

Original Article

Remembering Helpers and Hinderers Depends on Behavioral Intentions of the Agent and Psychopathic Characteristics of the Observer

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Abstract: Individual differences in proneness towards granting benefits (i.e., helping) or imposing costs (i.e., hindering) may have led to processes that detect and remember people who are prone to help or hinder. We examined two factors that might influence such memory: the intentionality of the acts and individual differences in psychopathy characteristics. Participants viewed several videos of computer-animated agents that helped or hindered another agent, either intentionally or unintentionally. Afterward, participants had better memory for agents that acted intentionally. Additionally, participants with more psychopathic tendencies had enhanced memory for helpers, suggesting that certain individual characteristics might result in heightened memory for people who are prone to granting benefits.

Keywords: helper recognition, hinderer recognition, behavioral intent, psychopathy.

Introduction

The human brain appears to be prepared to detect and evaluate helpers and hinderers at a very early age. Before 12 months of age, infants attribute a valence to actions such that enabling an agent to achieve its goal is seen to be similar to other positive actions (e.g., caressing), while thwarting an agent's progress is grouped with negative actions (Premack and Premack, 1997). Infants at this age also prefer agents who have been observed to help another individual over those who have purposefully hindered progress (and, indeed, actively avoid the latter), even when the agents themselves are little more than simple objects (e.g., a triangle or square) animated by puppeteers (Hamlin, Wynn, and Bloom, 2007). Moreover, infants appear to recognize that other individuals—those who

have been helped or hindered—will prefer those who have aided them in the past (Kuhlmeier, Wynn, and Bloom, 2003).

Thus, before we can engage in effective helping or hindering behavior due to motoric and other maturational constraints, humans show sophisticated interpretation of these behaviors. In the present study, we examine whether, by adulthood, our human cognitive systems for evaluating and detecting helping and hindering actions also promote enhanced memory for the agents involved. That is, while memory for individuals is fundamental for social competence, might individuals who engage in helping or hindering behavior be better remembered?

When approaching this question, we can consider the predictions of social contract theory (SCT; e.g., Cosmides and Tooby, 1992). SCT argues that human cognitive architecture is designed to detect *cheaters*, or those who “defect” by taking a benefit without fulfilling their end of a social contract. That is, cheaters cheat by not reciprocating. In fact, it is argued that this *cheater detection* system is necessary for cooperation to be an evolutionarily stable strategy because it allows for conditional helping (e.g., Cosmides and Tooby, 1989). More recently, some investigations of the social contract theory have moved from *cheater detection* to the hypothesis that people should be good at *remembering* and *recognizing* cheaters.

Cheater recognition research, however, has remained equivocal. In Mealey, Daood, and Krage (1996), participants had greater memory for the faces of cheaters than faces of trustworthy people. One study has since replicated this effect (Chiappe et al., 2004); however, the degree to which cheaters had cheated appeared to be greater than the degree to which cooperators had cooperated (Barclay and Lalumière, 2006). Additionally, Oda (1997) has also replicated Mealey et al.’s (1996) effect, but only when cheaters were male, not when they were female. Because social contract theory cannot explain these sex differences, results cannot be used to support the theory (Mehl and Buchner, 2008). Other studies have outright failed to replicate Mealey et al.’s findings (see Barclay, 2008, for review); Barclay and Lalumière (2006), for example, controlled for description intensity and added “altruists” in addition to cheaters, trustworthy, and neutral characters, and found no difference in memory across each of these categories.

In response to these findings, more recent research has proposed that instances of seemingly enhanced cheater recognition in some studies may be the result of assumptions regarding the low probability of such individuals in one’s environment, coupled with memory systems biased to encode rarity (Barclay, 2008). Indeed, people may do best to remember both cooperators and cheaters, as the former would also support preferential interaction with those who will provide benefits (Brown and Moore, 2000).

The present study examines the related question of how adults encode the agents involved in simple helping and hindering behavior (e.g., enabling goals or thwarting them). Here, SCT and accompanying “cheater recognition” proposals do not directly apply; it is unclear whether helping and hindering fit into the theory as originally construed as there is no explicit social contract information provided and the events provide no detail regarding the benefits to being a helper or hinderer (only, potentially, benefits to the agent who is helped). One possibility is if people who cheat in social contracts are also those who impulsively impose costs to others (as we might expect among psychopaths, for example), then enhanced ability to remember hinderers, particularly when the behavior is intentional, may have also been adaptive.

Psychopathy and memory for helpers and hinderers

Barclay and Lalumière (2006) have presented an intriguing hypothesis about individual difference characteristics that might enhance the ability to remember cheaters or altruists. They tested whether university students who scored higher on a measure of psychopathy (i.e., people with a personality oriented towards cheating) remembered the faces of cheaters better because they are sensitive to the underlying motives or whether they remember altruists better because altruists are exploitable; however, they found no such relationships in one experiment, and slight enhancement in memory of altruists in a second experiment. We therefore also wondered if psychopaths, who not only exploit others for personal benefits (i.e., without contributing to the social contract) but also impose costs (consider their crime versatility, impulsivity, irresponsibility, callousness, and poor behavioral control), are either more prone to remembering hinderers because they are sensitive to psychopathic motives, or are more prone to remember helpers because they are easier to exploit.

Although Barclay and Lalumière's process of transforming psychopathy into a categorical variable reduces statistical power to detect significant effects and increases the chances of a Type II error (Streiner, 2002), reanalysis of their data yielded the same null results (Barclay, personal communication, November 28, 2009). For comparative purposes, we were interested in using both Barclay and Lalumière's data analytic strategy and also the preferred approach that uses psychopathy in its original continuous form. Also of concern was the use of the Childhood and Adolescent Taxon Scale (CAT-SR; Harris et al., 1994; Seto, Khattar, Lalumière, and Quinsey, 1997) to evaluate psychopathy and its fusion with the Levenson Psychopathy Scale (LPS; Levenson, Kiehl, and Fitzpatrick, 1995) to create a composite measure of psychopathy. Although CAT-SR correlates with measures of psychopathy (e.g., Harris, Rice, and Quinsey, 1994), its psychometric properties have yet to be thoroughly investigated. The LPS, on the other hand, has been evaluated for its internal consistency, construct validity, and predictive validity (reviewed in Lilienfeld and Fowler, 2006). Indeed, Barclay found slightly different correlations with memory for cheaters when reanalyzing the data separately for LPS and CAT-SR (personal communication, November 28, 2009), though such differences did not change the interpretation of their results.

Intentionality and memory for helpers and hinderers

The characterization of others' actions as intentional or unintentional plays an important role for subsequent behavior evaluation and prediction (e.g., Knobe, 2003). For example, adults assign more blame or praise to intentional actions compared to unintentional actions (e.g., Ohtsubo, 2007) and are more likely to retaliate or reciprocate when harmful or helpful actions are intentional (e.g., Swap, 1991). Even children as young as three years of age allocate more responsibility for actions that are considered intentional (e.g., Nunez and Harris, 1998), and toddlers younger than 2 years consider an individual's previous intention to provide a desired object when determining whether to help her (Dunfield and Kuhlmeier, 2010).

Previous research has found no difference in memory for agents involved in intentional versus accidental actions unrelated to helping and hindering (e.g., a man purposefully popping a balloon or a man unintentionally dropping a pen; Fausey and Boroditsky, in prep.). Here, however, we examine whether memory for helpers or hinderers is affected by whether the agents have intentionally or accidentally engaged in the

behavior. It is possible, for example, that intentional helping and hindering actions may be different from other types of actions such that encoding of the agents involved is enhanced.

Present study

The purpose of the present study was to test two factors that might influence memory for individuals whose actions either aid (i.e., helpers) or harm (i.e., hinderers) another. In the first set of analyses, we tested whether memory for helpers or hinderers, or both, is enhanced when their actions are intentional, as opposed to unintentional. In the second set of analyses, we tested whether memory for either of these types of agents was enhanced among people with psychopathic traits using alternative statistical methods to increase power.

Given concerns raised regarding the stimuli used in previous studies (Barclay and Lalumière, 2006; Mehl and Buchner, 2008), we aimed to improve on procedures by keeping all events similar and removing verbal aspects. We took advantage of unique scenarios that have previously been used in studies with infants (e.g., Hamlin et al., 2007; Kuhlmeier et al., 2003). These movie stimuli consist of simple shapes (“agents”) that engage in helping or hindering another shape in its quest to climb a hill. In this way, we equate the length of time to observe the events and the general movement patterns of the actions, as well as strip away any facial/emotional elements of the scenarios.

Materials and Methods

Participants

Eighty undergraduate students (age range: 17 to 21 years; $M = 18.34$, $SD = 0.75$), recruited from the undergraduate subject pool, participated in this study. Of these participants, 19 (24%) were men and 61 (76%) were women. All received class credit for their participation.

Materials

The *Levenson Psychopathy Scale (LPS)* (Levenson, Kiehl, and Fitzpatrick, 1995) is a 26-item self-report questionnaire used to assess participants’ antisocial attitudes and behaviors. Its contents are similar to the clinical assessment of psychopathy (Psychopathy Checklist-Revised; Hare, 1991), and it is appropriate to use with university students. Each item is scored from 1 (*disagree strongly*) to 4 (*agree strongly*). Higher scores indicate a higher number of psychopathic tendencies. LPS scores for the sample ranged from 34.00 to 73.00 ($M = 50.63$, $SD = 8.00$).

The *Childhood and Adolescent Taxon Scale (CAT-SR)* is an 8-item, self-report questionnaire that measures early behavioral problems associated with adult psychopathy (Harris et al., 1994; Seto, Khattar, Lalumière, and Quinsey, 1997). Each item is scored as 0 (*absent*), 1 (*some indication*), or 2 (*present*); all 8 items are averaged for an overall score. CAT-SR scores of the sample ranged from 0.00 to 1.00 ($M = 0.11$, $SD = 0.22$).

Stimuli and Procedure. Videos were created using computer-animation software (Maya Unlimited 6.5, Alias Systems Corporation, 2005). These videos were presented to participants on a 61 cm computer monitor via MediaLab presentation software. Participants sat approximately 50 cm away from the computer, facing the monitor. Each participant was randomly assigned into one of two conditions, Intentional or Unintentional.

During the familiarization phase, participants in the Intentional condition were shown four *Intentional Help* movies and four *Intentional Hinder* movies (Figure 1), and participants in the Unintentional condition were shown four *Unintentional Help* movies and four *Unintentional Hinder* movies (Figure 2)¹, in pseudorandom order. All movies, based on earlier infant work (e.g., Kuhlmeier, Wynn, and Bloom, 2003; Premack and Premack, 1997), were 8 seconds long and set on a white background. The animated agents in the events were a triangle (varying in color with each video) and a red dome-shaped object (hereafter, “ball”). In each condition (Intentional and Unintentional), half of the participants observed one set of colors for the triangles, and the other half saw a different set of colors. A black screen was interspersed between each familiarization video.

The *Help* and *Hinder* movies in both conditions began with a red ball climbing the first of two hills. After it reached the top of this small hill, it stopped and expanded and contracted (as if excited) before continuing up the next, bigger hill. However, it had difficulty climbing this hill and thus, when halfway up it slid back down to the base. The ball tried to climb this hill again but as before, had difficulty and started to slide back down. At this moment, the events differed depending on the behavior type (help vs. hinder) and condition (intentional vs. unintentional).

In the *Intentional Help* video, a triangle moved down from its location at the top of the screen and helped the ball by pushing it up the bigger hill. When the ball reached the top of this hill, it expanded and contracted. In the *Intentional Hinder* video, a triangle moved down from its location at the top of the screen and hindered the ball by pushing it down the bigger hill. Due to momentum of the push, the ball slid all the way down to the base of the first hill.

In the *Unintentional Help* video, the stand on which the triangle was sitting tipped, causing it to bounce off a hexagon-shaped barrier and accidentally hit the ball from behind, in turn helping it up the hill. When the ball reached the top of this hill, it expanded and contracted. In the *Unintentional Hinder* video, the stand on which the triangle was sitting tipped, this time causing it to bounce off the barrier and accidentally hit the ball in the front, thus hindering it from going up the hill. Due to the momentum of the push, the ball slid all the way down to the base of the first hill.

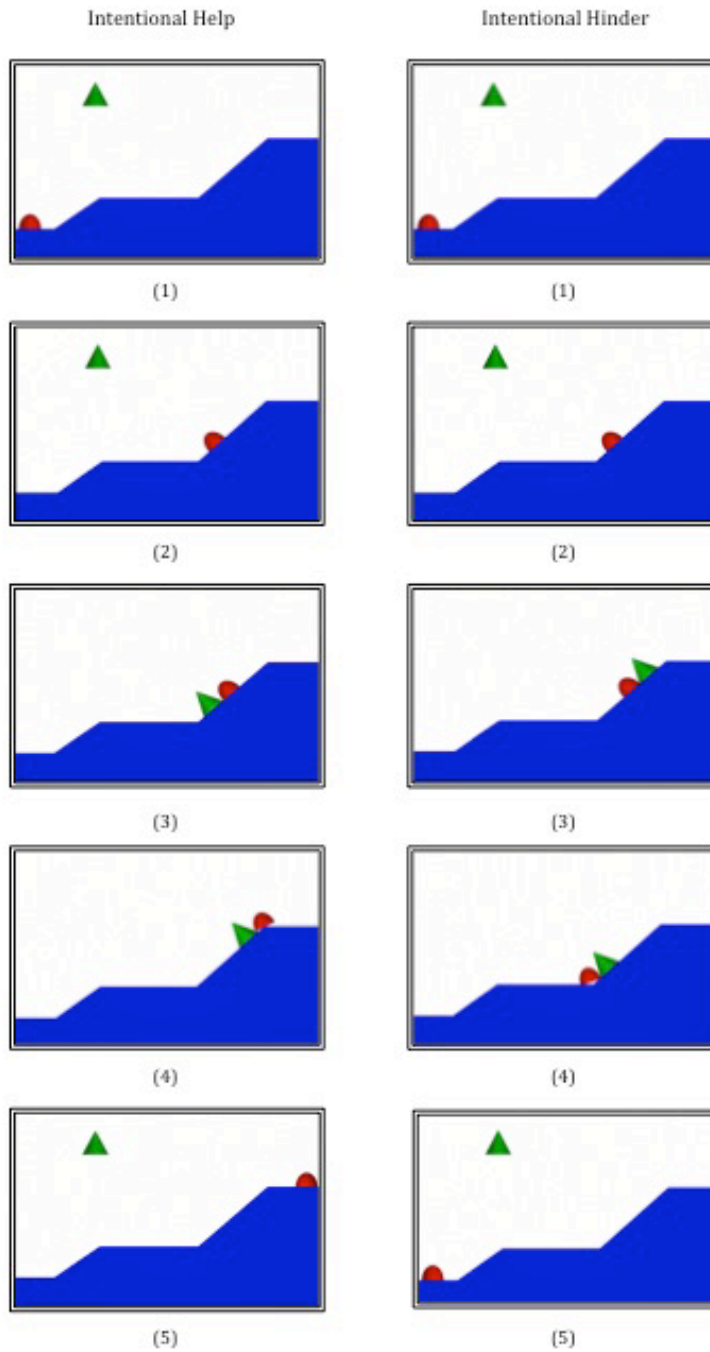
The four movies were equated on various parameters. The length of each movie was 8 seconds. Contact between the triangle and the ball occurred at the same frame across all movies, and duration of contact time was identical. Further, the amount and duration of motion of the triangle was the same in all events.

Following these movies and completion of the LPS and CAT-SR, the memory test screens showed 16 triangles (8 previously-viewed colors, 8 new colors; Table 1) in random order, one at a time. A recognition question for the color of the triangle was presented (“Do you remember this shape from the previous videos?”), and participants had the choice of selecting ‘Yes’ or ‘No’. Memory was measured by calculating the number of correct triangles remembered, with higher scores indicating better memory.

¹ Early pilot testing was undertaken to ensure that the movies indeed were seen to depict intentional and unintentional helping and hindering events. Ten out of 10 adult viewers watched the events and provided written descriptions that fit this interpretation (e.g., the intentional triangles were said to “want to push the ball” while the unintentional triangles were described as “slipping” or “falling”).

Remembering helpers and hinderers

Figure 1. Five still frames taken from one of the Intentional Help and one of the Intentional Hinder movies. The color (identity) of the triangle differed in each of the four Help and four Hinder movies.



Remembering helpers and hinderers

Figure 2. Five still frames taken from one of the Unintentional Help and one of the Unintentional Hinder movies. The color of the triangle differed for each movie following the same scheme as in the Intentional condition.

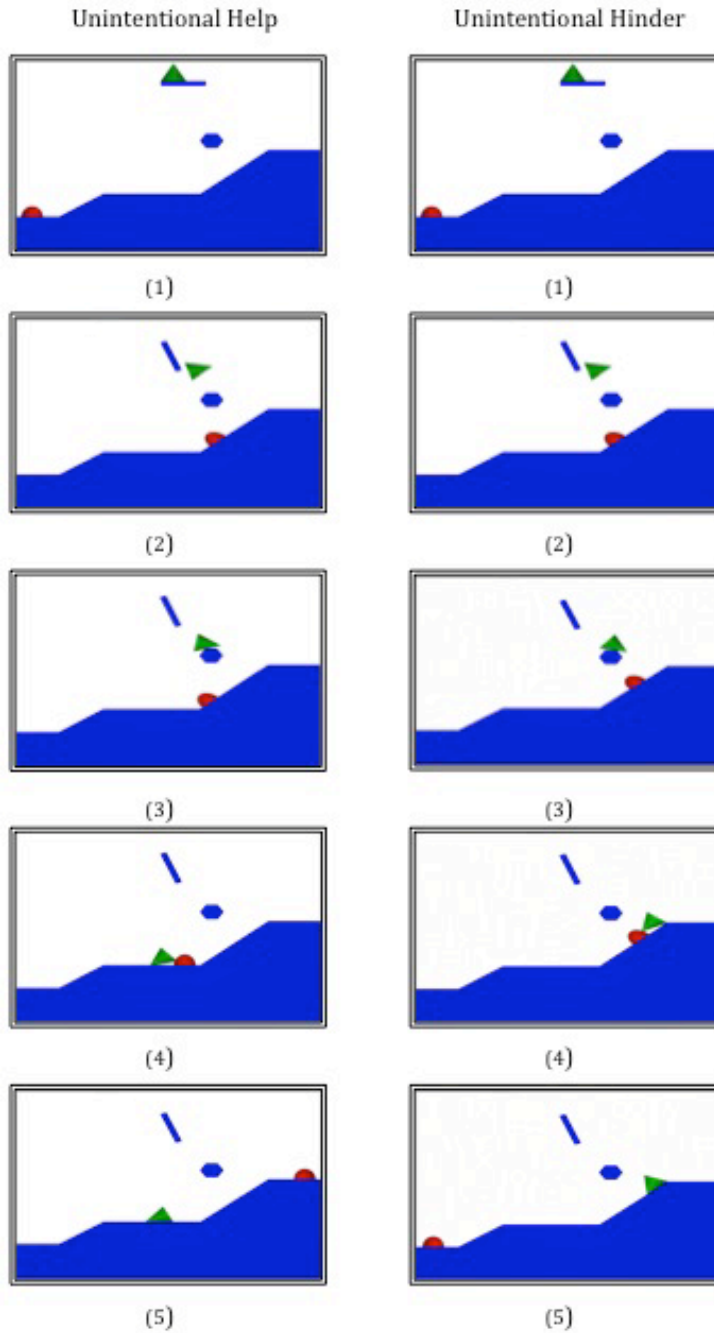


Table 1. Study Design.

Condition	Familiarization Events		Test Events
	Helpers	Hinderers	
Intentional (<i>n</i> = 39)	Yellow, light green, light purple, dark grey	Dark turquoise, beige, dark green, dark pink	Distractors: Black, Dark Purple, Dark Red, Dark Blue, Light Grey, Light Blue, Light Pink, Light Turquoise Targets: All colors in familiarization
	Group 1 (<i>n</i> = 20)		
	Dark turquoise, beige, dark green, dark pink	Yellow, light green, light purple, dark grey	
	Group 2 (<i>n</i> = 19)		
Unintentional (<i>n</i> = 41)	Yellow, light green, light purple, dark grey	Dark turquoise, beige, dark green, dark pink	Distractors: Black, Dark Purple, Dark Red, Dark Blue, Light Grey, Light Blue, Light Pink, Light Turquoise Targets: All colors in familiarization
	Group 1 (<i>n</i> = 20)		
	Dark turquoise, beige, dark green, dark pink	Yellow, light green, light purple, dark grey	
	Group 2 (<i>n</i> = 21)		

Psychopathy Score Data Management. We first replicated Barclay and Lalumière’s procedure for calculating psychopathy scores by standardizing LPS and CAT-SR within each sex, taking the averages, and then trichotomizing scores within each sex. To ensure results were not due to combining these measures (since psychometric properties of this combined measure have not been evaluated, and the psychometrics of CAT-SR is limited) or due to a lack of power when categorizing a continuous variable, we tested whether psychopathy was related to memory for helpers or hinderers using the original scales and the continuous version of psychopathy with correlation and regression methods.

Results

Memory for actors: Intentional versus unintentional actions

A mixed-model analysis of variance was conducted to investigate whether memory for the triangle actors varied with intentionality (between: intentional vs. unintentional), behavior type (within: help vs. hinder), or an interaction between them. Intentionality had a significant main effect on the number of triangles remembered, $F(1, 78) = 6.34, p = .014$, partial $\eta^2 = .075$ (Figure 3). Memory in the intentional condition ($M = 5.97, SD = 1.22$) was significantly better than that of the participants in the unintentional condition ($M = 5.20, SD = 1.52$). However, we found no significant main effect of behavior type, $F(1, 78) = 0.951, p = .33$, partial $\eta^2 = .012$; hinderers were not remembered any better than helpers or vice

versa (Figure 4). The interaction between intentionality and behavior type was also not significant, $F(1, 78) = 1.35, p = .25, \text{partial } \eta^2 = .017$.² Therefore, the effect of intentionality on the number of triangles remembered does not depend on the actions that the triangles are engaged in. Additionally, although intentionality influenced memory, participants in both intentional, $t(38) = 10.07, p < .001$, and unintentional conditions, $t(40) = 5.03, p < .001$, remembered triangles greater than chance.

Figure 3. Mean and SE bars of memory for intentional and unintentional triangle actors. Dashed line indicates chance responding.

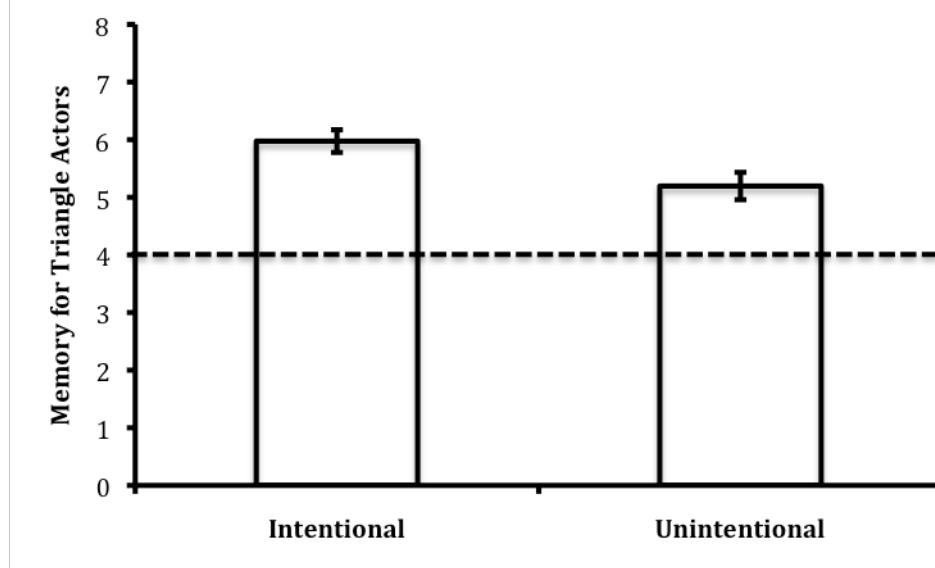
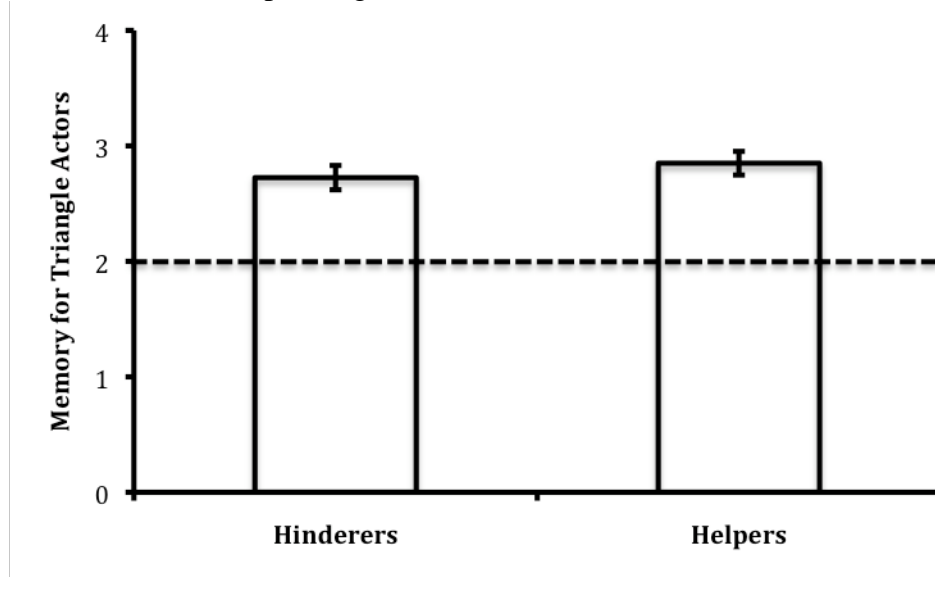


Figure 4. Mean and SE bars of memory for hinder and helper triangles. Dashed line indicates chance responding.



² Post-hoc power analysis, using the correlation between memory for helpers and memory for hinderers, $r(78) = .187, p = .097$, found 45% power to detect an interaction with the small effect size of 0.13.

Psychopathy scores and memory for actors

As expected from previous research, men ($n = 19$, $M = 54.74$, $SD = 8.61$) and women ($n = 61$, $M = 49.34$, $SD = 7.41$) differed on LPS, $t(78) = 2.66$, $p = .009$, and men ($n = 19$, $M = 0.23$, $SD = 0.32$) and women ($n = 61$, $M = 0.08$, $SD = 0.16$) differed on CAT-SR, $t(78) = 2.85$, $p = .006$. Because of these sex differences, all subsequent analyses used standardized scores of psychopathy within each sex.

Using a 2 x 3 x 2 mixed model ANOVA on memory scores (between: psychopathy and sex; within: behavior type), we found no main effect for psychopathy, $F(2, 74) = 2.35$, $p = .10$, behavior type, $F(1, 74) = 1.31$, $p = .26$, or sex, $F(1, 74) = .26$, $p = .61$, and none of the interactions were significant, $ps > .31$. With the exception of sex, our results replicated Barclay and Lalumière's findings.

To ensure these null findings were not due to a lack of power from categorizing psychopathy (see Streiner, 2002), we used multivariate regression to test for a linear relationship between psychopathy and memory for helpers and hinderers. Though psychopathy did not predict a linear combination of memory for helpers and hinderers, $F(2, 77) = 1.96$, $p = .15$, nor memory for hinderers alone, $F(1, 78) = .89$, $p = .35$, the prediction of memory for helpers approached significance, $F(1, 78) = 3.58$, $p = .06$.

Because the psychometric properties of a composite psychopathy measure are unknown, and because CAT-SR and LPS were not correlated among women³, we reran the multivariate regression using LPS and CAT-SR as independent predictors. CAT-SR did not predict a linear combination of memory for helpers and hinderers, $F(2, 76) = .131$, $p = .88$, nor did it predict memory for helpers, $F(2, 76) = 0.13$, $p = .88$. Interestingly, the relationship between LPS and a combination of helpers and hinderers approached significance, $F(2, 76) = 3.02$, $p = .06$. Further examination found a significant relationship between LPS and memory for helpers, $F(1, 77) = 4.46$, $p = .04$, but not for hinderers, $F(1, 77) = 2.54$, $p = .12$. Similarly, Pearson correlation coefficients found a significant relationship between LPS and memory for helpers, $r(78) = .25$, $p = .03$, and no relationship between LPS and memory for hinderers, $r(78) = .17$, $p = .13$. Using Fisher's r -to- z transformation, however, we found that these correlations were not significantly different, $z = -0.53$, $p = .59$ (two-tailed).

Discussion

Across our sample, we found no evidence for a difference in memory for agents who previously helped and agents who previously hindered a third party, consistent with a growing body of research suggesting that enhanced memory for either cheaters or hinderers over altruists or helpers (or vice versa), if existent, is subtle (e.g., Barclay and Lalumière, 2006; Mehl and Buchner, 2008). However, the novel procedures of the present study allowed us to explore factors that may influence encoding and memory for helpers and hinderers: the intention of the action and individual differences in psychopathy characteristics. Each will be discussed in turn.

³ This was found in the present study and that of Barclay and Lalumière (2006).

The intentionality of helping and hindering actions affected later memory of the agents (i.e., the triangles). Although in both the Intentional and Unintentional conditions the goal of the third party (i.e., the ball) was ultimately aided or thwarted, memory for the helpers and hinderers was enhanced when their actions were intentional. Remembering people who intentionally help or harm others may be adaptive because their actions reflect true goals and allow predictions of future actions (Malle and Knobe, 1997). Indeed, an important consideration is that this effect is not confounded with other factors (e.g., the goal of the ball and its final end states remain consistent, all physical features of the characters remain identical, the duration of contact between characters is equal), and the only difference between the movies in the two conditions was the intention of the agents to help or hinder.

We may also consider the processes that drove the enhanced recognition of the intentional helpers and hinderers. Our preferred interpretation is that participants encoded and remembered these agents more because they were intentional helpers and hinderers, yet alternatively it is possible that enhanced memory was observed because these were intentional objects acting volitionally on the screen that simply engendered more interest, regardless of their actions. To be clear, it is unlikely that participants in the Unintentional condition simply did not pay enough attention to the unintentional agents as memory for these agents was also above chance level. Additionally, recent research has found no difference in memory for human actors involved in intentional versus accidental actions unrelated to helping and hindering (Fausey and Boroditsky, in prep.), suggesting that our results may be specific to these particular intentional behaviors. Further, under the alternative explanation, one would not predict individual differences in memory for helpers or hinderers in the present study, an effect found when individual tendencies in terms of psychopathy were considered.

It is possible, though, that neutral, yet intentional, actions would also lead to enhanced memory of agents when compared to the Unintentional condition. This is an empirical question⁴, yet there is good reason to think that it is, in fact, the act of intentionally helping and hindering that is leading to improved memory for the agents in this paradigm. For example, Hamlin and colleagues (Hamlin, Wynn, and Bloom, 2007) found that infants under one year of age engaged in social evaluation of agents who intentionally helped or hindered but not intentional agents who engaged in neutrally valenced actions. This suggests that even at this early age, helpers and hinderers are being encoded in a manner strong enough to allow for subsequent adaptive behavior (e.g., showing a preference for a helper).

When using the LPS, a self-report psychopathy measure with known psychometric properties (Lilienfeld and Fowler, 2006), in its continuous form, we found that psychopathy was related to memory for helpers, not hinderers. Psychopaths are social predators who manipulate and exploit others without regret for any harm that may have been caused, and may therefore be predisposed to attend to and remember people who are exploitable. People who help, cooperate, and are altruistic are more exploitable than people who do not have these characteristics. Whether this trait represents an adaptive psychological module

⁴ The animated events in the present procedure do not allow for compelling presentation of actions that are perceived as truly neutral in relation to the hill-climber if other parameters are to be kept identical among conditions.

for remembering helpers as part of an obligate life-history strategy specific to psychopaths remains to be tested, especially because Barclay and Lalumière did not find a relationship between psychopathy and memory for altruists. Our failure to find a relationship between psychopathy and memory appeared to be driven by categorizing a continuous measure of psychopathy and using an unvalidated composite measure of psychopathy. This procedure, however, does not account for the differences between our study and Barclay and Lalumière's study. One possible explanation for these differences is that viewing behavioral cues in our study could be more salient and ecologically valid than reading scripted cues.

A limitation in our study, and in all relevant studies that use self-report measures of psychopathy, is that few, if any, participants were true psychopaths. A more direct way to test the hypothesis for enhanced memory of altruists among psychopaths while overcoming setbacks of these self-report measures is to assess a forensic sample using the clinical measure of psychopathy, the Psychopathy Checklist, Revised (Hare, 2003). If the helper and/or hinderer detection among psychopaths hypothesis is true, we expect larger and more robust effects in studies that includes clinical psychopaths. Until such studies are conducted, we remain cautious in interpreting the effects of psychopathy on memory for helpers.

In sum, individual differences in proneness towards granting benefits or imposing costs may have led to cognitive processes that allow enhanced encoding of individuals who intentionally help and hinder. Indeed, differential memory for hinderers over helpers, or vice versa, may not be a robust general effect across samples. Instead, certain individual characteristics might result in heightened memory for one over the other.

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