MORAL EMOTIONS AND PHYSIOLOGICAL MARKERS IN PROSOCIAL DECISION-MAKING

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SUMMARY

ABSTRACT

The present study aimed to investigate the effects of prototypical moral emotions on prosocial behavior in an economic task, in interaction with physiological markers of arousal, measured through Electrodermal Response and Heart Rate, and of parasympathetic response, measured through Heart Rate Variability. 40 undergraduate and postgraduate students performed an experimental version of the Ultimatum Game with moral vignettes describing the responders. We found that participants' mean offer in the elevation block was higher than in the outrage block. The physiological measures did not differ significantly between both emotional blocks. The results suggested that information people receive about third-parties influence their behavior towards them, through moral judgment. Therefore, the results are in line with the assumption that emotions elicited by a disinterested elicitor can influence one's decision to help or not a third-party.

Keywords: prosocial behavior, moral emotions, moral judgment

INTRODUCTION

Decision-making is an interdisciplinary subject explored by researchers from different fields such as Economics, Psychology, Medicine, and Sports Science (Sanvicente-Vieira, Marques, & Grassi-Oliveira, 2018). In terms of adaptive relevance, the class of social decision-making stands out. They occur in complex social environments that comprise a myriad of interactions (Rilling & Sanfey, 2011). Besides, decisions made by individuals such as politicians, policy-makers and health care professionals may affect, directly or not, many people's lives. Thus, a moral decision is the one that has consequences that go beyond the agent; they affect third parties (Vásquez, 1998). Regarding the consequences involved, this kind of decision is described as prosocial if it benefits others.

In the scope of contemporary moral development research, studies point out crucial cognitive processes underlying it. For instance, the ability to represent and integrate information usually results from one's actions and beliefs (Young, Cushman, Hauser, & Saxe, 2007). The reasoning about mental states is also relevant as it motivates the comprehension of other people's actions. According to Young and Waytz (2003), this also allows individuals to make predictions about decision-makers' acts, as well as evaluate them as future enemies or allies. Therefore, the moral salience of social contexts engages mind attribution in understanding and foreseeing others' actions. Likewise, mental disorders with an impairment of the theory of mind (e.g., the autism spectrum disorder) can lead to atypical moral development (Young & Waytz, 2013).

Moral Emotions

Regarding aspects that influence decision-making and behavior in real contexts Tangney, Stuewig and Mashek (2007) mention individual differences in the way people anticipate and experience emotions. In that sense, emotions are broadly considered as responses to changes, opportunities, and threats of the environment. They are usually associated with events that affect the *self* directly and have helped humans to adapt and live in society.

Models that consider emotional states can be useful to understand people's adherence to moral patterns. In addition, moral emotions relate to a concern for the welfare of the society or of people other than the person that is judging (Haidt, 2003). Beyond its importance from the evolutionary perspective, human beings also devote a great portion of their emotional lives to

think and react to social events that do not affect them directly. That is where, according to Haidt, moral emotions arise.

Many studies show that different emotional states can be linked to specific behavior tendencies and concerns (Haidt & Graham, 2007; Tangney et al., 2007). According to the Somatic Marker hypothesis, physiological responses signal a positive or negative valence of an event (Bechara & Damásio, 2005). In decision-making scenarios, a somatic element is triggered in the individual's body, and that is associated to a specific emotion. Even without awareness of the physiological signals, people's judgments can be influenced as if they were subjectively experiencing that emotion (Oveis et al., 2010).

Oveis et al. (2010) integrate the idea of social concerns engaging moral emotions (Haidt & Graham, 2007). For instance, within the physiological scope, disgust has been associated with a low heart rate. An experimental situation with stimuli involving purity and impurity content can elicit a disgust response. Under such conditions, it is expected that participants with lowered heart rate – a disgust signal – will make stiffer judgments (Oveis et al., 2010).

A contemporary theoretical model that has been used to study the aforementioned moral topics is the Prototypical Model of moral emotions (Haidt, 2003). Emotions can be recognized and analyzed within different component features. Haidt suggests that moral emotions can be analyzed by two features: disinterested elicitors and prosocial action tendencies. The first concept pertains to the event that elicits the emotion - a triggering event that does not involve the self directly. Concrete examples of disinterested elicitors are seeing pictures of people suffering, tragedies broadcasted by the media, among others. The second concept assumes that a moral emotion would put an individual in a specific motivational and cognitive state, representing an elevated tendency to engage in a goal-oriented behavior (Haidt, 2003).

Accordingly, the more disinterested the elicitor event, the more prototypical the emotion is considered. Examples of such emotions are compassion, guilt, elevation, and anger. Concomitantly, these are also the ones that are strongly associated with prosocial tendencies and, consequently, the most effective in promoting prosocial behavior (Haidt, 2003).

Nevertheless, Vyver and Abrams (2017) draw attention to the assumption that people not directly involved in the triggering event feel prototypical moral emotions. Thus, to promote third party prosocial behavior, some of the emotions mentioned might be inappropriate. Guilt, for

instance, has a focus on the self and it would not be appropriate for third parties to felt guilty – once they are not directly involved in the elicitor event.

Moreover, compassion is also considered inappropriate for promoting third party prosocial purposes. Although being experienced by third parties, compassion might induce paternalistic help. According to Vyver and Abrams (2017), this might come from a perception of one target group depending on the goodwill of the other one – in a more advantageous situation. Hence, it is suggested that elevation and outrage are the most efficient emotions to promote third party prosocial behavior.

Elevation is described as an emotional response that occurs when witnessing virtuous and morally valued acts. It could be elicited by behaviors involving charity, fidelity, and others with strong virtue valence. Therefore, elevation would work as a motivating factor, so that the spectator would be prone to behave similarly (Algoe & Haidt, 2009). On the other hand, outrage can be felt when witnessing situations of injustice when others are being harmed. Nevertheless, this emotion is different from anger, since the latter involves the self directly – usually, the person who feels he/she was harmed by an unjust act (Vyver & Abrams, 2015).

Prosocial behavior

Prosocial behavior is a common investigated topic when studying the repercussions of moral emotions on decision-making – at both individual and collective levels. It encompasses a broad category of actions that benefit other people (Penner, Dovidio, Piliavin, & Schroeder, 2005). Studying prosocial behavior with a focus on third parties is a less common perspective. However, this perspective is relevant, considering that social connections are usually plural and tend to engage more than two groups (Vyver & Abrams, 2017).

Many studies stress the influence of emotions on decisions and behavior (Haidt & Graham, 2007; Horberg, Oveis & Keltner, 2011; Tangney et al., 2007; Vyver & Abrams, 2017). Similarly, a study by Böckler, Tusche & Singer (2016) found that positive affect correlated positively with self-reported prosocial behavior. Concerning emotions and tendencies to act pro-socially, Oveis et al. (2010) investigated compassion and pride. While the first stimulated feelings of similarity with others, the second evoked dissimilarity – thus reinforcing that such association might influence the decision to help someone in need or not (Oveis et al., 2010).

In order to describe and classify prosocial behavior, Dunfield (2014) proposed that cognitive and social limitations propel it. In other words, witnessing someone struggling with such problems would bolster acts on behalf of that person. Dunfield's model categorizes these behaviors according to the negative state to which they respond to. The taxonomy establishes three requirements for such acts to happen. The first one is the ability to adopt another person's perspective, recognizing that s/he is going through difficulty. The second criterion refers to the capacity for determining the cause of the problem. At last, the third one concerns the motivation to help that person overcoming the situation (Dunfield, 2014).

The referred model considers three types of negative states that people must deal with, establishing correspondent prosocial behaviors. Accordingly, an *instrumental need* - characterized by a difficulty with executing a goal-oriented behavior - would have *helping* as the correspondent prosocial behavior. Another negative state is called *material desire*, which occurs when a person has no access to resources such as food and money. The prosocial act for this problem is *sharing*. The third state is *emotional distress* or suffering from a negative emotional state. *Comforting* is the behavior suggested to help someone with this problem (Dunfield, 2014).

Prosocial behavior in economic games

Based on the taxonomy proposed by Dunfield (2014), the present study adopts the concept of *sharing* as a way of operationalizing prosocial behavior, using fictitious money as the resource to be shared. Studies addressing this kind of decision in economic games have used tasks as the dictator game (DG) (Aguiar, Brañas-Garza & Miller, 2008; Ben-Ner, Kramer, & Levy, 2005; Engel, 2011) and the ultimatum game (UG) (Engel, 2011; Harlé & Sanfey, 2007). These games enable the investigation of how people make financial decisions, indicating some underlying aspects – like altruistic or strategic motives. Furthermore, such tasks are useful to study other kinds of decision-making and are very popular and straightforward to implement (Tisserand, Cochard & Le Gallo, 2015).

In its standard version, two participants play the UG (Güth et al., 1982): a proponent and a respondent. The proponent receives an endowment and is instructed to decide how much to share with the other player. The respondent can either accept or reject the offer. If s/he accepts it, then the endowment is distributed as decided by the proponent. However, the rejection of the

offer leads to the return of the endowment, and no one receives any money (Harlé & Sanfey, 2007).

In the DG, on the other hand, the respondent has no option as to reject or accept an offer – the dictator simply decides about how s/he wants to share the money. Unlike the DG, the possibility of refusal in the UG includes a variable of strategic consideration in the experiment. Regarding the options to behave in this scenario, a meta-analysis conducted by Tisserand et al. (2015) verified that the majority of proponents in the UG offered, on average, 40% of the endowment. Moreover, offers equivalent or below 20% were rejected by most respondents.

Studies included by Tisserand et al. (2015) followed the standard protocol – proponents and respondents were recombined to form new pairs each round, and the proponent had 10 choice possibilities. Even with such particularities, some relevant considerations can be drawn from the meta-analysis. Firstly, there seems to be no effect of the initial amount of money on players' choices. Secondly, there is also no scientific support for the effect of age on decisions.

Furthermore, there is no substantial evidence to support whether different game formats – one-shot or repeated rounds- affect proponents' choices. However, this association is obtained in the respondents' behavior. The probability of a particular offer being accepted by the respondent increases when the current offer is higher than the previous one, and the opposite is also valid (Cooper & Dutcher, 2011).

As pointed by Tisserand et al. (2015), the literature on economic games includes a variety of protocols with variations of the UG. The tasks can have many rounds, an avatar can represent participants, and the researcher can give information about the players. The latter can influence the amount offered by the proponent and his or her emotions while deciding (Aguiar et al., 2008).

In this way, a study by Sircar, Turley, van der Windt and Voors (2018) tested the effect of social information in the UG, in villages where people knew each other. The results showed that revealing the respondents' identity led to an increase in the offers, likely because of a decrease in social distance. Furthermore, even though controlled experiments can isolate the pertinent behavior, they lack accurate representation of real social contexts. Therefore, it is suggested that revealing the recipient's identity can help determine what a just offer is (Sircar et al., 2018).

However, even if the participants of a study are not from the same community, some considerations remain relevant. For instance, an anonymous UG overlooks some critical points. Those are knowledge of the opponent's characteristics, players' common social networks, and the possibility of previous and future interactions (Sircar et al., 2018).

In sum, economic games are alternatives to investigate prosocial behavior, considering tendencies of justice and altruism. Even in other sorts of tasks, it is verified that information concerning the social context can evoke specific emotions and affect help intentions (Pilatti, 2011; Tangney et al., 2007). In addition, just as there are many protocols for the UG, there is also a range of stimuli with social relevance that can be used in economic games as information about players. One example of stimuli with social relevance includes moral patterns (Clifford, Iyengar, Cabeza & Sinnott-Armstrong, 2015).

Psychophysiology and social decision-making

In order to better comprehend decision-making, studies usually rely on objective measures such as psychophysiological ones. Current studies have investigated how both sympathetic and parasympathetic autonomic nervous systems (ANS) relate to moral decision-making. While the first system is well known as responsible for fight-or-flight responses, the second is more activated during relaxation and rest states (Dulleck, Schaffner, Ristl, & Torgler, 2011).

Regarding social concerns, Berger (2011) investigated the influence of arousal on the decision to pass on social information. The results showed that the mobilization caused by the state of arousal would increase the chances of the individual sharing information. The excitation felt by the participant might mediate the effect of emotional induction, for this particular case of social communication. Therefore, the results of this study suggested that psychophysiological variables could influence social outcomes (Berger, 2011).

One of the theories that aim to integrate physiology and human behavior is Porges' Polyvagal theory (2011). It defends that the vagal nerves contain subsystems responsible for regulating adaptive responses. Humans are capable of auto regulating them and behaving pro-socially. According to this perspective, a standardized assessment of the vagal tone would be a useful marker for emotional self-regulation (Shaffer, McCraty, & Zerr, 2014).

Considering the potential interfaces between studies in psychophysiology and social decision-making, specific measures can be used. For instance, the heart rate (HR) and heart rate variability (HRV) have been adopted to operationalize the investigation of ANS and its relation to experimental tasks. The HR corresponds to the number of beats in one minute, and it is measured through subjacent R-R peaks. These peaks occur at the end of the atrial systole and the beginning of the ventricular systole (Berntson, Quigley, & Lozano, 2007).

The HRV, on the other hand, refers to the oscillation in the intervals between consecutive beats, as well as between consecutive HRs (Taskforce, 1996). It can be considered a neurocardiac measure that reflects the interaction between the heart, the brain, and the ANS (Shaffer et al., 2014). Optimal values of this measure positively influence an individual's adaptation and flexibility to his or her environment, promoting well-being and health (Shaffer et al., 2014).

HRV is also regarded as an indicator of psychological resilience and behavioral flexibility (Berntson et al., 2007). Higher HRV values are also associated with good performance in cognitive tasks that engage executive functions (Thayer, Hansen, Saus-Rose, & Johnsen, 2009). In economic games, HRV measures have been used to assess participants' reactions- such as those related to pay-off consequences and psychological states (Dulleck et al., 2011).

Regarding the HR, Fourie et al. (2011) developed an emotional induction paradigm in order to be ecologically valid and intense enough to trigger arousal. The HR results after the experiment showed that the group where guilt was the manipulated emotion had higher HR, compared to the pride and control group. That endorses other studies indicating that negative emotions correlate to higher cardiac reactivity (Fourie et al., 2011).

In investigations involving other-praising emotions, such as elevation, Algoe and Haidt (2009) used a self-reporting instrument to appraise physical sensations. Participants associated experiencing elevation to a feeling of "heat" on the chest, and "knot" in the throat. However, this kind of report depends considerably on the subjective perception of the respondent. Thus, an additional accurate alternative would be the use of physiological measures, such as HR and HRV, assessed by adequate equipment. In addition, a study by Bornemann, Kok, Böckler and Singer (2016) stressed that an association of these variables with social and emotional dispositions self-reports is incipient in the literature.

Another possibility is to investigate Electrodermal Activity (EDA), which can be measured by passing a small current through the skin, and then measuring the resulting resistance of the passage. A different method is the endosomatic technique, not involving external current. The first has evolved to what is known as a measurement of skin conductance (SC), used more often (Stern, Ray, & Quigley, 2001). For the purposes of this study, the target variable is the skin conductance response (SCR) amplitude, which refers to the phasic increase in conductance that follows the stimulus onset. The SCR amplitude can be considered as an index of sympathetic activity and can be elicited by stimuli with social or emotional content (Dawson, Schell, & Filion, 2007).

Therefore, the present study aimed to investigate the effects of prototypical moral emotions on prosocial behavior in an economic task, in interaction with physiological markers of arousal - measured through Electrodermal Response and Heart Rate, and of parasympathetic response - measured through Heart Rate Variability. Specifically, we tested the effect of information with moral emotions content (elevation and outrage) on prosocial decision-making, assessed by the UG. We also tested the differences in decisions made in both emotional blocks on arousal, measured as the increase of HR; and on parasympathetic activation, measured through HRV. Moreover, we investigated how DASS measures of depression, anxiety, and stress correlated with prosocial behavior – assessed by the value of offers.

Considering the literature on moral emotions and prosocial behavior, we expected that the average money offered in the elevation context would be higher than in outrage. In line with studies reporting higher arousal in negative valence contexts, we also hypothesized that HR means and EDA amplitude would be higher in the outrage context, compared to the elevation. On the other hand, we expected that HRV means would be higher in elevation trials.

CONCLUSION

In the present study, we were able to investigate how moral elevation and outrage affect prosocial decision-making in an economic game. The results were in line with the assumption that emotions evoked by a disinterested elicitor can influence one's decision to help or not a third-party. Additionally, we addressed both emotions in a way that elevation promoted prosocial behavior and outrage led to a punishment behavior. Nevertheless, we would like to have investigated other points. For instance, how moral outrage promotes prosocial behavior in this kind of experiment. This could be done by describing the responder as someone who suffered injustice (i.g. participants could feel outrage for a third-party who was unjust to the responder).

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