



Stress influences environmental donation behavior in men



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ABSTRACT

Stress has been found to have both positive and negative effects on prosocial behavior, suggesting the involvement of moderating factors such as context and underlying motives. In the present study, we investigated the conditions under which acute stress leads to an increase vs. decrease in environmental donation behavior as an indicator of prosocial behavior. In particular, we examined whether the effects of stress depended on preexisting pro-environmental orientation and stage of the donation decision (whether or not to donate vs. the amount to be donated).

Male participants with either high ($N=40$) or low ($N=39$) pro-environmental orientation were randomly assigned to a social stress test or a control condition. Salivary cortisol was assessed repeatedly before and after stress induction. At the end of the experiment, all subjects were presented with an opportunity to donate a portion of their monetary compensation to a climate protection foundation.

We found that stress significantly increased donation frequency, but only in subjects with low pro-environmental orientation. Congruously, their decision to donate was positively associated with cortisol response to the stress test and the emotion regulation strategy mood repair, as well as accompanied by an increase in subjective calmness. In contrast, among the participants who decided to donate, stress significantly reduced the donated amount of money, regardless of pro-environmental orientation.

In conclusion, our findings suggest that acute stress might generally activate more self-serving motivations, such as making oneself feel better and securing one's own material interests. Importantly, however, a strong pro-environmental orientation partially prevented these effects.

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1. Introduction

Prosocial decisions are often made under stress, for instance when we are asked to make a charitable donation while in a hurry, or when confronted with a person in need of help in the face of a life-threatening event such as an earthquake. Few studies, however, have investigated how acute stress influences prosocial behavior, and which motivational mechanisms may underlie these effects. From an evolutionary perspective, stress responses have traditionally been characterized as fight-or-flight (Cannon, 1932), which describes the tendency to either engage in aggressive behavior or escape from threat as an adaptive mechanism to enhance the chances of survival. However, an alternative pattern of tend-

and-befriend has also been proposed to better characterize female stress responses (Taylor et al., 2000). Tend-and-befriend behavior involves the protection of self and offspring and the creation and maintenance of social networks that provide resources and protection under stress. This implies that stress may sometimes increase prosocial instead of aggressive behaviors, at least in females.

Thus far, those few studies that have investigated effects of acute stress on prosocial behavior have produced conflicting results. On the one hand, psychosocial stress as induced by the Trier Social Stress Test (TSST; Kirschbaum et al., 1993) has been shown to enhance prosocial behaviors, such as sharing, trust, and trustworthiness among men (von Dawans et al., 2012). These results have been interpreted as evidence that tend-and-befriend behavior induced by stress is not restricted to females but may also occur among males. On the other hand, the TSST has also been shown to reduce the amount of charitable donations (Vinkers et al., 2013). These findings are difficult to compare, however, because the two studies differed in important aspects. First, while both studies assessed altruistic giving with the dictator game, in which participants must choose whether to share a reward with a third party

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or keep it for themselves (Kahneman et al., 1986), the recipient of the shared money differed. In the first study, it was another participant (von Dawans et al., 2012), whereas in the second it was a charitable organization (Vinkers et al., 2013). In light of the tend-and-befriend hypothesis, this might explain the differing results insofar as specific other persons can be expected to provide support in stressful times, whereas an anonymous charitable organization may not qualify as a peer who could reciprocate and provide help (Vinkers et al., 2013). In line with this interpretation, one recent study found a positive effect of stress on the generosity toward socially close but not distant others (Margittai et al., 2015). Interestingly, this effect only occurred immediately after stress exposure, but not 70 min later, indicating that the timing of the prosocial task also plays an important role. Finally, the described studies also differed in their operationalization of sharing, with one focusing on whether participants shared at all (von Dawans et al., 2012), and the other two investigating the donated amount of money (Margittai et al., 2015; Vinkers et al., 2013).

A recent study focused on these two distinct stages of donating and in the process identified yet another type of motivation for prosocial behavior (Dickert et al., 2011). The findings of Dickert et al. suggested that the initial decision whether to make any donation at all and the subsequent decision on how much money to donate are governed by different motivational mechanisms. While the decision to donate could primarily be ascribed to motivations for mood enhancement, the donated amount depended more strongly on empathic feelings toward the recipient. It is therefore possible that stress affects these two decision stages differently. Regarding the first stage, Dickert et al.'s results suggest an additional mechanism—besides the tend-and-befriend motivation—through which stress might increase prosocial behavior, even under conditions where the recipient cannot be expected to reciprocate. In particular, donation or other helping behavior under stress could be motivated by the objective of regulating stress-induced negative emotions. This hypothesis is supported by earlier research showing that sad mood induction might increase helping as an instrumental response designed to improve the helper's mood (reviewed in Cialdini et al., 1981; Manucia et al., 1984). In addition, more recent findings demonstrate that prosocial acts such as charitable donations have the potential to elicit positive affect (Aknin et al., 2013; Dunn et al., 2008) and activate the neuronal reward system in the same way as obtaining monetary rewards (Moll et al., 2006). Taken together, stress might thus increase the propensity to donate through a mechanism of emotion regulation. However, to date this hypothesis has not been empirically tested in the context of acute stress.

Regarding the second decision, which concerns the donated amount of money, the effects of stress might be less favorable. Particularly, there is some evidence that acute stress increases self-interested motivations and reduces empathy toward others. For example, a recent study found that altruistic punishment, which involves the punishing of unfair behavior at the cost of forgoing a reward, decreased 75 min after exposure to the TSST (Vinkers et al., 2013). The authors interpreted this finding as indicative of an increase in material self-interest. In another study, cortisol response to the TSST was positively associated with egoistic decision making in emotional moral dilemmas (Starcke et al., 2011). Starcke et al. suggested that this result might reflect a fear-induced priority to care for one's own needs first, which interferes with empathizing with other people's needs. The latter notion is supported by a study showing that social exclusion can lead to an empathy-mediated decrease in various prosocial behaviors, including charitable donating (Twenge et al., 2007). Consequently, if the donated amount of money is mainly influenced by more selfless motives, such as empathic concern as proposed by Dickert et al. (2011), it could decrease under stress. The above reported

negative effect of the TSST on the amount of money donated to charity (Vinkers et al., 2013) is in line with this interpretation.

Taken together, existing studies suggest that stress can have both positive and negative effects on prosocial and related behaviors. However, these findings may not be as contradictory as it seems at first glance. Rather, they are consistent with the hypothesis that stress causes people to consider their own needs first. This may become manifest in increased material self-interest, more egoistic decision-making, and less empathic concern for others, but also in increased helping behavior aimed at receiving support and comfort in return or at relieving stress-induced negative affect. In other words, sometimes our own needs under stress may be best served by helping others. To shed more light on these complex mechanisms, the present study focused on how stress as induced by the TSST affects two different stages of a donation decision.

Regarding our dependent measure of prosocial behavior, we chose donations to a climate protection organization due to the high political and economic relevance of the global climate change problem (Bernauer, 2013). Environmental donations and other pro-environmental behaviors are prosocial by nature since they serve long-term collective interests without entailing direct benefits for the acting individual (Bamberg and Möser, 2007; Joireman et al., 2001; Kaiser and Byrka, 2011; Kollmuss and Agyeman, 2002; Stern, 2000). Since charitable donations in general are strongly predicted by attitudes toward the purpose of the donation (Holland et al., 2002) and by past donation behavior (Verhaert and Van den Poel, 2011), we additionally considered participants' preexisting pro-environmental orientation. In particular, we tested whether stress would differentially affect environmental donating behavior in two groups of participants, with either high or low levels of pro-environmental attitudes and behaviors. Since strong attitudes are more strongly linked to donation behavior than weak attitudes (Holland et al., 2002), we hypothesized that stress effects might be weaker among participants with stronger pro-environmental orientation. That is, we assumed that the behavior of individuals with high levels of pro-environmental orientation would mostly be determined by their strong beliefs on the subject and might thus be less susceptible to situational factors such as acute stress.

In sum, in the present study we investigated how acute stress and preexisting beliefs regarding the donation objective influence environmental donation behavior. We expected positive effects of stress on the decision to donate, driven by the intention to regulate stress-induced negative affect. In contrast, we assumed that stress would negatively influence the donated amount of money, based on an increase in self-interested motivation. Further, we hypothesized that both of these effects would be weaker for participants with high pro-environmental orientation, since their beliefs would strongly influence their behavior regardless of the circumstances.

2. Methods

2.1. Participants

Eighty healthy men with a mean age of 27.2 years ($SD=5.7$, range: 18–39) participated in the experiment. 53.8 % ($n=43$) of the participants reported having completed education at the upper secondary level, which corresponds to level 3 of the International Standard Classification of Education (ISCED; UNESCO, 1997), while 45.0% ($n=36$) and 1.3 % ($n=1$) had reached the first and second stage of tertiary education, respectively (ISCED levels 5 and 6). Subjects were recruited through online advertisements, mailing lists of different organizations as well as flyers displayed at universities, shopping malls, and restaurants. Two groups of subjects with either low or high pro-environmental orientation were selected for participation. Pro-environmental orientation was determined prior

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