Research Article

Postdecisional Counterfactual Thinking by Actors and Readers

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ABSTRACT—*How do individuals think counterfactually about the outcomes of their decisions? Most previous studies have investigated how readers think about fictional stories, rather than how actors think about events they have actually experienced. We assumed that differences in individuals' roles (actor vs. reader) can make different information available, which in turn can affect counterfactual thinking. Hence, we predicted an effect of role on postdecisional counterfactual thinking. Reporting the results of eight studies, we show that readers undo the negative outcome of a story by undoing the protagonist's choice to tackle a given problem, rather than the protagonist's unsuccessful attempt to solve it. But actors who make the same choice and experience the same negative outcome as the protagonist undo this outcome by altering features of the problem. We also show that this effect does not depend on motivational factors. These results contradict current accounts of counterfactual thinking and demonstrate the necessity of investigating the counterfactual thoughts of individuals in varied roles.*

> You are probably still too young to know how simple life is. It only becomes hopelessly confused when one is thinking of oneself; but as soon as one stops thinking of oneself and asks oneself how to help someone else, it's quite simple! (Musil, 1930/1997, p. 1050)

Consider the following story:

> Anna, an undergraduate at your university, was asked to participate in a game. A research assistant told her, "In order to win two chocolates, you have to mentally multiply either two one-digit numbers or two two-digit numbers, in 30 seconds. If you fail, you do

not receive the chocolates. The two multiplication problems are contained in two sealed envelopes. Let us call them envelope A and envelope B. Of course, we do not know which envelope contains the one-digit multiplication problem and which one contains the two-digit multiplication problem." Anna accepted the offer to participate. She chose envelope A, and the research assistant opened it. Unfortunately, it contained the two-digit multiplication problem. She failed. Things would have been better for Anna, if . . . .

If you share most individuals' intuition, you are likely to complete the sentence as follows: ". . . she had chosen the other envelope." Since Kahneman and Tversky's (1982b) seminal work, research on counterfactual thinking (i.e., the construction of mental alternatives to reality) has established that some mental alternatives to the negative outcome of a scenario are more available than others (e.g., Byrne, 2005; Mandel, Hilton, & Catellani, 2005; Roese, 2005). In particular, Girotto, Legrenzi, and Rizzo (1991) showed that events under the control of the protagonist, such as his or her decisions, are more mutable (e.g., "if Anna had chosen the other envelope") than events the protagonist cannot control (e.g., "if the research assistant had provided Anna with a calculator").

Now suppose that a person makes the same choice and experiences the same negative outcome as the protagonist of a story. What sort of alternatives to the outcome will this person construct? Researchers have implicitly assumed that actors construct the same counterfactuals as do readers. But because past studies have relied heavily on measures of how readers undo the outcome of a fictional story, there is little information about how actors undo an outcome that they have actually experienced. There is evidence that the role individuals play may affect their choices (e.g., Camerer, Loewenstein, & Weber, 1989), their inferences (e.g., Light, Girotto, & Legrenzi, 1990), and the corresponding neural activations (e.g., Ruby & Decety, 2004). We hypothesized that an individual's role—in particular, whether the individual is a reader or an actor—can affect counterfactual thinking as well.

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One reason to make such a hypothesis comes from the insight that under many conditions, actors and observers will have different motivational goals. For example, Elster (1999) argued that in the case of traumatic events, actors will mentally modify external events rather than their own actions because actors, unlike observers, are motivated to avoid self-blame for their deeds. One study concerning actors' counterfactuals when experiencing regret is consistent with this interpretation. Gilbert, Morewedge, Risen, and Wilson (2004) asked individuals who actually missed their train by 1 min to reason counterfactually. These actors constructed external counterfactuals (e.g., "I would not have missed the train if all the gates had been opened instead of just one," rather than "I would not have missed the train if I'd woken up earlier") more often than passengers who merely had to imagine having missed their train.

There is, however, another reason to posit differences between actors' and readers' counterfactual thoughts: the differential availability or salience of information to actors and readers. In Anna's story, readers undo the protagonist's choice because the story can easily evoke the alternative in which Anna chooses the other envelope. But consider an individual who has had the same experience as Anna. Unlike readers, who simply know that Anna chose and failed a problem, this actor can easily retrieve from memory many elements of the problem-solving phase of the event (e.g., the difficulty of the mental calculation, the shortness of the time limit). Besides being more numerous than the single element forming the choice phase, these elements concern salient parts of the actor's experience, and modifying each of them implies the construction of an alternative in which the actor solves the chosen problem (e.g., "I would have solved the problem, if I had had a calculator"). In sum, an actor's role can make available, as counterfactual alternatives, elements in addition to the actor's choice. We hypothesized that in their counterfactual thinking, actors would alter these actor-salient elements more often than readers.

This prediction is at odds with those deriving from the current accounts of counterfactual thought. If readers do not alter personal or social norms (McCloy & Byrne, 2000) because counterfactual thinking tends to respect normalcy (Kahneman & Miller, 1986), the actors should do the same: undoing their choice, rather than altering the norms governing the problem (e.g., whether a calculator can be used). If readers undo controllable events because they represent the story from the protagonist's perspective (Legrenzi, Girotto, & Johnson-Laird, 1993), the actors should do the same: undoing their controllable choice, rather than the uncontrollable features of the problem. Finally, if actors want to avoid self-blame (Elster, 1999; Gilbert et al., 2004), they should undo their unblameworthy choice, rather than their more blameworthy failure to solve the problem.

We tested the role-effect hypothesis in eight studies in which we compared the mental simulations of actors and readers. The goal of the first six studies was to establish whether actors and readers differ in their counterfactual thought, and whether this effect is modulated by the salience of the alternative option and by the nature (blind vs. informed) and context (lottery vs. problem solving) of the choice. The final studies were intended to establish whether the effect depends on actors' motivation to avoid self-blame.

In all eight studies, the subjects were undergraduates from the Universities of Trieste and Venice (Italy) who took part voluntarily. Subjects either (a) read about a protagonist who participated in a game or a lottery or (b) themselves engaged in a game or a lottery. The outcome was always negative. (The game required solving a difficult multiplication or anagram problem, and no actor solved the problem.) In all studies except the final one, actors were asked to write about how things could have been better for them, and readers were asked to write about how things could have been better for the protagonist of the story. Answers that undid the actor's or protagonist's choice (e.g., "if I [Anna] had chosen the other envelope") were coded as choice modifications, and answers that altered features of the problem (e.g., "if I [Anna] had had more time," "if I [Anna] had had a calculator") were coded as problem modifications. The remaining answers (e.g., "if I [Anna] had won the chocolates") were coded as "other" modifications (see Table 1 for examples of the three categories of modifications).

Two independent judges coded the answers. Their agreement rate was always above 95%. Disagreements were solved via discussion. Following past studies, we analyzed only the first modification provided by each subject. We did not consider answers falling into the "other" category, unless they were the only modifications produced by a given subject.

STUDY 1

Method

In Study 1, subjects were randomly assigned either to an actor ($n = 48$) or to a reader ($n = 45$) condition. Subjects in the actor condition were invited to participate in a game in which they

TABLE 1

Examples of Counterfactual Modifications in Each Category

Choice counterfactuals
    If I had [she had] chosen the other envelope
    If I had [she had] gotten envelope B
Problem counterfactuals
    If I had [she had] had more time
    If I could [she could] have written it down
    If the use of a calculator had been allowed
    If I had [she had] concentrated enough
    If I had [she had] better mental arithmetic skills
    If the digits had been different (e.g., 10×20)
Other counterfactuals
    If I had [she had] been more lucky
    If I had [she had] won the chocolates
    If I had [she had] not met the experimenter

could win two chocolates by solving a problem. They were then asked to choose one of two sealed envelopes: One was said to contain a difficult problem, and one supposedly contained an easy problem. In fact, both envelopes contained the difficult problem. After attempting to solve the problem, actors were informed that they had failed and were asked to write at least one way in which things would have been better for them. In the reader condition, subjects read a story with a protagonist who faced the same choice and ended up with the same negative outcome as the subjects did in the actor condition (see Anna's story in the introduction). Readers were required to write at least one way in which things would have been better for the protagonist.

Half of the subjects in each condition had to mentally multiply two numbers (actor condition) or read a story about a multiplication problem (reader condition). The easy version of the problem required multiplying two one-digit numbers in 30 s, and the difficult version required multiplying two two-digit numbers in 30 s. The chosen envelope always contained the difficult version (68×76). The other half of the subjects had to anagram a word (actor condition) or read a story about an individual who had to anagram a word (reader condition). The easy version of this problem required anagramming a word of four letters in 30 s, and the difficult version required anagramming a word of seven letters in 30 s. The chosen envelope always contained the difficult version ("anagram the word *risotto*").

Results

There was no effect of problem content (multiplication vs. anagram). Therefore, this variable was not considered in subsequent analysis. As predicted, actors modified problem features more often than readers (see Table 2), $\chi^2(2, N = 93) = 16.55, p < .0001$.

STUDY 2

In Study 2, we aimed to test whether actors produce more problem modifications than readers even when it is clear that the alternative choice would have produced a positive outcome. To this end, actors who failed the difficult problem were presented with the easy problem they had missed.

Subjects were randomly assigned to one of two conditions. In one condition ($n = 31$), the procedure and the problem (mental multiplication) were the same as those used in the reader condition of Study 1. The other condition ($n = 25$) was the same as the actor condition (mental multiplication) of Study 1, except that each envelope contained both problems, although the actor did not know this. The experimenter always drew out the difficult problem from the envelope chosen by the actor. After the actor failed the problem, and before the experimenter asked the counterfactual question, the experimenter opened the envelope that had not been selected, drew out the easy problem (3×7),

TABLE 2

Percentage of Counterfactual Modifications in Each Category, Studies 1 Through 8

Group	Modification		
	Choice	Problem	Other
	Study 1		
Actor	31	69	—
Reader	76	24	—
	Study 2		
Actor	32	68	—
Reader	65	19	16
	Study 3		
Actor	32	68	—
Reader	90	5	5
	Study 4		
Actor	15	85	—
Reader	77	14	9
	Study 5		
Actual actor	7	93	—
Simulated actor	41	55	4
	Study 6		
Actor			
Problem solving	4	85	11
Lottery	74	—	26
Reader			
Problem solving	76	12	12
Lottery	83	—	17
	Study 7		
Actor	—	100	—
Reader	52	30	18
	Study 8		
Actor	44	56	—
Reader	81	19	—

and showed it to the actor. Thus, actors were made aware that the alternative choice would have produced a positive outcome. Yet they modified problem features more often than readers (see Table 2), $\chi^2(2, N = 56) = 11.57, p = .003$.

STUDY 3

In Studies 1 and 2, subjects undid an action by imagining an alternative course of action (e.g., "if I [Anna] had chosen the other envelope"). Readers, however, often prefer counterfactual inactions ("if Anna had not participated in the game") to counterfactual actions (Kahneman & Tversky, 1982a), possibly because counterfactual inactions restore normalcy (Kahneman & Miller, 1986). Consider a situation in which actors receive one chocolate at the beginning of the session. They have the option to

participate in a game (in which they can win three chocolates by solving a multiplication problem), but only if they stake the prize they have just received. If they fail, they lose it. In the case of a negative outcome in this scenario, would actors produce inaction counterfactuals ("if I did not stake my chocolate"), as readers do ("if Anna did not stake her chocolate"), so that the role effect would disappear? Study 3 dealt with this question.

Subjects were randomly assigned to one of two conditions. The actor condition ($n = 31$) was the same as in Study 1, except that subjects could participate in the game (in which they could win three chocolates by solving a multiplication problem) only if they staked their own chocolate. Six subjects refused to do so and were excluded from all analyses, leaving 25 subjects in the actor condition. The reader condition ($n = 22$) was the same as in Study 1, except that Anna decided to stake the chocolate she received in order to participate in a game in which she could win three chocolates.

Most readers modified the protagonist's choices (see Table 2), that is, her decision to participate (81%) or her choice of a given envelope (9%). By contrast, actors modified problem features, rather than their decision to participate (20%) or their choice of a given envelope (12%), $\chi^2(2, N = 47) = 16.57, p < .0001$. In sum, even when both action and inaction counterfactuals are potentially available, actors produce problem counterfactuals more often than readers.

STUDY 4

In the first three studies, the actors made a blind choice because they did not know the contents of the envelopes. In real life, however, actors often have to make informed choices, in which they have to consider the possible advantages and disadvantages of the available options. Consider a situation in which actors have to choose between problem A, which is easy but offers a small payoff, and problem B, which is more difficult but offers a larger payoff. Suppose that they choose problem B. Even before tackling it, they are aware that problem A is more likely to provide a positive outcome. Hence, if they fail problem B, they could easily mentally undo their choice ("if I had chosen problem A"). According to the role-effect hypothesis, however, actors in such a situation do not differ from actors who make a blind choice: In both cases, the problem-solving phase activates numerous salient alternative possibilities. Therefore, unlike readers, actors who make an informed choice should construct problem counterfactuals, despite the availability of the choice alternative. Study 4 tested this prediction.

Subjects were randomly assigned to one of two conditions. The actor condition ($n = 30$) was the same as in Study 1, except that the experimenter informed subjects, "Envelope A contains a problem requiring the multiplication of one two-digit number by one one-digit number (e.g., 7 times 16). If you solve it, you win one CD. Envelope B contains a problem requiring the multiplication of two two-digit numbers (e.g., 26 times 54). If you

solve it, you win five CDs." The attractiveness of the more difficult problem was increased by providing a relatively simple example of it (i.e., two even numbers) and by assigning it an appealing payoff (i.e., five CDs). The reader condition ($n = 22$) was the same as the reader condition in Study 1, except for changes corresponding to those for the actor condition (i.e., Anna deliberately chose the more difficult, more rewarding problem and failed it).

Ten subjects preferred envelope A and were excluded from the analysis, leaving 20 subjects in the actor condition. As in the previous studies, actors produced problem modifications more often than readers (see Table 2), $\chi^2(2, N = 42) = 17.44, p < .0001$.

STUDY 5

If actors' experience with a problem increases the availability of information about the problem solving, which in turn increases the actors' tendency to construct problem counterfactuals, then impoverishing that experience should reduce this tendency. This prediction was tested in Study 5, in which we compared counterfactuals produced by actual actors and by actors who simulated an unsuccessful attempt to solve the problem.

Subjects were randomly assigned either to an actual-actor condition ($n = 27$), which replicated the actor condition of Study 1, or to a simulated-actor condition ($n = 29$). The latter differed from the former in that subjects were given the following instructions: "Before opening the envelope you have chosen, you have to imagine that it contains the difficult problem, and that you fail to solve it. You have to write at least one way in which things would have been better for you." In other words, in the latter condition, the subjects produced their counterfactuals before actually opening the envelope.

As predicted, actual actors produced problem modifications more often than actors who simulated the problem solving (see Table 2), $\chi^2(2, N = 56) = 7.36, p = .03$.

STUDY 6

If actors' tendency to construct problem counterfactuals does not depend on a general reluctance to undo their choices, they should undo them in conditions in which they do not tackle any problem. We tested this prediction by comparing counterfactuals produced by actors who could win a prize in a lottery and by actors who could win a prize by solving a problem.

Subjects were randomly assigned to one of four conditions. Two were the same as in Study 1; that is, they were problem-solving conditions (actor: $n = 26$; reader: $n = 24$) in which the outcome depended on the actor's or protagonist's attempt to solve the chosen problem. Two were lottery conditions. In the actor's lottery condition ($n = 23$), subjects were instructed as follows: "One of these sealed envelopes contains an ace. The other one contains a jack. If you choose the envelope containing the ace,

you win a chocolate." The experimenter always drew the jack from the chosen envelope. In the reader's lottery condition ($n = 24$), subjects were told that the protagonist was offered the same choice and chose the envelope containing the jack.

As predicted, actors produced more choice counterfactuals in the lottery than in the problem-solving condition, $\chi^2(2, N = 49) = 32.81$, $p < .0001$ (see Table 2). In contrast, readers' counterfactuals did not differ between the lottery and problem-solving conditions.

STUDY 7

Individuals' motivational goals may affect their counterfactual thinking (Elster, 1999; Gilbert et al., 2004): Unlike individuals who imagine a negative outcome (e.g., missing their train by 1 min), those who actually experience it could try to avoid self-blame for their deeds (e.g., leaving home too late) by constructing external counterfactuals. In Study 4, unlike readers, actors could try to avoid self-blame for their greedy choice (i.e., preferring the more difficult but more rewarding problem) by constructing problem counterfactuals. The rest of our studies, however, suggest that actors and readers produce different counterfactuals primarily because they have access to different information. In fact, in the conditions in which our actors did not know the content of the envelopes, nobody could blame them for selecting the envelope with the difficult problem, yet they produced problem modifications. Our actors could be considered responsible for their failure to solve the problems, yet they preferred to modify the problem features rather than their unblameworthy choices. Ironically, problem modifications involved actors' responsibility to a greater extent than did choice modifications (e.g., "if I had had a calculator" implies that the actor is not good in arithmetic, whereas "if I had chosen the other envelope" simply implies that the actor could not see the contents of the sealed envelopes).

Study 7 was intended to provide a more direct test of the self-blame hypothesis. We compared actors' and readers' counterfactuals in a situation in which the experimenter, rather than the actor or protagonist, chose the envelope with the problem. In such a situation, if actors just want to avoid self-blame, they should undo the experimenter's choice rather than the problem features because undoing the latter may imply an indirect assignment of blame to themselves. Undoing the former absolves them from any responsibility. According to this interpretation, no role effect would be expected in this modified situation.

Subjects were randomly assigned either to an actor or to a reader condition ($n = 23$ in each group). The procedure was the same as in Study 1, except that the experimenter, rather than the actor or the protagonist of the story, selected the envelope. As in the previous studies, actors produced problem modifications more often than readers (see Table 2), $\chi^2(2, N = 46) = 19.83$, $p < .0001$.

STUDY 8

Study 8 provided a further test of the self-blame hypothesis. Subjects did not have to generate counterfactual thoughts, but instead indicated which one of two counterfactual modifications was closer to their thoughts. One modification assigned responsibility to the individual who made the choice (the concentration counterfactual: "if I [Anna] had concentrated better"), and the other one did not (the choice counterfactual: "if I [Anna] had chosen the other envelope"). If the role effect depends mainly on self-defensiveness, then actors should select the concentration counterfactual less often than readers, given that this counterfactual attributes explicitly to the actors the cause of the negative outcome. By contrast, if the effect depends mainly on the differential availability and salience of problem information, actors should select the concentration counterfactual more often than readers. The concentration counterfactual involves an actor's responsibility more than the choice counterfactual does. However, it is one of the problem counterfactuals produced by actors.

Subjects were randomly assigned either to an actor or to a reader condition ($n = 27$ per group). The procedure was the same as in Study 1, except that the final question was, "Indicate which one of these two sentences is closer to what you just thought." The two sentences were those quoted in the previous paragraph. Actors did not exhibit a clear preference for the concentration counterfactual (note that in the standard actor conditions of Studies 1 through 5, only 7% of subjects spontaneously produced this specific counterfactual). Nevertheless, they selected this counterfactual more often than readers did (see Table 2), $\chi^2(1, N = 54) = 6.43$, $p = .01$.

DISCUSSION AND CONCLUSION

Individuals' roles shape their counterfactual thoughts. Readers mentally undo the negative outcome of a story by undoing the protagonist's choice to tackle a given problem, rather than his or her unsuccessful attempt to solve it. In contrast, actors who make the same choice and experience the same negative outcome depicted in the story mentally alter the features of the problem solving. The role effect is found both with blind choices, in which actors do not know whether they will select an easy or a difficult problem, and with informed choices, in which actors deliberately decide to tackle a difficult problem. The effect depends on the differential availability of information about the problem-solving phase to actors and readers and diminishes when problem-solving information is less available to actors. It does not depend on motivational factors. Although actors could be especially motivated to avoid self-blame (Elster, 1999; Gilbert et al., 2004), the effect occurs even when actors make an unblameworthy choice, and when another person makes the choice for them. In a forced-choice condition, actors select a counterfactual that directly implies their responsibility (e.g., "if

I had concentrated better") more often than readers select a counterfactual that implies the protagonist's responsibility (e.g., "if Anna had concentrated better"). In sum, actors and readers produce different counterfactuals because they rely on different information, not because they have different motivations (for a similar explanation of role effects in bias perception, see Pronin, Gilovich, & Ross, 2004).

Previous investigations of counterfactual thinking have found that individuals tend to alter exceptional rather than normal events, actions rather than inactions, and controllable rather than uncontrollable events (Roese, 1997), and also prefer to make minimal alterations (Byrne, 2005). However, most previous studies relied on story-undoing procedures, in which subjects are in the role of readers. The present results cast doubt on the generality of these conclusions. Unlike readers, actors alter normal events in the direction of exceptionality, by breaking a game's rules (e.g., "if I had had a calculator"). They do not construct inaction counterfactuals, even if inaction alternatives are available (e.g., "if I did not stake my chocolate"). They alter uncontrollable events (e.g., "if I had had a calculator"), rather than controllable ones (e.g., "if I had chosen the other envelope"). Finally, they prefer large modifications in which they introduce elements not present in the real experience (e.g., "if I had had a calculator") to minimal modifications in which they simply alter some element of their experience (e.g., "if I had chosen envelope B"; for a similar tendency in the belief-revision process, see Johnson-Laird, Girotto, & Legrenzi, 2004). The finding that the determinants of counterfactual content depend on individuals' roles supports Kahneman and Tversky's (1982b) focus rule: That is, both readers and actors modify an outcome by altering properties of their main object of attention, but readers' attention and actors' attention are often focused on different aspects of a situation.

In conclusion, our results, along with those of Gilbert et al. (2004), suggest that the current accounts of counterfactual thinking offer an incomplete picture because of their reliance on the story-undoing procedure. This procedure has been a precious source of information about the way in which mental simulation works. However, in order to yield an accurate understanding of this important mental activity, future research should investigate not only the undoing of fictitious outcomes by readers, but also the undoing of real outcomes by real actors and actual observers.

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