

# Counterfactual thinking and causal reasoning: an integrative model

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When people experience a negative, surprising or distressful life event, tend to search for causal explanations for these events or struggle desperately to undo these events through counterfactual thinking. The relationship between these two cognitive processes lies far behind the mere common trigger events of both process and, seems to be of a rather complex nature. Some philosophical perspectives, known as counterfactual theories of causation, define after Hume (1748, Section VII) causation in terms of counterfactuals. From this perspective, an antecedent "C" of a given event "E" is considered a cause of the event if the antecedent had not been, the event never had existed. This perspective defines a necessary link between the antecedent "C" and the event "E". Wells and Gavanski (1989) offered empirical evidence supporting this perspective, showing that people considered the antecedent they counterfactually changed in a scenario resulting in the tragic death of a young woman after she had a meal containing an ingredient to which she were allergic, as more causal of the outcome. According to this perspective, people mentally run counterfactuals to undo a given event in order to spotlight a causal candidate and to test his causal role in the event. Using a different methodology, Roese and Olson (1997) found when people perform a counterfactual thinking after obtain a bad grade in an academic exam, they were more quick in perform a subsequent causal task on the same scenario, but not the inverse. These authors explain their results arguing that counterfactuals are one subset of causal judgments, of a more specific nature. When people perform counterfactuals easily step down to causal judgments but after performing causal judgments people find more difficult "to step up to the higher level of the counterfactuals" (Roese & Olson, 1997, pp. 40).

In a similar perspective, Spellman (1996) argue that counterfactual thinking and causal reasoning are related in the sense that counterfactuals permit to establish the base line of the probability of an event when we credit causality to a particular antecedent.

In a rather different perspective, other researchers argue that we need to achieve some causal understanding before we can mentally undo, through counterfactual thinking a given event. N'gbala and Branscombe (2003), using the same facilitation paradigm (see Klein & Loftus, 1993) as Roese and Olson (1999) found a reversed facilitation effect. Causal tasks performed first facilitated subsequent counterfactual tasks, but counterfactual tasks do not facilitate causal tasks.

Challenging the idea of one process supporting the other, making it more available or directing the focus of attention to a particular antecedent, past research, (Mandel & Lehman, 1996; N'gbala & Branscombe, 1995) produced evidence suggesting that counterfactual thinking and causal reasoning focus on different antecedents leading to a particular outcome. Causal reasoning tends to focus on sufficient covariant antecedents

whereas counterfactual thinking tends to focus on necessary enable antecedents (see also Mandel, 2003). Thus any facilitation effect between these two processes may be explained otherwise than due to a mere repetition of the focused antecedent (Wells & Gavanski, 1989) or due to a concept of a more specific or generic cognitive process underlying the other.

Einhorn and Hogarth (1986), following Mackie, (1974) argued that the causal relevance of a particular antecedent of an outcome is inferred from a causal field, differentiate causes from conditions. In their proposal causes and conditions should be considered simultaneously in a particular causal field in order to identify the probable cause of an outcome and their possible alternatives. In turn, Cheng and Novick (1990, see also, Cheng, 1997; Cheng & Novick, 1992) proposed the concept of causal set containing causal antecedents, enablers and causal irrelevant elements, and argue that the perception of causal and enablers vary depending on context. Causation is inferred by contrasting for selected factors in different focal sets, i.e., causal inference consider simultaneously causal and enabling conditions. Finally, McGill and Tenbrunsel (2000) showed that people tend to base their causal explanations on the height propensity factor, but only when this factor is perceived to be mutable, suggesting that both factors interact to influence causal backgrounds and hence causal selection.

According to this perspective, we suggest that counterfactual and causal thinking are related through the causal field defined both by causal and enabler conditions, rather than by a dependent relationship between two processes of different cognitive complexity. Although causal reasoning focus on causal (covariant, propensity factors) and counterfactual thinking focus on enabler sufficient conditions, both processes use the same causal field, defined by the processing necessity (causal or counterfactual). Within this perspective, we assume these two cognitive processes have identical complexity and should facilitate each other. Once one process is activated by the processing necessity, the causal field is defined containing causal and enabling conditions, necessary to both processes. Thus, when people first perform one task (causal or counterfactual), the second task should be facilitated since it use the same causal field defined by the first task, even if the second task focus in different elements of the causal field.

Using a facilitation paradigm (see Klein & Loftus, 1993) in a series of experiments we tested these predictions and found that: a) counterfactual and causal tasks take identical latency times; b) the facilitation effect between these two process is symmetric and have the same magnitude; c) the antecedent focused by each process did not qualified this effect; and d) performing a task of identifying antecedents, i. e. performing the cognitive task of processing the antecedents of an outcome contained in the causal field, generated the causal and the counterfactual facilitation effect with identical magnitude as performing previously the causal or counterfactual task.

Based on these results we discuss the model offered by Spellman, Kincannon and Stose (2005) and we propose an integrative model of these two processes.