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How expert witnesses' counterfactuals influence causal and responsibility attributions of mock jurors and expert judges

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Summary

Past research has shown that counterfactual ("If…then…") thoughts influence causal and responsibility attribution in the judicial context. However, little is known on whether and how the use of counterfactuals in communication affects lay jurors' and judges' evaluations. In two studies, we asked mock lay jurors (Study 1) and actual judges (Study 2) to read a medical malpractice case followed by an expert witness report, which included counterfactuals focused on either the physician, the patient, or external factors. Results showed that counterfactual focus had a strong effect on both lay jurors' and judges' causal and responsibility attributions. Counterfactual focus also moderated the effect of outcome foreseeability on responsibility attribution. Discussion focuses on how counterfactual communication can direct causal and responsibility attribution and reduce the importance of other factors known to influence judicial decision-making. The potential implications of these findings in training programs and debiasing interventions are also discussed.

KEYWORDS

attribution, counterfactual thinking, expert witness, responsibility

1 | INTRODUCTION

Many court cases and disputes concern events with complex causal chains, with multiple actors contributing with their decisions, actions or inactions to an eventual negative outcome. When asked to decide who is responsible for such outcome, jurors and judges often have to "work backwards" from the outcome to its causes. In doing this, they often engage in counterfactual thinking (Spellman & Kincannon, 2001), a form of mental simulation in which one or more antecedents of a past event are hypothetically mutated, resulting in a different outcome of the event (e.g., "If the driver had been more careful, the accident could have been avoided"; Girotto, Legrenzi, & Rizzo, 1991; Kahneman & Tversky, 1982; Roese, 1997). According to legal theorists, the process of identifying the necessary and sufficient antecedents of an event through counterfactual reasoning is one of the main procedures employed when assessing causal relations and determining responsibility in court (Alvarez & Miller, 2016; Cane, 2001; Daftary-Kapur & Berry, 2010; Hart & Honoré, 1985; Wright, 1988). Psychological research, in turn, has investigated when and how individuals engage in counterfactual thinking in judicial decision making (Alicke, Mandel, Hilton, Gerstenberg, & Lagnado, 2015), and in particular the role of counterfactual focus in causal and responsibility attribution (Gavanski & Wells, 1989; Gleicher et al., 1990; Macrae, 1992; Macrae, Milne, & Griffiths, 1993; Miller, Turnbull, & McFarland, 1990; Sherman & McConnell, 1995).

So far, research in the judicial context has mainly focused on the effects of individually generated counterfactual thoughts. We know much less about how the use of counterfactuals in communication may influence causal and responsibility attributions, in everyday and judicial contexts. Research carried out in the political domain has shown that counterfactual communication has subtle but significant effects on the way individuals think about past events and evaluate people involved in them (see Catellani & Bertolotti, 2014a, 2014b; Markman & Tetlock, 2000; McMullen & Markman, 2000). Some studies indicate that this may be also the case in the judicial context, as counterfactuals used in the presentation of court cases can affect jurors' causal and responsibility attributions (e.g., Catellani, Alberici, & Milesi, 2004).

In the present article, for the first time we investigated whether exposure to counterfactuals embedded in an expert witness'

communication affects lay jurors' and professional judges' causal and responsibility attributions regarding a judicial case. We tested whether counterfactuals included in an expert witness report would lead lay jurors and judges to attribute a prominent causal role, and thus greater responsibility, to the actor on whom those counterfactuals were focused. We also tested whether lay jurors and judges exposed to counterfactuals (compared to participants not exposed to them) would be more likely to base responsibility attribution on other factors that past research has shown to influence responsibility attribution in the judicial field, such as the severity and foreseeability of the outcome (Alicke, 2000; Mazzocco, Alicke, & Davis, 2004).

1.1 | Counterfactual thinking and causal attribution

In the past, several scholars have proposed detailed and articulated models of how individuals make causal attributions and explain events (Hart & Honoré, 1985; Heider, 1958; Kelley, 1967; Sloman & Lagnado, 2015; see Alicke et al., 2015 for a review). Nowadays, psychosocial research is increasingly focusing on understanding the spontaneous cognitive processes that guide causal attribution (Hilton, McClure, & Slugoski, 2005; Sloman & Lagnado, 2015), rather than on defining the formal validity of causal attribution rules (Hart & Honoré, 1985; Heider, 1958; Kelley, 1967). Among these processes, counterfactual thinking is one of the most relevant and frequently used. Individuals employ counterfactuals to compare how past events have unfolded with what is prescribed by routine (Kahneman & Miller, 1986) or social norms (Catellani et al., 2004; Catellani & Milesi, 2001; Catellani & Milesi, 2005; Halpern & Hitchcock, 2015). When they detect a deviation from these norms in an actor's behaviour, they interpret it as the factor that prevented the "normal" hypothetical course of events to unfold, thus attributing the actor a causal role, and the responsibility for the final outcome (Markman & Tetlock, 2000; Roese, 1997; Wells & Gavanski, 1989).

As a consequence, counterfactual thoughts regarding past events are not necessarily accurate, as they often oversimplify cause-effect relations and incorporate assumptions regarding the controllability and mutability of the event antecedents (Byrne, 2002; Byrne & Tasso, 1999; McClure, Hilton, & Sutton, 2007). For instance, when counterfactually undoing complex causal chains, individuals tend to select voluntary over involuntary actions (Alicke, 2000), and human actors over natural or mechanical causes (Hilton, McClure, & Sutton, 2010). This is the case because voluntary human actions are commonly seen as more controllable and more mutable than involuntary actions and natural causes, and therefore more accessible when one engages in counterfactual manipulation of an event.

1.2 | Counterfactual thinking and responsibility attribution

Like causal attribution, responsibility attribution is essentially a retrospective process, in which individuals look backwards from a known outcome to assess who participated in the events leading to it, and what they could or should have done to prevent it. Current models of blame ascription and responsibility attribution (Chockler & Halpern, 2004; Shaver, 1985) underline the relevant role in responsibility attribution of considerations that go beyond the mere physical causation, such as judgements of personal control, intentionality, and foreseeability. The culpable control model proposed by Alicke (2000) assumes that retrospective outcome evaluations can have a biasing effect on responsibility attribution, resulting in somewhat paradoxical judgements, such as actors being attributed responsibility for consequences that were unforeseeable at the time of their actions, but that are known after the facts. Empirical research has shown that individuals tend to ascribe greater responsibility to an actor when the outcome is more harmful than when it is less harmful (Alicke, Davis, & Pezzo, 1994; Robbenholt, 2000), and when the outcome is regarded as foreseeable than when it is regarded as unforeseeable (Gambetti, Nori, Marinello, Zucchelli, & Giusberti, 2017; Lagnado & Channon, 2008). These findings are in line with research on other cognitive biases, such as the outcome bias (Baron & Hershey, 1988; Mazzocco et al., 2004) or the hindsight bias (Fischhoff, 1975; Roese & Vohs, 2012).

Psychosocial research on the links between counterfactual thinking and responsibility attribution (Markman & Tetlock, 2000; Nario-Redmond & Branscombe, 1996; Wells & Gavanski, 1989) suggests that counterfactuals can greatly affect the way individuals explain past events. In the judicial context, some studies have shown that counterfactual thinking can affect responsibility attribution by making jurors focus on certain actors rather than others (Catellani & Milesi, 2001). Further studies have shown that counterfactual thinking also influences other pathways in jurors' attribution process. In particular, some studies have focused on the effects of counterfactual direction, that is, thinking of how things could have been better (upward counterfactual) or worse (downward counterfactual). Generating upward (vs. downward) counterfactuals affects retrospective outcome evaluation and, in turn, increases responsibility attribution (Grenier, Peecher, & Piercy, 2007; Roese & Olson, 1996; Savani & King, 2015). Furthermore, generating upward counterfactuals influences the perceived predictability of an outcome, which in turn is associated with intentionality judgement (Gambetti et al., 2017). All these studies have investigated the effects of self-generated counterfactuals, but not the effects of exposure to counterfactual communication.

1.3 | The effect of counterfactual communication on causal and responsibility attribution

Research on how counterfactuals are used in communication, and how being exposed to counterfactual communication affects recipients' attribution processes, has been limited so far (Catellani & Bertolotti, 2013; Catellani & Covelli, 2013; Lebow, 2010; Reiss, 2009). Early research (Tal-Or, Boninger, Poran, & Gleicher, 2004) found that persuasive messages including counterfactual statements were more effective than messages not including counterfactual statements, but

such effect persisted in the long term only when participants were prompted to generate themselves counterfactual thoughts. Subsequent studies analysed the use of counterfactuals in impression formation (Wong, 2010) and impression management (Bertolotti, Catellani, Douglas, & Sutton, 2013; Catellani & Bertolotti, 2014a, 2014b), showing that providing individuals with a counterfactual statement regarding an actor can effectively influence their judgements on the actor, the reconstructed event and even the source of the counterfactual statement itself. For instance, upward counterfactuals (e.g., "If he/she had acted in a different way, things would be better now") can be an effective form of implicit criticism, as they subtly imply that the actions of a chosen actor are causally linked to the outcome, and that the actor is therefore responsible for it (Catellani & Bertolotti, 2014b).

The above studies have been carried out in the political domain. While previous research has investigated the role of counterfactual *thinking* in juries' and judges' decision making (Alvarez & Miller, 2016; Bothwell & Duhon, 1994; Cane, 2001; Daftary-Kapur & Berry, 2010; Hart & Honoré, 1985; Turley, Sanna, & Reiter, 1995), much less attention has been devoted to the use of counterfactual *communication* in court testimonies and debates, and its effects (but see Broda-Bahm,-2001; SunWolf, 2010). Through counterfactual communication a speaker makes one or another actor of the event more salient, providing a scenario of how the event would have unfolded if the actor had behaved differently. In turn, individuals exposed to counterfactual communication are likely to focus their subsequent attribution processes on the same actor, as individuals tend to incorporate such counterfactual cues in their own reasoning (Galinsky, Moskowitz, & Skurnik, 2000). Therefore, also in the judicial domain one might expect that counterfactual communication can affect recipients' explanation of the events focused on, as well as attributions of responsibility regarding them. The frequency and effectiveness of counterfactual communication in the courtroom, however, is likely to be influenced by two relevant factors that are peculiar of the judicial context, namely, the norms that regulate its use by prosecutors, attorneys, and witnesses (including expert witnesses), and the degree to which juries and judges are susceptible to this type of argument.

1.4 | Normative and individual factors affecting counterfactual communication and its effects in the judicial context

Counterfactual thinking is central to the general theory of law, and both civil and criminal law entail its use (inter alia, Taormina, 2016), as recognized also by legislators (Canale & Tuzet, 2014). This is particularly the case when judges and juries are called to evaluate whether a defendant's decisions and behaviours (or omissions) could have prevented damages or harm to someone. In forensic medicine, for instance, the law allows experts called as witnesses to use counterfactual thinking in assessing whether the omission of a certain medical action (diagnostic, therapeutic, surveillance, etc.) could have avoided damage to the victim (Di Marco & Sichetti, 2010; Dominici, 2014). In the Italian case, a review of the decisions of the Supreme Court (Rossetti, 2011) shows a wide range of cases in which counterfactual reasoning was used to determine responsibility for medical procedures. Among others, these cases include: childbirth maneuvers resulting in severe neurological trauma to the child; delays and omissions in performing cesarean section resulting in hypoxic injury to the child or severe bleeding in the mother; erroneous diagnoses, especially in the emergency room, with omitted or delayed surgery, resulting in the death of a patient; omitted or deferred diagnostic tests, resulting in patients suffering from complications to their condition and worse prognoses.

When employed in the legal domain, counterfactual thinking is expected to be based on scientific theories (the so-called "coverage laws") and empirical evidence on the known impact of the actions or omissions focused on in the counterfactuals. As these are probabilistic estimates, based on sometimes conflicting data, experts often discuss multiple counterfactual scenarios, which prosecutors and lawyers then use to build their respective cases.

Furthermore, the counterfactual arguments used in court may not be equally persuasive for all judges and juries. Research on judicial decision-making and its underlying processes has investigated several factors influencing judges' and jurors' evaluation of cases, arguments, and supporting evidence (Danziger, Levav, & Avnaim-Pesso, 2011; Dhami, 2003; Ellison & Munro, 2009; Posner, 2008; Schmittat & Englich, 2016). Judges' expertise has emerged as a potential key factor in the quality of judicial decisions, as more expert judges may be able to make more rigorous and accurate evaluations than less experienced colleagues, based on their greater familiarity with the application of the law to real-world cases, and greater ability to detect potential sources of bias (Catellani, 1992). Experimental research in this area, however, is still limited and has led to somewhat inconsistent findings. For example, expert judges have been shown to rely on falsification more than lay jurors in some cases (Catellani, 1992; Giusberti, Bensi, & Nori, 2013) but not in others (Nori, Bensi, Gambetti, & Giusberti, 2012). Furthermore, so far, no studies have investigated the differential impact of counterfactual communication on individuals with varying degrees of judicial expertise. Therefore, in the present article we did not formulate a specific hypothesis on this point, and we explored the effects of experimentally manipulated counterfactuals on mock jurors and actual judges in two separate studies.

2 | RESEARCH OVERVIEW AND HYPOTHESES

We investigated whether and how counterfactuals employed in an expert witness report affected causal and responsibility attributions of lay jurors and expert judges. We conducted two studies with two separate groups of participants, differing in their degree of expertise and familiarity with judicial matters, namely mock jurors (Study 1) and real judges (Study 2). We presented participants with a medical negligence case scenario, followed by a report by an expert witness including upward counterfactuals focused on either the plaintiff (i.e., the

patient), the defendant (i.e., the physician), or other external factors (i.e., weather conditions that delayed treatment of the patient). We then compared causal and responsibility attributions made by participants in the different experimental conditions, in order to test three main research hypotheses.

First, as discussed above, counterfactuals focusing on a given element of a past event often lead individuals to attribute a greater causal role to such element. This is likely to be the case because counterfactuals focusing on what a certain actor could or should have done, or on how a certain antecedent could have unfolded, make that actor or antecedent particularly salient in the recipient's mind, increasing the likelihood of their selection as the main cause of the event (Martin & Cushman, 2016; Nario-Redmond & Branscombe, 1996; Wells & Gavanski, 1989). We expected that this would be the case also when mock jurors and expert judges are exposed to counterfactuals generated by an expert witness. On this basis, we generated the following research hypothesis.

> H1. Mock jurors and judges attribute a greater causal role to the factor on which the expert witness' counterfactuals are focused on, compared to other elements not mentioned in the counterfactuals. Therefore, participants in the physician focus counterfactual condition identify the defendant's behaviour as the main cause of the outcome (H1a), participants in the patient focus condition identify the plaintiff's behaviour as the main cause of the outcome (H1b), and participants in the external focus condition identify adverse weather conditions as the main cause of the outcome (H1c).

If confirmed, these results would show that the counterfactual focus on a certain actor (rather than another) influences judicial decision-making processes not only when counterfactuals are self-generated, as shown by past research, but also when they come from an external source such as an expert witness report on the case.

As mentioned in the introduction, according to previous research the focus of counterfactuals often affects not only causal explanation but also responsibility attribution, with individuals being more likely to attribute responsibility for the outcome to the actor on whom the counterfactual thought is focused on (Catellani & Bertolotti, 2014a; Nario-Redmond & Branscombe, 1996). We expected that this would be the case also when lay jurors and judges are exposed to counterfactuals embedded in an expert witness' report. On this basis, we generated our second research hypothesis.

> H2. Mock jurors and judges exposed to expert witness' counterfactuals focused on the physician attribute greater responsibility to the defendant than to the plaintiff (H2a), whereas the opposite is true for participants exposed to counterfactuals focused on the patient (H2b).

Previous research has shown that counterfactual thinking has a direct effect on responsibility attribution, as it enhances the saliency of the causal role played by the actor focused on in the counterfactual (Grenier et al., 2007; Roese & Olson, 1996; Savani & King, 2015). Counterfactual thinking has also an indirect effect on responsibility attribution, as it influences the importance attributed to factors like intentionality, outcome foreseeability and severity (Alicke, 2000; Alicke et al., 1994; Gambetti et al., 2017; Knobe, 2010; Lagnado & Channon, 2008). Consistently, in our two studies we also explored whether counterfactual communication moderated the effect of outcome foreseeability and severity, making participants align their responsibility attribution with the actor the expert witness report was focused on, rather than base it on retrospective evaluations. Our third hypothesis was as follows.

> H3. Outcome severity (H3a) and foreseeability (H3b) judgements have less impact on responsibility attribution when participants are exposed to the expert witness's counterfactuals than when participants are not exposed to the expert witness's counterfactuals (i.e., when they are in the control condition).

We expected our hypotheses to be confirmed among both mock jurors and real judges, as counterfactual thinking is a central process of causal attribution both in everyday and judicial decision making (Spellman & Kincannon, 2001). Once said that, we did not exclude to find some differences in mock jurors' and judges' reactions to counterfactual communication. As discussed above, past research investigating differences in the inferential processes of judges, jurors, and lay people has yielded partially inconsistent results, and no empirical study has investigated differences in the reactions to counterfactual communication. Therefore, in the present study we did not formulate any specific hypothesis in this regard.

3 | STUDY 1

In Study 1, we asked a group of university students to read a mock judicial case and an expert witness's report regarding the case. We used a mock medical negligence case designed to include different potential causal factors. We tested whether participants' causal attributions would be influenced by the focus of the manipulated counterfactual statements embedded in the report. Furthermore, we tested whether responsibility attributions were influenced by the counterfactual cues included in the report, as well as by participants' evaluations of the severity and foreseeability of outcome.

3.1 | Method

According to our a-priori power analysis, performed using G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007), we needed a minimum sample size of $N = 352$ to detect small effects with 95% power and an alpha level of .05 (two-tailed) in the planned tests. We were able to exceed those requirements, recruiting a total of 427 psychology students

(average age *M* = 21.99, *SD* = 4.30; 19.9% males) of the University of Urbino, Italy. Students took part in the study as volunteers during course hours. They were introduced to the study as an investigation on judicial decision-making, and handed a booklet containing the mock case text, the manipulation, and a follow-up questionnaire including the main study measures and a few questions collecting their socio-demographic information (age, gender, education level and professional position). A short debriefing note, including additional details on the purpose of the study, was provided on the last page of the booklet.

The 303-words long mock case (see the full text in the Appendix) presented a scenario in which a patient went to a physician's office lamenting vague symptoms that the physician initially attributed to a relatively mild condition (colitis). The physician prescribed rest and a follow-up check after a week. After the initial symptoms had faded, however, the patient left for a brief holiday and did not show up after a week. The patient's condition later turned out to be quite serious (intestinal volvulus). It required emergency surgery, which however had to be delayed due to the patient being on holiday in a remote mountain location, and bad weather preventing swift transfer to the closest hospital facility. The emergency surgery eventually resulted in the patient undergoing a long hospitalisation and rehabilitation, with negative work and lifestyle consequences.

After reading the case, participants in the experimental conditions read one of three different versions of a report made by the court-appointed medical advisor, ranging between 97 and 110 words and including counterfactuals (see Appendix for the full text). The report did not add any element to the case, but stated that the outcome would have been less severe if some actions and events had played out differently, thus introducing a counterfactual cue focusing on a certain actor in the scenario. In the physician focus experimental condition, the counterfactuals were focused on the physician's diagnosis (e.g., "*If Dr. Landini had considered Mr. Sarti's symptoms more carefully, he could have planned surgery before the situation worsened.*"). In the patient focus experimental condition, the counterfactuals were focused on the patient's behaviour (e.g., "*If Mr. Sarti had followed Dr. Landini's orders, the operation would have had smaller consequences*"). In the external focus experimental condition, the counterfactuals were focused on non-human external factors (e.g., "*If the mountain town had had an hospital, Mr. Sarti could have had surgery immediately after the diagnosis.*"). A fourth group of participants were allocated to the control condition, in which they read the same scenario read by the other participants, but no expert witness report thereafter (Table 1).

3.2 | Measures

3.2.1 | Manipulation check

To check participants' understanding of the expert witness report containing the experimental manipulation we asked participants in the experimental condition to complete the following statement: "In his report, Dr. Gerosa states that the damages suffered by Mr. Sarti could have been avoided…". Participants could choose only one of three different completion options, corresponding to the three counterfactual focus conditions: "…if Dr. Landini had behaved in a different way", "…if Mr. Sarti had behaved in a different way", "…if the circumstances at the moment of the hospitalisation had been different".

3.2.2 | Evaluation of the medical advisor

Participants in the experimental conditions (but not those in the control condition) were asked to indicate to what extent they believed that the medical advisor was "expert", "reliable" and "competent".

TABLE 1 Means and *SD*s (in parentheses) of causal attribution, outcome severity, outcome foreseeability, and medical advisor evaluation scores in the four experimental conditions (Study 1, mock juror sample)

	Counterfactual focus			
	Physician	**Patient**	**External**	**None (Control)**
Causal attribution				
Physician	6.73[a] (2.53)	4.62[b] (2.35)	5.80[c] (2.31)	6.06[ac] (2.65)
Patient	5.11[a] (2.72)	7.27[b] (2.22)	5.46[a] (2.55)	5.00[a] (2.53)
External	5.30[a] (2.85)	5.27[a] (2.83)	6.87[b] (2.44)	5.65[a] (2.49)
Outcome severity	7.10[a] (1.89)	7.16[a] (1.72)	7.04[a] (1.72)	7.25[a] (1.49)
Outcome foreseeability	6.64[a] (2.39)	5.36[b] (2.63)	5.07[b] (2.33)	5.43[b] (2.31)
Medical advisor evaluation	7.08[a] (1.86)	6.70[ab] (2.08)	6.16[b] (2.01)	— —

Note: Means with different superscripts within each row differ at $p < .05$.

Answers were given using a 10-point scale ranging from 1 ("Not at all") to 10 ("Very much").

The subsequent measures were rated on all participants and were again answered using a 10-point scale ranging from 1 ("Not at all") to 10 ("Very much").

3.2.3 | Outcome severity

Participants were asked to rate how severe the damages suffered by the patient were, and to what extent they would limit the patient personal and professional activities in the future. The two item scores, $r(425) = .535$, $p < .001$, were then used to compute a single outcome severity index.

3.2.4 | Outcome foreseeability

The retrospective foreseeability of the outcome of the case was assessed asking all participants to rate two statements (adapted from Blank, Nestler, von Collani, & Fischer, 2008): "The conclusion of the case was foreseeable", and "When I read the case, I imagined it would end this way". The two item scores, $r(421) = .756$, $p < .001$, were then averaged into a single outcome foreseeability index.

3.2.5 | Causal attribution

Participants were asked to say to what extent they believed the damages experienced by the patient were caused by: a) the physician's choices; b) the patient's choices; c) external factors, intended as factors beyond the two protagonists' choices.

3.2.6 | Responsibility attribution

Participants were asked to state to what extent the physician and the patient were to be considered responsible for the damages experienced by the patient. The two scores were used to compute a single dichotomic index of responsibility attribution, attributing a value of +1 to participants who attributed more responsibility to the physician than to the patient, and a value of −1 to participants who attributed more responsibility to the patient than to the physician.

3.3 | Results

3.3.1 | Manipulation check

Participants in the three experimental conditions clearly recognised the counterfactual focus of the expert witness's report summary. 97.2% of participants in the physician focus condition reported having read that the outcome would have been avoided if the physician had behaved in a different way. 94.3% of participants in the patient focus condition reported having read that the outcome would have been avoided if the patient had behaved in a different way. Finally, 97.4% of participants in the external focus condition reported having read that the outcome would have been different if the circumstances at the time of the hospitalisation had been different, $\chi^2(4, N = 327) = 583.67$, $p < .001$.

3.3.2 | Effect of counterfactual focus on the evaluation of the expert witness

We ran a univariate ANOVA to check whether participants in the experimental conditions evaluated the expert witness differently depending on the focus of the counterfactuals embedded in the report summary. Results showed a significant effect of counterfactual focus, $F(2,323) = 6.10$, $p = .003$, $\eta^2 = 0.04$. Post-hoc Bonferroni comparisons revealed that participants in the physician focus counterfactual condition ($M = 7.08$, $SD = 1.86$) evaluated the advisor significantly more positively than participants in the external focus counterfactual condition ($M = 6.16$, $SD = 2.01$), $p = .002$, whereas the evaluation of the advisor in the patient focus counterfactual condition ($M = 6.70$, $SD = 2.08$) did not differ from the other two conditions, indicating that participants appreciated the expert witness more when he focused on the doctor's role than when he focused on natural and situational elements.

3.3.3 | Effect of counterfactual focus on causal attribution

To test for differences in causal attribution across the four experimental conditions, we performed a repeated measures ANOVA with a mixed 4 (counterfactual focus: physician, patient, external factor, control) by 3 (causal attribution: physician, patient, external factor) design. No main within-participant, $F(2, 415) = 0.14$, $p = .866$, $\eta^2 < 0.01$, or between-participant effect emerged, $F(3,416) = 2.14$, $p = .094$, $\eta^2 = 0.02$, while the interaction effect was significant, $F(3,416) = 18.37$, $p < .001$, $\eta^2 = 0.12$.

To test our H1, according to which the counterfactual focus of the expert witness's report would drive participants' causal attributions in the corresponding direction, we compared scores in each experimental condition (see Figure 1). As predicted by H1a, in the physician focus condition participants significantly attributed the outcome of the event more to the physician than to the patient or to external factors, $F(2, 105) = 11.82$, $p < .001$, $\eta^2 = 0.18$. As predicted by H1b, in the patient focus condition participants attributed the outcome more to the patient than to the physician or external factors, $F(2, 103) = 29.74$, $p < .001$, $\eta^2 = 0.37$. Finally, as predicted by H1c in the external focus condition participants attributed the outcome more to external factors than to either actor, $F(2, 110) = 10.59$, $p < .001$, $\eta^2 = 0.16$. In the control condition, where no counterfactual clue was provided, participants attributed the outcome more to the physician than to external factors or to the patient $F(2, 94) = 3.49$, $p = .035$, $\eta^2 = 0.07$. To sum up, the results of the analysis fully supported our H1, according to which in the experimental conditions participants'

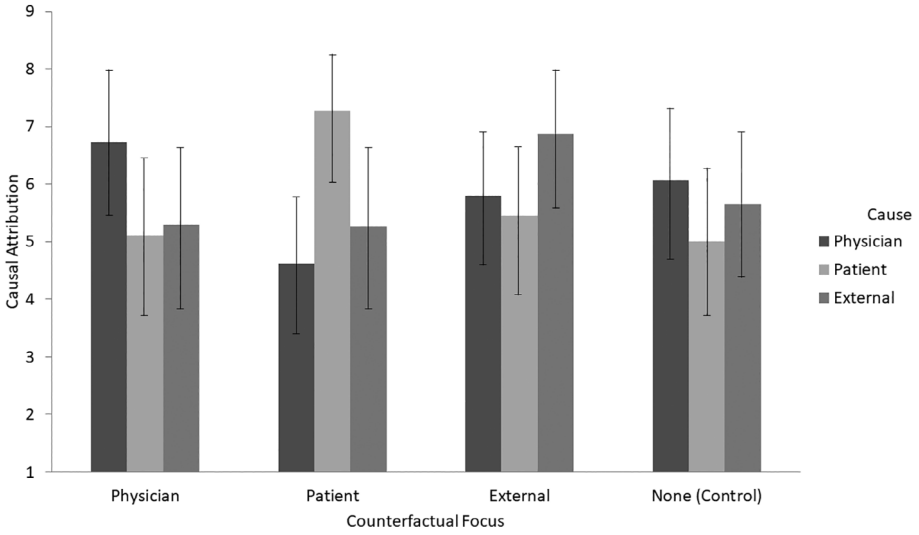

FIGURE 1 Causal attribution to the physician, the patient or external factors as a function of counterfactual focus (Study 1, mock juror sample)

attribution of causality would have been consistent with the focus of the counterfactuals employed by the expert witness.

3.3.4 | Effect of counterfactual focus on the perceived severity of the outcome

We ran a univariate ANOVA to test for differences in the perceived severity of the damage suffered by the patient among the four research conditions. Results showed that the outcome for the patient was rated similarly severe in all conditions (as reported in Table 1), $F(3,423) = 0.30$, $p = .828$, $\eta^2 < 0.01$. Therefore, the focus of the counterfactuals embedded in the expert witness's report did not increase or reduce the perceived severity of the damage suffered by the patient.

3.3.5 | Effect of counterfactual focus on the perceived foreseeability of the outcome

We then performed a univariate ANOVA on perceived foreseeability scores. Results showed a significant effect of counterfactual focus, $F(3, 420) = 8.96$, $p < .001$, $\eta^2 = 0.06$, with participants perceiving the outcome as more foreseeable in the physician focus condition ($M = 6.62$, $SD = 2.39$) than in the other three conditions, namely the patient focus condition ($M = 5.36$, $SD = 2.64$), $p = .001$, the external focus condition ($M = 5.07$, $SD = 2.33$), $p < .001$, and the control condition ($M = 5.43$, $SD = 2.30$), $p = .002$.

3.3.6 | Effect of counterfactual focus, outcome severity, and foreseeability on responsibility attribution

Finally, we analysed how participants' prevalent responsibility attribution to either the patient or the physician, as measured by the dichotomic responsibility index, varied as a function of the manipulated counterfactual focus, outcome severity and foreseeability.

A preliminary Chi-squared test showed that participants in the external focus condition were evenly split between those who gave more responsibility to the physician (50%) and those who gave more responsibility to the patient (50%). Responsibility attribution to the physician prevailed among participants in the physician focus (62%) and the control (64%) conditions, whereas responsibility attribution to the patient prevailed among participants in the patient focus condition (82.8%), χ^2 (3, $N = 427$) = 64.13. These results provided support to our H2a and H2b, according to which participants in the physician focus condition would attribute more responsibility to the physician than to the patient, and participants in the patient focus condition would do the opposite. In addition, they showed a tendency of participants in the control condition to attribute more responsibility to the physician.

We then performed a multiple logistic regression on the responsibility index. We used as predictors counterfactual focus (dummy-coded to compare physician focus, patient focus, and control conditions to the external focus condition), outcome severity, foreseeability, and the respective interaction terms. Full results of the logistic regression model are reported in Table 2. A significant interaction effect between counterfactual focus and foreseeability emerged, Wald χ^2 (3, $N = 427$) = 13.02, $p = .005$. Consistent with our H3b, we found a significant positive effect of the foreseeability by control condition interaction, Wald χ^2 (1) = 12.72, $p < .001$, O.R. 1.61, 95% confidence interval [1.24; 2.10], and no significant effect of the foreseeability by physician focus condition, Wald χ^2 (1) = 1.40, $p = .236$, O.R. 1.15, 95% C.I. [0.91; 1.46], or patient focus condition interactions, Wald χ^2 (1) = 0.97, $p = .341$, O.R. 1.14, 95% C.I. [0.87; 1.48]. Therefore, whereas in the control condition participants' responsibility attribution to the physician was positively associated with outcome foreseeability, this association was no longer significant when the expert witness report included counterfactuals focussed on either the physician or the patient. No significant effect of outcome severity was found, nor of the interaction between severity and counterfactual focus, Wald χ^2s (1, $N = 427$) < 0.45, $ps > .506$.

To summarise, the results of Study 1 fully supported our hypotheses. Participants' causal attributions were directly affected by the focus of the counterfactuals in the expert witness's report, with participants attributing a greater causal role to the actor or element the

TABLE 2 Binary logistic regression model of responsibility attribution to the physician or the patient as a function of counterfactual focus, outcome severity and foreseeability, and the respective interaction terms (Study 1, mock juror sample)

							O.R. 95% confidence interval	
	B	*SE*	Wald	*df*	*p*	O.R.	Lower	Upper
Constant	0.124	0.941	0.017	1	.895	1.132		
CF focus			3.523	3	.318			
Physician	−0.696	1.288	0.292	1	.589	0.498	0.040	6.228
Patient	−2.404	1.702	1.996	1	.158	0.090	0.003	2.538
Control	−2.447	1.582	2.393	1	.122	0.087	0.004	1.92
Severity	0.076	0.114	0.441	1	.507	1.079	0.862	1.350
Foreseeability	−0.134	0.084	2.556	1	.110	0.875	0.742	1.031
CF focus × severity			0.272	3	.965			
Physician	0.065	0.157	0.170	1	.680	1.067	0.784	1.452
Patient	0.008	0.200	0.002	1	.969	1.008	0.681	1.492
Control	0.077	0.189	0.164	1	.686	1.080	0.745	1.565
CF focus × foreseeability			13.018	3	.005*			
Physician	0.143	0.120	1.404	1	.236	1.153	0.911	1.460
Patient	0.128	0.134	0.907	1	.341	1.137	0.873	1.479
Control	0.479	0.134	12.721	1	.000**	1.614	1.241	2.101

Note: Nagelkerke R^2 = 0.246.
*p < .05.
**p < .001.

counterfactuals focused on in each condition. Conversely, when participants were presented just the judicial case (i.e., in the control condition), they tended to attribute the negative outcome to the physician, namely, the actor that was likely to be perceived as the one more in control of the situation. This result was consistent with the often-observed tendency to pose causal attribution mainly on human and controllable factors (Gopnik et al., 2004; Hart & Honoré, 1985; McClure et al., 2007). A similar direct effect of counterfactual focus was found in the case of responsibility attribution, as participants in the physician-focused and patient-focused conditions attributed greater responsibility to the respective actor as compared to participants in the external-focused condition. In line with what seen for causal attribution, participants in the control condition tended instead to attribute more responsibility to the physician than to the patient. Finally, whereas among participants in the control condition responsibility attribution was to some extent influenced by outcome foreseeability judgements, this was not the case for participants exposed to counterfactual cues in the expert witness report, suggesting that exposure to counterfactuals reduced the perceived relevance of this factor.

4 | STUDY 2

In Study 2, we replicated the same paradigm used in Study 1, with a sample of real judges. Based on our initial hypotheses, and on the results of Study 1, we expected that also expert judges' attributions would be congruent with the focus of the counterfactual statements embedded in the medical expert's report. Although we did not exclude that expert judges would in some way differ from mock jurors in the way information was handled, we did not formulate any specific hypothesis in this regard.

4.1 | Method

An invitation to join an online study on judicial decision-making was sent to the institutional email address of a total of 300 Italian judges holding a variety of positions and ranks in the judicial system. Among those who were contacted, 96 judges completed the questionnaire, with a 32.0% participation rate. Considering the moderate to large size of the effects found in Study 1 the final number of participants in Study 2 was still well above the required sample size to detect effects with 80% power and an alpha level of .05. Participants were in majority (60.4%) females, with an average age of M = 52.71, SD = 5.67, and an average of M = 22.90, SD = 7.29 years of service in the judicial system. Participants reported working as members of civil (44.7%), and criminal law courts (26.6%), or as members of special sections, such as juvenile or labour courts (16.0%). A small number of participants reported working as prosecutors (12.8%).

4.2 | Measures

The same materials and measures used in Study 1 were employed in Study 2. The final section of the questionnaire including sociodemographic questions was altered to include additional questions regarding participants' current position in the judicial system and their seniority.

4.3 | Results

4.3.1 | Manipulation check

All participants (100% in the physician and patient focus conditions, and 91.3% in the external focus condition) successfully recognised the focus of the medical examiner's report summary, $\chi^2(4, N = 67) = 134.00$, $p < .001$.

4.3.2 | Effect of counterfactual focus on the evaluation of the expert witness

We checked for differences in the evaluation of the expert witness across conditions, finding no significant effect of counterfactual focus, $F(2,92) = 1.15$, $p = .335$, $\eta^2 = 0.04$. The preference of student participants for the expert witness focusing counterfactuals on the physician, observed in Study 1, was not so evident in Study 2, although also expert judges showed a tendency to give the expert witness higher scores in the physician focus condition ($M = 6.59$, $SD = 2.28$) than in the patient focus condition ($M = 6.06$, $SD = 1.90$) and the external focus condition ($M = 5.35$, $SD = 2.69$) (Figure 2).

4.3.3 | Effect of counterfactual focus on causal attribution

As in Study 1, we analysed differences in causal attributions using a repeated measures ANOVA with a 4 (counterfactual focus: physician, patient, external, control) × 3 (causal attribution: physician, patient, external factor) mixed design. No main effect of causal attribution emerged, $F(2, 86) = 0.68$, $p = .50$, $\eta^2 = 0.02$, while a main effect of counterfactual focus, $F(3, 87) = 3.42$, $p = .021$, $\eta^2 = 0.11$, and of the interaction between counterfactual focus and causal attribution did emerge, $F(6,174) = 8.29$, $p < .001$, $\eta^2 = 0.22$. As in Study 1, the results fully confirmed our H1. As can be seen in Table 3, in the physician focus condition participants significantly attributed the final outcome more to the physician than to the patient or to external factors, $F(2, 20) = 10.46$, $p < .001$, $\eta^2 = 0.51$ (H1a). In the patient focus condition participants attributed the outcome more to the patient than to the physician or to external factors, $F(2, 22) = 7.57$, $p < .001$, $\eta^2 = 0.41$ (H1b). In the external focus condition, participants attributed the outcome more to external factors than to either actor, $F(2, 21) = 8.80$, $p = .002$, $\eta^2 = 0.47$ (H1c). No significant difference emerged in the case of the control condition, $F(2, 20) = 1.13$, $p = .344$, $\eta^2 = 0.10$. Therefore, as in the case of mock jurors (Study 1), judges' causal attributions were strongly influenced by the counterfactual focus of the expert witness's report, shifting from one actor to another in agreement with the counterfactual cues provided by the report.

4.3.4 | Effect of counterfactual focus on the perceived severity of the outcome

As in Study 1, no effect of counterfactual focus on the perceived severity of the outcome was found, $F(3,92) = 1.24$, $p = .301$, $\eta^2 = 0.04$. Participants across all four conditions perceived the outcome as moderately severe ($M = 6.21$, $SD = 1.80$).

4.3.5 | Effect of counterfactual focus on the perceived foreseeability of the outcome

We performed a univariate ANOVA on the perceived foreseeability scores. Results showed the same significant effect of counterfactual focus already observed in Study 1, $F(3, 92) = 3.15$, $p = .029$, $\eta^2 = 0.09$,

TABLE 3 Means and *SD*s (in parentheses) of causal attribution, outcome severity, outcome foreseeability, and medical advisor evaluation scores in the four experimental conditions (Study 2, judge sample)

	Counterfactual focus			
	Physician	**Patient**	**External**	**Control**
Causal attribution				
Physician	7.32[a] (1.78)	3.54[b] (2.72)	4.00[b] (2.56)	3.55[b] (2.60)
Patient	4.32[a] (2.19)	6.67[b] (2.68)	4.26[a] (2.65)	4.27[a] (2.31)
External factors	4.00[a] (2.55)	4.75[a] (3.23)	7.04[b] (2.18)	4.82[a] (3.14)
Outcome severity	6.84[a] (1.78)	5.96[a] (1.94)	6.15[a] (1.80)	5.96[a] (1.67)
Outcome foreseeability	6.05[a] (2.05)	4.44[ab] (1.90)	4.10[b] (2.41)	4.92[ab] (2.63)
Medical advisor evaluation	6.59[a] (2.28)	6.06[a] (1.90)	5.35[a] (2.69)	— —

Note: Means with different superscripts within each row differ at $p < .05$.

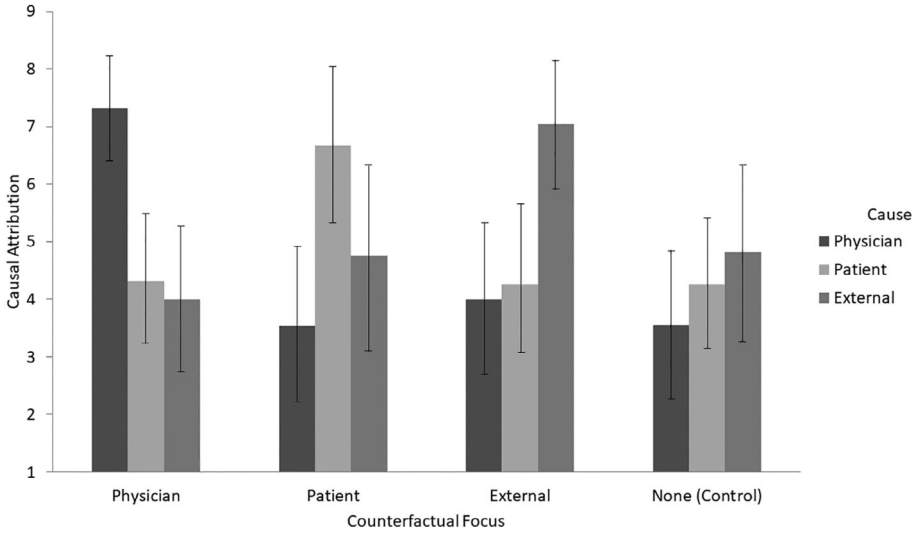

FIGURE 2 Causal attribution to the physician, the patient or external factors as a function of counterfactual focus (Study 2, judge sample)

with participants perceiving the outcome as more foreseeable in the physician focus condition (M = 6.05, SD = 2.05) than in the external focus condition (M = 4.10, SD = 2.41), p = .029. The difference with the patient focus condition (M = 4.44, SD = 1.90), p = .113, and with the control condition (M = 4.92, SD = 2.63), p = .554, was not significant.

4.3.6 | Effect of counterfactual focus, outcome severity, and foreseeability on responsibility attribution

Finally, as in Study 1 we analysed how judges' prevalent responsibility attribution to either the physician or the patient varied as a function of the manipulated counterfactual focus and the outcome severity and foreseeability scores.

A Chi-squared test showed that a large majority of participants in the control condition (80%) attributed more responsibility to the patient than to the physician, as it was the case for participants in the external focus condition (62.5%) and in the patient focus condition (87%), whereas responsibility attribution to the physician prevailed in the physician focus condition (72.7%), χ^2 (3, N = 89) = 20.40. This finding further supported our H2a and H2b, but also showed, when compared with the corresponding findings of Study 1, that judges were reluctant to attribute responsibility to the defendant of the mock case, unless counterfactual cues in the expert witness' report pointed in that direction.

We subsequently tested the same multiple logistic regression model used in Study 1. Given the limited size of the sample, we applied a bootstrapping procedure with 1,000 resamples prior to the analysis, in order to obtain confidence intervals for our results (Chernick & LaBudde, 2014). A significant effect of counterfactual focus was found, Wald χ^2 (1, N = 89) = 11.33, p = .010, as well as the predicted significant interaction effect between counterfactual focus and foreseeability, Wald χ^2 (3, N = 89) = 8.07, p = .045, with a significant positive effect of the foreseeability by control condition interaction, B = 2.55, p = .014, O.R. 12.76, 95% C.I. [1.68; 96.90]. No other significant effects were found. The full regression model with all coefficients and confidence intervals is reported in Table 4. In sum, the retrospective evaluation factor of outcome severity had only a weak effect on judges' attribution of responsibility to the physician, whereas foreseeability had an impact only in the absence of the counterfactual cues given by the expert witness, as already observed in Study 1, and consistent with our Hypothesis H3b.

In conclusion, the results of Study 2 substantially replicated those of Study 1, corroborating our expectations that the counterfactual focus of the expert witness's report would affect participants' causal and responsibility attributions, and that the presence of counterfactuals in the report would moderate the importance of outcome foreseeability. Interestingly, some differences in the results of the two studies did emerge, and they regarded mainly the control condition. In this condition mock jurors (Study 1) were more inclined to see the physician than the patient as the main cause and the main responsible of the event, while this was not the case for judges (Study 2).

5 | GENERAL DISCUSSION

Our findings showed for the first time that the focus of counterfactuals included in an expert witness's report consistently influences causal and responsibility attributions regarding a judicial case, and that this is true for both lay jurors and expert judges. In addition to influencing causal and responsibility attribution, exposure to counterfactuals reduced reliance on other factors that have been shown to affect attributions in judicial decision-making, namely, outcome severity and foreseeability (Alicke, 2000; Lagnado & Channon, 2008).

Our results offer an advancement in the so far scarcely explored research area on the effects of counterfactual communication in the judicial domain. As discussed in the Introduction, past research on judicial decision-making has shown that different actors (jurors, judges, prosecutors, attorneys, victims and defendants) recur to

TABLE 4 Binary logistic regression model of responsibility attribution to the physician or the patient as a function of counterfactual focus, outcome severity and foreseeability, and the respective interaction terms (Study 2, judge sample)

							O.R. 95% confidence interval	
	B	*SE*	Wald	*df*	*p*	O.R.	Lower	Upper
Constant	−0.945	0.562	2.827	1	.093	2.572		
CF focus			11.331	3	.010*			
Physician	1.675	0.788	4.526	1	.033*	5.341	1.141	25.007
Patient	−1.158	0.928	1.558	1	.212	0.314	0.051	1.935
Control	−0.360	0.875	0.169	1	.681	0.698	0.126	3.881
Severity	−0.008	0.483	0.000	1	.987	0.992	0.385	2.555
Foreseeability	−0.962	0.596	2.601	1	.107	0.382	0.119	1.230
CF focus × severity			0.195	3	.978			
Physician	−0.047	0.709	0.004	1	.947	0.954	0.238	3.826
Patient	0.176	0.759	0.054	1	.816	1.193	0.270	5.277
Control	−0.252	0.944	0.071	1	.790	0.777	0.122	4.945
CF focus × foreseeability			8.073	3	.045*			
Physician	1.625	0.840	3.742	1	.053	5.076	0.979	26.328
Patient	0.215	1.060	0.041	1	.839	1.240	0.155	9.897
Control	2.546	1.035	6.056	1	.014*	12.756	1.679	96.904

Note: Nagelkerke $R^2 = 0.409$.
*$p < .05$.

counterfactual thinking when they evaluate events and their consequences, or assess causality and responsibility (Alicke et al., 2015; Cane, 2001; Spellman & Kincannon, 2001). However, counterfactual thinking has always been conceptualised and investigated as a strictly intrapersonal process (Alvarez & Miller, 2016; Bothwell & Duhon, 1994; Daftary-Kapur & Berry, 2010; Turley et al., 1995), although there is ample evidence showing that counterfactuals are commonly shared and discussed in the courtroom (Broda-Bahm, 2001; Nivelle, 2008; Taormina, 2016), as they are in other domains (Catellani & Covelli, 2013; Lebow, 2010; Tetlock & Lebow, 2001). Our findings therefore contribute to extending this area of research from the intrapersonal to the interpersonal domain, by providing evidence that information presented in a counterfactual format by an expert witness can indeed affect judicial decisions, by influencing recipients' causal and responsibility attributions.

Previous research carried out in the political domain had investigated the conditions under which counterfactual attacks and defences influence the evaluation of the actor focused on in the counterfactuals (Catellani & Bertolotti, 2014b). In the context of judicial decision making we have now shown that counterfactuals embedded in communication function as a powerful cue in recipients' causal and responsibility attribution process, highlighting the perceived role of the actor on whom they are focused. Furthermore, we have shown that exposure to counterfactual communication determines also a structural change in the relative weight of the factors usually contributing to responsibility attribution, reducing reliance on retrospective considerations such as outcome severity and foreseeability.

In our research, counterfactuals were produced by an allegedly neutral and authoritative source, namely an expert witness. Past research carried out in the political field has found that the influence of counterfactual communication can diminish or even disappear when the counterfactual source is perceived as unreliable (Catellani & Bertolotti, 2014b). This might be the case also in the judicial field. Therefore, further research might usefully explore the factors that are likely to enhance or, conversely, reduce receivers' reliance on counterfactual statements employed by judicial actors. For example, seniority and professional credentials, which are associated with credibility (Shapiro, Mixon, Jackson, & Shook, 2015), are likely to reduce jurors' level of scrutiny (Salerno, Bottoms, & Peter-Hagene, 2017). The perceived expertise of the source (Parrott, Neal, Wilson, & Brodsky, 2015; Porter & Ten Brinke, 2009; Tadei, Finnilä, Reite, Antfolk, & Santtila, 2016; Wood, DeVault, Miller, Kammelmeier, & Summers, 2019), or the clarity (Leslie, Young, Valentine, & Gudjonsson, 2007) and perceived credibility of testimonies and reports might also influence the persuasiveness of counterfactual communication.

Consistent with our hypotheses, we found that counterfactuals are a powerful communication tool for influencing both naïve people and expert professionals. That said, we also found that mock jurors and real judges did have different evaluations in the control conditions of our two studies, namely, when participants read the judicial case without being exposed to the expert witness's counterfactuals. In this case, mock jurors tended to attribute a relatively greater share of causal contribution and responsibility for the outcome to the physician, while this was not the case for actual judges. In other words, mock jurors focused causal and responsibility attributions on the actor

that was perceived to be more in control of the situation. This result suggests that mock jurors might be more subject than actual judges to the often-observed tendency to pose causal attribution mainly on voluntary and human factors (Gopnik et al., 2004; Hart & Honoré, 1985; McClure et al., 2007). In the same condition judges behaved differently, very likely applying the so called "*in dubio pro reo*" principle, according to which a defendant shall not be judged guilty unless compelling evidence is provided. It is also noteworthy that in the judges sample the regression models of responsibility attribution explained a greater share of variance than in the mock juror sample, suggesting a possible more rigorous and uniform reasoning style in the case of judges, which is in line with some findings of previous research on judges' decision-making (Posner, 2008). Overall, these differences suggest the opportunity to further investigate possible differences in the causal and responsibility attribution processes of lay and expert judges, to assess whether the latter are more likely than lay jurors to recur to an in-depth reasoning style, particularly when dealing with complex decisions such as comparative negligence assessment (Wiener et al., 1994; Wiener, Krauss, & Lieberman, 2011). Future research may also explore the potential differences between lay jurors and judges in the pathways that lead from causal inference to responsibility attribution, and particularly whether retrospective evaluations of outcome severity and foreseeability play different roles in the two groups (Gambetti et al., 2017; Grenier et al., 2007; Lagnado & Channon, 2008).

Our research has some limitations. The number of participants in Study 2 was lower than in Study 1. This was because the population of judges in active duty is rather small and difficult to involve in experimental research. The different number of mock jurors and actual judges involved in this research prevented us from performing a direct comparison between them in a single study. Future research may address this issue, further investigating some of the differences we have observed in the present research as regards mock jurors and judges' reactions to counterfactual communication. Furthermore, due to the design of our studies we did not compare the effects of expert witness reports containing counterfactual cues with those of reports including only factual elements. Further studies with an alternative design could provide some insight on the relative strength of counterfactual arguments as compared with factual ones. Another limitation to the external validity of our findings is the uniform nationality of the participants, which prevented us from investigating possible intervening effects of different cultural norms, customs, and judicial systems. Finally, concerning the ecological validity of our findings, we should stress the fact that, due to the controlled experimental nature of our studies, we tested our hypotheses using a single simplified medical case scenario, and provided participants with a short excerpt from an alleged expert witness report. Therefore, we necessarily ignored the numerous other elements that are present in an actual trial, such as witness cross-examination (Cotterill, 2004) and attorney interactions (Reed & Bornstein, 2018).

Our results have some relevant practical implications. They suggest that training programs for jurors or judges (Devine, Clayton, Dunford, Seying, & Pryce, 2001) might usefully incorporate knowledge on how counterfactuals function and affect people's reasoning. Furthermore, given the potential of counterfactual communication as a debiasing tool (e.g., in reducing the importance attributed to retrospective evaluations such as outcome severity), new procedures based on the explicit discussion of counterfactual alternatives to the events presented in a case might be explored as a way to improve the overall quality of judicial decision-making.

In conclusion, our research showed, for the first time, that expert witnesses' counterfactuals are a powerful communicative tool to influence the judicial reasoning of both lay jurors and expert judges. Counterfactuals enhance the causal role receivers attribute to human and non-human factors involved in a judicial case, and reduce the role played by other retrospective evaluations that may influence causal and attributional evaluations, such as the severity of the outcome and its foreseeability. As such, our results contribute to a better understanding of the psychological factors that may influence the quality of lay jurors' and expert judges' decisions.

CONFLICT OF INTEREST

The authors declare no known conflict of interest associated with this publication.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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APPENDIX

Full text of the medical malpractice case used in Study 1 and Study 2.

Giorgio Sarti is a 35-year old professional. One day he starts experiencing an abdominal pain of unusual intensity, and decides to visit his general practitioner, Dr. Landini. The doctor examines the patients and concludes that, as it is the first time he has experienced this type of symptoms, it might be the initial stage of a colitis, that is a generic inflammation of the large intestines. He prescribes Mr. Sarti to take a few days of rest, follow a light diet and to go back for a follow-up check in a week. In the following days Mr. Sarti's pain gradually subsides and he decides to go for a ski trip he had planned months in advance.

After a couple of days, however, the abdominal pain reappears, with even greater intensity than before. Mr. Sarti has to visit the local Emergency Room of the mountain town where he is staying. The exams show an advanced-stage peritonitis due to intestinal volvulus, that is an abdominal inflammation due to a twisted section of the intestines, a condition requiring immediate surgical intervention.

The closest hospital, however, is located down in the valley and, due to a snowstorm, it takes several hours for the ambulance to bring Mr. Sarti there. When he finally undergoes surgery, a large part of his intestines has to be resected. This results in a 20-day long hospitalisation, followed by a long convalescence.

Consequently, Mr. Sarti loses several months of work as Italian representative for a commercial company, and has to give up on rock climbing as a sport, which used to be a quite important activity in his lifestyle.

Therefore, Mr. Sarti decides to sue Dr. Landini for not having diagnosed correctly his condition. The judge reads the plaintiff's and defendant's claims and appoints a medical examiner, Dr. Gerosa, to assess the patients' temporary and/or permanent damages, and the doctor's responsibility. Dr. Gerosa examines the clinical documentation and visits Mr. Sarti, estimating a permanent 20% damage and a six-month period of partial disability, corresponding to his absence from work, recovery and convalescence.

[Physician focus counterfactual condition]

In his final report, Dr. Gerosa concludes that if Dr. Landini had considered the patient's symptoms more carefully, he could have planned surgery before the situation had worsened. If Dr. Landini had prescribed some simple diagnostic tests, the emergency surgery could have been avoided.

[Physician focus counterfactual condition]

In his final report, Dr. Gerosa concludes that if Mr. Sarti had followed the doctor's orders, the operation would have had smaller consequences. If Mr. Sarti had stayed home, he could have contacted the doctor as soon as the symptoms had come back, before the situation had worsened.

[External focus counterfactual condition]

In his final report, Dr. Gerosa concludes that if the mountain town had an hospital, Mr. Sarti could have had surgery immediately after the diagnosis. If the road had not been closed by the severe weather, Mr. Sarti would have reached the hospital sooner.