Getting Close in the Dark: Darkness Increases Cooperation

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Introduction

Aspects of our physical environment, such as temperature and space, can influence social contact by evoking bodily and perceptual experiences that signal social distance or proximity and can trigger compensatory behavior (Bargh & Shalev, 2011; IJzerman & Semin, 2009; Kolb, Gockel, & Werth, 2012; Williams & Bargh, 2008). Darkness also changes social perception and behavior but it is rather unclear how (Baron et al., 1992). The present paper addresses this question from a social distance perspective (Liberman, Trope, & Stephan, 2007).

First, darkness and dim lighting conditions impair visual perception, particularly the perception of details, and recognition of other individuals. The lack of detailed information about another person increases one's perceived distance (Trope & Liberman, 2010) and is assumed to evoke a feeling of isolation and anonymity (Page & Moss, 1976; Zhong, Bohns, & Gino, 2010). Accordingly, it has recently been demonstrated in a series of IATs that darkness is conceptually associated with psychological distance, including social distance (Steidle, Werth, & Hanke, 2011). In sum, darkness can be understood as an environmental condition associated with social distance.

Second, humans generally strive to be close to other humans (Baumeister & Leary, 1995), especially in situations evoking social distance and the danger of social isolation (Williams, 2007). Hence, we argue that darkness, as a sign of social distance, should enforce strivings for social closeness. In support of this assumption, several studies have shown that experiencing fear in the dark increases people's inclination to affiliate with others (Darley & Aronson, 1966). Children usually react to darkness by increasing the proximity to their parents (Bowlby, 1973) but also adults seek more social closeness even to strangers in the dark (Baron, Rea, & Daniels, 1992; Gergen, Gergen, & Barton, 1973; Miwa & Hanyu, 2006). In sum, we assume that darkness amplifies people's inclination to approach each other.

In the present studies, we examined the effects of darkness on feeling close to and on approaching other individuals by focusing on cooperation. Cooperating with other people is a common way to reduce social distance and is a sign of social closeness (Clark & Mills, 1979). Hence, we hypothesized that individuals would be more likely to behave cooperatively if cooperation is functional to reduce social distance. In five experiments, we tested the main prediction as well as moderating and mediating variables.

Experiment 1A and 1B

Experiments 1A and B provided an initial test of the hypothesis that darkness would increase cooperation. In Experiment 1A, darkness (brightness) was manipulated by writing about a dark (bright) location (Steidle et al., 2011), whereas in Experiment 1B, indoor lighting was manipulated directly. Additionally, we also used different measures of cooperation. In Experiment 1A, participants then read conflict scenario about a joint seminar presentation (Baron et al., 1992) and indicated their likelihood to cooperate on an analogous scale. In Experiment 1B, cooperation was assessed with 5 trials of computerized social dilemma task ("the fishing game"; Sanna, Parks, & Chang, 2003). Here, cooperation was assessed as the sacrifice of own profit (number of fish people had returned) to save a common resource. As predicted, in Experiment 1A, participants in the dark condition were more willing to cooperate (M

= 71.84; *SD* = 17.14) than participants in the bright condition (*M* = 62.50; *SD* = 19.79), *t*(78) = 2.25, *p* = .028, *d* = .50. In Experiment 1B, participants in the dim room (150 lux) made more cooperative decisions (returned more fish to the lake; *M* = 40.21; *SD* = 11.44) than participants in the brightly lit room (1500 lux; *M* = 32.66; *SD* = 10.57), *t*(56) = 2.61, *p* = .012, *d* = .69. Task difficulty, task motivation, fun, and mood were controlled in all experiments, but did not change the results. These results support our assumption that darkness (primed or physically manipulated) facilitates cooperation.

Experiment 2

We assumed that this effect would be mediated by an enhanced inclination for social closeness in the dark. To test this assumption, participants played a computerized version of the prisoner`s dilemma (adapted from Axelrod, 1980) sitting in a dimly or a brightly lit room (150 lux vs. 1500 lux). This cooperation measure and lighting conditions were used in all subsequent experiments. To assess perceived social closeness to the partner, participants were asked how close they felt to their fellow player using the Inclusion Other in the Self (IOS) Scale (Aaron, Aaron, & Smollan, 1992). The sum of cooperative decisions served as a measure of the participant`s cooperation. Perceived anonymity which is argued to be an important mediator of social behavior in the dark was also assessed (Thong et al, 2010). Replicating the results of Experiment 1A and 1B, participants in the dim room chose the cooperative win-win strategy more often (*M* = 2.96; *SD* = 1.43) than participants in the brightly lit room (*M* = 2.09; *SD* = 1.38), *t*(46) = 2.15, *p* = .037, *d* = .62. Furthermore, participants in the dim room felt closer to their fellow player (*M* = 2.80; *SD* = 1.21) than participants in the brightly lit room (*M* = 2.04; *SD* = .82), *t*(46) = 2.64, *p* = .011, *d* = .74. To test whether social closeness mediated the effect of lighting on cooperation, we used bootstrapping. Additionally, we controlled for perceived anonymity in our analysis.

Results showed that the effect of darkness on cooperation was mediated by social closeness (indirect effect = .16, SE = .10, 95% confidence interval: .03, .38), but not by perceived anonymity (indirect effect = -.01, SE = .03, 95% confidence interval: -.17, .03). With the mediators in the model, the direct effect of darkness on cooperation was no longer significant. These results provide strong evidence that social closeness can explain the effect of darkness on cooperation.

Experiment 3

Experiments 3 and 4 aimed at testing dispositional and situational moderators of a darkness-related increase in cooperation. In Experiments 1A to 2, participants were confronted with a situation in which the fictive interaction partner always cooperated. In this case, cooperation helped the subjects to create social closeness. However, people's cooperation depends on their interaction partner (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). If the interaction partner behaves uncooperatively, cooperation will not be functional. Trying to get close to such a person should not satisfy people's need for affiliation. To test this, we manipulated the fictive interaction partners' strategy in the PDG to be either cooperative and or uncooperative. Results showed no main effects of lighting condition and strategy condition, *F*s(1, 43) < .01, *p* > .94, but as predicted, a significant interaction effect, *F*(1, 43) = 7.75, *p* = .008, *η*² = .15 (see Figure 2). Simple contrasts revealed that, only in the cooperative condition, participants behaved more cooperatively in the dim (*M*= 2.31, *SD*= 1.25) than in the bright room (*M*= 1.00, *SD*= .85), *t*(23) = 3.02, *p* = .006, *d* =.87. In the uncooperative condition, darkness had no effect on cooperation, *t*(20) = 1.13, *p* = .27. These findings support our hypothesis that cooperative behavior occurs under conditions that allow to reduce social distance.

Experiment 4

What happens when the situational conditions lose their signaling function because some people generally strive to

reduce social distance? For instance, those with a chronically strong desire for social closeness tend to place less value on maximizing their own benefits and behave more cooperatively across many situations (Baumeister & Leary, 1995). In contrast, those with a low desire for social closeness tend to behave more egoistically. Therefore, particularly those who have no chronically strong desire for social closeness should be sensitive to environmental indicators of social distance, like darkness. To test this assumption, we measured participant`s egoistic motivation, using the individualistic scale of the social value orientation (SVO; Van Lange & Liebrand, 1991). After this measurement, we used the same lighting conditions and cooperation game as in Experiment 2. As expected, the effect of darkness on cooperation was moderated by individualistic orientation, $\beta = .29$, $t(58) = 2.50$, $p = .015$. Simple slopes analyses showed that darkness promoted cooperation for participants high in individualistic orientation, $\beta = .62$, $t(58) = 3.69$, $p < .001$. In contrast, no lighting effect was found for individuals low in individualistic orientation, $\beta = .01$, $t(58) < .03$, $p = .98$. These results indicate that the darkness-related increase in cooperation is moderated by a dispositional desire for social closeness. Only those who are high in individualistic orientation showed sensitivity to darkness.

Discussion

The present paper investigated the effect of darkness on cooperation from a social distance perspective (Liberman et al., 2007). Across five experiments, being in the dark increased cooperation regardless of whether people imagined or really experienced the different lighting conditions (Experiments 1A to 4). This darkness-related increase in cooperation was mediated by feeling closer to the fictive partner (Experiment 2). This is in line with previous findings showing that darkness promotes a global information processing style (Steidle et al., 2011) because this processing style helps recognizing similarities between people and reduces social distance (Förster, 2009). Darkness

appears to work as an environmental signal of social distance leading to compensatory affiliative behavior in the form of stronger cooperation.

The most important implication of our findings is that the positive effect of darkness on cooperation depends on the functionality of cooperation as a strategy to reduce social distance and achieve affiliation. This argument is supported by the moderation effects obtained in Experiments 3 and 4. Here, participants showed more cooperation in the dark when there were opportunities to reduce unwelcome social distance. In contrast, other researchshow that dim lighting conditions can also increase selfish behavior (Zhong et al., 2010) and negative stereotype (Schaller, Park, & Mueller, 2003). In this experiment, there was no possibility for participants to approach another person. Similarly, in our Experiment 3, darkness did not increase participants' cooperation when the partner was uncooperative. Hence, our results can be understood as an extension of previous findings. It is important for future research to identify the multiple ways in which situational variables, like darkness, can influence interpersonal processes.

To our knowledge, the present studies are the first to provide a consistent explanation of the effects of darkness on prosocial behavior in general and cooperation in particular. Our findings support the idea of grounded cognition and embodiment (Barsalou, 2008) and the notion that environmental conditions, such as darkness or lighting, can influence interpersonal perception and behavior. Moreover, the present findings contribute to the cooperation literature by showing that, not only the social situation, but also the environmental conditions can affect the behavior of the interaction partners (Salewski, 1993). In conclusion, this research offers a starting point to investigate the possibly wide-ranged impact of a basic environmental condition, namely illumination, on social cognition and behavior.

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