

RUNNING HEAD: Causes, enablers, and the law

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Causes, enablers, and the law

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Abstract

Many theories in philosophy, law, and psychology, make no distinction in meaning between the enabling conditions, *E*, that are necessary for a cause, *C*, to yield an outcome, *O*. Yet, given *E*, there are three possibilities: *C and O*, *not-C and O*, and *not-C and not-O*; whereas, given *not-E*, there are only two possibilities: *C and not-O*, and *not-C and not-O*. Three experiments corroborated this account, showing that individuals distinguish between causes and enabling conditions in brief descriptions of wrongful outcomes. They rate actions that bring about outcomes as causes, and actions that make possible the causal relation as enablers. Likewise, causers (as opposed to enablers) are rated as more responsible for the outcome, as liable to longer prison sentences, and as liable to pay higher fines. Theories and the law, both criminal and civil, therefore languish behind the intuitions of those to whom they are supposed to apply.

The defendants, who were manufacturers of guns, negligently oversupplied shops in States with weak gun laws. Criminals came into possession of some of these guns and murdered relatives of the plaintiffs. The court decided that some defendants were the ‘proximate’ cause of the homicides (Lytton, 2000). In a contrasting case, the defendant, a building contractor, negligently left open an unguarded elevator shaft, and a young lad, knowing that the elevator was not there, invited the plaintiff to step into it (Hart & Honoré, 1959/1985). The court took the traditional view that a free action of a third party – the young lad – negated the causal relation. Yet, the negligence of both the gun manufacturers and the building contractor seem similar: they enabled unfortunate outcomes to occur. The divergent judgments in the two cases are symptomatic of a pervasive problem in the law, which also occurs in philosophy and psychology: a failure to recognize a principled distinction between causes and enabling conditions. The present paper proposes an alternative theory, which implies that they differ in a fundamental way, and it shows that naïve individuals – those with no training in the law or psychology – are sensitive to this difference.

Many theorists have followed Mill (1843/1973) in arguing that the choice of a cause from a set of conditions is often capricious. This view has influenced philosophy to its detriment (see Lombard, 1990). Jurists have also agreed with Mill (Hart & Honoré, 1959/1985), and both criminal law and the law of tort echoes him too (Roberts & Zuckerman, 2004; Jones, 2005). Psychologists have rejected a difference in meaning between claims about causes and enabling conditions, and instead have proposed many pragmatic distinctions between them: the cause is inconstant whereas the enabling state is constant (Cheng & Novick, 1991), the cause violates a norm whereas the enabling condition does not (Einhorn & Hogarth, 1986), the cause is what you describe whereas the enabling condition is what you take for granted (Turnbull & Slugoski, 1988; Hilton & Erb, 1996), or the cause is

what you describe first and the enabling condition is what you describe second (Kuhnmünch & Beller, 2005).

Why have theorists echoed Mill in this way? The answer, in our view, is that it is hard to hold in mind the different possibilities referred to in a description of how a cause and an enabler work together to bring about an effect. We can illustrate our theory of the difference in meaning between the two, using the following vignette:

Mary threw a lighted cigarette into a bush. Just as the cigarette was going out, Laura deliberately threw petrol on it. The resulting fire burnt down her neighbour's house.

Naïve individuals can think about counterfactual possibilities (Byrne, 2005; Frosch & Byrne, 2006), and so they should understand that given that Mary threw the lighted cigarette into the bush, there were at that time three possibilities:

Laura throws the petrol and there's a fire.

Laura doesn't throw the petrol and there's a fire (for some other reason).

Laura doesn't throw the petrol and there's not a fire.

The first possibility is what happened in fact, and the other two possibilities are counterfactual. But, given that Mary hadn't thrown the lighted cigarette into the bush, there were two other counterfactual possibilities:

Laura throws the petrol and there's not a fire.

Laura doesn't throw the petrol and there's not a fire.

It follows that Mary's action enables Laura's action to cause the fire. In general, enabling conditions are necessary for an outcome, whereas causes are sufficient for the outcome given the presence of a relevant enabling conditions and, as Cummins (1995, Cummins, Lubart, Alksnis, & Rist, 1991) pointed out, the lack of disabling conditions.

It is not easy to hold in mind all the counterfactual possibilities consistent with such causal vignettes. On our account, individuals tend to focus on the salient case in which enabler, cause, and outcome all occur (see also Goldvarg & Johnson-Laird, 2001). One consequence is that they have difficulty in distinguishing between the two, and that is why Mill's position has been so popular. But it does not follow that the task of distinguishing the two is impossible, and the aim of our experiments was to determine whether naïve individuals were sensitive to the distinction when it occurred in legal contexts.

THE EXPERIMENTS

We carried out three experiments in order to examine whether participants distinguish between causes and enablers. In Experiments 1 and 2, they were presented with vignettes describing the actions of two agents and a subsequent outcome affecting a third party, e.g.:

(1) In a tower block Mr. Jones, a contractor, left open an unguarded lift shaft. Mr.

Peters knew that this was the case and invited David to step inside. David was badly injured.

The enabling condition is the unguarded lift (elevator) shaft, which enables Peters' invitation to cause David's injury. In Experiment 3, each vignette described only one agent, either the causer or else the enabler. For example, vignette (1) was edited to describe only the causer:

(2) In a tower block Mr. Peters invited David to step inside an open lift shaft when he knew that the lift wasn't there. He was badly injured.

or only the enabler:

(3) In a tower block Mr. Peters left open an unguarded lift shaft, and David stepped inside the shaft, but the lift wasn't there. He was badly injured.

In Experiment 1, the participants were assigned at random to one of two groups. One group rated the causer on four scales, and the other group rated the enabler on four scales. In

Experiment 2, the participants acted as their own controls and rated the causer on the four scales for three vignettes and rated the enabler on the four scales for three vignettes. In Experiment 3, the participants also acted as their own controls, receiving both versions of each vignette (one with a causer alone, and one with an enabler alone), but the versions were in two separate blocks of trials presented in a counterbalanced order.

Method

Participants

Thirty-four women undergraduate students from the University of Reading (mean age = 20 years, range = 18-44) took part in Experiment 1. Twenty undergraduate students from the University of Southampton (mean age = 22 years, range = 19-49, 15 women and 5 men) took part in Experiment 2. And thirty-two psychology undergraduate students from the University of Reading (mean age = 20 years, range = 16-26, 31 women and one man) took part in Experiment 3.

Materials and procedure

Six vignettes, including both the example about the fire and the example about the elevator (the lift), were created in which one agent's action enabled another agent to bring about an unfortunate outcome in a wrongful way (see the Appendix). The status of these vignettes was corroborated by someone acting as an independent judge who enumerated the possibilities in the way that we described in the Introduction. Each vignette was constructed in three versions to counterbalance the order in which the cause, the enabler, and the outcome, were described, using the following orders: enabler-cause-outcome; cause-enabler-outcome; cause-outcome-enabler. Each participant received two instances of each of the orders, which were systematically rotated in every experiment. The participants' task was to rate an agent,

the enabler or the causer or both (depending on the experiment) on four five point-scales (see the Appendix):

- To what extent did X cause the outcome (i.e. bring about the outcome) as opposed to enable it to occur (i.e. make it possible for the outcome to happen)?
- To what degree was X responsible for the outcome?
- If you were the judge giving out a prison sentence, roughly how many years would you sentence X to?
- If you were on a jury awarding damages, roughly how much would you make X pay?

These ratings occurred in different random orders from one trial to another. Each of the vignettes and its associated questions-and-scales were printed on a separate page of a booklet which was given to participants to complete. Participants in Experiment 1 were tested in groups of up to 10 people; and participants in Experiments 2 and 3 were tested individually.

Results

Figures 1, 2, and 3 present the results from the three experiments: the mean ratings for the causers and for the enablers on each of the four scales. Participants had no difficulty in distinguishing between the two sorts of agent in all three experiments. In comparison to enablers, causers in Experiment 1 were rated as more a cause than an enabler of the outcome (Mann Whitney $U = 6$, $p < .001$), they were rated as more responsible for the outcome ($U = 12.5$, $p < .001$), they were sentenced to more years in prison ($U = 19.5$, $p < .001$), and they had to pay a greater amount in damages ($U = 32$, $p < .001$). The same effects occurred within subjects in Experiment 2: in comparison to enablers, causers were rated as more a cause than an enabler of the outcome (Wilcoxon test, $z = 3.8$, $p < .001$), they were rated as more responsible for the outcome ($z = 3.9$, $p < .001$), they were sentenced to more years in prison

($z = 3.5, p < .001$), and they had to pay a greater amount in damages ($z = 3.6, p < .001$). And these effects also occurred within subjects in Experiment 3: in comparison with enablers, causers were rated as more a cause than an enabler of the outcome (Wilcoxon test, $z = 5, p < .001$), they were rated as more responsible for the outcome ($z = 5.02, p < .001$), they were sentenced to more years in prison ($z = 5.02, p < .001$), and they had to pay a greater amount in damages ($z = 5.02, p < .001$). An analysis of the first block of trials in this experiment yielded the same pattern of results, and they occurred for each of the two versions of the six vignettes.

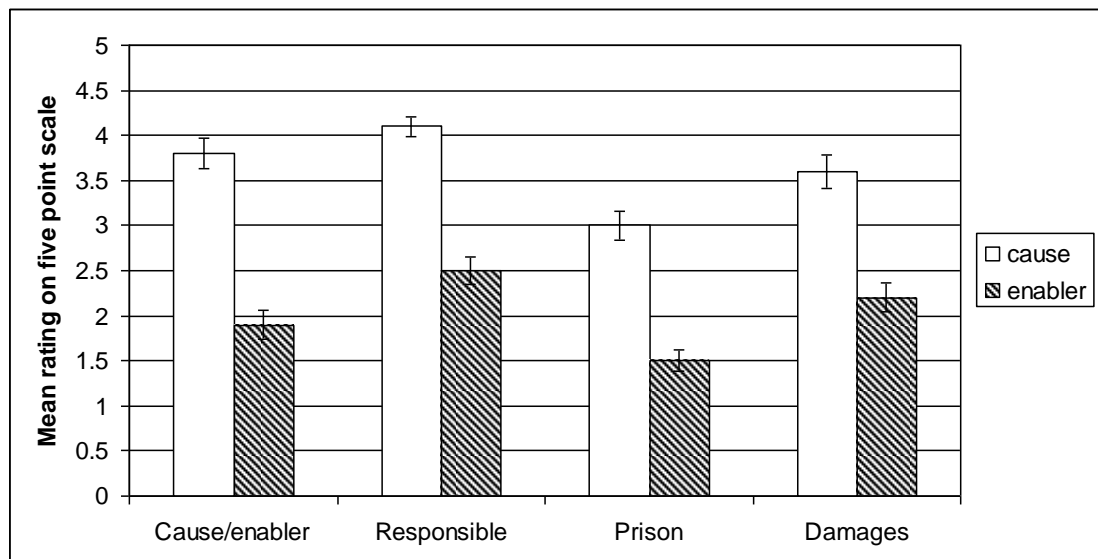


Figure 1. Mean ratings on the four 5-point scales for causes and enablers in Experiment 1. Bars are standard error.

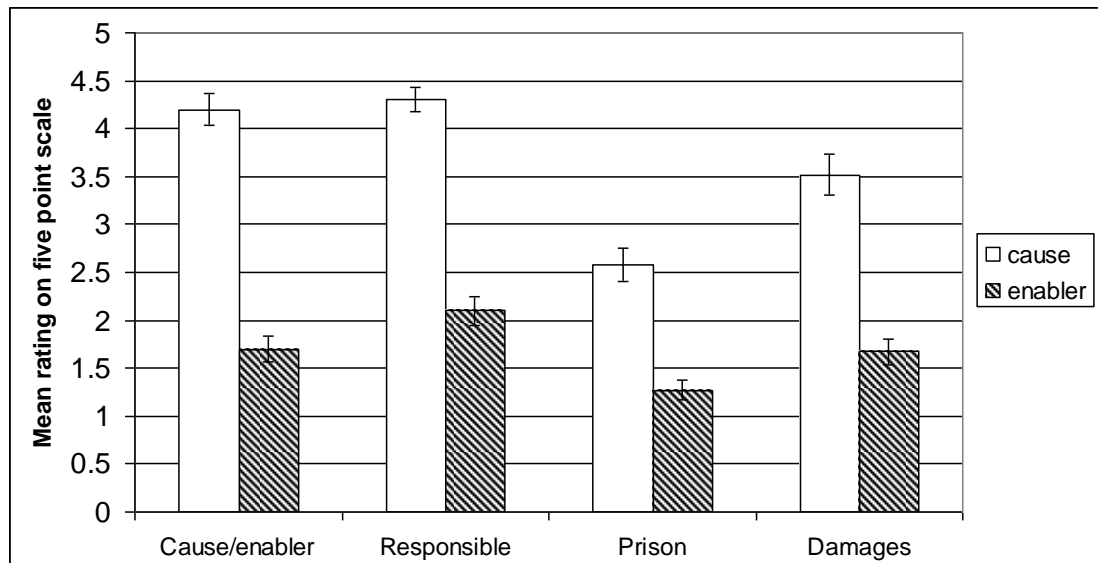


Figure 2. Mean ratings on the four 5-point scales for causes and enablers in Experiment 2. Bars are standard error.

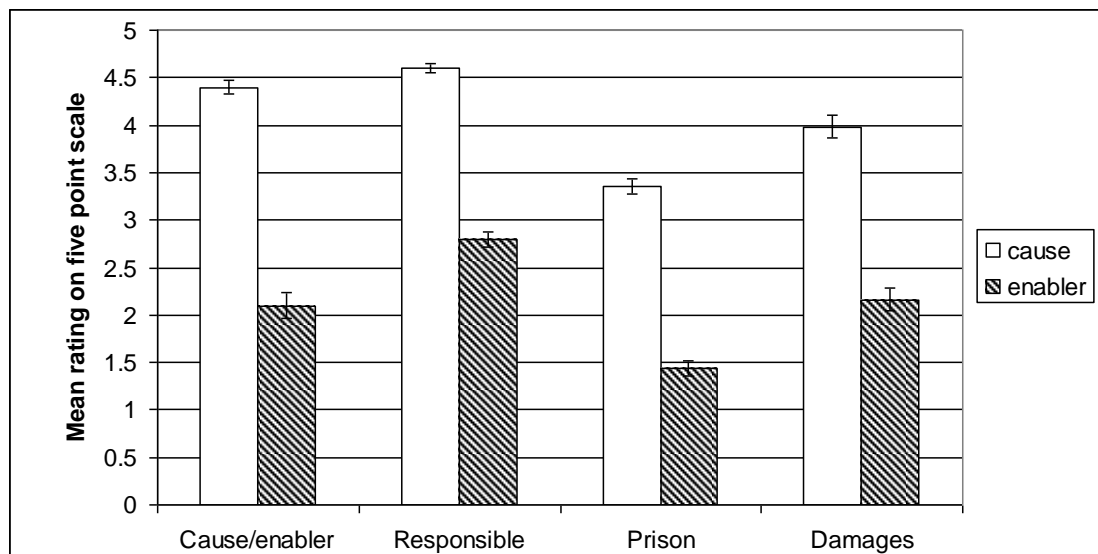


Figure 3. Mean ratings on the four 5-point scales for causes and enablers in Experiment 3. Bars are standard error.

The order of mention of the causal agents had no reliable effect on the rating of causal status on the cause-enabler rating scale: tests of an effect of order of mention in the three different versions of each vignette all yielded non-significant results in both Experiments 1

and 2 (Kruskall-Wallis $H < 4.9$ and all $p > .09$). Because Experiment 3 used vignettes containing one agent, the question of order does not arise.

In Experiment 1, an analysis of the six different contents showed no overall reliable differences among their ratings except for years in prison, which is to be expected because the crimes varied in severity (Friedman's nonparametric analyses of variance, yielded $\chi^2(5)$ values of .96 for cause-enabler scale, 3.5 for responsibility, 15.4 for years in prison, and 6.8 for amount of damages, $p > .05$ for all cases except years in prison: $p < .01$). However, a post-hoc examination revealed that for one vignette, which was about faulty brakes on a car, participants did not consistently distinguish between the cause and the enabler ($U = 94.5$, $p = .085$). We edited this vignette to clarify the distinction (see the Appendix), and Experiments 2 and 3 showed the predicted effects for all six vignettes on the cause-enabler ratings, and the responsibility ratings.

As the Figures show, in comparison with the participants in Experiments 1 and 2, those in Experiment 3 rated the causal agent as more of a cause, as more responsible, as liable to a longer prison sentence, and as liable to pay greater damages (for $n_1 = 37$ and $n_2 = 33$, Mann Whitney U ranged from 313 through 345, p values ranged from $p < .001$ through $< .03$). One plausible reason for this difference is that the co-presence of an enabler in the vignettes in the first two experiments diffuses causal responsibility, and so the enabler ends up carrying some of the responsibility that would otherwise have been attributed to the causer.

General Discussion

A court decided that gun makers who negligently supplied guns to stores in States with weak gun laws were a cause of murders that criminals committed with such guns; yet, another court decided that a builder who negligently left an open lift shaft unguarded was not

the cause of an accident when a young lad deliberately invited a stranger to step inside. Such judgments reflect a common view that where more than one agent is involved in an outcome, the choice of which agent *caused* the outcome is capricious (Mill, 1843/1973; Hart & Honoré, 1959/1985). As we mentioned in the Introduction, many psychological theories also draw no principled distinction between causes and enabling conditions. Yet, the participants in our experiments did distinguish between them. We had deliberately contrived the vignettes that they rated so that one agent carried out an action that enabled the other to cause an outcome. For example, Mary threw a lighted cigarette into a bush, Laura deliberately threw petrol on it, and the resulting fire burnt down a house. Individuals have no difficulty in thinking about counterfactual possibilities (Byrne, 2005; Frosch & Byrne, 2006). They grasp that given that Mary threw the lighted cigarette into the bush, there are three possibilities: Laura throws the petrol and there's a fire, Laura doesn't throw the petrol and there's a fire (for some other reason), and Laura doesn't throw the petrol and there's not a fire. But, given that Mary didn't throw the lighted cigarette into the bush, there are only two possibilities: Laura throws the petrol and there's not a fire, and Laura doesn't throw the petrol and there's not a fire. They accordingly rate Laura as a cause rather than an enabler of the event, and they rate Mary as an enabler rather than a causer of the event. They likewise give Laura a higher rating of responsibility than the rating they give to Mary; they sentence Laura to a longer prison sentence than the one they assign to Mary; and they give Laura a higher fine than the one they give to Mary. These ratings occurred in a study in which one group of participants assigned ratings to the causers and another group assigned ratings to the enablers (Experiment 1). The same patterns occurred when individuals acted as their own controls and rated the causes in some vignettes and the enablers in the other vignettes (Experiment 2). They also occurred when individuals rated some vignettes that described only the cause of the outcome and other vignettes that described only the enabler of the outcome (Experiment

3). This last result shows that not even the *temporal* order of the two events is needed as clue to the status of the causer and the enabler. The ratings did not differ reliably across six different vignettes in any of the studies. They did not differ reliably depending on whether the description of the cause occurred before or after the description of the enabler in Experiment 1 and 2 (pace Kuhnmünch & Beller, 2005). And in Experiment 3, of course, the vignettes described only one antecedent action, the cause or else the enabler. The absence of a second agent is likely to have led the participants to assign higher ratings to the scales in this experiment: in contrast, when there are two agents, causal responsibility is diffused between them. In general, individuals are unlikely to think about all the possibilities compatible with causal claims, and more likely to focus on the salient case in which the enabler, cause, and outcome all occur.

Can other psychological theories explain our results? We have seen that accounts based on which act is described, or which is described first as opposed to second, cannot explain the phenomena. Likewise, probabilistic accounts of causation do not provide any principled distinction between causes and enablers: the conditional probability of the effect given the enabler can be equal to its probability given the cause (pace Cheng, 1997). In our legal vignettes, both sorts of action – throwing a cigarette into a bush and throwing petrol (gasoline) on it – can be said to violate a norm (pace Einhorn & Hogarth, 1986). In some of our vignettes, the enabling state is constant whereas the cause is inconstant (Cheng & Novick, 1991), but in others the enabler is just as much an action as the cause, e.g., to renew a prescription (see vignette 5 in the Appendix). However, one other extant theory may offer an alternative explanation: the view that individuals rely on causal models based on mechanisms and forces (Sloman, Barbey, & Hotaling, 2007).

The moral of our studies for jurists is simple: in cases in which the actions of one agent enable those of another agent to cause an event, individuals ignorant of the law can

distinguish between the two. Like the psychological theories, the law in this respect languishes behind the intuitions of those whom it is supposed to govern.

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References

- Byrne, R. M. J. (2005). *The rational imagination: how people create alternatives to reality*. Cambridge, Mass.; London: MIT.
- Cheng, P. W. (1997). From covariation to causation: a causal power theory. *Psychological Review*, *104*, 367–405.
- Cheng, P. W., & Novick, L. R. (1991). Causes versus enabling conditions. *Cognition*, *40*, 83-120.
- Cummins, D. D. (1995). Naive theories and causal deduction. *Memory & Cognition*, *23*(5), 646-658.
- Cummins, D. D., Lubart, T., Alksnis, O., & Rist, R. (1991). Conditional reasoning and causation. *Memory & Cognition*, *19*(3), 274-282.
- Einhorn, H. J., & Hogarth, R. M. (1986). Judging Probable Cause. *Psychological Bulletin*, *99*(1), 3-19.
- Frosch, C.A., & Byrne, R.M.J. (2006). Priming Causal Conditionals. In R. Sun (ed.). *Proceedings of the 28th Annual Conference of the Cognitive Science Society*. p. 2485. Mahwah, NJ: Erlbaum.
- Frosch, C. A., Johnson-Laird, P. N., Cowley, M. (2007). Don't blame me your Honor, I'm only the enabler. *Proceedings of the 29th Annual Conference of the Cognitive Science Society*, p. 1755, Mahweh, N. J: Erlbaum. Nashville, USA.

- Goldvarg, E., & Johnson-Laird, P. N. (2001). Naive Causality: a mental model theory of causal meaning and reasoning. *Cognitive Science*, 25, 565-610.
- Hart, H. L. A., & Honoré, A. M. (1959/1985). *Causation in the law* (2 ed.). Clarendon: Oxford University Press.
- Hilton, D. J., & Erb, H. (1996). Mental Models and Causal Explanation: Judgements of Probable Cause and Explanatory Relevance. *Thinking and Reasoning*, 2(4), 273-308.
- Jones, M. A. (2005). *Torts* (8th Ed.). Oxford: Oxford University Press.
- Kuhnmünch, G., & Beller, S. (2005). Distinguishing Between Causes and Enabling Conditions-Through Mental Models or Linguistic Cues? *Cognitive Science*, 29, 1077-1090.
- Lombard, L. B. (1990). Causes, Enablers, and the Counterfactual Analysis. *Philosophical Studies*, 59, 195-211.
- Lytton, T.D. (2000) Tort claims against gun manufacturers for crime-related injuries: defining a suitable role for the tort system in regulating the firearms industry. *Missouri Law Review*, 65.
- Mill, J. S. (1843/1973). *A System of Logic Ratiocinative and Inductive: Being a Connected View of the Principles of Evidence and the Methods of Scientific Investigation*. Toronto: University of Toronto Press, Routledge & Kegan Paul.
- Roberts, P., & Zuckerman, A. (2004). *Criminal Evidence*. Oxford: Oxford University Press.
- Slovan, S., Barbey, A.K., and Hotaling, J. (2007) A Causal Model Theory of the Meaning of *Cause, Enable, and Prevent*. Under submission.
- Turnbull, W. & Slugoski, B. (1988). Conversational and linguistic processes in causal attribution. In D. Hilton (Ed.), *Contemporary science and natural explanations: Commonsense conceptions of causality* (pp. 66-93). New York: New York University Press.

Appendix

The six vignettes in the three Experiments in the order: enabling condition, cause, outcome.

The modified version of item 6 was used in Experiments 2 and 3.

1. In a tower block Mr Jones, a contractor, left open an unguarded lift shaft. Mr Peters knew that this was the case and invited David to step inside. David was badly injured.
2. In the USA a gun manufacturer oversupplied shops situated in States with weak gun laws. Martin bought one of these guns and murdered Martha.
3. Mary threw a lighted cigarette into a bush. Just as the cigarette was going out, Laura deliberately threw petrol on it. The resulting fire burnt down her neighbour's house.
4. When John left the factory, he left the door unlocked. Troy entered the factory to burgle it and encountered Tracey. Troy hit Tracey over the head and killed her.
5. James wrongfully renewed Elaine's prescription. A week later Elaine made her sister take the drugs. As a result, she died of an overdose of the drug.
6. Max knew that the brakes on his car were not working properly but lent it to Mary. As she drove a little recklessly along the twisting coast road, the brakes failed and crashed into another car. She survived unscathed, but Bob Brown, the other driver, was injured in the accident.
- 6'. [The modified version] Max knew that the brakes on his car were not working properly and mentioned this to Mary when he lent her the car. As she drove a little recklessly along the twisting coast road, the brakes failed, and she crashed into another car. She survived unscathed, but Bob Brown, the other driver, was injured in the accident.

The scales used in the three experiments:

To what extent did X cause the outcome (i.e. bring about the outcome) as opposed to enable it to occur (i.e. make it possible for the outcome to happen)?

1 2 3 4 5
enable cause

To what degree was X responsible for the outcome?

1 2 3 4 5
not at all responsible fully responsible

If you were on a jury awarding damages, roughly how much would you make X pay?

£0 £25,000 £50,000 £75,000 £100,000
nothing the maximum

If you were the judge giving out a prison sentence, roughly how many years would you sentence X to?

0 7.5 15 22.5 30
nothing the maximum
i.e. 0 years i.e. life sentence