be appropriately valued. In recent years different

“dual process” theories have been developed. They pose two systems, one for quick, nonconscious and automatic processes (“System 1”) and one for slow, conscious and deliberative processes (“System 2”) [10]. There are also other features that characterize the systems so it is questionable if there is really only one System 1 or there are more. There is also no agreement if the two systems are two parallel systems, first representing implicit system of knowledge and second the explicit, that are in competition, or it is more a question of how preconscious processes contextualize deliberation and decision making. We will concentrate on emotions (System 2) and their role in decision making.

## **THE ROLE OF EMOTIONS AND FEELINGS IN DECISION MAKING**

Recently, many philosophers, neuroscientists and psychologists have pointed out that emotions play an extremely important role not only in goal setting but also in decision making. The philosopher de Sousa, for example, claims that when dealing with the issue of making decisions one can benefit significantly by accepting the hypothesis that emotions are active participants in decision making, as they make sure that only a small percentage of all possible alternatives and facts become relevant in the process [2]. Antonio Damasio has come to similar conclusions, but from the perspective of neuroscience and psychology. His definitions of emotions and feelings and the roles they play in decision making will be dealt with more thoroughly in the following sections.

### **DAMASIO’S VIEW ON EMOTIONS AND FEELINGS**

Antonio Damasio is one of the leading researchers in the field of neurobiology of mental processes. In addition to numerous scientific papers, he published three very popular books [11 – 13]. His first book, entitled *Descartes’ Error*, deals with the role of emotions and feelings in decision making. As its very title suggests, Damasio feels that Descartes wrongly identified rational decision making as being immaterial and separate from emotions.

In his book, Damasio describes the famous neurological case of Phineas Gage: an American construction worker who injured himself in 1848 while blasting rock. In the accident, the thrust of explosion carried an iron pole through Gage’s head. However, and much to everyone’s surprise, Gage, despite the gravity of his injury, managed to survive and was almost fully restored. But from a caring, working and tidy husband he became a completely different person: someone who was unreliable, impatient and incapable of following orders. The reconstruction of Gage’s injury indicates that frontal lobes (especially the left one) were damaged.

Damasio was confronted with a similar case – patient Elliot who, after the removal of his tumour, had a damaged ventromedial prefrontal cortex. After the surgery, Elliot’s character also changed significantly: his behaviour became inappropriate; at his work, he showed systematically lessened abilities of judgement. Even though standard tests of intelligence and memory failed to detect any significant changes, Elliot’s everyday behaviour was highly irrational. He was having especially serious problems with systematic planning. It seemed that he was contemplating every little detail of possible future actions that never even occurred. Damasio describes how, during one of his visits, he asked Elliot, which of the two dates for the next meeting would suit him best. Usually, a person would come to a conclusion after a brief reflection. But in Elliot’s case, this process became terribly prolonged, as he was going through all the possible reasons for and against a given date, until – after half an hour – he was interrupted by Damasio with a suggestion. Elliot accepted Damasio’s decision calmly and thereby ended his calculations [11; pp. 193-194].

Damasio noticed that other patients with damaged ventromedial prefrontal cortex have similar problems with decision making in their everyday lives. Such situations – in contrast to

solving problems in the laboratory where problems are limited and clearly defined – always contain a certain amount of uncertainty and vagueness. But how are we to explain the irrational behaviour of such patients, if their abilities of rational calculation seemed to remain intact? The prevailing theories of decision making emphasized the rational aspect of the process, as it was traditionally thought that the ability of rational decision making was what separated humans from other creatures. As mentioned above, the history of philosophy was dominated by the “negative view of emotions”, and many philosophers (e.g. Plato, Descartes and Kant) defended the view that in the process of rational decision making, emotions were a hindrance to clear thinking.

But clinical experience induced Damasio to start investigating the roles of emotions in decision making. With the help of his co-workers he examined and tested even more patients with the damaged ventromedial prefrontal cortex. He established that emotional responses play an important role in decision making processes both in everyday life and in laboratory conditions, which stimulate such circumstances. Since emotional responses were not detected in his patients, he concluded that their absence is the source of problems in decision making.

### **SOMATIC MARKER HYPOTHESIS**

Why do patients with damaged ventromedial prefrontal cortex have problems in uncertain situations and frequently fail to act in accordance with social rules? Damasio started tackling this problem by investigating the mechanism which enables emotional processes to guide or direct behaviour, most notably decision making. He named his approach the somatic marker hypothesis.

Damasio established that, when faced with situations which could lead to different types of action, these patients are unable to activate emotion-related memory that would help them pick the most advantageous alternative. It turned out that such patients are having especially serious problems with situations, in which they have to choose between mutually exclusive options and vague outcomes, such as choosing a career or making business decisions. And it was already seen that even seemingly simple tasks, such as choosing a date for the next meeting, posed grave problems for patients like Eliot.

Damasio states that an important part of the decision making process consists of the comparison of potential alternatives with emotions and feelings from similar past situations. Furthermore, the process also involves the estimation of results brought about by these past events and potential rewards or punishments that might have been gained during such events. This procedure enables us to simulate potential future outcomes based on our past experiences and then opt for a move that will lead to the best possible solution. People tend to classify situations, experienced under the influence of social emotions and emotions of joy and sorrow, which are, in turn, triggered by rewards and punishments, in conceptual categories. These categories are formed on both mental and corresponding neural levels, and are then connected with brain apparatus responsible for triggering emotions. This enables appropriate emotions to come about quickly and automatically. This is how Damasio describes the mechanism in neurological terms: “When circuits in posterior sensory cortices and in temporal and parietal regions process a situation that belongs to a given conceptual category, the prefrontal circuits that hold records pertinent to that category of events become active. Next comes activation of regions that trigger appropriate emotional signals, such as the ventromedial prefrontal cortices, courtesy of an acquired link between that category of event and past emotional-feeling responses. This arrangement allows us to connect categories of social knowledge – whether acquired or refined through individual experience – with the innate, gene-given apparatus of social emotions and their subsequent feelings.” [13; p.147]

Damasio and his co-workers did a series of tests, in which they simulated decision making in conditions of uncertainty. They used a psychological test designed by Bechara with co-workers from the University of Iowa, commonly referred to as the Iowa Gambling Test [14]. The test is carried out in the following manner: Participants are confronted with 4 decks of cards. They are told that every card they pick will bring them a certain amount of money, but occasionally a chosen card can also bring about the loss of money. A drawn card can therefore bring either punishment or reward. Bad cards are arranged differently in sets, so that some sets are “good”, because in the long run they bring profit, while some sets are “bad”, because in the long run they bring loss. The goal of the test is to make as much money as possible. The results of studies conducted by Damasio and his co-workers demonstrate that, after a certain number of drawn cards, healthy individuals choose only cards from the two “good” decks, while patients also opt for “bad” decks, even though they know they were causing them to lose money. Also, the participants’ skin conductance was measured, which is one of the physiological indicators of emotional reaction. It turned out that healthy individuals showed stressful reactions a lot sooner than they consciously realized that a given deck is “bad”. In contrast, patients with the damaged ventromedial prefrontal cortex did not have these reactions to “bad” results. Damasio therefore concluded that, because of their lesions, patients failed to develop physiological reactions to the threat of punishment. The emotion-related signal was therefore weakened, which, in turn, brought about problems with decision making.

Emotional signals can be conscious and can make us re-live the corresponding feelings, or they can be hidden and automatic. In this case, emotional signals mark the possibilities and outcomes as positive or negative (a kind of alarm) and thus help us decide to take actions that are in accordance with our past experiences. Since such decisions are made relatively quickly and without conscious thinking, they are often called “intuitive”. Damasio agrees with de Sousa when he says that emotions narrow the decision making space and, simultaneously, increase “the probability that the action will conform to past experience.” [13; p.148]. It is this narrowing of the decision making space that was lacking in Damasio’s patients.

Let me conclude this presentation with the observation that irrespective of the final judgement on the Damasio’s theory of emotion and feelings, he has given a strong push to a further investigation of the role of emotions in decision making.

## **DECIDING IN MORAL DILEMMAS**

Philosophers are particularly interested to investigate decision making in the situations when the agent is in a moral dilemma. They question the similarities and differences between decision making in moral and in ordinary context. Some think that in the case of moral dilemma we judge rationally and after conscious deliberation [15] while in the everyday situations without moral significance decisions are often left to automatic and unconscious processes. Others suggest the opposite. They regard decisions as results of automatic, unconscious processes and rational justification only as a form of later rationalization [16]. I think that both extremes are missing out important aspects and that Joshua Green’s dual-process theory of moral judgement is much more promising. Green [17, 18], has synthesized both emotional and rational processes and hypothesized an explanation of why and when each of them occurs.

Green investigated people confronted with different moral dilemmas. One set of the dilemmas was inspired by a well known philosophical puzzle known as the Trolley Problem. In the first dilemma, named the footbridge dilemma, a runaway trolley is headed for five people who will be killed if it proceeds on its present course. You are standing on a

footbridge next to a large stranger. The only way to save the lives of these five people is to push the stranger off the bridge and onto the tracks below. His body will stop the trolley from reaching the others but he will die as a result. Would you push the person from the bridge? In a second, named the switch dilemma, there is a similar situation as before and a runaway trolley threatens to kill five people. The only way to save these people is to hit a switch that will turn the trolley onto a side track, where it will run over and kill one person instead of five. Would you push the switch? It turns out that the majority of people are willing to push the switch in the second dilemma while they think it is morally wrong to push the person from the bridge in order to save five lives.

Green and his co-workers performed several experiments in which they exposed persons to these two dilemmas. On the basis of the results obtained by brain imaging (fMRI) and with the measuring of the reaction time, Green developed dual-process theory of moral judgment. According to this theory, characteristically deontological judgements, as the one formed in the footbridge dilemma (“it is wrong to kill one person for the benefit of five others”) are driven by automatic negative emotional response. In contrast, characteristically utilitarian or consequentialist judgments, as the one formed in the switch dilemma (“better to save more lives”) are driven by the controlled cognitive processes (e.g. reasoning, planning). Green is in agreement with Hume and accepts that moral judgment have both components. But he suggests that the function of emotions in characteristically deontological judgments is different from the function in characteristically consequentialist judgements. In the former they are functioning more like alarms and in the latter more like a currency. I think that in this respect Green’s theory is in accordance with the Damasio’s somatic marker hypothesis presented in the previous section. Koenings and his co-workers [19] have shown that patients with patients with the damaged ventromedial prefrontal cortex decide on the basis of “cold computations”, much closer to the utilitarian moral judgements.

Green has tried to explain why people respond differently to the proposed dilemmas. He has proposed a hypothesis that the distinction is primarily based on the distinction between personal and impersonal setting. In the case of the switch dilemma, the agent is not directly confronted with the killed person and for that reason ratio prevails. In contrast, in the case of the footbridge dilemma, the agent is in a direct contact with the person that will be killed and is much more emotionally involved. He also proposed other possible explanation, as for example that in the latter case direct physical contact is present, or that there is a combination of personal force and intention. Green thinks that even if there are justified critiques about the hypothesis on personal/impersonal distinction, it does not present a threat to the dual-process theory in general.

## **IS CONSCIOUS DECISION MAKING AN ILLUSION?**

Research in cognitive science, particularly in cognitive neuroscience, offers us an improved picture about the working of the brain. On the basis of the knowledge of neural mechanisms some scientists question the very possibility of deliberation and conscious rational decision making. Are our intuitions that at least sometimes our choices are voluntary and free just an illusion? Namely, if neuroscience will discover (deterministic) mechanisms of our decision making – will that still allow us to talk about free choice?

Wegner [20, 21] has contributed to these worries from the neuroscientific and psychological perspective. He analysed many experiments, neurological disorders and psychological praxis and argued that “the experience of consciously willing an action is not a direct indication that the conscious thought has caused the action” [21; p.2]. He concluded: “Although our thoughts may have deep, important, and unconscious causal connections to our actions, the

experience of conscious will arises from a process that interprets these connections, not from the connections themselves. Believing that our conscious thoughts cause our actions is an error based on the illusory experience of will – much like believing that a rabbit has indeed popped out of an empty hat.” [20; p.490] He supported his thesis by numerous examples and experiments from neuroscience and psychology, including Libet’s famous studies on the unconscious cerebral initiative [22] and the role of conscious will in voluntary action, experiments with transcranial magnetic stimulation and examples of absence of the experience of will in the case of motor automatism (table-turning, Ouija-board spelling, pendulum diving).

Wegner suggests that the experience of consciously willing our actions arise primarily when we believe our thoughts have caused our actions. This happens when the following three principles are satisfied [20; pp.483-486]: (i) priority – the thought should precede the action at a proper interval, (ii) consistency – the thought should be compatible with the action, and (iii) exclusivity – the thought should be the only apparent cause of action. The interpretative process that creates the experience of conscious will works according to the theory of apparent mental causation [20, 21]. The theory tells us that the actual causal paths are not present in the person’s consciousness. It is the principles of priority, consistency and exclusivity that govern the inferences people make about the causal influence of their thoughts on their actions, and thus underlie the experience that their actions are willed.

Wegner discusses experiments that show that conscious willing of an action can be separated from the action. Sometimes people have a conscious feeling of not owning an action and not being responsible for it, but they in fact are, and vice versa. He also supports his theory by Libet’s findings that conscious experience of free will is about 400 ms late – it is possible to predict the movement on the basis of the measured brain activity (readiness potential) before the subject is subjectively aware of his wish to move. According to Libet’s interpretation the conscious will can not function as the initiator of the action, but because it does appear some 150 ms before the muscle is activated, it might block or veto the process in the brain so that no act occurs [22; p.51].

So, do the data gathered by Wegner really support the interpretation that conscious will does not play a causal role? In my opinion such inference is invalid and can be avoided from at least two directions. First concern the interpretation and methodology of the experiments while the second points to the rich history of philosophical discussions about determinism and free will.

Let me first shortly present some of my doubts that concern the experiments. Wegner described situations in which subjects felt as if they caused the action, but in fact they did not, and vice versa. This shows there are situations in which our experience that we consciously initiated the action (or that we did not), is wrong. But this does not mean that conscious intention in general is not causally relevant. I think it is a hasty generalization to conclude from these specific examples that conscious willing is never causally relevant, as would be wrong to conclude that perceptual illusions show us that our perception is always misleading.

I agree with Nahmias that Wegner’s examples show “that there are various exceptions to the rule that our conscious experiences of our actions correspond with those actions. But the fact that there are these exceptions does not show that, in the normal cases of correspondence, conscious will is causally irrelevant.” [23; p.533]. In my opinion the psychological experiments to which Wegner refers support only the weaker interpretation of illusion, i.e. we do not have direct access to the causal link between thought and action. Wegner is right to take our folk-psychological belief in direct access to the causes of our action as false. But in contrast to him I believe that this is not enough to infer that conscious intentions could not cause actions. This weaker interpretation does not say that we could not have causally



relevant conscious intentions, it just indicates a false understanding of mental processes and of our own agency. As we have seen in previous sections, research in neuroscience suggests that taking a process through which a person makes her decision as purely rational is false. Damasio's and Green's theories suggest that we have to look at the emotional aspects and subjective feelings in constructing more sophisticated model of agency [17, 18, 20, 21].

In my opinion both Libet and Wegner take as a starting point a very naïve picture of intentional causation which presupposes a simple causal relation between a thought and an action. For example, in Libet's experiment the author was asking for the causal effect of the conscious wish or urge for the flick of the wrist which occurred next to the action. But it was totally overlooked that the subject previously agreed to participate in the experiment and therefore to complete the action once in the future. It is most likely that she formed the intention already at that time.

I also think that interpretations of experiments and neuroscientific investigations often overlook philosophical attempts to find the solution to the problem. Questions like "Is deliberative, free willed decision making possible?" and "Is deliberative, free willed decision making compatible with determinism?" are hard questions without obviously correct or accepted answers. It turned out that accepting compatibilist or incompatibilist solution largely depends on different understanding of involved notions of determinism and free will [24, 25]. It seems to me that both Libet and Wegner presuppose a very strong metaphysical notion of free will, according to which free willed action is equated with non-caused action. Wegner himself said that we could not help to look at our own causal influence as something supernatural, that it is essential for perceiving ourselves as humans. "We are enchanted by the operation of our minds and bodies into believing that we are "uncaused causes", the origins of our own behavior. Each self is magic in its own mind. Unfortunately, the magic self stands squarely in the way of the scientific understanding of the psychological, neural and social origins of our behavior and thought." [26; p.226]. Such libertarian position about freedom is close to our common sense western view and is part of our manifest humanistic image [27, 28]. It is usually supported by a dualistic position in the mind-body problem and kind of extra factor strategy, as for example an immaterial soul or agent causation. It is not surprising that such understanding of the self is in opposition to the scientifically oriented interpretations. Scientist like Wegner and Libet – maybe not fully aware of their presupposition of such a strong notion of free will, therefore conclude that free decision making is only an illusion. But this viewpoint, generally called "hard determinism" is only one of the possible answers. Some try to preserve this strong libertarian notion of freedom and argue for the indeterministic processes in the brain at neural and/or quantum level [29] and thus save conscious rational decision making. And there is also a third group called compatibilism. Compatibilists argue there are strong reasons that determinism and free will are compatible, we only have to understand freedom in a weaker sense, not as something uncaused, but mainly as expressing our own control, our ability to do otherwise and to do without a coercion [30]. This compatibilist position is totally overlooked by those who on the basis of neuroscientific research deny the possibility of free decisions. But as Adina Roskies [31; p.421] states: "A view of ourselves as biological mechanisms should not undermine our notion of ourselves as free and responsible agents. After all, some causal notion is needed for attributions of moral responsibility to make sense. The predictive power of our high-level psychological generalizations grounds our views of agency, so further evidence that we behave in a law-like fashion should not undermine our notions of freedom."

In questioning the possibilities of free will we are relying on subjective experience and on our understanding of the nature and self. Recent investigations in neuroscience and psychology have given a new push to old question. But solving the problem of free will is

connected to other metaphysical and epistemological problems, particularly the mind-body problem. Dualists and libertarians “set the bar for free will ridiculously high” [32; p.124] and combine dualistic view with the subjective experience. I do not see why we should accept this combination for granted and as a base for the in principle objection to any attempts to explain deliberation and decision making as free.

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## RACIONALNOST I EMOCIJE U ODLUČIVANJU

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### SAŽETAK

Odlučivanje se tradicionalno smatra racionalnim procesom u kojemu razum određuje najbolji način postizanja cilja. Istraživanja iz različitih grana kognitivne znanosti su pokazala kako su ljudske odluke i djelovanja u znatno većoj mjeri pod utjecajem intuicije i emocionalnih odziva nego se prije smatralo. U ovom radu ispitujem ulogu emocija u odlučivanju, posebno Damasiovu hipotezu somatskih markera i Greenov dvojni proces moralne prosudbe. Članak zaključujem diskusijom stava kako su namjere i svjesna racionalnost prividi.

### KLJUČNE RIJEČI

filozofija kognitivne znanosti, odlučivanje, emocije, problem slobodne volje, etika