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How Actions Change Liking: The Effect of an Action's Outcome on the Evaluation of the
Action's Object

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Abstract

People like positive objects (e.g., fun activities) and dislike negative objects (e.g., boring activities). However, objects usually do not appear in isolation; They are often objects of an action (e.g., the boring activities *were canceled*). Using a wide array of stimuli and procedures, 11 experiments ($N = 5,573$) found that evaluation of objects is biased by the outcome of an action performed on the objects. For example, when participants read that a gene increases the likelihood of possessing the trait *kindness* (an action with a positive outcome) they evaluated kindness more positively than after reading the gene inhibits the trait (an action with a negative outcome). Conversely, they disliked *dishonesty* more after reading about genes that increased dishonesty than after reading about genes that decreased dishonesty. The effect was incompatible with logical inference from the information provided. We found evidence that misattribution of the valence of the action's outcome to the action's object contributes to this effect. These findings extend knowledge about the factors that lead to evaluative change. Importantly, the results demonstrate a recursive evaluation process: the valence of the outcome of an action on the object determines the evaluation of the object, but the valence of the outcome is already based on a previous evaluation of the object itself. We discuss the possible implications of our findings to a wide range of research domains, such as moral judgment and economic decisions.

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How Actions Change Liking: The Effect of an Action's Outcome on the Evaluation of the Action's Object

People often experience situations in which actions are performed on objects. Does hearing about an action or witnessing an action influence the evaluation of the action's object? Would a hot stove seem more negative to a child if she hears that her dog pushed her sibling against the hot stove or away from it? Does free healthcare seem more positive when the government decides to start providing it to the citizens or when the government decides to cancel it? Would people evaluate being intelligent as a more positive trait after hearing about a gene that increases the likelihood of possessing that trait or about a gene that decreases that likelihood? By examining questions like these, we shed light on a novel factor that leads to evaluative change – the effect of the valence of an action's outcome on the evaluation of the action's object. Increasing the likelihood of intelligence is an action with a positive outcome, whereas decreasing that likelihood has a negative outcome. We found that the outcome's valence is a contextual factor that has a strong effect on the evaluation of the action's object, irrespective of logical inference.

Evaluating whether objects are positive or negative is one of the most important and frequent judgment decisions people make in everyday life. Therefore, identifying factors that affect evaluation, and formulating the rules that describe the conditions under which evaluation change, are basic goals of research on judgment. Previous research has demonstrated that the mere linking of an object to an affective stimulus leads to an assimilative effect on the evaluation of the object. For example, when a neutral stimulus repeatedly occurs in spatiotemporal proximity to an affective stimulus, people's subsequent evaluation of the neutral stimulus becomes more similar to their evaluation of the affective stimulus (De Houwer, Thomas, & Baeyens, 2001; Walther, Weil, & Dusing, 2011). This is the Evaluative Conditioning (EC) effect. Research that focused on social perception of group

membership found that people extended their (dis)liking of one person to another person, only because both were members of the same social group (Ranganath & Nosek, 2008; see also Ratliff, Swinkels, Klerx, & Nosek, 2012). More evidence for the assimilative evaluative effect of linking with affective stimuli comes from research on spontaneous trait transference (STT): communicators are often perceived as having traits that they merely describe in others (Carlston & Skowronski, 2005). Although these findings have been investigated separately, they share a single abstract rule: linking a target stimulus with affective stimuli usually changes the evaluation of the target stimulus toward the evaluation of the affective stimulus.

Another line of research that found an abstract rule for an assimilative effect of linking on evaluation investigates how positive or negative motor actions change evaluation. For example, the action of choosing an object often increases the positivity of the object (Brehm, 1956; Huang, Wang, & Shi, 2009); Approaching an object often leads to more positive evaluation than avoiding it (Cacioppo, Priester, & Berntson, 1993; Centerbar & Clore, 2006; Jones, Vilensky, Vasey, & Fazio, 2013; Kawakami, Phills, Steele, & Dovidio, 2007; Kawakami, Steele, Cifa, Phills, & Dovidio, 2008; Wiers, Eberl, Rinck, Becker, & Lindenmeyer, 2011). And, head nodding often leads to more positive evaluation than head shaking (Tom, Pettersen, Lau, Burton, & Cook, 1991; Wells & Petty, 1980). The abstract rule that this line of research demonstrates is that linking a target stimulus with an affective *action* usually changes the evaluation of the target stimulus toward the evaluation of the affective action.

A New Linking Effect

The present research began with an unexpected discovery of an assimilative evaluative effect of linking that is not a link to a stimulus or an action. This was an incidental, unexpected finding in our investigation of the effect of co-occurrence with affective stimuli (Moran, Bar-Anan, & Nosek, 2016). Participants received information about novel men who

performed actions on affective stimuli. For example, one man gave the participants cute animals, one man gave them nasty animals, one man took away cute animals from the participants, and one man took away nasty animals from them. We examined how this information influenced the evaluation of *the men*. In these experiments, we focused participants on the valence of the stimuli by asking them, after each trial that presented the man's action, to rate the valence of the cute or nasty animal that was the object of the action. Because we investigated the evaluation of the men, we initially did not analyze participants' ratings of the animals. The present research, however, started when we eventually analyzed these ratings. We found that the cute animals were evaluated more positively after they were given to the participants (an action with a positive outcome, $M = 3.61$, $SD = 0.38$) than after they were taken away from the participants (an action with a negative outcome, $M = 3.22$, $SD = 0.72$), $t(513) = 12.12$, $p < .001$, $d = 0.67$. Nasty animals were evaluated more positively after they were taken away from the participants (an action with a positive outcome, $M = 1.83$, $SD = 0.72$) than after they were given to the participants (an action with a negative outcome, $M = 1.53$, $SD = 0.46$), $t(513) = 9.84$, $p < .001$, $d = 0.49$ ¹.

These results are surprising because the action's objects (the cute and nasty animals) already have a strong inherent valence. Moreover, participants needed to use this object's valence in order to infer the action's outcome. It is not trivial that after people already evaluated the object in order to infer the action's outcome they would update this evaluation in line with the action's outcome. This is a new effect of linking, different than any of the previously investigated linking effects. Instead of a link with an affective stimulus or an

¹ See osf.io/hqmzt/ for full details about this experiment and another experiment that allowed the same unplanned analysis. Experiments 1 and 3 in the present paper are exact replications of these findings.

action, the target stimulus is linked with a valence of an action's outcome, which is inferred from the combination of the action and the valence of the target *itself*.

There are several reasons why the effect of the action's outcome on the evaluation of the action's object is important. First, the two linking effects we described above (linking the target object to affective stimuli or to affective motor actions) do not require an initial evaluation of the target object. The evaluation of the linked affective stimulus or action spreads to the evaluation of the co-occurring object or the action's object. So far, the target object itself has never had a role in determining the direction of the effect of linking on the target's evaluation. In the present effect, the valence of the target object has a crucial role in determining whether linking with the action would push the evaluation of the object to the positive side or to the negative side.

Importantly, whereas the effects of linking with an affective stimulus or an affective action can be the result of a one-step evaluative process, the novel effect requires two steps. In the first step, the observer must evaluate the action's object in order to infer the valence of the action outcome. On the second step, the valence of the action outcome spreads to the evaluation of the action's object. The present effect paints evaluation as an iterative process in which the evaluation of the target is computed multiple times, taking into account the output of previous processes, before the evaluative response is emitted. This is compatible with the Iterative Reprocessing (IR) Model that highlights the iterative nature of evaluation, based on neurological evidence (Cunningham & Zelazo, 2007; Cunningham et al., 2007). According to the IR model, evaluation operates as an interactive cycle. At each iteration, the current evaluation serves as an input. With each iteration, the current evaluation can be adjusted in light of additional contextual information.

Further, most previous research on the effect of actions on evaluation (Brehm, 1956; Cacioppo, Priester, & Berntson, 1993; Wells & Petty, 1980) focused on the effect of *enacting* very specific actions (e.g., approaching an object, nodding). The present effect applies to a much wider range of actions and to actions that people witness or hear about; not only actions that they perform. As we show in the present research, the effect applies to evaluative events (e.g., an immoral act) that are the object of an action (initiated or prevented, intensified or weakened), and to stimuli (e.g., a scary dog) targeted by an action (e.g., create, destroy, give, and take away).

As an abstract rule that explains how evaluation changes, the effect of the valence of an action's outcome on the evaluation of the action's object is at the same level of abstraction as the two previously noted basic causes for change in evaluation (linking an object with affective stimuli and with affective actions). As an abstract rule that explains change in evaluation, the basic cause we identified here subsumes a wide array of more concrete instances that would be difficult to understand without it. Because linking with affective stimuli and actions are basic causes of evaluation change, each of these causes has inspired much previous research on possible moderators, boundary conditions, mechanisms, and implications. The knowledge accumulated in those investigations cannot be easily applied to the case of change in evaluation of an action's object as a function of the valence of the action's outcome. Because of its recursive nature, the effect of the valence of an action's outcome on the evaluation of the action's object is more complex than the previous effects, favoring evaluation theories that assume that evaluation is an iterative process. Here, we document this effect for the first time in various contexts, search for initial evidence about the mechanism that underlies it, and test its boundary conditions. We also demonstrate its implications for specific fields of study, by using this abstract rule of evaluation change to uncover an irrational bias in moral judgment.

Overview of the Experiments

In the present experiments, participants evaluated affective stimuli and concepts immediately after reading about an action performed on those objects. The actions either diminished or facilitated the effect of those objects. Actions that diminished the effects of negative objects (e.g., *the cockroach was taken away from the boy*) had a positive outcome. Actions that facilitated the effects of negative objects had a negative outcome (e.g., *the cockroach was given to the boy*). Actions that facilitated the effects of positive objects had a positive outcome (e.g., *the puppy was given to the girl*). Actions that diminished the effects of positive objects had a negative outcome (e.g., *the puppy was taken away from the girl*). We tested the effect of the outcome's valence on the evaluation of the action's object.

In Experiments 1-7, participants evaluated each object twice: once in the context of an action with a positive outcome and once in the context of an action with a negative outcome. In all these experiments, we found that people's immediate evaluation of the objects was more positive if the action performed on the objects had a positive outcome than if the action had a negative outcome. This occurred for both positive and negative stimuli. Experiments 1-3 were all conceptual replications of one another, testing the research question with actions performed by human agents on various affective objects (images of animals and verbal descriptions of pleasant or unpleasant events).

It is tempting to explain these findings as the result of logical inference. For example, the action "Kevin gave the girl a puppy" might suggest that the puppy is very positive, whereas the action "Kevin took the puppy from the girl" might suggest that there is something wrong with the puppy. In other words, perhaps participants' evaluations reflected an inference from the assumption that the agents performed benevolent actions. However, benevolent intentions cannot account for the effect with negative stimuli: the action "Kevin gave the girl a cockroach" would suggest that the cockroach is not all negative (in

comparison to the inference from “Kevin took the cockroach from the girl”). Yet, our finding is the opposite: people evaluated the cockroach more negatively after reading the cockroach was given than after reading that it was taken away.

Still, to reduce the possibility that any inference about intentions could explain our results, in Experiment 4, the actions were attributed to genes – inanimate agents that have no intentions. The genes increased or decreased the likelihood of possessing positive or negative traits. We examined whether negative traits (e.g., laziness) would be evaluated more positively after reading about genes that decreased the likelihood of possessing them (an action with a positive outcome), whereas positive traits (e.g., intelligence) would be evaluated more positively after reading about genes that increased the likelihood of possessing those traits.

In Experiment 5, we demonstrated the generality of this effect by testing its possible implications to research on moral judgment. Participants read about court judges who permitted or prohibited immoral acts. We examined whether people would rate immoral acts more positively after reading that a judge prohibited this act (an action with a positive outcome) than after reading that a judge permitted this act (a negative outcome). This finding further demonstrates that the effect of action's outcome on the evaluation of the action's object can defy logic inference. Logic dictates that an immoral act that a judge prohibits is more wrong than an immoral act that a judge allows (we also verified, empirically, that this is the prevalent logical conclusion).

In Experiments 6-7, we tested two accounts for the effect: misattribution versus association activation. Finally, in Experiments 8-11, we replaced the contextual paradigm with a learning paradigm and examined whether the effect persists over time.²

Experiments 1 and 2: Giving and Taking Away Cute and Nasty Animals

In a context of a computer game, male characters helped or harmed the participants with four types of actions: Actions with positive outcomes performed on positive stimuli (e.g., *giving a cute animal to the participant*), actions with negative outcomes performed on positive stimuli (e.g., *taking a cute animal from the participant*), actions with positive outcomes performed on negative stimuli (e.g., *taking a nasty animal from the participant*), and actions with negative outcomes performed on negative stimuli (e.g., *giving a nasty animal to the participant*). We presented the actions one at a time. After each presentation, participants evaluated the stimulus that was the object of the action. In Experiment 1, each action was confounded with a specific man (e.g., the same man always took away the nasty animals). To test whether Experiment 1's findings depended on different men performing each type of action, in Experiment 2 we replicated Experiment 1 with one modification: the same man performed all of the actions.

Method

Participants. The participants in all the experiments excluding Experiment 3 volunteered to participate on the internet at the Project Implicit research website (Nosek, 2005). For technical reasons, in all the internet experiments we collected a larger sample than planned. Based on the effect size found unexpectedly in a preliminary study

² We report all data exclusions, manipulations, measures, and how we determined our sample sizes. In all experiments, decisions to stop collecting data did not depend on the obtained results. To see the materials and data of the whole project visit osf.io/yu5kx/

(osf.io/hqmzt/), for Experiment 1, we estimated that 100 participants would provide a power of 99% to detect that effect. 321 participants completed the study. We excluded 14 participants who completed the study more than once (reloaded the web page). Therefore, 307 participants (66% women, $M_{age} = 30.81$, $SD_{age} = 13.61$) entered the analyses. In all the Internet experiments in this research, the dropout rate was about 35% (e.g., 474 participants started Experiment 1). In a later section, we report dropout rates for all the experiments and discuss possible limitations the dropout casts on drawing conclusions from our experiments. In Experiment 2, 223 participants completed all the relevant measures and were included in the final sample (68% women, $M_{age} = 33.84$, $SD_{age} = 13.95$). All experiments were approved by the Ben-Gurion University Ethics Committee and participants provided written informed consent prior to taking part in the study. Participants were debriefed at the end of their session.

Materials. We used pictures of young adult white males (Minear & Park, 2004; pre-tested by Bar-Anan & Amzaleg-David, 2014) as the persons who performed the actions. In Experiment 1, we used four pictures naming them *Chris*, *James*, *Michael*, and *David*. In Experiment 2, the computer randomly chose the man picture from a pool of six pictures, and the man's name from a pool of six names (*James*, *Kevin*, *Michael*, *David*, *Brian*, and *Mark*). The affective stimuli in both experiments were eight images of cute animals and eight images of nasty animals, most of them from the International affective picture system (IAPS; Lang, Bradley, & Cuthbert, 1999).

Design. The design was 2 (Stimulus' Valence: positive, negative; within participants) X 2 (Valence of the Action's Outcome: positive, negative; within participants).

Procedure. Excluding Experiment 3, we programmed all the experiments with Minno.js (Version 0.3; Zlotnick, Dzikiewicz, & Bar-Anan, 2015). We presented the task as a game of chance in which participants want to obtain as many cute animals as possible and as

few nasty animals as possible. We told them in advance that on each trial in the game they would meet a man who would either give them cute animals, give them nasty animals, take cute animals away from them, or take away nasty animals. We told participants in advance they would have no control on those outcomes. In Experiment 1, we instructed the participants to memorize what actions each man performed, and to form impressions of the men. In Experiment 2, we instructed participants to form an impression of the man based on his actions.

Each trial started with a 400ms fixation (randomly selected in each trial from various images of forests). Afterwards, a man image with his name appeared on the left side of the screen next to an image of cute or nasty animals on the right side of the screen for 400ms. Next, text appeared between the man and the animals, indicating either *gives* or *takes away*. That was the display of the full action and it remained on the screen for 1600ms, before disappearing. Next, we presented the same animal image again with the instructions “*Please rate how positive or negative this animal is.*” The rating scale was 1 (very negative), 2 (negative), 3 (positive), and 4 (very positive). Each affective stimulus appeared twice during the task; once it was the object of a positive action and once the object of a negative action (a total of 32 trials). The trial order was randomized for each participant.³

Results

Figures 1 and 2 present the average rating in each condition, in Experiments 1 and 2. We submitted the average score of the four conditions to a 2 (Stimulus’ Valence) x 2 (Valence of Action’s Outcome) repeated measures ANOVA. A strong main effect of

³ To avoid deception, in all of the experiments (except from Experiments 4, 5 and 9), at the end of the experiment, participants rated the men, as promised in the beginning of the task. Because Project Implicit policy is to add indirect evaluation measures to studies, participants in Experiments 1, 6 and 8 also completed an indirect measure that compared two of the men. We never had any hypotheses or interest in those measures, irrelevant for the present research question. Therefore, we report those results only in the online supplement (osf.io/qdz7c/).

stimulus' valence, in Experiment 1, $F(1, 306) = 1079.57, p < .001, \eta_p^2 = .77$, 90% CI [.74, .80], and in Experiment 2, $F(1, 222) = 572.38, p < .001, \eta_p^2 = .72$, 90% CI [.67, .75], reflected more positive evaluation of positive stimuli ($M = 3.37, 3.26, SD = 0.49, 0.47$, in Experiments 1 and 2 respectively), than negative stimuli ($M = 1.74, 1.88, SD = 0.52, 0.50$). Most relevant for the research question, we found a strong effect of the valence of action's outcome, in Experiment 1, $F(1, 306) = 84.06, p < .001, \eta_p^2 = .21$, 90% CI [.15, .27], and in Experiment 2, $F(1, 222) = 91.21, p < .001, \eta_p^2 = .29$, 90% CI [.21, .36], reflecting a more positive evaluation of the stimuli when they were the object of an action with a positive outcome ($M = 2.72, 2.82, SD = 0.41, 0.43$) than when they were the object of an action with a negative outcome ($M = 2.39, 2.33, SD = 0.42, 0.46$). The interaction between stimulus' valence and action's valence was weak, in Experiment 1: $F(1, 306) = 2.98, p = .085, \eta_p^2 = .009$, 90% CI [NA, .03], and in Experiment 2: $F(1, 222) = 4.20, p = .041, \eta_p^2 = .01$, 90% CI [00, .05], reflecting somewhat stronger effect of the outcome's valence on positive stimuli, Experiment 1: $F(1, 306) = 77.07, p < .001, \eta_p^2 = .20$; Experiment 2: $F(1, 222) = 94.47, p < .001, \eta_p^2 = .29$, than on negative stimuli, Experiment 1: $F(1, 306) = 67.88, p < .001, \eta_p^2 = .18$; Experiment 2: $F(1, 222) = 67.73, p < .001, \eta_p^2 = .23$.

To test the robustness of the effect of the valence of the action's outcome on the evaluation of the action's object, we tested the effect for each stimulus, separately. In Experiments 1 and 2, participants evaluated each of the positive stimuli more positively when they were the object of an action with a positive outcome than when they were the object of an action with a negative outcome ($ps < .001, d$ ranged from 0.34 to 0.54), and evaluated each of the negative stimuli more positively when they were the object of an action with a positive outcome than when they were the object of an action with a negative outcome ($p < .018, d$ ranged from 0.13 to 0.36). The chances of obtaining results in the predicted direction for all

16 stimuli are $p = .00002$, providing evidence of the statistical reliability of the finding and in its generality beyond specific stimuli.

We reported by-stimulus results to demonstrate its robustness. It is also possible to test the generalizability of the results by estimating stimulus variance in linear mixed models analyses that include both participants and stimuli as random affects (e.g., Judd, Westfall, & Kenny, 2012). The results of these analyses in all the experiments are described in the Appendix. These analyses obtained results similar to the ANOVA reported in the text, and never altered the statistical inference, despite reduced power (Westfall, Kenny, & Judd, 2014).

Figure 1. Experiment 1: Mean evaluation for positive and negative stimuli, as a function of valence of the action's outcome (positive, negative). Error-bars are 95% confidence intervals.

Figure 2. Experiment 2: Mean evaluation for positive and negative stimuli, as a function of valence of the action's outcome (positive, negative). Error-bars are 95% confidence intervals.

Discussion

The results of Experiments 1 and 2 support the hypothesis that stimuli are evaluated more favorably when they are the objects of actions with a positive outcome than when they are the objects of actions with a negative outcome. The results were robust and generalized across all 16 stimuli. Importantly, the results were strong even when the different actions were not confounded with specific men (Experiment 2), suggesting that the effect is not due to the valence of the man who performed the action. However, the actions performed on the objects were limited to *giving* and *taking*, and the outcome was always personal for the participants (the objects were given to them or taken away from them). To test whether the findings are limited to those settings, in Experiment 3, we used a different type of stimuli (relatively abstract objects described verbally), and the actions influenced a fictional third party, rather than the participants.

Experiment 3: Reading about Behaviors that Help or Harm Other People

Method

Participants. Sixty student participants in an Israeli university completed the study ($M_{age} = 24.04$, $SD_{age} = 1.68$; the age of three participants was not recorded due to a program error). All participants were women because the experiment was added at the end of a study that tested women's attitudes toward feminism. Based on the unexpected effect found in a preliminary study (osf.io/hqmzt/), we planned to run 60 participants to reach a power of 99% to detect the expected effect.

Materials. We used the same four male images we used in Experiment 1. Each man appeared in eight trials of the same condition. We used 32 behaviors. Eight described an action on a positive object with a positive outcome, eight described an action on a positive object with a negative outcome, eight described an action on a negative object with a negative outcome, and eight described an action on a negative object with a positive outcome. Each affective object appeared in two behaviors: one with a positive and one with a negative outcome, allowing a within-participants test of the hypothesis for each of the 16 objects. Figure 3 presents all the behaviors (translated from Hebrew).

Design. The design was 2 (Stimulus' Valence: positive, negative; within participants) X 2 (Valence of the Action's Outcome: positive, negative; within participants).

Procedure. At the beginning of the experiment, printed instructions explained that the participants would meet four men and that they should learn about their typical behaviors and form impressions of the men.

In each trial of the task, participants saw a man image and name at the top of the screen, and a behavior description below them (e.g., *David prevented his son's success in school*). This presentation remained on the screen for 3000ms. Then, the presentation

disappeared and the instructions “*Please rate how positive or negative XXXXX is/are*” appeared, with the same affective object instead of the XXXXX (e.g., *Please rate how positive or negative success in school is*). The rating scale ranged from 1 (*very negative*) to 9 (*very positive*).

Results.

Figure 3 presents the average ratings in each condition, by stimuli and across stimuli. We submitted the average score of the four conditions to a 2 (Stimulus’ Valence) x 2 (Valence of the Action’s Outcome) repeated measures ANOVA. A strong main effect of stimulus’ valence, $F(1, 59) = 1222.07, p < .001, \eta_p^2 = .95$, 90% CI [.93, .96], reflected more liking of positive stimuli ($M = 7.66, SD = 0.71$) than negative stimuli ($M = 2.38, SD = 0.67$). Importantly, as in Experiments 1 and 2, we found a strong effect of the valence of the action’s outcome, $F(1, 59) = 14.02, p < .001, \eta_p^2 = .19$, 90% CI [.06, .32], reflecting a more positive evaluation of the stimuli when they were the object of an action with positive outcome ($M = 5.22, SD = 0.52$), than when they were the object of an action with negative outcome ($M = 4.83, SD = 0.57$). We found no reliable evidence that the effect of the outcome’s valence was moderated by the stimulus’ valence, $F(1, 59) = 1.68, p = .199, \eta_p^2 = .02$, 90% CI [0, .12], reflecting a strong effect of outcome’s valence for positive stimuli, $F(1, 59) = 11.99, p = .001, \eta_p^2 = .16$, 90% CI [.04, .30], and for negative stimuli, $F(1, 59) = 10.81, p = .001, \eta_p^2 = .15$, 90% CI [.03, .29].

To test the robustness of the effect of outcome’s valence, we further examined whether it occurred for each of the affective objects, separately. As illustrated in Figure 3, participants evaluated all eight positive concepts more favorably when they were the object of an action with a positive outcome than when they were the object of an action with a negative outcome ($0.16 < ds < 0.43$), and this effect was statistically reliable for five of the concepts. Participants evaluated seven out of the eight negative concepts more favorably

when they were the object of an action with a positive outcome than when they were the object of an action with a negative outcome ($0.18 < ds < 0.35$), and this effect was statistically reliable for four of the concepts. Because the chances of obtaining results in the predicted direction for 15 out of 16 stimuli are $p = .0005$, we are confident in the statistical reliability of the results and in its generality beyond specific stimuli.

Discussion

In Experiment 3, like in Experiments 1-2, we found evidence for a strong assimilative effect of the valence of an action's outcome on the evaluation of the action's object. In Experiments 6-11, we used the paradigms from Experiments 1-3 to learn about possible mechanisms behind the effect and to examine whether immediate judgment is a boundary condition of the effect. After conducting those studies, we returned to the basic effect and conducted Experiment 4 as another test for the generality of our finding and its importance, with stimuli and actions that were much different from those we used in the other experiments. Importantly, the agents that performed the actions in Experiment 4 were inanimate object (genes), to reduce the likelihood of alternative accounts that assume inference from the agent's intentions.

A. Positive Stimuli

B. Negative Stimuli

Figure 3. Experiment 3: Mean evaluation for positive stimuli (A) and negative stimuli (B), as a function of valence of the action's outcome (positive, negative). On the left side are the behaviors presented in the experiment. In bold: the affective objects that were the target of the actions (and the evaluation). The p values are for t-tests. Error-bars are 95% confidence intervals.

Experiment 4: Genes and Traits

In Experiment 4, participants read about genes that increase or decrease the likelihood of positive or negative human traits. That is, inanimate agents performed the actions, and their objects were abstract entities, well-known to the participants. We examined whether people would rate positive [negative] traits more positively [negatively] after reading that a gene increases the likelihood of possessing that trait (an action with a positive [negative] outcome) than after reading that a gene decreases that likelihood (a negative [positive] outcome).

Further, in addition to a straightforward evaluation of the trait, participant also evaluated how positive people who possess this trait are. We speculated that perhaps because people are very experienced in judging other people based on their traits, that particular question would not be sensitive to the valence of the action's outcome.

Method

Participants. We planned to collect data from 350 participants to achieve power of 99% to detect an effect of $\eta_p^2 = .05$. 368 participants (65% women, $M_{age} = 32.93$, $SD_{age} = 15.01$) completed all the measures and entered the analysis.

Materials. For each participant, the computer randomly chose four genes names from a list of 16 fictitious genes names (*CCR5*, *IL10*, *BCL2*, *ZBT7*, *NP4N*, *KRT4*, *VHF8*, *ALB7*, *HFE3*, *PGL2*, *SDHC*, *GAST*, *LCK7*, *MCM6*, *SL8A*, *UI2F*). The affective stimuli were six positive traits and six negative traits randomly selected for each participant from a list of 14 positive traits (*Calmness*, *Cheerfulness*, *Cleanliness*, *Compassion*, *Creativity*, *Eloquence*, *Flexibility*, *Friendliness*, *Generosity*, *Honesty*, *Humility*, *Intelligence*, *Loyalty*, and *Optimism*) and a list of 14 negative traits (*Aloofness*, *Anxiety*, *Arrogance*, *Clumsiness*, *Duplicity*,

Irritability, Laziness, Melancholy, Neuroticism, Passivity, Pessimism, Rigidity, Selfishness, and Sociopathy).

Design. The design was 2 (Stimulus' Valence: positive, negative; within participants) X 2 (Valence of the Action's Outcome: positive, negative; within participants).

Procedure. We presented the task as a learning task in which participants need to learn the role of a few genes. We told the participants in advance that on each trial they would see a gene name and information about whether the gene increases or decreases the likelihood of possessing a specific trait. We instructed the participants to learn what each gene does.

Each trial started with a 400ms fixation. Afterwards, a gene name appeared on the left side of the screen next to a positive or negative trait on the right side of the screen for 400ms. Next, text appeared between the gene and the trait, indicating either *increases* or *decreases*. That was the display of the full action and it remained on the screen for 1600ms, before disappearing. Next, we presented the same trait again. In the task's first block, the trait appeared with the instructions "*Please rate how positive or negative this trait is.*" The rating scale was 1 (very negative), 2 (negative), 3 (positive), and 4 (very positive). In the task's second block, the trait appeared with the question "*How positive or negative are people who possess this trait?*" with the same rating scale.

The task consisted of two blocks of 24 trials. Each block showed 4 genes and 12 traits (six positive and six negative traits). Each gene appeared six times in each block. Each trait appeared twice in each block: once as the object of a positive action and once as the object of a negative action. We randomized the trial order for each participant with the constraint that we did not repeat any trait before all 12 traits were presented (i.e., two mini-blocks of 12 trials).

Results

Trait ratings. Figure 4 presents the average rating of traits (i.e., Block 1 only), by stimuli and across stimuli. We submitted the average rating of each condition to a 2 (Stimulus' Valence) x 2 (Valence of Action's Outcome) repeated measures ANOVA. A strong main effect of stimulus' valence, $F(1, 367) = 1,254.02, p < .001, \eta_p^2 = .77$, 90% CI [.74, .79], reflected more positive evaluation of positive traits ($M = 3.33, SD = 0.44$), than negative traits ($M = 1.94, SD = 0.40$). Compatible with the previous results, we found a strong effect of the valence of action's outcome, $F(1, 367) = 83.36, p < .001, \eta_p^2 = .185$, 90% CI [.12, .24], reflecting a more positive evaluation of the traits when they were the object of an action with a positive outcome ($M = 2.78, SD = 0.32$), than when they were the object of an action with a negative outcome ($M = 2.49, SD = 0.41$). The interaction between stimulus' valence and action's valence was significant, $F(1, 367) = 46.41, p < .001, \eta_p^2 = .11$, 90% CI [.06, .16], reflecting stronger effect of the outcome's valence on positive traits, $F(1, 367) = 109.43, p < .001, \eta_p^2 = .22$, than on negative traits, $F(1, 367) = 37.73, p < .001, \eta_p^2 = .09$.

A. Positive Traits

B. Negative Traits

Figure 4. Experiment 4: Mean evaluation of traits for positive stimuli (A) and negative stimuli (B), as a function of valence of the action's outcome (positive, negative). The p values are for t-tests. Error-bars are 95% confidence intervals.

Evaluation of possessing the traits. Figure 5 presents the average rating of people possessing each trait (i.e., Block 2 only), by stimuli and across stimuli. We submitted the average evaluation of possessing the trait in each of the four conditions to a 2 (Stimulus' Valence) x 2 (Valence of Action's Outcome) repeated measures ANOVA. A strong main

effect of stimulus' valence, $F(1, 367) = 928.26, p < .001, \eta_p^2 = .71$, 90% CI [.67, .74], reflected more positive evaluation of people possessing the positive traits ($M = 3.24, SD = 0.46$), than of people possessing the negative traits ($M = 2.00, SD = 0.41$). Contrary to our speculation that the finding might not replicate when participants evaluate how positive people who possess each trait are, we found a strong effect of the valence of action's outcome, $F(1, 367) = 113.17, p < .001, \eta_p^2 = .23$, 90% CI [.17, .29], reflecting a more positive evaluation of possessing the traits when they were the object of an action with a positive outcome ($M = 2.81, SD = 0.36$) than when they were the object of an action with a negative outcome ($M = 2.43, SD = 0.43$). The interaction between stimulus' valence and action's valence was significant, $F(1, 367) = 29.00, p < .001, \eta_p^2 = .07$, 90% CI [.03, .11], reflecting stronger effect of the outcome's valence on positive traits, $F(1, 367) = 113.65, p < .001, \eta_p^2 = .23$, than on negative traits, $F(1, 367) = 88.13, p < .001, \eta_p^2 = .19$.

By-stimulus analysis. To test the robustness of the main finding we further examined whether the outcome's valence had an effect on the evaluation of each trait separately. As detailed in Figures 4 and 5, for both questions, participants evaluated each of the positive traits more positively when they were the object of an action with a positive outcome than when they were the object of an action with a negative outcome. That difference was reliable for all 16 traits. Participants also evaluated each of the negative traits more positively when they were the object of an action with a positive outcome than when they were the object of an action with a negative outcome. That difference was statistically reliable in 10 of the 16 negative traits in direct rating of the traits, and in 13 of the 16 traits in evaluating people who possess the traits.

A. Positive Traits

B. Negative Traits

Figure 5. Experiment 4: Mean evaluation of people who possess the traits, for positive stimuli (A) and negative stimuli (B), as a function of valence of the action's outcome (positive, negative). The p values are for t-tests. Error-bars are 95% confidence intervals.

Discussion

Replicating the finding from previous studies, people evaluated traits more positively if the action that was performed on the traits had a positive outcome than if the action had a negative outcome. These results further increase the generality of the effect. Together, the

results of Experiments 1-4 suggest that the link between the object and the action's outcome that is determined by this object has an assimilative effect on evaluation of the object. We next report an experiment that demonstrates the usefulness of the present effect in uncovering interesting phenomena in specific fields of research. We realized that from our effect follows a prediction about moral judgment that contradicts logic. Experiment 5 tested that prediction.

Experiment 5: Moral Judgment

In Experiment 5, participants read about court judges who permitted or prohibited immoral acts. We examined whether people would rate immoral acts more positively after reading that a judge prohibited this act (an action with a positive outcome) than after reading that a judge permitted this act (a negative outcome).

Importantly, that effect contradicts evaluation based on logical inference: immoral acts prohibited by judges are supposed to be more morally wrong than immoral acts permitted by judges. To verify our logic, we also conducted an auxiliary experiment with one question. Participants ($N = 445$, $M_{age} = 36.20$, $SD_{age} = 14.26$) read two statements presented on the screen one below the other: *Judge Johnson allowed a man to perform the "Immoral Behavior X"* and *Judge Smith prevented a man from performing the "Immoral Behavior Y"*. The assignment of the two names to the two actions was random. Below these two statements appeared the question "Based only on this information, using simple logic, which behavior is more wrong?". There were five response options, presented here with the percentage of participants who chose each: *"immoral behavior X" is certainly more wrong than "immoral behavior Y"* (4.9%), *"immoral behavior X" is probably more wrong than "immoral behavior Y"* (7.6%), *"immoral behavior X" and "immoral behavior Y" are equally wrong* (29.7%), *"immoral behavior Y" is probably more wrong than "immoral behavior X"* (48.8%), and *"immoral behavior Y" is certainly more wrong than "immoral behavior X"* (9.0%). Thus, 58% agreed with our logic, and only 12.5% made the opposite inference (we speculate that

the participants who did not agree wanted to express their lack of trust in court judges, rather than expressed pure logic). Therefore, if we find that people actually rated permitted immoral behaviors as more wrong than prohibited behaviors, logical inference could not explain these results.

Method

Participants. We planned to collect data from at least 396 participants to achieve power of 99% to detect an effect of $d = 0.2$. 397 participants completed all the measures and entered the analysis (62% women, $M_{age} = 35.65$, $SD_{age} = 13.90$).

Materials. For each participant, the computer randomly chose 16 judges names from a list of 20 fictitious names (*Johnson, Smith, Williams, Hall, Walker, Lee, Lewis, Clark, Martin, Thompson, Harris, Jackson, Thomas, Anderson, Taylor, Moore, Wilson, Miller, Davis, and Jones*). The affective stimuli were eight immoral behaviors randomly selected for each participant from a list of 13 immoral behaviors that were used in previous studies on moral judgments (Graham, Haidt, & Nosek, 2009; Gray, Schein, & Ward, 2014; Haidt, Koller, & Dias, 1993; Schnall, Haidt, Clore, & Jordan, 2008). Figure 6 presents all the behaviors.

Procedure. We presented the task as a learning task in which participants need to learn fictitious court ruling. We told the participants in advance that on each trial they would see one court ruling. We instructed the participants to learn the information they read.

Each trial started with a 300ms fixation. Afterwards, information that includes the judge name, an action (*allowed or prevented*) and an immoral behavior (e.g., *Judge Wilson prevented the man from making cruel remarks to an overweight colleague about her appearance*), appeared on the screen for 5000ms, before disappearing. Next, we presented the same immoral behavior again with the instructions “*Please rate how wrong this behavior*

seems to you.” The rating scale was 1 (not at all wrong), 2 (somewhat wrong), 3 (very wrong), and 4 (extremely wrong).

The task consisted of 16 trials. Each immoral behavior appeared twice: once as the object of a positive action and once as the object of a negative action. We randomized the trial order for each participant with the constraint that we did not repeat any behavior before all eight behaviors were presented (i.e., two mini-blocks of 8 trials).

Results

Figure 6 presents the average rating of the immoral behaviors, by stimuli and across stimuli. Supporting our prediction, participants judged the immoral behaviors more positively (less wrong) after they were prevented by a judge (an action with a positive outcome, $M = 2.71$, $SD = 0.63$) than after they were allowed by a judge (an action with a negative outcome, $M = 2.84$, $SD = 0.58$), $t(396) = 5.46$, $p < .001$, $d = 0.21$.

To test the robustness of the effect of outcome’s valence, we further examined for which immoral behaviors the effect occurred. The effect was reliable for seven of the behaviors. Of the six behaviors that did not show that effect, five were rated, overall, as the least wrong (see Figure 6). That is, the effect did not occur when participants did not think that the behavior was much wrong. We speculate that the failure to find the effect with those behaviors is actually compatible with the overall finding: when the target stimulus (the immoral behavior) is not considered very negative or very positive, the outcome of the action performed on it (permitting or prohibiting the behavior) would not be considered very negative or positive. In that case, we do not expect the action’s outcome to have any effect on the judgment of the action’s object. Thus, our mistake in choosing some of these behaviors (they were not considered as negative as we thought they would be) might serve as more evidence that our description of the effect is correct and that the novel finding we show in this experiment, pertaining to moral judgment, is a specific instance of the same finding we

detected in the previous experiments. However, because this is a post-hoc explanation, further confirmatory research is needed for establishing this speculative inference more firmly (e.g., by manipulating the initial extremity of the affective stimuli).

Figure 6. Experiment 5: Mean judgment of wrongness of immoral behaviors as a function of valence of the action's outcome (positive, negative). The p values are for t-tests. Error-bars are 95% confidence intervals.

Discussion

Replicating the finding from previous studies, people evaluated immoral behaviors as more wrong if the action that was performed on the behaviors had a negative outcome than if the action had a positive outcome. These results further increase the generality of the effect and demonstrate its possible implications to various judgment domains. Next, in Experiments 6 and 7, we examined two possible mechanisms for the observed effect.

Experiment 6: Testing Two Mechanisms

One possible mechanism for the present finding is *association formation* (Baeyens et al., 1992; Levey & Martin, 1975; Ranganath & Nosek, 2008; Skowronski et al., 1998).

According to this account, the information that two objects are linked automatically forms a mental association between the objects, or between each object and the valence of the other object. That association, in turn, has an assimilative influence on the evaluation of the object.

Another possible mechanism is *misattribution* (e.g., Jones, Fazio, & Olson, 2009; Payne, Cheng, Govorun, & Stewart, 2005; Schwarz & Clore, 1983). People sometimes misattribute the effect of one source to another source, and the misattribution influences judgment and evaluation. According to this account, when people evaluate an affective stimulus that was just presented as an object of an action, they erroneously identify their affective reaction to the action's outcome as a part of their reaction to the target stimulus.

In Experiment 6, we tested these two accounts by asking one group of participants to evaluate the valence of the action's outcome before they evaluated the action's object.

Evaluating the action's outcome should increase the salience of the valence of the action's outcome. The two accounts have opposite predictions about the effect of an emphasis on the valence of the action's outcome. According to the *association formation* account, an increase

in the salience of the outcome's valence would result in a *greater assimilative effect* on the evaluation of the object because a focus on the outcome increases the likelihood that participants would form an association between the object and the outcome's valence. In contrast, according to the *misattribution* account, an increase in the salience of the outcome's valence would lead to a *smaller assimilative effect* on the evaluation of the object because people would accurately attribute their feeling to the correct source. We tested these competing predictions in Experiment 6 by adapting Experiment 1's procedure.

Method

Participants. We planned to collect 507 participants to achieve power of 95% to detect an interaction effect of $\eta_p^2 = .03$. We collected data from 598 participants. We excluded eight participants who completed the study more than once (reloaded the web page). The final sample included 590 participants (67% women, $M_{age} = 34.73$, $SD_{age} = 16.07$).

Design. The design was 3 (Questions Order: action first, object first, control; between participants) X 2 (Stimulus' Valence: positive, negative; within participants) X 2 (Valence of the Action's Outcome: positive, negative; within participants).

Materials and Procedure. The materials were identical to those used in Experiment 1. The procedure was adapted from Experiment 1. The first part of the sequence of each of the 32 trials was identical to those of Experiment 1, displaying a man with verbal information about his action on a positive or a negative stimulus. Trials in the control condition continued like in Experiment 1: participants saw only the stimulus object and rated it on a 1-4 scale. Participants in the other two conditions saw another question, appearing before or after the question about the evaluation of the object. In that question, the animal image appeared with the text (*gives* or *takes*), just like the full display presented earlier, but without the man's image and name. The instructions were "*Please rate how positive or negative the outcome of*

this action is.” Participants rated the outcome on the same 1-4 scale⁴. In the *action first* condition, participants always saw the question about the action's outcome before the question about the action's object. In the *object first* condition, the order of the questions was opposite. Like in Experiment 1, each affective stimulus appeared twice during the task; once it was the object of a positive action and once it as the object of a negative action. We randomized the trial order for each participant.

Results

Figure 7 presents the average evaluation of the animals in each condition. We submitted the average scores to a 3 (Questions Order) x 2 (Stimulus' Valence) x 2 (Valence of Action's Outcome) mixed ANOVA. There was a weak main effect of questions order, $F(2, 585) = 3.60, p = .027, \eta_p^2 = .01, 90\% \text{ CI } [.00, .02]$, reflecting overall more positive evaluation when participants evaluated the action's object first ($M = 2.61, SD = 0.25$), than when participants evaluated only the object ($M = 2.54, SD = 0.25$), $F(1, 585) = 7.18, p = .007, \eta_p^2 = .012$. There was no evidence for any difference in the overall evaluations between the *action first* and the *object first* conditions, $F(1, 585) = 2.27, p = .132, \eta_p^2 = .003$, and no evidence for a difference in the overall evaluations in the *action first* and *control* conditions, $F < 1, \eta_p^2 = .002$.

We found a strong main effect of stimulus' valence, $F(1, 585) = 3578.60, p < .001, \eta_p^2 = .85, 90\% \text{ CI } [.84, .87]$, reflecting a more positive evaluation of positive stimuli ($M = 3.55, SD = 0.45$), than negative stimuli ($M = 1.59, SD = 0.49$). The effect of stimulus' valence was moderated by questions order condition, $F(2, 585) = 8.91, p < .001, \eta_p^2 = .02, 90\% \text{ CI } [.009, .05]$. The interaction reflected stronger effect of stimulus' valence when participants

⁴ Because our main interest was the evaluation of the action's object, we report the evaluations of the action's outcome in Experiments 6-7 at an online supplementary (osf.io/qdz7c/)

evaluated the action's outcome first, $F(1, 191) = 1762.87, p < .001, \eta_p^2 = .90$, than when participants evaluated the action's object first, $F(1, 191) = 984.87, p < .001, \eta_p^2 = .83$, or evaluated only the object, $F(1, 203) = 1001.39, p < .001, \eta_p^2 = .83$.

We replicated the main finding of this research: a strong main effect of the valence of action's outcome, $F(1, 585) = 86.99, p < .001, \eta_p^2 = .12$, 90% CI [.08, .17], reflecting a more positive evaluation of the stimuli when they were the object of an action with a positive outcome ($M = 2.68, SD = 0.37$) than when they were the object of an action with a negative outcome ($M = 2.47, SD = 0.38$). The interaction between stimulus' valence and action's valence was weak, $F(1, 585) = 5.79, p = .016, \eta_p^2 = .009$, 90% CI [.00, .02], reflecting somewhat stronger effect of the outcome's valence on positive stimuli, $F(1, 589) = 93.61, p < .001, \eta_p^2 = .13$, than on negative stimuli, $F(1, 589) = 55.56, p < .001, \eta_p^2 = .08$.

More relevant to the mechanism question, the effect of action's outcome was further moderated by questions order condition, $F(2, 585) = 8.68, p < .001, \eta_p^2 = .028$, 90% CI [.009, .05]. That interaction reflected a pattern compatible with the hypothesis we derived from the *misattribution* account: the effect of the valence of the action's outcome was weaker when participants evaluated the action's outcome first, $F(1, 191) = 15.26, p < .001, \eta_p^2 = .07$, than when participants evaluate the action's object first, $F(1, 191) = 31.70, p < .001, \eta_p^2 = .14$, and when participants evaluated only the action's object, $F(1, 203) = 41.04, p < .001, \eta_p^2 = .16$.

Discussion

In Experiment 6, the assimilative effect of action's valence on the evaluation of action's object decreased if participants evaluated the action's outcome before evaluating the action's object. This result is compatible with the misattribution account for our finding: after evaluating the action's outcome participants were less likely to think that their affective reaction to the outcome is their reaction to the action's object. Therefore, the outcome had a

weaker effect on the object's evaluation. The results seem incompatible with the association formation account for our finding: emphasizing the action's outcome with which the action's object was linked did not increase the assimilative effect of the action's outcome on the evaluation of the action's object. Experiment 7 was a conceptual replication of Experiment 6, this time adapting the procedure from Experiment 3.

Figure 7. Experiment 6: Mean evaluation for positive stimuli and negative stimuli as a function of valence of the action's outcome (positive, negative) and question order condition (action first, object first, control). Error-bars are 95% confidence intervals (calculated based on Jarmasz and Hollands, 2009).

Experiment 7: Testing Two Mechanisms (Conceptual Replication)

Method

Participants. We planned to collect 663 participants to achieve power of 98% for detecting the interaction effect found in Experiment 6. We collected data from 733

participants. We excluded nine participants who completed the study more than once (reloaded the web page). The final sample included 724 participants (63% women, $M_{age} = 35.33$, $SD_{age} = 14.86$).

Design. The design was 3 (Questions Order: action first, object first, control; between participants) X 2 (Stimulus' Valence: positive, negative; within participants) X 2 (Valence of the Action's Outcome: positive, negative; within participants).

Materials. We used the same four male images from Experiment 1. Each man appeared in four trials of the same condition. We used 16 behaviors that were randomly chosen from a pool of 32 behaviors (translated to English from the behaviors used in Experiment 3). Four described an action on a positive object with a positive outcome, four described an action on a positive object with a negative outcome, four described an action on a negative object with a negative outcome, and four described an action on a negative object with a positive outcome.

Procedure. The procedure was similar to the procedure of Experiment 3 with the addition of the questions manipulation used in Experiment 6. In each trial of the task, participants saw a man image and name at the top of the screen, and a behavior description below them (e.g., *David removed the fun activities from the classwork*). This presentation remained on the screen for 3,500ms. We manipulated between participants the questions that followed each trial. The *control* condition was similar to Experiment 3, presenting the instructions “*Please rate: How positive or negative is XXXXX*”, with the same affective object replacing the XXXXX (e.g., *Please rate: How positive or negative are fun activities*). The rating scale ranged from 1 (extremely negative) to 7 (extremely positive). In the other two conditions, we added a question regarding the action's valence: “*Please rate how positive or negative the following action is: XXXXX*” with the action instead of the XXXXX (e.g., *Please rate how positive or negative the following action is: Removing fun activities from the*

classwork). Rating was on the same 1 to 7 scale. In the *action first* condition, participants always saw the question about the action's outcome before the question about the action's object. In the *object first* condition, the order of the questions was opposite. Each affective stimulus appeared twice during the task: once as the object of a positive action and once as the object of a negative action (i.e., a total of 16 trials). We randomized the trial order for each participant.

Results

Figure 8 presents the average evaluation of the objects in each condition. We submitted the average scores to a 3 (Questions Order) x 2 (Stimulus' Valence) x 2 (Valence of Action's Outcome) mixed ANOVA. A strong main effect of stimulus' valence, $F(1, 721) = 2517.84, p < .001, \eta_p^2 = .77, 90\% \text{ CI } [.75, .79]$, reflected more positive evaluation of positive stimuli ($M = 5.25, SD = 0.74$), than negative stimuli ($M = 2.74, SD = 0.77$). The effect of stimulus' valence was moderated by questions order condition, $F(2, 721) = 27.29, p < .001, \eta_p^2 = .07, 90\% \text{ CI } [.04, .10]$. The interaction reflected a weaker effect of stimulus' valence in the control condition, $F(1, 226) = 430.14, p < .001, \eta_p^2 = .65$, than in the other two conditions, when participants evaluated the action's outcome first, $F(1, 252) = 1344.08, p < .001, \eta_p^2 = .84$, and when participants evaluated the action's object first, $F(1, 243) = 972.84, p < .001, \eta_p^2 = .80$.

As in the previous experiments, we found a strong effect of the valence of action's outcome, $F(1, 721) = 328.89, p < .001, \eta_p^2 = .31, 90\% \text{ CI } [.26, .35]$, reflecting a more positive evaluation of the stimuli when they were the object of an action with a positive outcome ($M = 5.57, SD = 0.69$), than when they were the object of an action with a negative outcome ($M = 4.93, SD = 1.13$). More relevant to the mechanism question, the effect of action's outcome was moderated by questions order condition, $F(2, 721) = 48.76, p < .001, \eta_p^2 = .119, 90\% \text{ CI } [.08, .15]$. The interaction reflected the same results as in Experiment 6, supporting the

misattribution account. The effect of action's outcome was weaker when participants evaluated the action's outcome before evaluating the action's object, $F(1, 252) = 25.15, p < .001, \eta_p^2 = .09$, than when participants evaluated the action's object before the action's outcome, $F(1, 243) = 89.93, p < .001, \eta_p^2 = .27$, or when they only evaluated the action's object, $F(1, 226) = 141.23, p < .001, \eta_p^2 = .38$.

Figure 8. Experiment 7: Mean evaluation for positive stimuli and negative stimuli as a function of valence of the action's outcome (positive, negative) and question order condition (action first, object first, control). Error-bars are 95% confidence intervals (calculated based on Jarmasz and Hollands, 2009).

Discussion

Experiment 7's results replicated the results of Experiment 6, providing more support for the misattribution account, and more evidence against the association formation account. Nevertheless, it should be noted that although rating the action's outcome before rating the

action's object decreased the effect of the valence of the action's outcome on the evaluation of the action's object, the effect was still statistically significant. This could suggest that our manipulation had success in reducing misattribution but not in eliminating misattribution. Another possibility is that misattribution contributed to the effect but was not the only reason for the effect.

Experiments 8-11: Does the Effect Persist Over Time?

The experiments so far show that when people evaluate an object right after an exposure to an action on that object, the valence of action's outcome has an assimilative effect on the evaluation of the action's object. This is an important finding because people often encounter stimuli in the context of actions. One interesting aspect in the experiments so far is that participants evaluated each stimulus twice in the same session, once when presented as the object of a positive action and once as the object of a negative action. That setup emphasizes not only the strength of the effect but also its immediacy. The evaluation was strongly controlled by the very immediate context. To investigate whether immediate context is a condition for this effect, we examined if the effect lasts over time.

In Experiments 8-11, participants evaluated the stimuli only after they finished reading all the information about the affective stimuli. We adapted the procedure we used in Experiments 1 and 2 with two key differences: participants did not rate the objects while reading about the actions performed on them, and each object always appeared with the same action. We examined whether the action's outcome would influence the evaluation of the object at the end of the task. The four experiments differed in minor procedural variations, employed because the results were sometimes weak, impeding clear conclusions.

Method

Participants. In each experiment, we planned to collect data from 650 participants to achieve 95% power to detect an effect of $\eta_p^2 = .02$. 779, 699, 720, and 712 participants completed Experiments 8-11, respectively. From Experiment 8, we excluded six participants who completed the study more than once by reloading the web page. The final number of participants in Experiments 8-11 was 773 (59% women, $M_{age} = 43.05$, $SD_{age} = 19.08$), 699 (58% women, $M_{age} = 43.25$, $SD_{age} = 18.70$), 720 (65% women, $M_{age} = 36.61$, $SD_{age} = 14.39$), and 712 (47% women, $M_{age} = 33.52$, $SD_{age} = 13.33$).

Materials. Experiments 8 and 9 used the materials from Experiment 1. Experiments 10 and 11 used the materials from Experiment 2.

Design. The design was 2 (Stimulus' Valence: positive, negative; within participants) X 2 (Valence of the Action's Outcome: positive, negative; within participants).

Procedure. We presented the task as a game of chance in which participants want to obtain as many cute animals as possible and as few nasty animals as possible. They were told in advance that on each trial in the game they would meet a man who would either give them cute animals, give them nasty animals, take cute animals away from them, or take away nasty animals. We told participants in advance they would have no control on those outcomes. In Experiments 8 and 9, the participants saw four men during the game. In Experiment 8, the different actions were confounded with specific men. In Experiment 9 in each trial, the man-action pairing was random. In Experiments 10 and 11, one man performed all the actions.

Each trial started with a 400ms fixation (different images of forests). Afterwards, a man image with his name appeared on the left side of the screen next to an image of cute or nasty animals on the right side of the screen for 400ms. Next, text appeared between the man and the animals, indicating either *gives* or *takes away*. That was the display of the full action and it remained on the screen for 1600ms, before disappearing. During the task one cute

animal was always given to the participants, one nasty animal was always given to the participants, one cute animal was always taken away from the participants, and one nasty animal was always taken away from the participants. The program randomly selected two cute animals and two nasty animals for each participant from a pool of eight cute animals and eight nasty animals. The number of the trials was 24, 32, 24 and 48 trials in Experiments 8-11, respectively (the number of trials was the only difference between Experiments 10 and 11).

After the task, participants evaluated the four animals that appeared in the task. In Experiments 8, 10, and 11 the instructions stated: *Next, we will show you the animals that you saw in the game. For each animal, please rate how positive or negative this animal is.* In the evaluation task, in each trial (randomly order), we presented an animal image with the instructions “*Please rate how positive or negative this animal is.*” The rating scale was 1 (very negative), 2 (negative), 3 (positive), and 4 (very positive).

In Experiment 9, participants saw the instructions: *Next, we will show you the animals that you saw in the game. We will ask you how positive and friendly each of the animals is, in your opinion, and how much you like each animal.* Participants reported on a 7-point scale how much they liked each animal (1=dislike extremely, 7=like extremely), and how friendly (1= extremely unfriendly, 7= extremely friendly) and positive each animal is (1= extremely negative, 7= extremely positive). The questions were presented in a random order. We averaged the ratings for each animal ($\alpha > .75$).

Results and Discussion

Table 1 presents the average evaluation of the animals in each condition. In each experiment, we submitted the average scores to a 2 (Stimulus’ Valence) x 2 (Valence of Action’s Outcome) repeated measures ANOVA. All experiments found a strong main effect of stimulus’ valence, Experiment 8: $F(1, 772) = 6538.04, p < .001, \eta_p^2 = .89, 90\% \text{ CI } [.88,$

.90]; Experiment 9: $F(1, 698) = 8796.16, p < .001, \eta_p^2 = .92, 90\% \text{ CI } [.91, .93]$; Experiment 10: $F(1, 719) = 3639.57, p < .001, \eta_p^2 = .83, 90\% \text{ CI } [.81, .84]$; Experiment 11: $F(1, 711) = 3619.71, p < .001, \eta_p^2 = .83, 90\% \text{ CI } [.82, .84]$. That effect reflected more positive evaluation of positive stimuli ($M = 3.69, 6.26, 3.53, 3.57, SD = 0.44, 0.75, 0.50, 0.50$), than negative stimuli ($M = 1.41, 1.79, 1.59, 1.58, SD = 0.51, 0.81, 0.55, 0.56$).

Importantly, we found a reliable effect of the valence of action's outcome in all of the experiments, Experiment 8: $F(1, 772) = 44.96, p < .001, \eta_p^2 = .05, 90\% \text{ CI } [.03, .08]$; Experiment 9: $F(1, 698) = 6.12, p = .023, \eta_p^2 = .008, 90\% \text{ CI } [.00, .02]$; Experiment 10: $F(1, 719) = 4.87, p = .027, \eta_p^2 = .006, 90\% \text{ CI } [.00, .02]$; Experiment 11: $F(1, 711) = 12.44, p = .001, \eta_p^2 = .017, 90\% \text{ CI } [.004, .03]$. That effect reflected a more positive evaluation of the stimuli when they were repeatedly the object of an action with a positive outcome ($M = 2.62, 4.06, 2.58, 2.61, SD = 0.40, 0.59, 0.40, 0.40$), than when they were repeatedly the object of an action with a negative outcome ($M = 2.47, 3.99, 2.53, 2.53, SD = 0.42, 0.60, 0.43, 0.42$).

The interaction between stimulus' valence and action's valence was reliable in Experiments 8, $F(1, 772) = 8.03, p = .004, \eta_p^2 = .01, 90\% \text{ CI } [.001, .02]$, and in Experiment 10, $F(1, 719) = 15.11, p < .001, \eta_p^2 = .02, 90\% \text{ CI } [.006, .04]$. That interaction reflected a stronger effect of the outcome's valence on positive stimuli, Experiment 8: $F(1, 772) = 54.16, p < .001, \eta_p^2 = .06$; Experiment 10: $F(1, 719) = 21.64, p < .001, \eta_p^2 = .029$, than on negative stimuli, Experiment 8: $F(1, 772) = 10.52, p = .001, \eta_p^2 = .013$; Experiment 10: $F(1, 719) = 1.58, p = .209, \eta_p^2 = .002$. The interaction was not significant in Experiment 9, $F(1, 698) = 0.26, p = .607, \eta_p^2 < .001$, and in Experiment 11, $F(1, 711) = 1.11, p = .293, \eta_p^2 = .001$.

To test the overall effect across experiments, we meta-analyzed the four experiments (fixed effects). The overall effect was $d = 0.193, 95\% \text{ CI } [0.142, 0.243], Z = 7.409, p < .001$, reflecting a more positive evaluation of the stimuli when they were the object of an action

with a positive outcome, than when they were the object of an action with a negative outcome. The valence of the action's outcome still influenced evaluation a few minutes after the action's object repeatedly occurred as the object of the action, but the effect was smaller than the immediate effect.

Table 1

Experiment 8-11: Evaluation as a function of stimulus' valence and valence of action's outcome.

Experiment	Positive stimuli		Negative stimuli		Overall		Cohen's d 95% CI
	Positive Action	Negative Action	Positive Action	Negative Action	Positive Action	Negative Action	
8	3.78 (0.45)	3.59 (0.67)	1.45 (0.70)	1.36 (0.60)	2.62 (0.40)	2.47 (0.42)	0.366 [0.259, 0.473]
9	6.29 (0.85)	6.24 (0.95)	1.83 (1.02)	1.75 (0.95)	4.06 (0.59)	3.99 (0.60)	0.118 [0.024, 0.211]
10	3.60 (0.55)	3.46 (0.72)	1.56 (0.69)	1.61 (0.74)	2.58 (0.40)	2.53 (0.43)	0.120 [0.017, 0.224]
11	3.62 (0.56)	3.52 (0.68)	1.60 (0.72)	1.55 (0.72)	2.61 (0.40)	2.53 (0.42)	0.195 [0.089, 0.301]

Notes. Standard deviations are in parentheses; In the Overall column, Positive Action is the mean evaluation score of the stimuli when they were the object of an action with a positive outcome. Negative Action is the mean evaluation score of the stimuli when they were the object of an action with a negative outcome.

The finding that misattribution contributes to the effect (Experiments 6-7) is compatible with the theme of immediacy: misattribution is a highly contextual effect, influencing judgment only as long as the source of the misattributed reaction is present. For instance, studies that found misattribution effects of arousal on self-ascribed states—such as specific emotions (Schachter & Singer, 1962; Sinclair et al., 1994), sexual attraction (White, Fishbein, & Rutsein, 1981), and anger (Konechi, 1975; Younger, & Doob, 1978)—always showed biased judgment while arousal was still high, and usually did not examine whether

previous misattributed arousal could influence judgment after the arousal decreased.

Therefore, the weaker evidence obtained in Experiment 8-11 might serve as more evidence in support of misattribution as the main reason for the present finding. However, the results of Experiment 8-11 can also support the associative account as a decay of the associative memory might explain these results. Therefore, the results of Experiment 8-11 cannot serve as evidence to the process underlying the effect. Rather these results highlight that the effect of action's outcome is not limited to immediate evaluation.

Dropout across the Experiments

Most of our studies were conducted online at the Project Implicit research website (Nosek, 2005). Because the participants on Project Implicit research website are volunteers, dropout rate in Project Implicit tends to be high, typically 35%-40%. The dropout rates in our studies were 35%, 28%, 32%, 35%, 17%, 19%, 26%, 35%, 27%, and 30% in Experiments 1-11 respectively (excluding Experiment 3 that was conducted in the lab).

According to Zhou and Fishbach (2016), condition-dependent attrition threatens the internal validity of the experiment, which is predicated on successful random assignment. In the present research context, this threat is relevant only to Experiments 6 and 7, because all the other experiments used a within-participants design. In Experiment 6, the information about the assigned condition was recorded for 897 participants out of the 903 participants who started the task⁵. The dropout rates during the task were 35% when participants evaluated the action's outcome before they evaluated the action's object (the *action first* condition), 37% when participants evaluated the action's object before they evaluated the action's outcome (the *object first* condition), and 29% when participants evaluated only the

⁵ The task was programmed such that data was recorded every five trials. Participants with no recorded data quitted the task before they completed five trials.

action's object (the *control* condition). In Experiment 7, the information about the assigned condition was recorded for 877 participants out of the 882 participants who started the task. The dropout rates during the task were 13% in the *action first* condition, 18% in the *object first* condition and 18% in the *control* condition.

The lower dropout rates in the control condition compared to the other two conditions (at least in Experiment 6) makes sense considering that participants' task included answering one question instead of two after each trial. The fact that the two critical experimental conditions (the *object first* and *action first* conditions) did not differ in their content or in the level of their difficulty, but only in the order of the two questions, leave little reason to suspect that the results of these studies were affected by condition-dependent attrition.

General Discussion

In 11 experiments, we tested the effect of the valence of an action's outcome on the evaluation of the affective stimulus that was the object of the action. In Experiments 1-4, we found that the evaluation of affective stimuli was more positive when the stimulus was the object of an action with a positive outcome than when it was the object of an action with a negative outcome. The effect was robust and generalized across different types of actions, affective stimuli, and agents. In Experiment 5, we found that the effect generalizes to moral judgments and that it is incompatible with logical inference. In Experiments 6 and 7, we tested the mechanism underlying this effect. We tested a hypothesis derived from the assumption that association activation is behind the effect, and an opposite hypothesis derived from the assumption that misattribution underlies the effect. Both experiments found results compatible with the hypothesis derived from the misattribution account and incompatible with the hypothesis derived from the association activation account. Finally, in

Experiments 8-11, we found that the effect persists over time, although it is much stronger when the evaluation is measured immediately after the exposure to the action's outcome.

The present finding is robust and has several theoretical and practical implications. The finding belongs to the general category of linking effects: linking an object to valence changes its evaluation. The two most studied effects of that category are linking with an affective stimulus (Carlston & Skowronski, 2005; De Houwer, Thomas, & Baeyens, 2001; Ranganath & Nosek, 2008;) and linking with affective action (Brehm, 1956; Cacioppo, Priester, & Berntson, 1993; Wells & Petty, 1980). The contribution of the present research is both at the functional level and at the mental level of explanation (e.g., De Houwer, 2011). On the functional level, the present investigation identified a new pattern of environmental determinants of evaluation. The present effect is the result of linking an already-affective object with the valence of an outcome of an action performed on that object. Importantly, the valence of the action's outcome is determined by the evaluation of the object and then changes that evaluation. Whereas the previously identified linking effects reflect an evaluative process that does not require an initial evaluation of the target object, here the valence of the target object has a crucial role in determining whether the linking with the action would push the evaluation of the object to the positive pole or the negative pole.

At the mental level of explanation, any cognitive model for the present effect would need to assume that evaluation is (at least sometimes) an iterative process in which evaluation is updated multiple times (e.g., Cunningham et al., 2007). The evaluation operated in an iterative cycle. At the first iteration, the evaluation of the action's object was used in order to evaluate the action's outcome. At the second iteration, the evaluation of the action's outcome was used in order to update the evaluation of the action's object. This iterative process has a recursive element: the eventual evaluation used the output of a previous evaluation (for computing the evaluation of the action's outcome). That is an intriguing element that could be

further investigated, to understand why people are biased by the evaluation of the action's outcome despite already having evaluated the object.

Causes for the Effect of Action's Outcome

Initial evidence toward a mental mechanism for the present finding comes from the investigation of two potential accounts in Experiments 6 and 7: direct association formation and misattribution. According to the direct association formation account, whenever a person stores in memory the information that a target stimulus is linked to another stimulus, attributes of the other stimulus might become active when thinking of the target stimulus (Moran, Bar-Anan, & Nosek, 2016). In turn, those attributes influence the evaluation of the target object. This account can apply to any linking effects, even immediate effects such as the one we presented here. However, in the present research, we did not find evidence that this mechanism contributed to our finding. We tried to strengthen the effect of direct association formation by increasing participants' attention to the valence associated with the target before they evaluated the targets. Yet, that emphasis on the associated valence decreased rather than increased the effect. Still, more research is needed before concluding that direct association formation has no role in the present effect. In the present research, we emphasized *the valence* of the associated outcome. In future research, we will test whether the results are the same when emphasizing *the link* between the outcome and the target object.

The evidence we found in present research is compatible with a misattribution account. According to that account, when people evaluate an affective stimulus that was just presented as an object of an action, they erroneously identify their affective reaction to the action's outcome as a part of their reaction to the target stimulus. Importantly, there is evidence that misattribution is more likely to occur when the actual source of the evaluation is low in salience while another appropriate object is highly salient (e.g., Cantor, Zillmann, &

Bryant, 1975; Schwarz & Clore, 1983; Schachter & Singer, 1962; White & Kight, 1984). The present research used this logic to test whether misattribution contributes to the present finding. We increased the salience of the actual source by asking participants to evaluate the action's outcome before they evaluated the actions' object. Supporting the misattribution account, in Experiments 6 and 7, we found that the assimilative effect of action outcome's valence on the evaluation of action's object decreased when participants evaluated the action's outcome before evaluating the action's object. Still, even in that condition, the effect was statistically significant in both experiments. This could suggest that our manipulation had success in *reducing* misattribution but was not strong enough to *eliminate* misattribution. Another possibility is that misattribution is only one factor that contributes to the effect of action's outcome on evaluation.

There is ample evidence that people sometimes misattribute the effect of one source to another source, and that misattribution affects judgment and evaluation (e.g., Anderson, Siegel, White, Barrett, 2012; Gorn, Pham, & Sin, 2001; Payne et al., 2005; Ottati & Isbell, 1996; Schwarz & Clore, 1983). When people are asked to report their affective reaction to a target object, they might ask themselves "How do I feel about it?" (Schwarz & Clore, 1996). This introspection sometimes erroneously attributes to the judgment's target affective reactions activated by other factors such as mood (e.g., Schwarz & Clore, 1983), the positive affect resulting from processing fluency (e.g., Reber, Winkielman, & Schwarz, 1998), and the affective reaction elicited by an unrelated stimulus presented in spatiotemporal proximity (e.g., Jones, Fazio, & Olson, 2009; Payne, Cheng, Govorun, & Stewart, 2005). In that respect, the present finding might be more evidence for the importance of attribution in evaluation: activated feelings and concepts must be binded to the object for evaluation to occur. Therefore, attribution is a probable building block in many judgment processes.

Future research could test other factors or processes that might contribute to the present finding. One such process is a conceptual categorization (Davey, 1994). According to this account, the valence of the action's outcome highlights certain evaluative properties in the target object. Therefore, after reading about an action with a positive [negative] outcome, people might be more likely to focus on positive [negative] aspects of any object than to focus on the object's negative [positive] aspects. Further research could test that account directly. For now, note that the conceptual categorization account is incompatible with the finding that rating the outcome valence before rating the object's valence reduces the effect (Experiments 6-7). If anything, this account predicts the opposite pattern – a stronger effect when rating the outcome valence before rating the object's valence.

Another possible factor that further research on the present finding might pursue is intentional inference. People might intentionally use the valence of an action's outcome as a source of information for the judgment of the action's object. For now, we could not find reasonable rules for inference that would explain our results. First, we did not find any inference logic that would explain the basic findings documented in Experiment 1-3, when the acts read by the participants were enacted by animate agents (people and aliens). Further, to rule out that inference about the reasons of the behavior of animate agents could explain the results, in Experiment 4 the agents were genes. Second, before Experiment 5, when we asked participants to infer the relative wrongness of an immoral behavior that a judge permitted versus an immoral behavior that a judge prohibited, most participants inferred that the prohibited behavior is more wrong than the permitted behavior, and hardly anyone inferred the opposite difference in wrongness. Yet, in Experiment 5, when we asked (other) participants to actually judge immoral behaviors after reading that a judge permitted or prohibited them, the results reflected relative difference in wrongness judgment that was hardly inferred by anyone in the logic inference pre-test. Intentional reasoning also does not

fit the finding of Experiments 6-7. If people intentionally use the valence of an action's outcome as a source of information for the judgment of the action's object, then rating the outcome valence before rating the object's valence should increase the effect, not decrease it (as found in Experiments 6-7).

A more likely factor that might contribute to the present effect is vividness. Previous research found that more vivid stimuli have more impact on judgment (e.g., Blondé & Girandola, 2016; Nisbett & Ross, 1980). In the present context, it is possible that positive actions on positive objects (e.g., *giving puppy*) and negative actions on negative objects (e.g., *giving cockroach*) make the objects more vivid, because it is easy to imagine the objects after the outcome of the actions (e.g., the objects are in the possession of the receiver). By contrast, negative actions on positive objects (e.g., *taking away puppy*) and positive actions on negative objects (e.g., *taking away cockroach*) might make the objects less vivid, if it is harder to imagine the objects after the outcome of the actions (e.g., the objects *are not* in the possession of the receiver). One future research direction would attempt to manipulate or measure object vividness, to examine whether the vividness of the object after the action is a mediating factor of the present finding.

An unpredicted pattern that emerged in some of the experiments was that action outcome had a stronger effect on the evaluation of the action's object when the object was positive rather than negative. This moderation was usually small, but the relatively consistent pattern across studies suggests some reliability. We speculate that this pattern might be the result of negativity bias in social judgment. Past research found that for social judgments involving liking, negative information receives greater emphasis (Rydell & McConnell, 2006; Skowronski & Carlston, 1987). The present results suggest a possible extension of this finding: the evaluation of inherently negative objects is more immune to contextual effects than the evaluation of positive objects. This immunity might fit the misattribution account:

because negative objects are more salient, they attract more attention and reduce the likelihood of misattribution. Future research could test that hypothesis further with other contextual effects.

Implications

The present research has important practical and theoretical implications on various judgment areas. Evaluations play an important role in a large variety of psychological phenomena such as phobias and addictions (e.g., Franken, 2003), consumer behavior (e.g., Gibson, 2008), political psychology (e.g., Krosnick, 1988), and discrimination (e.g., McConnell & Leibold, 2001). Therefore, identifying the sources that influence evaluation is highly important and relevant for many areas of psychology. Importantly, the basic pattern of the present effect—an action on an affective stimulus or event—is ubiquitous and has many instances that are relevant for specific important and interesting cases. In the present investigation, we demonstrated that notion by uncovering a novel phenomenon of irrational moral judgment (Experiment 5).

As another example of the possible application of the present finding, the present research offers interesting predictions about economic decisions. The effect of action's outcome on the judgment of the action's object seems to contradict the principle of diminishing returns or subjective utility function (Kahneman & Tversky, 1979). Consider a person who has two bottles of wine. In which case would that person evaluate a bottle of wine as more valuable? After someone gives her another bottle of wine (an action with a positive outcome), or if someone, takes one bottle of wine away from her (an action with a negative outcome)? The subjective utility function (Kahneman & Tversky, 1979) dictates that the more a person has of something, the less satisfaction the person gains from each additional unit consumed (see also Schurr & Ritov, 2013). Therefore, according to a subjective utility function, the person should evaluate the bottle of wine as more valuable or

positive if someone takes one bottle of wine away from her then if someone gives her one bottle of wine. However, the opposite is predicted by our basic finding. The bottle of wine should be evaluated more positively after someone gave the person a bottle of wine (an action with a positive outcome) than after someone took away a bottle of wine from her (an action with a negative outcome).

The present research also has important implications for a number of topics in the attitudes research. First, our finding is a step forward in understanding the effect of actions on evaluation. Previous research on the evaluative effect of actions (Brehm, 1956; Cacioppo, Priester, & Berntson, 1993; Centerbar & Clore, 2006; Jones, Vilensky, Vasey, & Fazio, 2013; Kawakami, Steele, Cifa, Phillips, & Dovidio, 2008; Wiers, Eberl, Rinck, Becker, & Lindenmeyer, 2011) focused mostly on how one's own action on an object affects one's evaluation of the object. For example, it was found that movements representing the positive motivational orientation of approaching (like arm flexion or pulling a joystick) during presentation of stimuli lead to a positive evaluation of these stimuli, whereas movements representing the negative motivational orientation of avoidance (like arm extension or pushing a joystick) lead to a negative evaluation (Cacioppo et al., 1993; Kawakami et al., 2008; Priester, Cacioppo, & Petty, 1996).

In contrast to the perspective that the particular action holds the valence (i.e., approach = positive, avoid = negative), Centerbar and Clore (2006) proposed that the evaluative meaning and consequences of approach-avoidance action do not depend on the action alone but on the motivational appropriateness of the action. Supporting this claim, research found that engaging in motivationally compatible motor action (approaching positive object, avoiding negative object) results in more positive evaluations of the actions' objects than engaging in motivationally incompatible motor action (approaching negative objects, avoiding positive objects; Centerbar & Clore, 2006; Eder & Rothermund, 2008). The

present research found that actions other than approaching or avoiding have evaluative consequences. We found that these evaluative consequences do not depend on the action alone (e.g., *increasing* is not always positive and *decreasing* is not always negative), but on the outcome of the action on a specific object (e.g., *decreasing laziness* is positive, but *decreasing honesty* is negative, see Eder, Rothermund & De houwer, 2013, for a similar evidence with the actions *turn-on* and *turn-off*). The present finding suggests a novel, non-motivational, factor that might have contributed to the previous findings. Perhaps approached positive objects and avoided negative objects were evaluated more positively because the actions had more favorable outcomes than avoiding positive objects and approaching negative objects. At the same time, it is noteworthy that motivational states *can* moderate the present finding by temporarily changing the evaluation of objects. For instance, if aggressiveness is perceived as a positive trait in the context of the business world, a gene that increases that trait performs an action that has a positive outcome (when considering the business world), and might therefore make the evaluation of aggressiveness more positive rather than more negative (as found in Experiment 4).

Finally, our research is highly compatible with a contextual approach to evaluation (e.g., Schwarz, 2007). Evaluation theories differ in the extent to which they argue that attitudes toward objects are judgments constructed on the spot versus stable representations stored in memory (Bohner, & Dickel, 2011). According to the "file-drawer" approach, attitudes are represented as object–evaluation associations, retrieved from long-term memory at the time of evaluation (Fazio 2007; Petty, Briñol & DeMarree, 2007). According to the "constructionist" approach, attitudes are generally constructed on the spot from the context and information available (Ferguson & Bargh, 2007; Schwarz, 2007; Schwartz & Bohner, 2001; Smith & Conrey, 2007). The present results demonstrate that evaluation is the product of memory and immediate context. On one hand, the effect of stimuli valence was strong

across all studies, suggesting that the evaluations of the affective stimuli were highly sensitive to their inherent valence, stored in the long-term memory. On the other hand, the immediate context had a sizable effect on evaluation. Unique among contextual effects, the valence of the immediate context in the present research depended on inferring the action valence, and this inference was based on retrieving the object valence from memory. In that respect, the present results highlight the mutual contribution of memory and immediate context to evaluation, and show that the immediate context can come in the form of inference from novel information on object with pre-existing evaluation (i.e., inference from an action on the object itself).

Context of the Research

Evaluating whether objects are positive or negative is one of the most important and frequent judgment decisions people make in everyday life. Evaluation research pursues knowledge about the factors that influence evaluation, and about the abstract rules describing the conditions that lead to evaluative change. In this research, we identified a new factor that changes evaluation. We found that the evaluation of objects is sensitive to the outcome of the action performed on the object. This factor is present in many events in everyday life, but was never identified and investigated before. This factor highlights the iterative nature of evaluation, thus contributing to the understanding of the processes underlying evaluation. Because our finding is rather basic and general, it can apply to many instances, with important practical and theoretical implications on various judgment areas. For instance, the effect can defy people's logic, contributing to the understanding of how affect biases judgment. In the present article, we provided a thorough documentation of the effect with multiple conceptual replications, added a demonstration of its application to moral judgment, conducted initial investigation of the mechanism behind the effect, and studied one important boundary condition (the importance of immediate judgment). We also suggested many future

directions for further investigation, and for further applications of this finding to other contexts of research.

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Appendix

Linear mixed models analyses

The results of linear mixed models analyses for all the experiments are described in Tables A1 and A2. Because we did not have any theoretical assumptions regarding what random effects should be included in our models, and because the maximal model (Barr, Levy, Scheepers, & Tily, 2013) for all the experiments failed to converge, we chose to test two types of model analysis in all the experiments. The first model includes only the intercepts of participants and stimuli as random factors. The second model includes, in addition to the intercepts, the slopes for action and stimulus's valence for participants and the slope for action for stimuli, as random factors.⁶

The models were computed using the R packages 'lme4' and 'lmerTest' (Bates, Mächler, Bolker, & Walker, 2014; Kuznetsova, Brockhoff, & Christensen, 2015). In both models, participants and stimuli were included as random factors. In the intercepts + simple slopes models, the slopes for action and stimulus's valence for participants and the slope for action for stimuli were also included as random factors. To estimate the main effects in Experiments 1-5 and 8-11, we centered the variables Valence of the Action's Outcome and Stimulus' Valence and included the centered variables and their interaction as fixed factors in the model. To estimate the main effects in Experiments 6-7, we included only the main effects as fixed factors in the model. To estimate the two-way interactions in Experiments 6-7, we included the main effects and all the two-way interactions as fixed factors in the model.

As can be seen in Tables A1 and A2, the results of the analyses with the first model replicated all the findings in all of the experiments. We found a reliable main effect of the valence of action's outcome in Experiments 1-5 (Table A1). A reliable interaction between

⁶ See <https://osf.io/tp8ye/> for a detailed R script of these analyses

the valence of action's outcome and questions order in Experiments 6-7, representing a pattern compatible with the hypothesis we derived from the *misattribution* account (Table A2). And, a reliable effect of the valence of action's outcome in Experiments 8-11, indicating that the effect of the valence of action's outcome survives a delay (Table A1). The results of the analysis with the second model were identical with one exception: the effect of the valence of action's outcome in Experiment 11 was not reliable with this model ($p = .051$), probably because of a low power (e.g., Westfall, Kenny, & Judd, 2014).

Table A1

Experiments 1-11: linear mixed model analysis, results of fixed effects of valence of action outcome, stimulus's valence and interaction between valence of action outcome and stimulus' valence

Experiment	Model type	Fixed Effects		
		Valence of the Action's Outcome	Stimulus' Valence	Interaction
1	Only intercepts	$b = 0.33, SE = 0.01, t(9,490) = 19.35, p < .001$	$b = 1.63, SE = 0.06, t(14) = 25.94, p < .001$	$b = 0.05, SE = 0.03, t(9,490) = 1.45, p = .145$
	Intercepts + simple slopes	$b = 0.33, SE = 0.03, t(145.89) = 8.59, p < .001$	$b = 1.63, SE = 0.07, t(34.15) = 20.66, p < .001$	$b = 0.05, SE = 0.03, t(14) = 1.30, p = .213$
2	Only intercepts	$b = 0.49, SE = 0.02, t(6,882) = 22.85, p < .001$	$b = 1.38, SE = 0.06, t(14) = 22.55, p < .001$	$b = 0.07, SE = 0.04, t(6,882) = 1.76, p = .078.$
	Intercepts + simple slopes	$b = 0.48, SE = 0.05, t(212.46) = 9.44, p < .001$	$b = 1.38, SE = 0.08, t(43.87) = 16.75, p < .001$	$b = 0.07, SE = 0.03, t(41.60) = 2.04, p = .047.$
3	Only intercepts	$b = 0.39, SE = 0.06, t(1,843) = 6.04, p < .001$	$b = 5.27, SE = 0.25, t(14) = 20.61, p < .001$	$b = 0.13, SE = 0.12, t(1,843) = 1.04, p = .297.$
	Intercepts + simple slopes	$b = 0.39, SE = 0.10, t(59) = 3.74, p < .001$	$b = 5.27, SE = 0.29, t(22.9) = 18.10, p < .001$	$b = 0.13, SE = 0.11, t(1,444.20) = 1.17, p = .242.$
4 – evaluation of traits	Only intercepts	$b = 0.29, SE = 0.01, t(8,432) = 18.48, p < .001$	$b = 1.38, SE = 0.05, t(26) = 23.17, p < .001$	$b = 0.18, SE = 0.03, t(8,432) = 5.82, p < .001.$
	Intercepts + simple slopes	$b = 0.29, SE = 0.03, t(182.75) = 8.24, p < .001$	$b = 1.38, SE = 0.07, t(46.08) = 18.72, p < .001$	$b = 0.18, SE = 0.04, t(25.25) = 4.59, p < .001.$
4 – evaluation of people	Only intercepts	$b = 0.38, SE = 0.01, t(8,435) = 23.62, p < .001$	$b = 1.24, SE = 0.05, t(26) = 21.17, p < .001$	$b = 0.13, SE = 0.03, t(8,435) = 4.23, p < .001.$
	Intercepts + simple slopes	$b = 0.38, SE = 0.03, t(211.96) = 9.66, p < .001$	$b = 1.24, SE = 0.07, t(49.17) = 16.73, p < .001$	$b = 0.13, SE = 0.04, t(25.53) = 3.23, p = .003.$
5	Only intercepts	$b = 0.12, SE = 0.02, t(5,942) = 5.92, p < .001$	-	-
	Intercepts + simple slopes	$b = 0.13, SE = 0.04, t(14.15) = 3.05, p = .008$	-	-
6	Only intercepts	$b = 0.22, SE = 0.01, t(18,210) = 19.83, p < .001$	$b = 1.96, SE = 0.06, t(14) = 30.96, p < .001$	$b = 0.04, SE = 0.02, t(18,210) = 1.97, p = .048$
	Intercepts + simple slopes	$b = 0.22, SE = 0.02, t(368.2) = 9.14, p < .001$	$b = 2.03, SE = 0.06, t(26.5) = 31.45, p < .001$	$b = 0.04, SE = 0.01, t(41.90) = 2.28, p = .027$
7	Only intercepts	$b = 0.66, SE = 0.02, t(11,550) = 27.53, p < .001$	$b = 2.51, SE = 0.13, t(14) = 18.10, p < .001$	$b = -0.05, SE = 0.04, t(11,550) = -1.14, p = .254$

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	Intercepts + simple slopes	$b = 0.66, SE = 0.06, t(26.40) = 9.54, p < .001$	$b = 2.48, SE = 0.13, t(17.80) = 17.92, p < .001$	$b = -0.05, SE = 0.12, t(13.80) = -0.44, p = .662$
8	Only intercepts	$b = 0.14, SE = 0.02, t(3,080) = 6.57, p < .001$	$b = 2.27, SE = 0.05, t(13.9) = 39.67, p < .001$	$b = 0.09, SE = 0.04, t(3,080) = 2.07, p = .038$
	Intercepts + simple slopes	$b = 0.14, SE = 0.02, t(147.28) = 6.70, p < .001$	$b = 2.27, SE = 0.06, t(17.29) = 37.56, p < .001$	$b = 0.09, SE = 0.03, t(78.04) = 2.56, p = .012$
9	Only intercepts	$b = 0.08, SE = 0.03, t(2,780.9) = 2.42, p = .015$	$b = 4.47, SE = 0.13, t(14) = 33.76, p < .001$	$b = -0.02, SE = 0.06, t(2,780.9) = -0.42, p = .673$
	Intercepts + simple slopes	$b = 0.08, SE = 0.03, t(8.75) = 2.43, p = .038$	$b = 4.47, SE = 0.13, t(16.10) = 32.17, p < .001$	$b = -0.03, SE = 0.06, t(8.53) = -0.44, p = .668$
10	Only intercepts	$b = 0.05, SE = 0.02, t(2,859) = 2.10, p = .035$	$b = 1.94, SE = 0.06, t(14) = 32.06, p < .001$	$b = 0.17, SE = 0.05, t(2,859) = 3.56, p < .001$
	Intercepts + simple slopes	$b = 0.05, SE = 0.02, t(11.12) = 2.27, p = .043$	$b = 1.94, SE = 0.06, t(17.34) = 28.31, p < .001$	$b = 0.17, SE = 0.04, t(10.28) = 3.96, p = .002$
11	Only intercepts	$b = 0.07, SE = 0.02, t(2,833) = 3.07, p = .002$	$b = 1.98, SE = 0.06, t(14) = 31.34, p < .001$	$b = 0.04, SE = 0.04, t(2,833) = 0.85, p = .392$
	Intercepts + simple slopes	$b = 0.07, SE = 0.03, t(12.12) = 2.16, p = .051$	$b = 1.98, SE = 0.07, t(17.67) = 27.62, p < .001$	$b = 0.04, SE = 0.06, t(11.39) = 0.65, p = .523$

Table A2

Experiments 6-7: linear mixed model analysis, results of fixed effects of the interaction between valence of action outcome and questions order.

Experiment	Model type	Fixed Effects	
		<i>Object first vs. Action first comparison</i>	<i>Control vs. Action first comparison</i>
6	Only intercepts	$b = 0.18, SE = 0.02, t(18,210) = 6.78, p < .001$	$b = 0.22, SE = 0.02, t(18,210) = 8.28, p < .001$
	Intercepts + simple slopes	$b = 0.18, SE = 0.05, t(585) = 3.23, p = .001$	$b = 0.22, SE = 0.05, t(585) = 3.94, p < .001$
7	Only intercepts	$b = 0.43, SE = 0.05, t(11,550) = 7.66, p < .001$	$b = 0.90, SE = 0.05, t(11,550) = 15.63, p < .001$
	Intercepts + simple slopes	$b = 0.43, SE = 0.09, t(720.7) = 4.85, p < .001$	$b = 0.90, SE = 0.09, t(721.2) = 9.86, p < .001$