

The Morality of Larks and Owls: Unethical Behavior Depends on Chronotype as Well as Time of Day

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Kouchaki and Smith (2014) proposed that people are more ethical in the morning than later in the day—that is, the morning morality effect. Arguing that daily activities accumulate to tax people's energy (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998), they suggested that people wear out as a day wears on. Despite this important contribution, the assumption that individuals wear out during a day overlooks the fact that approximately 40% of people experience increased energy later in the day (Horne & Ostberg, 1976). Specifically, people have chronotypes that dictate their individual circadian rhythms (i.e., their 24-hr cycles of physiological functions; Monk et al., 1997). Morning people ("larks") tend to experience morning peaks and evening troughs in circadian rhythms; evening people ("owls") experience the reverse (Kerkhof, 1985). We propose a *chronotype morality effect* in which the fit between an individual's chronotype and time of day predicts the individual's ethicality. This Commentary reports the results of two experiments testing whether this fit predicts an individual's ethicality better than time of day alone.

Sleep is governed by two processes (Borbely, 1982): *Homeostatic processes* increase people's sleep propensity while they are awake, and *circadian processes* produce cyclical fluctuations in sleep propensity. Although the two processes are largely independent, they have similar effects on several psychological variables (e.g., alertness; Jewett, Dijk, Kronauer, & Dinges, 1999). Whereas homeostatic processes lead many people to lose energy throughout the day (Kouchaki & Smith, 2014), circadian processes accentuate these homeostatic effects for morning people and diminish them for evening people. This means that morning people should demonstrate more ethical behavior in the morning (when both sleep processes support ethicality) than in the evening (when both processes oppose ethicality): This is the morning morality effect. For evening people, however, homeostatic and circadian processes conflict in both the morning and the evening. Thus, their

ethicality at both times should depend on the relative strength of the two processes. If homeostatic processes dominate circadian processes, a morning morality effect should emerge for evening people. If the two processes are comparably strong, then evening people should demonstrate similar levels of ethicality in the morning and evening. Finally, if circadian processes dominate, then evening people should demonstrate more ethicality in the evening than the morning. We hypothesized that the strength of circadian processes is sufficient to reduce or even reverse the morning morality effect for evening people.

Study 1: Ethicality in the Morning

Our first experiment investigated moral decisions made in the morning; we predicted that people's *eveningness* (i.e., the degree to which their scores on a chronotype scale indicated that they were an evening person) would predict their unethical behavior. Forty-eight U.S. M.B.A. students (23 women, 25 men; mean age = 25.90 years, $SD = 3.25$) participated, for course credit and a reward of up to \$10, during one of five morning sessions (between 7:30 and 9:30 a.m.). Participants had 5 min to complete Gino, Ayal and Ariely's (2009) matrix task, earning \$0.50 per matrix they claimed to have "solved." Cheating was operationalized as the number of matrices reported as correct minus the number actually correct. Chronotype was measured after the matrix task using an updated version of the 19-item Horne-Ostberg scale (Horne & Ostberg, 1976). Participants were categorized into one of three groups (morning people, intermediate people, and evening people) on the basis of their chronotype score.¹

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Participants' eveningness scores predicted how much they cheated, $b = 0.017$, 95% confidence interval (CI) = [0.004, 0.03], $p = .01$, as did their chronotype categories, $b = 0.18$, 95% CI = [0.03, 0.35], $p = .02$. On average, morning people inflated the number of matrices that they reported having solved by only 0.13 ($SD = 0.29$), intermediate people inflated their number by 0.25 ($SD = 0.34$), and evening people inflated their number by 0.50 ($SD = 0.56$). In addition, chronotype category predicted the percentage of people who cheated (morning people: 18.8%; intermediate people: 40.0%; evening people: 58.3%), $b = 1.80$, 95% CI = [0.26, 21.39], Wald = 4.32, $p = .04$. This experiment provided preliminary evidence that the fit between chronotype and time of day influences unethical behavior.

Study 2: Ethicality and the Fit Between Chronotype and Time of Day

Our second experiment had a 2 (chronotype: morning vs. evening) \times 2 (session: morning vs. evening) factorial design. We predicted an interaction between chronotype and time of day such that the morning morality effect would be attenuated among evening people.

One hundred forty-two participants (72 women, 70 men; mean age = 30.00 years, $SD = 11.39$) from two samples (users of Amazon's Mechanical Turk and university students from the eastern United States) completed a two-part online study for a fixed fee and a chance to win one of two larger prizes. In Part 1, they completed an abbreviated version of the chronotype scale (Adan & Almirall, 1991). Participants whose scores indicated that they were morning or evening people qualified for Part 2 and were randomly assigned to either a morning session (7:00 to 8:30 a.m.) or an evening session (12:00 to 1:30 a.m.)

In Part 2, participants were asked to report the outcome of a die roll; the higher the reported number, the more raffle tickets they would receive for a large monetary prize. Participants thus had an incentive to inflate the outcome of the roll to get more raffle tickets (Shalvi, Dana, Handgraft, & De Dreu, 2011). We found a significant Chronotype \times Session interaction, $F(1, 138) = 4.30$, $p = .04$, $\eta^2 = .03$: Morning people tended to report higher die-roll numbers in the evening than in the morning, but evening people tended to report higher numbers in the morning than in the evening (Fig. 1; see also Table S1 in the Supplemental Material).

The Chronotype Morality Effect

Our experiments suggest that the fit between a person's chronotype and the time of day offers a more complete predictor of that person's ethicality than does time of day

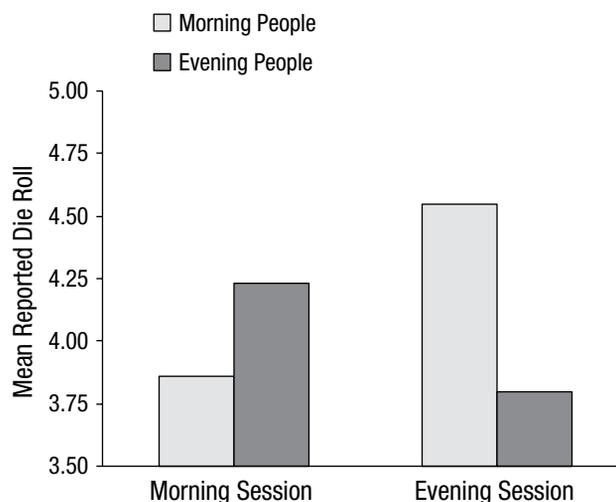


Fig. 1. Results for Study 2: mean reported die roll as a function of session for morning and evening people.

alone. Morning people demonstrated the morning morality effect (Kouchaki & Smith, 2014), in accordance with both their homeostatic and chronotype processes. Evening people, however, behaved more ethically in the evening than in the morning. From a theoretical standpoint, these results suggest that the relationship between ethicality and time of day is best conceptualized as a matter of Person \times Situation fit. From a practical standpoint, they suggest that ethical behavior arises when people "match" their situations (e.g., evening people in the evening), but does not necessarily emerge in particular situations (e.g., morning) or from particular people (e.g., morning people). In addition, our results cast doubt on the stereotype that evening people are somehow dis-solute (Yam et al., 2014).

These results qualify Kouchaki and Smith's (2014) important findings, suggesting a boundary condition for the morning morality effect. A model that focuses more broadly on Person \times Situation fit may be more complete. This perspective, though new, builds from a wealth of "fit" research (e.g., Kristof, 1996) and may facilitate the advancement of theory on ethicality and time of day. Future research on the chronotype morality effect might investigate underlying mechanisms, as well as interventions that might increase fit (e.g., napping) or exacerbate misfit (e.g., daylight saving time). Such research may help to advance a more comprehensive understanding of ethicality and time of day.

Author Contributions

B. C. Gunia developed the study concept and design, supervised the data collection, and led the writing of the manuscript. C. M. Barnes and S. Sah contributed to the study concept and design, assisted in data analysis, wrote portions of the

manuscript, and provided critical revisions. All authors approved the final version of the manuscript for submission.

Declaration of Conflicting Interests

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

Supplemental Material

Additional supporting information can be found at <http://pss.sagepub.com/content/by/supplemental-data>

Note

1. More detailed information on the methods and results for both studies is in the Supplemental Material available online.

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