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Psychological Science published online 29 January 2010

DOI: 10.1177/0956797609360754

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Psychological Science
 XX(X) 1–4
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 DOI: 10.1177/0956797609360754
<http://pss.sagepub.com>


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Abstract

Darkness can conceal identity and encourage moral transgressions; it may also induce a psychological feeling of *illusory anonymity* that disinhibits dishonest and self-interested behavior regardless of actual anonymity. Three experiments provided empirical evidence supporting this prediction. In Experiment 1, participants in a room with slightly dimmed lighting cheated more and thus earned more undeserved money than those in a well-lit room. In Experiment 2, participants wearing sunglasses behaved more selfishly than those wearing clear glasses. Finally, in Experiment 3, an illusory sense of anonymity mediated the relationship between darkness and self-interested behaviors. Across all three experiments, darkness had no bearing on actual anonymity, yet it still increased morally questionable behaviors. We suggest that the experience of darkness, even when subtle, may induce a sense of anonymity that is not proportionate to actual anonymity in a given situation.

Keywords

darkness, illusory anonymity, dishonesty, self-interested behavior

Received 5/4/09; Revision accepted 8/21/09

In “Worship,” Ralph Waldo Emerson (1860/1888) wrote, “As gaslight is the best nocturnal police, so the universe protects itself by pitiless publicity” (p. 214). This quote expresses an inherent aspect of darkness: Darkness conceals identity and decreases inhibitions. Indeed, criminal assaults are most frequent during hours of darkness (Hartley, 1974; Karnes, 1960), and dark rooms promote aggressive behavior (Page & Moss, 1976). This licensing effect of darkness might have contributed to the popularization of streetlights in urban landscapes during the 19th century (Bouman, 1987).

Darkness can disinhibit criminal acts and moral transgressions by producing anonymity. Unethical acts are more likely when transgressors cannot be identified. In *The Republic*, Plato told the story of the ring of Gyges, which granted its owner the power of invisibility and eventually led to the owner’s corruption. Similarly, Zimbardo (1969) showed that participants dressed in concealing hoods and baggy clothing delivered longer electric shocks to strangers than did participants wearing regular clothing. The same effect has also been found for unrestrained, impulsive, and uncontrolled behavior when individuals experience anonymity or deindividuation through their association with a group (e.g., Festinger, Pepitone, & Newcomb, 1952; Singer, Brush, & Lublin, 1965).

Departing from this body of work, we suggest that darkness does more than simply produce conditions of actual anonymity. We contend that darkness may create a sense of *illusory anonymity* that disinhibits self-interested and unethical behaviors. Individuals in a room with slightly dimmed lighting or people who have donned a pair of sunglasses may feel anonymous not because the associated darkness significantly reduces others’ ability to see or identify them, but because they are anchored on their own phenomenological experience of darkness. When individuals in such circumstances experience darkness and, consequently, impaired vision, they generalize that experience to others, expecting that others will conversely have difficulty perceiving or seeing them. Piaget (1936) described this kind of egocentrism among young children. In one study (Piaget & Inhelder, 1956), children were presented with a three-dimensional model of a scene with a small doll sitting opposite them and were asked to describe what the doll saw. Children between the ages of 4 and 7 tended to identify an image that showed what they saw despite the difference in the

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scene that would be viewed from the doll's position. Even though adults are better able to take others' perspectives, they never completely grow out of egocentrism (e.g., Epley, Morewedge, & Keysar, 2004; Tversky & Kahneman, 1974). For example, adults tend to overestimate the extent to which their thoughts, feelings, and sensations are accessible to others because they are anchored on their own experience, using it as a starting point to predict others' experiences (Gilovich, Savitsky, & Medvec, 1998). Thus, just as children playing hide-and-seek will close their eyes and believe that others cannot see them, the experience of darkness may lead adults to feel they are hidden from others regardless of whether that is actually true. We propose that this illusory anonymity can consequently license unethical behaviors.

Three experiments tested whether darkness can license dishonesty and self-interested behaviors. In Experiment 1, we manipulated environmental dimness and examined whether participants cheated to earn undeserved money. In Experiment 2, we examined the extent to which people would act selfishly in a dictator game while wearing sunglasses versus clear glasses. Finally, Experiment 3 examined whether subjective perceptions of anonymity mediated the licensing effect of wearing sunglasses.

Experiment 1: Cheating in a Dim Room

A central aspect of our prediction is that darkness can license self-interested and unethical behaviors regardless of actual anonymity. In Experiment 1, we controlled for actual anonymity by having participants engage in an individual task in which no identifying information was revealed and participants' choices could not be traced. We manipulated the lighting of the room in which the task took place and examined whether room dimness promoted cheating.

Eighty-four college students at the University of North Carolina at Chapel Hill (40 female, 44 male; average age = 20.54 years) participated in the study for a maximum payment of \$12. Participants received a \$2 fee for showing up and had the opportunity to earn an extra \$10. They were randomly assigned to one of two conditions (dim room vs. control room) upon arrival. The well-lit, or control, room (15 ft × 14 ft) was illuminated by 12 fluorescent lights mounted to the ceiling. The dim room was similar in size, but was lit by 4 fluorescent lights; the participants could see each other and the experimental material, but this room was visibly dimmer than the well-lit room. Participants in the dim-room condition were simply told that some of the lights were out.

For the task, participants received a brown envelope that contained \$10 (nine \$1 bills and four quarters) and an empty white envelope, along with two sheets of paper. The first paper was a worksheet with 20 matrices, each consisting of 12 three-digit numbers (e.g., 4.78; Mazar, Amir, & Ariely, 2008). The second paper was a collection slip on which participants were to report their performance and answer demographic questions. On the back of the collection slip we included instructions for the task and a different matrix as an example.

Participants were told that they would have 5 min to find two numbers in each matrix that added up to 10. For each pair of numbers correctly identified, they would keep \$0.50 from their supply of money; they were also asked to transfer the remaining amount to the white envelope and drop it in a designated box along with the collection slip. Note that 5 min is not enough time to solve all 20 matrices. In previous studies (Gino, Ayal, & Ariely, 2009; Mazar et al., 2008), people were able to find 7 of the 20 pairs on average during this amount of time. In addition, there was no apparent identifying information anywhere on the two sheets, so results seemed anonymous. Thus, participants had both an incentive and the opportunity to overreport their performance to earn more money.

All participants received the same matrices to solve, except that a single number was unique for each participant. One of the three-digit numbers in the matrix used as an example on the back of each collection slip matched the unique number on the corresponding test sheet. This allowed us to match the worksheet with the collection slip of each participant and compute the difference between self-reported performance and actual performance. This difference score was our main dependent variable. Positive difference scores indicate that participants overreported their performance and cheated on the task.¹

After the 5-min task, participants in both conditions wrote down on the collection slip the number of matrices they had solved correctly. They dropped the collection slip and the remaining money in one box and the matrices sheet in another box located in a different corner of the room.

A *t* test revealed that there were no significant differences in actual performance between the two conditions ($M = 7.26$ correct, $SD = 2.27$, vs. $M = 6.95$ correct, $SD = 2.49$), $t(82) < 1$, $p = .56$, $p_{\text{rep}} = .46$. However, we found significant differences in self-reported performance, $t(82) = 4.48$, $p < .001$, $p_{\text{rep}} > .99$. Participants in the control room reported a lower number of correctly solved matrices ($M = 7.78$, $SD = 3.09$) than did participants in the dim room ($M = 11.47$, $SD = 4.32$). This resulted in a difference of \$1.85 in actual payout. We found that cheating was greater in the dim room than in the control room both when we examined the average number of matrices by which participants overstated their performance ($M = 4.21$, $SD = 4.12$, vs. $M = 0.83$, $SD = 1.58$), $t(82) = 4.92$, $p < .001$, $p_{\text{rep}} > .99$, and when we examined the percentage of participants who overstated their performance ($M = 60.5\%$, $SD = 50\%$, vs. $M = 24.4\%$, $SD = 44\%$), $\chi^2(1, N = 84) = 11.15$, $p = .001$, $p_{\text{rep}} = .99$.

These results provide strong support for the predicted relationship between darkness and cheating. Although early studies such as the one by Prentice-Dunn and Rogers (1980) manipulated dimness and measured its effect on aggressive behaviors, in these studies room dimness was manipulated along with other factors, such as white noise and confidentiality of personal information; thus, the causal relationship between darkness and cheating has not previously been established. In our first experiment, the task was completely anonymous, and the only difference across conditions was room

dimness. We found that a slightly dim room increased cheating above and beyond the effect of guaranteed anonymity.

Experiment 2: “Shades” and Self-Interested Behavior

As we mentioned earlier, a useful metaphor for the illusory anonymity induced by darkness is the example of children playing hide-and-seek, who close their eyes and believe that others cannot see them. In Experiment 2, we tested this idea by having some participants wear a pair of sunglasses (and others wear clear glasses²) while engaging in an on-line task without expectation of face-to-face interaction. Clearly, the fact that one is wearing a pair of sunglasses should not impair other people’s sight, especially when there is no face-to-face interaction. Nevertheless, because darkness induces illusory anonymity, we expected that participants wearing sunglasses would be more likely than those wearing clear glasses to behave selfishly in an anonymous dictator game.

Fifty students at the University of Toronto volunteered (31 female, 19 male; average age = 21.36 years) for a maximum payment of \$11. Participants received a \$5 fee for showing up and had the opportunity to earn up to \$6 during the study. The experiment had a one-factor (sunglasses vs. clear glasses) between-subjects design. Participants were randomly assigned to “test” either a pair of sunglasses or a pair of clear glasses while completing some “unrelated” tasks. We purposely selected oversized glasses so that participants who came in with their own glasses could wear the experimental glasses on top of their own.

The supposedly unrelated task involved an ostensible interpersonal interaction with a stranger in a different room. The interaction was a typical one-shot dictator game that included two roles, initiator and recipient. The initiator had \$6 to allocate between him- or herself and the recipient. Initiators kept whatever they did not offer; recipients could choose to accept or reject the offer, but their choices did not affect initiators’ outcomes. Although participants were told they had been randomly assigned to a role, they all played the initiator against the experimenter. We emphasized that participants would not see or talk to their counterparts during or after the experiment—all the interactions would be mediated by a computer program. This ensured that the sunglasses did not affect actual anonymity or visibility of facial expressions. The experiment ended after participants made their choice; they then answered a few demographic questions and were paid \$5 plus the amount they kept for themselves in the dictator game.

Participants offered between \$0 and \$6 ($M = \$2.24$, $SD = \$1.62$). As expected, those who wore sunglasses gave significantly less ($M = \$1.81$, $SD = \$1.30$) than those who wore clear glasses ($M = \$2.71$, $SD = \$1.83$), $t(48) = 2.02$, $p = .049$, $p_{\text{rep}} = .88$. Also, participants in the sunglasses condition gave significantly less than the fair division (i.e., \$3), $t(25) = -4.688$, $p < .01$, $p_{\text{rep}} > .95$, whereas the amount given by those in the control condition was not significantly different from the fair

division, $t(23) = 0.78$, $p = .44$, $p_{\text{rep}} = .54$. These results are consistent with those of Experiment 1 and provide even stronger evidence that darkness can license dishonest and self-interested behaviors through illusory anonymity: Wearing a pair of sunglasses should have no bearing on anonymity in an on-line task without face-to-face interaction.

Experiment 3: “Shades” and Perceived Anonymity

In Experiment 3, we directly examined perceived anonymity as a mediator of the licensing effect of darkness on self-interested behaviors. Experiment 3 employed the same design and procedure as Experiment 2 except that we included a five-item measure of perceived anonymity (see Table 1) after the dictator game. These items captured the extent to which participants felt anonymous and thought that others were not paying attention to them and their choices during the dictator game ($\alpha = .93$). Participants indicated their agreement with each item on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*).

Eighty-three students at the University of North Carolina at Chapel Hill participated (39 female, 44 male; average age = 20.71 years) for a maximum payment of \$11 (\$5 fee for showing up and potential earnings up to \$6). On average, participants offered \$2.35 ($SD = \1.43). As expected, those who wore sunglasses gave significantly less ($M = \$1.93$, $SD = \$1.27$) than did those who wore clear glasses ($M = \$2.76$, $SD = \$1.46$), $t(81) = -2.77$, $p < .01$, $p_{\text{rep}} > .95$. Also, participants in the sunglasses condition gave significantly less than the fair division (i.e., \$3), $t(40) = -5.40$, $p < .001$, $p_{\text{rep}} > .99$, whereas the amount given by those in the clear-glasses condition was not significantly different from the fair division, $t(41) = -1.06$, $p = .30$, $p_{\text{rep}} = .65$. These results fully replicated the findings of Experiment 2.

Further, participants who wore sunglasses reported feeling more anonymous during the study ($M = 4.73$, $SD = 1.10$) than did those who wore clear glasses ($M = 4.01$, $SD = 1.17$), $t(81) = 2.87$, $p < .01$, $p_{\text{rep}} > .95$. We examined whether this perceived anonymity mediated the effects of darkness on the amount participants offered in the dictator game (Baron & Kenny, 1986). The effect of wearing sunglasses was reduced to nonsignificance (from $\beta = -0.29$, $p < .01$, $p_{\text{rep}} > .95$, to $\beta = -0.09$, $p = .28$, $p_{\text{rep}} = .66$) when perceived anonymity was included in

Table 1. Items Used to Measure Perceived Anonymity and Concealed Identity in Experiment 3

1. I was watched during the study.*
2. I was anonymous during the study.
3. My choice went unnoticed during the study.
4. My identity was not known to others during the study.
5. Others were paying attention to my behavior during the study.*

Note: Reverse-scored items are indicated by asterisks.

the equation, and perceived anonymity was a significant predictor of the offered amount ($\beta = -0.67, p < .001, p_{rep} > .99$). A bootstrap analysis showed that the 99% bias-corrected confidence interval for the size of the indirect effect excluded zero ($[-0.77, -0.75]$), suggesting a significant indirect effect (MacKinnon, Fairchild, & Fritz, 2007). These results show that perceived anonymity mediated the effect of darkness on selfish behavior.

General Discussion

Imagine that a person who is alone in a closed room is deciding whether to lie to a total stranger in an e-mail. Clearly, whether the room is well lit would not affect the person's actual level of anonymity. Nevertheless, darkness may license unethical behavior in such situations. Across three studies, we found that darkness, induced by room dimness (Experiment 1) or wearing sunglasses (Experiments 2 and 3), licensed self-interested and cheating behavior. In addition, an illusory sense of anonymity seems to have mediated this licensing effect of darkness (Experiment 3). Darkness appears to induce a false sense of concealment, leading people to feel that their identities are hidden.

It is important to note that across all three experiments, our darkness manipulations did not have any bearing on actual anonymity. In Experiment 1, we manipulated darkness by dimming the lights. Although the room in the experimental condition was darker than the one in the control condition, participants had no trouble seeing and identifying each other. In Experiments 2 and 3, we manipulated darkness simply by asking participants to wear a pair of sunglasses. The task used in these latter two experiments was fully mediated by computers, and participants did not expect to see or talk to the recipient of their offer during or after the experiment. Further, the task was designed so that it promised complete anonymity. Nevertheless, in each of these studies, darkness increased dishonesty and self-interested behaviors.

Previous studies have treated darkness as just one of many factors that induce a state of deindividuation (e.g., Zimbardo, 1969), but our studies suggest that the experience of darkness, combined with the difficulty of transcending one's own phenomenological experience, triggers a fundamental psychological belief that one is protected from others' attention and inspections. Our results suggest that darkness, even experienced one-sidedly through the act of wearing sunglasses, can have potentially harmful consequences. Thus, Emerson may have been correct when he stated that good lamps are the best police.

Acknowledgments

The authors thank the Center for Decision Research at the University of North Carolina at Chapel Hill for its support.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interests with respect to their authorship and/or the publication of this article.

Notes

1. No participant underreported his or her performance.
2. The glasses did not have prescription lenses.

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