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What else could have caused it? Counterfactuals, Enablers and Alternatives

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Abstract. The aim of this study was to explore why people focus on enablers rather than causes in their counterfactual thinking (i.e., how people undo the past). We report the results of an experiment that compared causes and enablers in likelihood and the number of available alternatives. The results indicate that the number of alternatives may explain the focus of counterfactual thoughts. The findings are discussed in the context of previous research on counterfactual thinking and causality.

Keywords. Counterfactual thinking; causation; enablers; mental model theory

1. Introduction

In the aftermath of the 9/11 attacks on the United States in 2001 people focused on how the attacks could have been prevented. There are a limitless number of thoughts people could have generated (e.g., if only the terrorists were never born; if only the terrorists did not hate America), all of which would undo the outcome and should be equally imaginable. However, rather than focusing on the direct cause (i.e., the terrorists), many counterfactual thoughts about the disaster focused on events that enabled the terrorists to carry out their plan (i.e., if only the security at the airports had been better; if only they had not gained access to the cockpits). Previous research has identified that people focus their counterfactual thinking on enabling events [1]. However, it is unclear *why* people prefer to focus on enablers rather than causes in their counterfactual thoughts.

The aim of this research is to explore the factors that influence the type of counterfactual thoughts people generate, specifically why they tend to choose an enabling event, instead of a cause, to undo an outcome. First we consider previous research on counterfactual thinking before discussing the relationship between counterfactual and causal thinking. We then present data from an experiment which tests the idea that there is a greater likelihood of preventing a negative outcome if the enabling event, rather than the cause, is not present.

1.1 Counterfactual thinking

When thinking about the past people regularly think about how things could have been different [1,2]. This ability to consider what might have been is called counterfactual thinking. Counterfactual conditionals (e.g., if airport security had been better then the attack would have been prevented) have been researched by linguists [3], philosophers [4,5], and psychologists [2]. They have also been useful in artificial intelligence in planning sub-goals [6] and have implications for human learning [7] and reasoning [8].

Previous research on counterfactual thinking has shown that when generating counterfactual thoughts people focus on controllable rather than uncontrollable events [9] and exceptional rather than ordinary events [2]. They tend to undo actions rather than inactions [2] and socially unacceptable actions rather than socially acceptable actions [10]. They also prefer to focus on enabling events rather than causal ones [1].

However, in some cases it is difficult to interpret previous findings regarding the focus of counterfactual thoughts due to methodological reasons. For example, some studies have only manipulated the controllability of the enabler but not the cause [11] while in others the cause was always immoral [9]. In a previous study we demonstrated that when causes and enablers are matched for controllability people still prefer to focus their counterfactual thoughts on enablers rather than causes [12]. This suggests that enablers do have a special role to play in counterfactual thinking and it is not just due to enablers (e.g., if only airport security had been better) being more controllable than causes (e.g., if only the terrorists had not hated America).

1.2 Counterfactual and causal thinking

Counterfactual thinking and causal thinking have long been associated [13] and many counterfactual thoughts are of a causal nature. A cause can be thought of as something that makes a difference to an outcome and if the cause is removed then the outcome will be different (e.g., if the terrorists had not hated America then the attacks would not have happened) [5]. However, there is debate about what events should be identified as causes and Berofsky [14] argues that enabling events (e.g., poor airport security) should be considered causes as well.

There is little agreement regarding how people distinguish between causes and enablers but a number of dimensions have been identified on which they differ. For example, causes tend to be inconstant and out of the ordinary whereas enablers tend to be constant and normal [15,16]. Another distinction is that causes may be considered sufficient to bring about an outcome (e.g., a spark causes a fire) while enablers are necessary (e.g., oxygen enables a fire). However, these distinctions do not explain the difference between causes and enablers, nor the reason why counterfactual thoughts are more likely to focus on enablers than causes.

One explanation has been put forward by the mental model theory to explain the difference between causes and enablers [17]. The mental model theory suggests that when people think about events and outcomes they keep various possibilities in mind such as the event and the outcome occurring together (e.g., spark and fire), neither the event nor the outcome occurring (e.g., no spark and no fire) or perhaps the

event occurring but the outcome not occurring (e.g., a spark but no fire). Goldvarg and Johnson-Laird suggest that people think about different possibilities for causes and enablers and it is these different possibilities that underlie the distinction between causes and enablers (see table 1 below). Research by Frosch and Byrne [18] supports this view, showing that causes and enablers prime different possibilities.

Table 1: Possibilities people keep in mind for causes and enablers.

Cause (a spark caused the fire):	Enabler (oxygen enabled the fire):
Spark and fire	Oxygen and fire
<i>No spark and no fire</i>	Oxygen and no fire
<i>No spark and fire (another cause)</i>	<i>No oxygen and no fire</i>

2. The Experiment: Alternatives versus Likelihood

We propose that the different possibilities people typically keep in mind for causes and enablers may be important for why counterfactual thoughts focus more on enablers than causes. As table 1 above shows [see italics], when there is no cause (e.g., no spark) the outcome may still happen or it may not (e.g., the fire could be caused by the spark or by something else such as a lighter). However, when the enabler is not present (e.g., no oxygen) then the outcome cannot happen (e.g., no fire). We suggest that counterfactual thoughts focus on enablers because it is more difficult to think of an alternative enabler (e.g., an alternative to oxygen) than an alternative cause (e.g., an alternative to a spark).

Another explanation for why counterfactual thoughts focus on enablers may be due to the relative likelihood of the removal of causes versus the removal of enablers in preventing the outcome. Previous research suggests that counterfactual thoughts are closely linked to prevention [1]. If this is the case then it would be expected that the removal of enablers should have a higher likelihood than removal of causes in changing the outcome, i.e., $P(\text{outcome}|\neg\text{enabler}) < P(\text{outcome}|\neg\text{cause})$.

2.1 Method

In order to test the competing explanations of likelihood versus alternatives we presented 34 participants (average age 29 years) from the University of Reading with a booklet containing a series of 8 scenarios. The scenarios were pre-tested to ensure that the cause and enabler were identifiable and equally controllable (see [19] for full details). Each scenario mentioned one cause, one enabler and a negative outcome, such as:

Richard is writing up his thesis and cannot be bothered to spend a few minutes backing it up to the University server (enabler). When he checks his emails he opens an email from a stranger with an attachment containing a virus (cause) which renders his computer and all the files on it useless (outcome).

For each scenario participants had to complete three tasks: rating likelihood, generating alternatives and rating the probability of alternatives. First, after reading each scenario participants were asked to indicate how likely it was that changing the cause (e.g., opening an email) would change the outcome (e.g., losing files) on a scale of 0 (not at all a good way to change the outcome) to 10 (absolutely the best way to change the outcome). Participants then completed the same rating for the enabler (e.g., backing up files on the server).

Second, participants were asked to imagine everything about the scenario remained the same except that the cause did not occur (e.g., the email was not opened) and to list as many other ways they could think of that the outcome would still occur (e.g., files lost). Participants then completed this task for the enabler. Finally, participants were asked to go back and to rate each alternative generated on its probability of actually occurring on a scale of 0 (the event is not at all probable) to 10 (the event is extremely probable).

2.2 Results

Overall, the results suggest that when thinking counterfactually, the alternative causes and enablers people can think of are more important than the relative likelihood of causes versus enablers in bringing about the outcome.

Table 2. Comparison of measures for causes and enablers

	Cause	Enabler
Average likelihood of altering outcome if event is altered	8.33	7.76*
Number of alternatives generated	17.06	15.47*
Probability of alternatives occurring	4.31	4.15

* Significantly different from figure in previous column at .05 alpha level

Likelihood. Participants indicated that altering the cause would be more likely to change the outcome than altering the enabler (8.33 versus 7.76), $t(33) = -2.35$, $p = .025$. This finding is surprising given that counterfactual thinking is associated with prevention and tends to focus on the enabler. If the relative likelihood of causes versus enablers was the underlying reason for why people prefer to undo enablers and focus on enablers for prevention, then we would expect removing the enabler to have

a higher likelihood of changing the outcome; we observed the opposite. This finding goes against the idea that likelihood is the reason why people prefer to undo enablers.

Alternatives. Overall participants generated more alternatives about causes than enablers for the eight scenarios (17.06 versus 15.47), $t(33) = 9.36$, $p = .004$, indicating that it was easier to think about alternatives that could have produced the same outcome for the causes (e.g., spark) than the enablers in the scenarios (e.g., oxygen). This finding is consistent with the proposal regarding the different possibilities people keep in mind for causes and enablers [17]. We were also interested in the probability ratings of the alternatives generated to investigate if causes might have a lower probability than enablers of actually occurring, even though people can imagine more alternative causes than enablers. However, we found no significant difference between them (4.31 versus 4.15), $t(33) = -1.02$, $p = .32$, suggesting that the probability ratings of these alternatives are unlikely to have an influence on the counterfactual generated.

3. Discussion and conclusion

The aim of this study was to investigate the factors that encourage people to focus on enablers rather than causes in their counterfactual thinking. The experiment asked participants to rate the likelihood that removing causes or enablers would prevent the outcome. Spellman [20] has suggested that likelihood is important in counterfactual thinking. Our results showed that altering the cause was rated higher than altering the enabler in the likelihood to alter the outcome. This finding is in line with the results of previous research which indicates that causes are also rated higher than enablers in contributing to the outcome and that the outcome is more foreseeable due to the presence of the cause than enabler [12]. The relatively likelihood of the cause versus the enabler in bringing about the outcome does not seem to be the explanation as to why people focus on enablers in their counterfactual thoughts.

The experiment also explored the idea that the alternatives people generate may be important in why they undo enablers more so than causes. They generated more alternatives to causes than enablers that could have brought about the same outcome. It may be that people focus on enablers in their counterfactual thinking because there are less alternative enablers than causes to choose from; when the enabler is removed from the situation there are less alternative enablers to take its place than there are alternative causes if the cause were removed.

This finding is consistent with the mental model theory of causation [21] as it predicts that causes bring to mind the possibility where the cause is absent but the outcome still occurs (i.e., no spark but still a fire), i.e., people can think of alternative ways in which an outcome can be produced. Enablers on the other hand typically do not bring this possibility to mind. Hence removing the enabler may be seen as a more effective way of preventing the outcome as less alternatives which could take its place come to mind. Mandel [22] has also suggested that counterfactuals focus on factors that are sufficient to prevent the outcome which is in keeping with the proposal that enablers bring less alternatives to mind.

Although previous research has acknowledged that counterfactual thoughts focus on enabling events and are closely linked to prevention, it has not explored why this should be the case. The results of our study suggest it is due to the number of alternative causes and enablers available. The importance of understanding why the enabling event is focused on is evident when considering the implications of causality and counterfactual thinking in the legal domain. For example, research shows that when people think counterfactually about an enabling event in a mock trial situation (e.g., the enabling actions of the victim) they assign less blame and punishment to the cause (e.g., the actions of the criminal) [23].

Although people are sensitive to the distinction between causes and enablers [24] neither British nor American law formally recognizes the distinction [25]. As a result, diverse judgments can be made in cases involving enablers with sometimes the blame being put on the enabler and sometimes on the cause [26]. Understanding the role the enabler plays in bringing about an outcome and why it is often the focus of counterfactual thinking may therefore have implications for philosophers, psychologists, and the legal domain.

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