

Post-decisional counterfactuals by actors and readers

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### Abstract

How do individuals think counterfactually about the outcomes of their decisions?

Unfortunately, most previous studies have investigated the way in which readers think about fictional stories, rather than the way in which actors think about events they have actually experienced. We assume that an individual's role (actor vs. reader) can make different information available, which in turn can affect counterfactual thinking. Hence, we predict a role effect. In 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 her unsuccessful attempt to solve it. But actors who make the same choice and experience the same negative outcome as the protagonist alter problem features. We also show that the effect does not depend on motivational factors. These results contradict current accounts of counterfactual thinking and demonstrate the necessity to investigate the counterfactual thoughts of individuals other than story readers.

You are probably still too young to know how very simple our life is. It becomes unmanageably confused only when we think of ourselves. The moment one does not think of oneself, but asks oneself how can one help someone else, it becomes very simple. (Robert Musil, *The man without qualities*)

Consider the following story:

Anna, an undergraduate at your university, was asked to participate in a game by a research assistant who 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 to participate. She chose envelope A. 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 (1982a) 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 her decisions, are more mutable (e.g., “If Anna had chosen the other envelope”) than uncontrollable events (e.g., “If the research assistant had provided Anna

with a calculator”). Now, suppose that one person makes the same choice and experiences the same negative outcome as the protagonist of a story. What sort of alternatives will this person construct? Past studies have implicitly assumed that actors construct the same counterfactuals as do readers. But, since 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. Evidence exists that the role they play may affect individuals’ choices (e.g., Camerer, Loewenstein, & Weber, 1989), inferences (e.g., Light, Girotto, & Legrenzi, 1990), and the corresponding neural activations (e.g., Ruby & Decety, 2004). We hypothesize that an individual’s role, in particular reader versus actor, could affect counterfactual thinking as well. One reason to make such an hypothesis comes from the insight that under many conditions actors and observers will have different motivational goals. For example, Elster (1999) argued that, in case of traumatic events, actors would 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 one minute 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 reader-actor role differences in counterfactual thoughts: the differential availability or salience of information to actors and readers. In Anna’s story, readers undo the protagonist’s choice because it 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 task (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 she solves the chosen problem (e.g., "I would have solved the problem, if I had had a calculator"). In sum, an actor's role is such that it can make available, as counterfactual alternatives, elements that differ from the choices she has made. We hypothesize that 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 the major determinant of counterfactual content is normalcy, that is, if counterfactuals alter exceptional events back to their normal status (Kahneman & Miller, 1986), then no role effect could be predicted. It is difficult to claim that the actor's choice differs from her failure to solve the problem as regards normalcy. Moreover, individuals should not alter the rules governing the problem (e.g., using a calculator), given their preference for modifications in which rules are respected over modifications in which rules are altered (McCloy & Byrne, 2000). 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 as readers: 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 the comparatively more blameworthy failure to solve the problem.

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

## Study 1

### *Method*

#### *Participants.*

In all the reported studies, the participants were undergraduates from the Universities of Trieste and Venice (Italy) who took part in the studies voluntarily. In Study 1, participants were randomly assigned either to an actor ( $n = 48$ ) or to a reader ( $n = 45$ ) condition.

#### *Material and procedure.*

In all the reported studies, participants in the actor conditions were invited to participate in a game in which they could win two chocolates by solving a problem. They were then asked to choose one of two sealed envelopes: one contained a difficult problem, the other one an easy problem. In fact, unknown to actors, both envelopes contained the difficult problem. In all the reported studies, no actor solved the problem. Actors were informed that they failed, and asked to write at least one way in which things would have been better for them. In the reader conditions, participants read a story whose protagonist faced the same choice and ended up with the same negative outcome as the participants did in the actor condition (see Anna's story above). Readers were required to write at least one way in which

things would have been better for the protagonist. In Study 1, half of the participants in each condition had to mentally multiply two numbers (actor condition) or read a story about a multiplication problem (reader condition). The easy version consisted in multiplying two one-digit numbers. The difficult version consisted in multiplying two two-digit numbers. The chosen envelope always contained the difficult version: “You have to mentally multiply 68 x 76 in 30 seconds.” The other half 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 consisted in anagramming a word of four letters. The difficult version consisted in anagramming a word of seven letters. The chosen envelope always contained the difficult version: “You have to anagram the word ‘risotto’ in 30 seconds.”

### *Results*

In all the reported studies, answers that undid the actor’s choice (e.g., “If I [Anna] had chosen the other envelope”) were coded as choice modifications (see Table 1). Answers that altered the problem features (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] won the chocolates”) were coded as other modifications.

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Insert Table 1 about here

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Two independent judges coded the answers. Their agreement rate was always above 95%. Disagreements were solved via discussion. Following past literature, only the first modification provided by each participant was analyzed. There was no effect of problem content (multiplication vs. anagram). Therefore, this variable was not considered in

subsequent analysis. Table 2 presents the percentage of participants who produced counterfactuals of each category in the various conditions of the reported studies.

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Insert Table 2 about here

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As predicted, actors modified problem features more often than readers,  $\chi^2(2, N = 93) = 16.55, p = 5 \cdot 10^{-5}$ .

## Study 2

Study 2 aimed to test whether actors produce more problem modifications than readers even in a condition that made it clear that the alternative choice would have produced a positive outcome. To this aim, actors who failed the difficult problem were presented with the easy problem they missed.

Participants 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 of Study 1, except that, unknown to the actor, each envelope contained both problems. The experimenter always drew the difficult problem from the envelope chosen by the actor. Once the actor failed the problem and before asking the counterfactual question, the experimenter opened the envelope that had not been selected, drew the easy problem ( $3 \times 7$ ), and showed it to the actor.

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 Study 1 and 2, participants 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, 1982b), possibly because counterfactual inactions restore normalcy (Kahneman & Miller, 1986). Now, 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 could win three chocolates by solving a multiplication problem), only if they stake the prize they have just received. If they fail, they lose it. In the case of a negative outcome, would these actors produce inaction counterfactuals (“If I did not stake my chocolate”) as readers do (“If Anna did not stake her chocolate”), with the result that the role effect would disappear? Study 3 dealt with this question.

Participants were randomly assigned to one of two conditions. The actor condition ( $n = 31$ ) was the same as in Study 1, except that participants 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 participants refused to do so and were excluded from all analyses, leaving 25 participants 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, Anna’s 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%),  $\chi^2(2, N = 47) = 16.57, p = 3 \cdot 10^{-4}$ . In sum, even when both action and

inaction counterfactuals are potentially available, actors produce problem counterfactuals more often than readers.

#### Study 4

In the studies above, the actors made a blind choice because they did not know the content 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, easy but offering a small payoff, and problem B, more difficult but offering 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 undo their choice (“If had chosen problem A”). Following the role effect hypothesis, however, these actors do not differ from actors who make a blind choice: in both cases, the problem-solving phase activates numerous and 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.

Participants 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 them that “Envelope A contains a multiplication problem of one two-digit number multiply by one one-digit number (e.g., 7 times 16). If you solve it, you win one CD. Envelope B contains a multiplication problem of two two-digit numbers (e.g., 26 times 54). If you solve it, you win five CDs.” In order to increase the attractiveness of the more difficult problem, an apparently simple example of it was provided (i.e., two even numbers), and an appealing payoff was

proposed (i.e., five CDs). The reader condition ( $n = 22$ ) was changed accordingly (i.e., Anna deliberately chose the more difficult and more rewarding problem, and failed it).

Ten participants preferred envelope A and were excluded from the analysis, leaving twenty participants in the actor condition. As in previous studies, actors produced problem modifications more often than readers (see Table 2),  $\chi^2(2, N = 42) = 17.44, p = 2 \cdot 10^{-4}$ .

### Study 5

If actors' experience with the problem determines the availability of information about the problem solving, which in turn determines their 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 their unsuccessful attempt to solve the problem.

Participants were randomly assigned either to an actual actor condition ( $n = 27$ ), which replicated the actor condition of Study 1, or to a simulated experience condition ( $n = 29$ ). The latter differed from the former in that participants 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."

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

### 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 it by solving a problem.

Participants were randomly assigned to one of four conditions. Two were the same as in Study 1, that is, problem solving conditions (actor:  $n = 26$ ; reader:  $n = 24$ ) in which the outcome depended on the actor's attempt to solve the chosen problem. Two were lottery conditions. In the actor's lottery condition ( $n = 23$ ), participants 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. A reader's lottery condition ( $n = 24$ ) was changed accordingly.

As predicted, actors produced more choice counterfactuals in the lottery than in the problem solving condition,  $\chi^2(2, n = 49) = 32.81, p = 7 \cdot 10^{-8}$  (see Table 2). In contrast, readers produced the same sorts of counterfactuals in the two conditions.

### Study 7

Individuals' motivational goals may affect counterfactual thinking (Elster, 1999; Gilbert et al., 2004): Unlike individuals who imagine a negative outcome (e.g., missing their train by one minute), those who actually experience it could try to avoid self-blame for their deeds (e.g., losing time at home) by constructing external counterfactuals. Likewise, 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, suggests that actors and readers produce different counterfactuals primarily because they have access to different information. In fact, in the condition in which they did not know the content of the envelopes, nobody could blame our actors 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 problem. Yet, they preferred to modify the problem features rather than their unblameworthy choice. Ironically, problem modifications involved actors' responsibility to a greater extent than choice modifications (e.g., "If I had had the 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 content of the sealed envelopes).

Study 7 was aimed to provide a more direct test of the self-blame hypothesis. We compared counterfactuals produced in a situation in which the experimenter, rather than the actor, chose the envelope with the problem. If actors just want to avoid self-blame, they should undo the experimenter's choice rather than the problem features. Undoing the latter may imply an indirect assignment of blame to themselves. Undoing the former absolves them from any responsibility. Following this interpretation, no role effect could be predicted in this modified situation.

Participants were randomly assigned either to an actor or to a reader condition ( $n = 23$  in both groups). 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 previous studies, actors produced problem modifications more often than readers (see Table 2),  $\chi^2(2, N = 46) = 19.83, p = 5 \cdot 10^{-5}$ .

### Study 8

To provide a further test of the self-blame hypothesis, in Study 8 participants did not have to generate counterfactual thoughts, but to indicate which one of two counterfactual modifications was closer to their thoughts. One assigned responsibility to the individual who

made the choice (“If I [Anna] had concentrated better”) and the other one did not (“If I [Anna] had chosen the other envelope”). If the role effect mainly depends on self-defensiveness, then actors should select the choice counterfactual more often than readers. By contrast, if the effect mainly depends 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. However, it is closer to the usual problem counterfactuals produced by actors.

Participants 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 reported above. Actors did not exhibit a clear preference for the sentence concerning their concentration (note that in the standard actor conditions of Study 1 to 5, only 7% of participants spontaneously undid their concentration). Nevertheless, they selected the sentence more often than readers (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 her unsuccessful attempt to solve it. 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 concerns both blind choices, in which actors do not know whether they select an easy or a difficult problem, and informed choices, in which actors deliberately decide to tackle a difficult problem. It depends on the differential availability of problem information to actors and readers. It diminishes when problem-solving alternatives

are less available to actors. It does not depend on motivational factors. Actors could be especially motivated to avoid self-blame (Elster, 1999; Gilbert et al., 2004). The effect, however, occurs even when actors make an unblameworthy choice, and when another person makes it. In a forced choice condition, actors select a counterfactual that directly implied their responsibility (e.g., “If I had concentrated better”) more often than readers select a counterfactual that implied 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 investigation have described individuals’ tendencies to alter exceptional rather than normal events, actions rather than inactions, controllable rather than uncontrollable events (Roese, 1997), as well as a preference for minimal alterations (Byrne, 2005). However, most previous studies relied on story undoing procedures, where participants are in the role of readers. The present results cast doubts 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, additive modifications to minimal, subtractive ones (see the previous examples; for a similar tendency in belief revision process, see Johnson-Laird, Girotto, & Legrenzi, 2004). The finding that the determinants of counterfactual content depend on individuals’ roles supports Kahneman & Tversky’s (1982a) “focus rule”: readers *and* actors modify an outcome by altering properties of their main object

of attention; but, readers' and actors attention are often focused on different aspects of a situation.

In conclusion, along with Gilbert et al.'s (2004) results, our results suggest that the current accounts of counterfactual thinking offer an incomplete picture because of their reliance on story undoing procedure. Such a 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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Table 1

*Examples of Counterfactual Modifications in Each Category*

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Choice

If *I had/she had* chosen the other envelope.

If *I had/she had* got envelope B.

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Problem

If *I had /she had* more time.

If *I could/she could* have written it down.

If the use of calculator was admitted.

If *I was/she was* concentrated enough.

If *I had/she had* better mental arithmetic.

If the digits were different (e.g. 10 x 20).

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Other

If *I had/she had* more lucky.

If *I won/she won* the chocolates.

If *I had/she had* not met the experimenter.

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Table 2

*Percentage of the Main Classes of Counterfactual Modifications in Studies 1-8*

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

Table 2 (continued)

Group	Modification		
	Choice	Problem	Other
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	—