



No evidence for unethical amnesia for imagined actions: A failed replication and extension

Matthew L. Stanley¹ · Brenda W. Yang¹ · Felipe De Brigard²

Published online: 12 March 2018
© Psychonomic Society, Inc. 2018

Abstract

In a recent study, Kouchaki and Gino (2016) suggest that memory for unethical actions is impaired, regardless of whether such actions are real or imagined. However, as we argue in the current study, their claim that people develop “unethical amnesia” confuses two distinct and dissociable memory deficits: one affecting the *phenomenology* of remembering and another affecting memory *accuracy*. To further investigate whether unethical amnesia affects memory accuracy, we conducted three studies exploring unethical amnesia for imagined ethical violations. The first study ($N = 228$) attempts to directly replicate the only study from Kouchaki and Gino (2016) that includes a measure of memory accuracy. The second study ($N = 232$) attempts again to replicate these accuracy effects from Kouchaki and Gino (2016), while including several additional variables meant to potentially help in finding the effect. The third study ($N = 228$) is an attempted conceptual replication using the same paradigm as Kouchaki and Gino (2016), but with a new vignette describing a different moral violation. We did not find an unethical amnesia effect involving memory accuracy in any of our three studies. These results cast doubt upon the claim that memory accuracy is impaired for imagined unethical actions. Suggestions for further ways to study memory for moral and immoral actions are discussed.

Keywords Moral · Unethical amnesia · Memory · Imagination · Emotion

Literature is plagued with characters haunted by remorse, constantly ruminating on their immoral actions, from Shakespeare’s *Macbeth*, to Conrad’s *Lord Jim*, to Dostoevsky’s Raskolnikov in *Crime and Punishment*. These characters exemplify an all-too-human psychological experience whereby memories of unethical behaviors remain vivid, difficult to forget, ruminated upon, and frequently retrieved. Although scant, extant scientific evidence supports this observation. For instance, Evans, Ehlers, Mezey, and Clark (2007) interviewed 105 convicted criminals, half of whom suffered from repetitive intrusive memories of their crimes, and found that such memories tended to be very vivid,

clear, and rich in sensory and cognitive content, with levels similar to those reported by assault and trauma victims (Ehlers, Hackmann, & Michael, 2004; Ehlers et al., 2002). More recently, Woodworth et al. (2009) asked 50 convicted murderers to reminisce about either their homicide or a past positive event, and found that memories for their criminal actions were more vivid and had more sensory components than their memories of positive events, as measured both by self-reported ratings and external coders.

These prior studies have explored differences in the phenomenological experience of remembering criminal versus noncriminal events. Although related, less is known as to whether memories for immoral actions are also more accurate than memories for morally permissible events. However, research on accuracy for emotional experiences indirectly suggests that memories for immoral actions, which are typically negative and emotionally charged (Escobedo & Adolphs, 2010; Stanley, Henne, Iyengar, Sinnott-Armstrong, & De Brigard, 2017), might be more likely to be remembered. A wealth of evidence has demonstrated that experiences evoking strong emotions are more likely to be accurately remembered than experiences that do not (Bradley, Greenwald, Petry, & Lang, 1992; Cahill & McGaugh, 1995; Kensinger, 2004).

Matthew L. Stanley and Brenda W. Yang contributed equally to this work.

✉ Felipe De Brigard
felipe.debrigard@duke.edu

¹ Department of Psychology and Neuroscience, Center for Cognitive Neuroscience, Duke University, Durham, NC, USA

² Department of Psychology and Neuroscience, Center for Cognitive Neuroscience, Department of Philosophy, Duke Institute for Brain Sciences, Duke University, 203A West Duke Building, Durham, NC 27708-0743, USA

Importantly, this *emotional memory enhancement* effect is more pronounced for negative emotional events relative to those with positive or neutral valence (Kensinger, 2007, 2009; Kensinger & Schacter, 2006). Because unethical actions tend to elicit negative feelings (Escobedo & Adolphs, 2010; Stanley et al., 2017), it is likely that the memory accuracy advantage for negative as opposed to neutral or positive experiences carries over when such negative emotions are linked to unethical actions. Given these results, one would expect that memories for unethical actions would be better remembered—both from the point of view of phenomenology as well as accuracy—than memories for ethically permissible actions.

However, a recent article by Kouchaki and Gino (2016) challenges this expectation. The authors report results from nine studies suggesting that people develop “unethical amnesia”: the process by which memories of unethical misdeeds become—according to the authors—“less clear, less detailed, and less vivid” over time, leading people to remember unethical actions “less well” compared with ethical ones. Unfortunately, this terminology seems to confuse two related but distinct notions: one having to do with the *accuracy* of the memory and another having to do with the experience, or *phenomenology*, of remembering. But, by definition, amnesia involves at least some memory loss, meaning that accuracy must be impaired to some extent (Cohen & Eichenbaum, 1993). In memory research, ample evidence has demonstrated that higher ratings in phenomenological characteristics, such as vividness and clarity, need not translate into higher accuracy (Rubin, Schrauf, & Greenberg, 2003; Otgaar, Scoboria, & Mazzoni, 2014). Dissociations between the accuracy and phenomenological characteristics of retrieved memories have been well documented in a variety of domains, including false memories (Payne, Neuschatz, Lampinen, & Lynn, 1997; Roediger & McDermott, 1995), flashbulb and traumatic memories (Talarico & Rubin, 2007), and recognition memory (Craik, Rose, & Gopie, 2015; Voss, Baym, & Paller, 2008; Voss & Paller, 2009). This evidence overwhelmingly suggests that people can vividly remember events that did not happen, just as they can dimly remember events that did.

As such, it is worth wondering whether the effect uncovered by Kouchaki and Gino (2016) pertains to the phenomenology of remembering unethical deeds, the accuracy of those memories, or both. *Prima facie*, their suggestion seems to be that unethical amnesia affects both. Indeed, they suggest that it does by including one study (Study 5) using memory *accuracy* as a dependent variable. In their other eight studies, the authors employed as dependent variables only *phenomenological* measures of participants’ recollections (i.e., modified versions of the Memory Characteristics Questionnaire, Johnson, Foley, Suengas, & Raye, 1988; and the Autobiographical Memory Questionnaire; Rubin et al., 2003). For their one particular study employing an objective memory accuracy measure, Kouchaki and Gino (2016) asked participants ($N = 88$) to read vignettes purportedly

depicting either ethical or unethical behaviors. The vignettes did not describe an event that participants had necessarily personally experienced; rather, they were asked to imagine experiencing the event described in the vignette (i.e., cheating or not cheating on a test; see Appendix A). One week later, participants were presented with a recognition memory test that included 18 statements pertaining to information in the vignettes. The authors found a significant small-to-medium size effect ($p = .049$, Cohen’s $d = 0.43$), whereby participants who read the ethical vignette remembered, on average, almost one more statement ($M = 15.23$) than those who read the unethical vignette ($M = 14.37$).

To further investigate the extent to which Kouchaki and Gino’s (2016) reported “unethical amnesia” effect pertains to memory accuracy for imagined unethical versus ethical actions, we conducted three studies. Study 1 investigates the effect of condition (imagined unethical versus ethical action) on memory accuracy by directly replicating Kouchaki and Gino’s (2016) fifth study. Study 2 includes several additional variables to help increase our chances of finding the target effect from Kouchaki and Gino’s (2016) fifth study. Study 3 utilizes a vignette depicting a different type of moral violation to ensure that any accuracy effect is not specific to the particular vignette employed by Kouchaki and Gino (2016).

Study 1

Materials and method

Participants A total of 290 individuals were recruited to participate in this study through Amazon Mechanical Turk (AMT) and completed the first session. Participant recruitment was restricted to fluent English speakers from the United States with a prior approval rating above 85%. Two hundred and twenty-eight individuals (78.6% of those from the first session) returned for the second session one week later ($M_{\text{age}} = 35.92$ years, $SD = 10.39$, age range: 20–69, 107 females, 121 males).¹ Following the recommendation from Simonsohn (2015), our sample size was selected to ensure that we would have 2.5 times as many participants as the original study conducted by Kouchaki and Gino (2016). Assuming an alpha level of .05, we have the statistical power at the recommended .80 level, with 228 participants to detect even a small

¹ Kouchaki and Gino (2016) recruited a sample of college students from the United States to participate in their online study. However, there is no a priori reason as to why the accuracy effect identified by Kouchaki and Gino (2016) should only be generalizable to college students. Indeed, at no point do they suggest that unethical amnesia only applies to college students; they take their sample to be representative of the general population. As such, if there is an unethical amnesia effect of accuracy, we should expect to find it in another sample representative of the general population, such as the one we employ here. For a recent discussion on sample representativeness and generality constraints, see Simons, Shoda, and Lindsay (2017).

effect (Cohen's $d = .30$) of condition (ethical vs. unethical) on the number of items correctly remembered using a two-sided independent-samples t test, even with an attrition rate of 25%. All studies reported here were approved by the Duke University Campus Institutional Review Board.

Materials The ethical and unethical vignettes used in this study were identical to those used by Kouchaki and Gino (2016), and the 18 items used in the recognition memory test were also identical to those used by Kouchaki and Gino. The vignettes describe a situation that involves being tempted to cheat on a chemistry exam. The items in the recognition memory test consisted of nine true and nine false statements that asked about details common to both ethical and unethical vignettes. All materials are provided in Appendix A.

Procedure In the first session, participants were randomly assigned to read either an ethical or unethical version of the cheating vignette. Before reading the vignette, participants received the following instruction: "Please read the short story on the next page. While reading, please take a first-person perspective and put yourself in the position of the main character." One week later, after receiving an e-mail reminder, participants completed the second part of the study. In this second session, participants were asked to answer 18 true or false questions about the vignettes from the first session; the order of the statements was randomized. The procedure we employed was identical to the procedure from Kouchaki and Gino (2016).

Results and discussion

The purpose of Study 1 was to attempt to replicate Kouchaki and Gino's (2016) fifth study which, as mentioned, was their only study indexing objective memory accuracy. We found no statistically significant difference in the number of statements correctly identified between participants who read the vignette depicting the ethical behavior ($n = 108$, $M = 12.52$, $SD = 2.53$) versus the unethical cheating behavior ($n = 120$, $M = 13.15$, $SD = 2.52$), $t(226) = 1.89$, $p = .06$, 95% CI $[-.03, 1.29]$, Cohen's $d = .26$ (see Fig. 1).² Although it did not reach significance, this pattern of results was in the opposite direction of the one reported by Kouchaki and Gino (2016). Participants who read the vignette describing ethical behavior performed somewhat *worse* on the recognition memory test than participants who read the vignette describing unethical behavior. These results fail to replicate the effect reported by Kouchaki and Gino, and they cast doubt upon their claim, solely based on their fifth study, that memory accuracy is impaired for imagined unethical relative to ethical actions.

² All 95% CIs reported in this manuscript are for the mean difference.

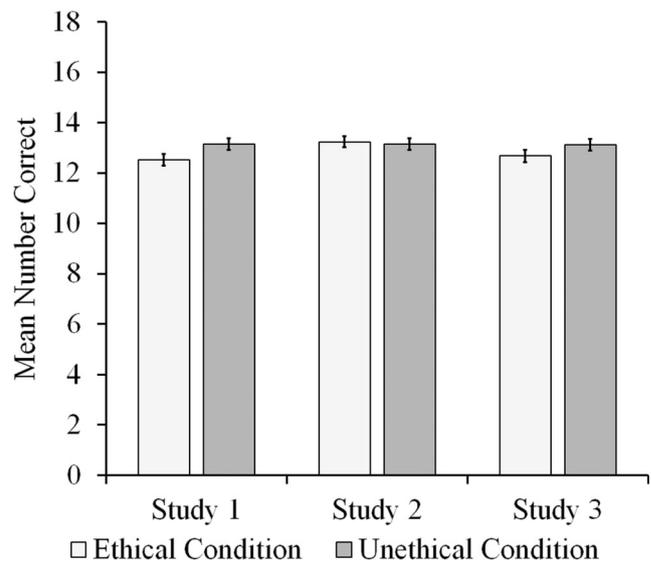


Fig. 1 For ethical and unethical conditions in all three studies, means and standard errors for the number of items correctly remembered are depicted. Error bars indicate SEM

Study 2

There are several reasons why Study 1 may have failed to replicate those results from Kouchaki and Gino (2016). For instance, the ability to imagine the events described in the vignettes may be a necessary precondition for identifying a difference in memory accuracy between ethical and unethical behaviors. If enough participants have difficulty simulating the events described in the vignettes, then we may not truly be indexing differences in memory accuracy for imagined ethical and unethical events. Furthermore, if enough participants do not believe that the cheating behavior described in the vignettes is unethical, then we may not actually be characterizing memory accuracy between ethical and unethical actions. To extend our first study and to further investigate the possibility of a memory accuracy effect for unethical relative to ethical events, we conducted a second replication. This time, we included two additional variables as covariates to increase our chances of finding an effect of condition on memory accuracy. Specifically, participants were asked to rate their ability to simulate the events in the vignettes as well as the moral wrongness of cheating more generally.

Materials and method

Participants As in Study 1, we recruited 290 individuals to participate in this study through AMT and completed the first session. All individuals who had participated in Study 1 were prevented from participating in Study 2. Participant recruitment was restricted to fluent English speakers from the United States with a prior approval rating above 85%. Two hundred and thirty-two individuals (80.0% of those from the first

session) returned for the second session one week later ($M_{\text{age}} = 37.62$ years, $SD = 11.54$, age range: 19–71, 90 females, 138 males). As before, assuming an alpha level of .05, we have the statistical power at the recommended .80 level to detect even a small effect (Cohen's $d = .30$) of condition on the number of items correctly remembered using a two-sided independent-samples t test, allowing for an attrition rate of 25%.

Materials The two vignettes and the 18 items for the recognition memory test used in Study 2 were identical to those in our Study 1 and to those used by Kouchaki and Gino (2016). All materials are provided in Appendix A.

Procedure Procedures for Study 2 were identical to Study 1, except from the addition of two new items. In the first session, after participants read either an ethical or unethical version of the cheating vignette, they also rated on a 5-point scale their ability to imagine the events in the vignettes (1 = *very difficult to imagine*; 5 = *very easy to imagine*). Then, at the end of the second session, participants also rated on a 5-point scale how morally wrong it is to cheat on an exam (1 = *not at all morally wrong*; 5 = *extremely morally wrong*).

Results and discussion

The purpose of Study 2 was to attempt to replicate Kouchaki and Gino's (2016) fifth study once more, and also to eliminate two potential problems that could have reduced our chances of finding an effect of condition on memory accuracy in Study 1. However, we did not find a significant difference in the number of statements correctly identified between participants who read the vignette depicting the ethical behavior ($n = 119$, $M = 13.24$, $SD = 2.38$) versus the unethical cheating behavior ($n = 113$, $M = 13.15$, $SD = 2.45$), $t(230) = 0.27$, $p > .78$, 95% CI $[-.71, .54]$, Cohen's $d = .04$ (see Fig. 1).

Next, we examined memory accuracy as a result of our two additional items relating to ease of imagining and moral wrongness. Most participants thought that the events in the vignettes were easy to imagine and that cheating is morally wrong, as evidenced by distributions of both intervals being severely negatively skewed. However, it remains possible that an effect of unethical amnesia could be found only for participants who found the vignette easy to imagine, or who believed cheating to be unethical. However, isolating the subset of participants who thought that the events in the vignettes were easy to imagine (ratings of 4 and 5 on the 5-pt scale), yielded no significant difference in memory accuracy between participants who read the ethical vignette ($n = 106$, $M = 13.42$, $SD = 2.32$) versus the unethical vignette ($n = 99$, $M = 13.25$, $SD = 2.41$), $t(203) = 0.49$, $p > .62$, 95% CI $[-.49, .81]$, Cohen's $d = .07$. Similarly, isolating the subset of participants who judged cheating on exams to be morally wrong (ratings of 4 and 5 on the 5-pt scale) yielded no significant difference

in the number of statements accurately recalled between participants who read the ethical vignette ($n = 72$, $M = 12.86$, $SD = 2.55$) versus the unethical vignette ($n = 61$, $M = 13.38$, $SD = 2.22$), $t(131) = 1.23$, $p > .21$, 95% CI $[-.31, 1.34]$, Cohen's $d = .22$. Lastly, we isolated the subset of participants who both thought that the events in the vignettes were easy to imagine *and* judged cheating on exams to be morally wrong (ratings of 4 and 5 on the 5-pt scale). As before, this did not yield a significant difference in the number of statements accurately recalled between participants who read the vignette depicting the ethical vignette ($n = 65$, $M = 13.02$, $SD = 2.47$) versus the unethical vignette ($n = 53$, $M = 13.40$, $SD = 2.08$), $t(131) = 0.90$, $p > .37$, 95% CI $[-.46, 1.22]$, Cohen's $d = .17$. Note that no matter how the subset of participants was selected for these follow-up analyses, there was still a greater number of participants in each of our follow-up analyses relative to the number of participants in Kouchaki and Gino's (2016) entire fifth study.

Study 3

Both Studies 1 and 2 cast doubt on the claim that memory accuracy is impaired for imagined unethical actions relative to ethical actions. To ensure that these findings are not specific to just one vignette describing one type of moral violation, the procedure of Study 3 is identical to the one from Study 2, but Study 3 uses a new vignette describing a different moral violation.

Materials and method

Participants As in our prior two studies, 290 individuals were recruited to participate in this study through AMT and completed the first session. All individuals who had participated in Studies 1 and 2 were automatically prevented from participating in Study 3. Participant recruitment was restricted to fluent English speakers from the United States with a prior approval rating above 85%. Two hundred and twenty-eight individuals (78.62% of those from the first session) returned for the second session one week later ($M_{\text{age}} = 37.64$ years, $SD = 11.15$, age range: 20–68, 119 females, 104 males). As in the prior two studies, assuming an alpha level of .05, we have the statistical power at the recommended .80 level to detect even a small effect (Cohen's $d = .30$) of condition on the number of items correctly remembered using a two-sided independent-samples t test, allowing for an attrition rate of 25%.

Materials The ethical and unethical vignettes used in Study 3 and the 18 items used in the recognition memory test are provided in Appendix B. This time, the first-person vignette describes a driver who accidentally backs into a parked car in a parking lot. In the ethical condition, the

driver leaves a note on the windshield of the damaged car with contact information, whereas in the unethical condition, the driver drives away without leaving a note. These vignettes were written to be similar in tone, structure, and length to the original cheating vignettes used by Kouchaki and Gino (2016). Mirroring Studies 1 and 2, the items in the recognition memory test consisted of nine true and nine false statements that asked about details common to both ethical and unethical vignettes.

Procedure The procedure in Study 3 is the same as the procedure in Study 2, with the difference between the two studies being the content of the vignettes and the recognition memory test items.

Results and discussion

The purpose of Study 3 is to attempt to conceptually replicate our findings from Study 2 using a different type of moral violation. We did not find a significant difference in the number of statements correctly identified between participants who read the vignette depicting the ethical behavior ($n = 117$, $M = 12.68$, $SD = 2.66$) versus the unethical cheating behavior ($n = 111$, $M = 13.11$, $SD = 2.38$), $t(226) = 1.27$, $p > .20$, 95% CI $[-.24, 1.08]$, Cohen's $d = .17$ (see Fig. 1).

As in Study 2, we examined potential differences in memory accuracy within subsets of our sample by isolating participants who (1) thought the events in the vignettes were easy to imagine (ratings of 4 and 5 on the 5-pt scale), (2) believed it is morally wrong to damage another car and drive off without leaving a note (ratings of 4 and 5 on the 5-pt scale), and (3) found the vignettes easy to imagine *and* believed the scenario described is morally wrong. As in Study 2, regardless of condition (ethical vs. unethical), most participants thought (1) that the events in the vignettes were easy to imagine and (2) that it is morally wrong to damage another car and just drive off without leaving any contact information.

Isolating the subset of participants who thought that the events in the vignettes were easy to imagine (ratings of 4 and 5 on the 5-pt scale), there was still no significant difference in the number of statements correctly identified between participants who read the vignette depicting the ethical behavior ($n = 97$, $M = 13.05$, $SD = 2.57$) versus the unethical cheating behavior ($n = 100$, $M = 13.19$, $SD = 2.45$), $t(195) = .39$, $p > .69$, 95% CI $[-.57, .85]$, Cohen's $d = .06$. Furthermore, isolating the subset of participants who thought that damaging another car and driving off without leaving any contact information is morally wrong (ratings of 4 and 5 on the 5-pt scale), there was still no significant difference in the number of statements correctly identified between participants who read the vignette depicting the ethical behavior ($n = 98$, $M =$

12.80, $SD = 2.66$) versus the unethical behavior ($n = 94$, $M = 13.29$, $SD = 2.33$), $t(190) = 1.36$, $p > .17$, 95% CI $[-.22, 1.20]$, Cohen's $d = .20$. Finally, isolating the subset of participants who both thought that the events in the vignettes were easy to imagine *and* thought that damaging another car and driving off without leaving any contact information is morally wrong (ratings of 4 and 5 on the 5-pt scale), there was still no significant difference in the number of statements correctly identified between participants who read the vignette depicting the ethical behavior ($n = 82$, $M = 13.10$, $SD = 2.62$) versus the unethical cheating behavior ($n = 89$, $M = 13.30$, $SD = 2.37$), $t(169) = .54$, $p > .58$, 95% CI $[-.55, .96]$, Cohen's $d = .08$. Note that no matter how the subset of participants was selected for these follow-up analyses, there was still a greater number of participants in each of our follow-up analyses relative to the number of participants in Kouchaki and Gino's (2016) entire fifth study.

General discussion

In their thought-provoking paper, Kouchaki and Gino (2016) reported results from nine studies suggesting, according to the authors, that people develop “unethical amnesia,” which they characterize as “impaired,” “worse,” or “obfuscated” memory for unethical relative to ethical actions. However, their description of the results blurs a critical distinction between the *phenomenology* of our recollective experience and the *accuracy* of the retrieved memorial content. As mentioned, a wealth of evidence from several lines of research demonstrates that lower ratings in phenomenological characteristics (e.g., vivacity) do not necessarily result in lower memory accuracy, and vice versa (e.g., Otgaar et al., 2014; Roediger & McDermott, 1995; Talarico & Rubin, 2007; Voss et al., 2008). By definition, however, amnesia involves memory loss: A failure to accurately remember at least some information of past events is a necessary condition for identifying a case as one of amnesia. But only one of the nine studies reported by Kouchaki and Gino (2016) provides an objective measure of memory accuracy that could be used to identify a possible amnesia effect. We have reported the results of three studies aimed at replicating and extending the only study conducted by Kouchaki and Gino (2016) that used a memory accuracy measure, as opposed to self-reported measures of phenomenology.

Nevertheless, we were unable to directly or conceptually replicate Kouchaki and Gino's (2016) memory accuracy effect. Participants in our studies did not show a memory disadvantage for details of the unethical relative to the ethical vignette, despite having sample sizes in each of our studies more than 2.5 times as large as the sample size from Kouchaki and

Gino (2016).³ In fact, in our first study (the attempted direct replication of Kouchaki and Gino's, 2016, fifth study), the pattern of results was in the opposite direction as the one reported by Kouchaki and Gino (2016). Although the results were not statistically significant ($p = .06$), participants who read the ethical vignette performed somewhat worse on the recognition memory test than those who read the unethical vignette. In our other two studies, however, memory performance did not differ as a function of whether participants were assigned to the ethical or unethical condition. In Kouchaki and Gino's (2016) only study that measured objective memory performance on the recognition test, it was unclear whether participants could reasonably simulate the events described in the vignettes or whether participants thought that cheating on an exam was unethical. Even after investigating whether their finding depended on participants' ability to simulate the events or the perceived moral wrongness of the behaviors described, there was still no memory accuracy advantage for ethical relative to unethical actions.

It is also important to stress that the nine studies reported by Kouchaki and Gino (2016) investigated two different kinds of memories: those that involved *imagined* events and those that involved actually *experienced* events. Their one study that obtained a measure of memory accuracy only indexed recognition performance for *imagined* events. Our findings cast doubt on an unethical amnesia effect for imagined events specifically, so the lack of an unethical amnesia effect in our results does not necessarily generalize to actually experienced events. However, converging results from other lines of research cast doubt on the possibility that there is unethical amnesia involving the accuracy of remembered events that were actually experienced (i.e., not merely imagined). For instance, *emotional memory enhancement* effects show that people are better at accurately remembering details from negative emotional events than positive or neutral ones (Kensinger, 2007, 2009; Kensinger & Schacter, 2006). Given that memories of unethical actions tend to be both emotionally charged and more negative than memories of ethical actions, one might reasonably predict that memories for details of previously experienced unethical actions are more accurate than memories for details of previously experienced ethical actions. Taking our reported results and existing research on emotional memory enhancement together, we do not believe that there is, at present, compelling evidence for an "amnesia" effect, which is a serious cognitive impairment that renders individuals incapable of retrieving many (if any at all) details of past experiences.

³ After combining the data from all three experiments, we also computed a linear mixed effects regression model of condition (ethical vs. unethical) on the number of items successfully remembered, including the study as a random effect with random intercepts only. Using a Kenward–Roger approximation, condition was not significantly related to the number of items correctly remembered ($p > .10$).

Despite considerable evidence that negative, charged, and personally significant events tend to be better remembered than positive, neutral, or nonsignificant ones (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), there are still some documented memory biases that could, in principle, reduce retrieval accuracy for some unethical actions relative to ethical ones. For example, research on self-enhancement and self-protection motivations suggests that people tend to remember certain kinds of positive information about themselves better than negative information about themselves (Alicke & Sedikides, 2009; Baumeister et al., 2001; Sedikides & Green, 2000). Relatedly, for memories of lying to or emotionally harming others, people judge their own past behaviors as less morally wrong and less negative than those in which other people lied to or emotionally harmed them (Stanley et al., 2017). The mechanisms responsible for motivated forgetting may, under some circumstances, enable people to forget undesirable details of past actions (Anderson & Hanslmayr, 2014). And people tend to forget the unethical actions of third parties when they benefit from those actions (Bell, Schain, & Echterhoff, 2014; Reczek, Irwin, Zane, & Ehrich, 2017). It is possible, therefore, that our memory for some moral violations could tap into these self-serving biases and thus reduce the accuracy of recollections for certain details. Further research is needed to explore the extent to which memory biases influence how accurately personal immoral behaviors are recalled.

We believe that our failed replications cast doubt on the reality of the effect uncovered by the only study Kouchaki and Gino (2016) reported with an accuracy measure. But what can we say about the phenomenology of ethical relative to unethical remembered events? Contrary to Kouchaki and Gino's (2016) postulated "unethical amnesia" for phenomenological characteristics, many prior studies actually suggest that committing serious moral transgressions elicits vivid, detailed, and highly emotional unwanted memories, tantamount to those elicited by serious traumatic events (Cima & van Oorsouw, 2013; Ehlers et al., 2004; Ehlers et al., 2004; Evans et al., 2007; Scott, 2012; Woodworth et al., 2009). Given these prior findings, perhaps the phenomenological component of the purported unethical amnesia effect reported by Kouchaki and Gino (2016) is strictly confined to less serious moral violations, or perhaps only to cheating scenarios, which is the only type of unethical action they tested. While our data do not directly speak to the phenomenology effects reported by Kouchaki and Gino (2016), we do believe that there is a need for further research on both the phenomenology and accuracy of remembered (im)moral actions and decisions.

Funding This project was made possible through the support of a grant from the John Templeton Foundation to F.D.B. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the John Templeton Foundation. This project was also supported by a research grant from the Duke Institute for Brain Science to F.D.B.

Compliance with ethical standards

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.

Appendix A

Ethical Vignette (Kouchaki & Gino, 2016)

I hate chemistry. I hate taking chemistry classes, and I am not good at it. The last time I took chemistry, I had to do it for a semester for my bachelor's degree in anthropology. I needed this last general education requirement to graduate. The professor I had was really lax about things. He didn't even really teach us much.

Finals rolled around, and I was 1 point away from a solid C in the class. I studied very hard; I even pulled an "all nighter," where I stayed up all night studying the night before the examination. I didn't feel that I was retaining any information. As a result, I made a cheat sheet on white notebook paper as a backup. I justified it by telling myself that because I hadn't learned much from the class, that this was the only way to pass. The professor barely taught us, so I believe I need a backup plan just in case. I also told myself that I was not really using chemistry later in my life and career.

During the final examination there was one question about amino acids, which was really confusing. I thought about it for a few minutes. I finally remembered the answer, so I did not need to use my cheat sheet hidden under a binder on top of my desk to answer any questions.

In the end I received a C+ for the class. I still feel really good about it, because I think I did something morally right; it was just that I was tempted and did not give in. I felt proud and pleased with myself.

Unethical vignette (Kouchaki & Gino, 2016)

I hate chemistry. I hate taking chemistry classes, and I am not good at it. The last time I took chemistry, I had to do it for a semester for my bachelor's degree in anthropology. I needed this last general education requirement to graduate. The professor I had was really lax about things. He didn't even really teach us much.

Finals rolled around and I was 1 point away from a solid C in the class. I studied very hard; I even pulled an "all nighter," where I stayed up all night studying the night before the examination. I didn't feel that I was retaining any information. As a result, I made a cheat sheet on white notebook paper as a backup. I justified it by telling myself that because I hadn't learned much from the class, that this was the only way to pass. The professor barely taught us, so I believe I need a backup plan just in case. I also told myself that I was not really using chemistry later in my life and career.

During the final examination there was one question about amino acids that was really confusing. I thought about it for a few minutes. I could not remember the answer, so I needed to use my cheat sheet hidden under a binder on top of my desk to answer a question.

In the end I received a C+ for the class. I still feel really bad about it, because I think I did something morally wrong; it was just that I was tempted and gave in. I felt guilty. I felt guilty and angry with myself.

Recognition test items and answers for Studies 1 and 2 (Kouchaki & Gino, 2016)

Item		Correct answer
1	The professor did not really teach the student much.	TRUE
2	The student took a chemistry class during their undergraduate program.	TRUE
3	Studying very hard for the exam, the student even stayed up all night studying.	TRUE
4	Before the exam, the student was 1 point away from getting a C in the class.	TRUE
5	The student needed chemistry as a last general education requirement for their degree.	TRUE
6	The student was majoring in anthropology.	TRUE
7	The cheat sheet was the student's backup plan.	TRUE
8	The student hid the cheat sheet underneath binders that were on top of their desk during the exam.	TRUE
9	The hardest question on the exam involved amino acids.	TRUE
10	The question the student thought about the most during the exam was asking about ionic bonds.	FALSE
11	In the end, the student received a C- for the class.	FALSE
12	The cheat sheet was written on blue paper.	FALSE
13	The student is sure chemistry will be important in their later career.	FALSE
14	Physiology was heavily asked about during the exam.	FALSE
15	The student was working on a master's in anthropology.	FALSE
16	The cheat sheet was hidden under the student's exam.	FALSE
17	The professor said to the class that each person was allowed to bring one cheat sheet to the final exam.	FALSE
18	The student liked taking chemistry classes.	FALSE

Appendix B

Ethical vignette

It had been a long and exhausting Monday. My boss and I were not getting along at work, but I was finally on my way home. Halfway home, I realized I only had cereal left to eat at the house. It was getting late, and I could hear my stomach grumbling with hunger. I decided to make a stop at the grocery store to make a late dinner.

The stop had to be fast, because I still had a lot of work to finish for an important project due early the next morning. I was nervous it would not get finished on time. I entered the grocery store parking lot and found an empty spot close to the left entrance. After buying ingredients to make dinner, I walked back to my car and started to back out of the parking spot.

Apparently I wasn't paying enough attention, because I heard a dull thud and was jerked forward in my seat. I realized I had backed into the car parked behind me! I got out to inspect the damage. The car I hit was a silver sedan. I had shattered its right tail light, and the rear bumper was barely attached to the rest of the car. I knew it would be really expensive to fix. My car had a small dent in the rear bumper, but otherwise it looked fine. Surprisingly, the airbags did not deploy, and no car alarms went off.

I wrote down my contact information on a blank sheet of white notebook paper to take responsibility for my actions. Looking around, I saw that nobody else was in the parking lot. I could just drive away without leaving a note behind.

In the end, I decided to leave a note on the car I hit. I still feel really good about it, because I did something morally right. I felt proud and pleased with myself.

Unethical vignette

It had been a long and exhausting Monday. My boss and I were not getting along at work, but I was finally on my way home. Halfway home, I realized I only had cereal left to eat at the house. It was getting late, and I could hear my stomach grumbling with hunger. I decided to make a stop at the grocery store to make a late dinner.

The stop had to be fast, because I still had a lot of work to finish for an important project due early the next morning. I was nervous it would not get finished on time. I entered the grocery store parking lot and found an empty spot close to the left entrance. After buying ingredients to make dinner, I walked back to my car and started to back out of the parking spot.

Apparently I wasn't paying enough attention, because I heard a dull thud and was jerked forward in my seat. I realized I had backed into the car parked behind me! I got out to inspect the damage. The car I hit was a silver sedan. I had shattered its right tail light, and the rear bumper was barely attached to the rest of the car. I knew it would be really expensive to fix. My car had a small dent in the rear bumper, but otherwise it looked fine. Surprisingly, the airbags did not deploy, and no car alarms went off.

I wrote down my contact information on a blank sheet of white notebook paper to take responsibility for my actions. Looking around, I saw that nobody else was in the parking lot. I could just drive away without leaving a note behind.

In the end I decided to just drive away without leaving a note on the car I hit. I still feel really bad about it, because I think I did something morally wrong; it was just that I was tempted and gave in. I felt guilty and angry with myself.

Recognition test items and answers for Study 3

Item		Correct answer
1	No car alarms went off.	TRUE
2	The narrator could hear his/her stomach grumbling with hunger on the way home.	TRUE
3	The other car that the narrator backed into was a sedan.	TRUE
4	The narrator had a deadline early the next morning.	TRUE
5	The narrator was halfway home when (s)he decided to go to the store.	TRUE
6	There was nobody in the parking lot when the narrator hit the stranger's car.	TRUE
7	The narrator shattered the stranger's right tail light.	TRUE
8	The narrator still had a lot of work to finish for an important project that evening.	TRUE
9	The rear bumper of the stranger's car was damaged when the narrator hit it.	TRUE
10	The narrator parked far from the entrance of the grocery store.	FALSE
11	The other car that the narrator hit was blue.	FALSE
12	The narrator wrote down his/her contact information on blue paper.	FALSE
13	The events in the story took place on a Wednesday.	FALSE
14	The narrator and the boss had been getting along well at work that day.	FALSE
15	The narrator had left work early in the day to go to the grocery store.	FALSE
16	The car of the narrator was heavily damaged.	FALSE
17	The narrator only had yogurt to eat at home.	FALSE
18	The airbags in the narrator's car deployed after backing into the other car.	FALSE

References

- Alicke, M. D., & Sedikides, C. (2009). Self-enhancement and self-protection: What they are and what they do. *European Review of Social Psychology*, 20(1), 1–48.
- Anderson, M. C., & Hanslmayr, S. (2014). Neural mechanisms of motivated forgetting. *Trends in Cognitive Sciences*, 18(6), 279–292.
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, 5, 323–370.
- Bell, R., Schain, C., & Echterhoff, G. (2014). How selfish is memory for cheaters? Evidence for moral and egoistic biases. *Cognition*, 132, 437–442.
- Bradley, M. M., Greenwald, M. K., Petry, M. C., & Lang, P. J. (1992). Remembering pictures: Pleasure and arousal in memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 18(2), 379–390.
- Cahill, L., & McGaugh, J. L. (1995). A novel demonstration of enhanced memory associated with emotional arousal. *Consciousness and Cognition*, 4, 410–421.
- Cima, M., & van Oorsouw, K. (2013). The relationship between psychopathy and crime-related amnesia. *International Journal of Law and Psychiatry*, 36(1), 23–29.
- Cohen, N. J., & Eichenbaum, H. (1993). *Memory, amnesia, and the hippocampal system*. Cambridge, MA: MIT Press.
- Craik, F. I. M., Rose, N. S., & Gopie, N. (2015). Recognition without awareness: Encoding and retrieval factors. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 41(5), 1271–1281.
- Ehlers, A., Hackmann, A., & Michael, T. (2004). Intrusive re-experiencing in post-traumatic stress disorder: Phenomenology, theory, and therapy. *Memory*, 12, 403–415.
- Ehlers, A., Hackmann, A., Steil, R., Clohessy, S., Wenninger, K., & Winter, H. (2002). The nature of intrusive memories after trauma: The warning signal hypothesis. *Behaviour Research and Therapy*, 40, 1021–1028.
- Escobedo, J. R., & Adolphs, R. (2010). Becoming a better person: Temporal remoteness biases autobiographical memories for moral events. *Emotion*, 10(4), 511–518.
- Evans, C., Ehlers, A., Mezey, G., & Clark, D. M. (2007). Intrusive memories and ruminations related to violent crime among young offenders: Phenomenological characteristics. *Journal of Traumatic Stress*, 20(2), 183–196.
- Johnson, M. K., Foley, M. A., Suengas, A. G., & Raye, C. L. (1988). Phenomenal characteristics of memories for perceived and imagined autobiographical events. *Journal of Experimental Psychology: General*, 117, 371–376.
- Kensinger, E. A. (2004). Remembering emotional experiences: The contribution of valence and arousal. *Reviews in the Neurosciences*, 15, 241–251.
- Kensinger, E. A. (2007). How negative emotion affects memory accuracy: Behavioral and neuroimaging evidence. *Current Directions in Psychological Science*, 16, 213–218.
- Kensinger, E. A. (2009). Remembering the details: Effects of emotion. *Emotion Review*, 1(2), 99–113.
- Kensinger, E. A., & Schacter, D. L. (2006). When the Red Sox shocked the Yankees: Comparing negative and positive memories. *Psychonomic Bulletin & Review*, 13, 757–763.
- Kouchaki, M., & Gino, F. (2016). Memories of unethical actions become obfuscated over time. *Proceedings of the National Academy of Sciences of the United States of America*, 113(22), 6166–6171.
- Otgaar, H., Scoboria, A., & Mazzoni, G. (2014). On the existence and implications of nonbelieved memories. *Current Directions in Psychological Science*, 23(5), 349–354.
- Payne, D. G., Neuschatz, J. S., Lampinen, J. M., & Lynn, S. J. (1997). Compelling memory illusions: The qualitative characteristics of false memories. *Current Directions in Psychological Science*, 6(3), 56–60.
- Reczek R. W., Irwin, J., Zane, D. M., & Ehrich, K. R. (2017). That's not how I remember it: Willfully ignorant memory for ethical product attribute information. *Journal of Consumer Research*. Advance online publication. <https://doi.org/10.1093/jcr/ucx120>
- Roediger, H. L., & McDermott, K. B. (1995). Creating false memories: Remembering words not presented in lists. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 21(4), 803–814.
- Rubin, D. C., Schrauf, R. W., & Greenberg, D. L. (2003). Belief and recollection of autobiographical memories. *Memory & Cognition*, 31(6), 887–901.
- Scott, C. L. (2012). Evaluating amnesia for criminal behavior: A guide to remember. *Psychiatric Clinics of North America*, 35(4), 797–819.
- Sedikides, C., & Green, J. D. (2000). On the self-protective nature of inconsistency-negativity management: Using the person memory paradigm to examine self-referent memory. *Journal of Personality and Social Psychology*, 79(6), 906–922.
- Simons, D. J., Shoda, Y., & Lindsay, D. S. (2017). Constraints on Generality (COG): A proposed addition to all empirical papers. *Perspectives in Psychological Science*, 12(6), 1123–1128.
- Simonsohn, U. (2015). Small telescopes: Detectability and the evaluation of replication results. *Psychological Science*, 26(5), 559–569.
- Stanley, M. L., Henne, P., Iyengar, V., Sinnott-Armstrong, W., & De Brigard, F. (2017). I'm not the person I used to be: The self and autobiographical memories of immoral actions. *Journal of Experimental Psychology: General*, 146, 884–895.
- Talarico, J. M., & Rubin, D. C. (2007). Flashbulb memories are special after all; in phenomenology, not accuracy. *Applied Cognitive Psychology*, 21, 557–587.
- Voss, J. L., Baym, C. L., & Paller, K. A. (2008). Accurate forced-choice recognition without awareness of memory retrieval. *Learning & Memory*, 15(6), 454–459.
- Voss, J. L., & Paller, K. A. (2009). An electrophysiological signature of unconscious recognition memory. *Nature Neuroscience*, 12(3), 349–355.
- Woodworth, M., Porter, S., ten Brinke, L., Doucette, N. L., Peace, K., & Campbell, M. A. (2009). A comparison of memory for homicide, non-homicidal violence, and positive life experiences. *International Journal of Law and Psychiatry*, 32, 329–334.