How people think "If only…" about reasons for actions

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When people think about how a situation might have turned out differently, they tend to imagine counterfactual alternatives to their actions. We report the results of three experiments which show that people imagine alternatives to actions differently when they know about a reason for the action. The first experiment ($n = 36$) compared reason–action sequences to cause–effect sequences. It showed that people do not imagine alternatives to reasons in the way they imagine alternatives to causes: they imagine an alternative to an action more than an effect, and to a cause more than a reason. The second experiment ($n = 214$) and the third experiment ($n = 190$) both show that different sorts of reasons have different sorts of effects on how people imagine alternatives to actions. People imagine an alternative to an action (the protagonist went to a ball) less often when they know the reason for the action was an obligation (he had to participate in fundraising) compared to when they know about a weaker reason (he wanted to meet a famous violinist) or no reason. The second experiment shows the effect for a social obligation and the third experiment replicates and extends it to a health obligation. We interpret the results in terms of the possibilities that people keep in mind about actions and their reasons.

Under [reasons] are to be included desires, wantings, urges, promptings, and a great variety of moral views, aesthetic principles, economic prejudices, social conventions, and public and private goals and values...not only permanent character traits that show themselves for a lifetime of behavior, like love of children or a taste for loud company, but also the most passing fancy that prompts a unique action, like a sudden desire to touch a woman's elbow.

Davidson, 1963, pp. 685–686

People often think "if only..." and imagine alternatives to reality by changing some of the facts, for example "if only Paul had left work at a different time, he would not have been in the car accident" (e.g., Kahneman & Miller, 1986; Kahneman & Tversky, 1982a). Thinking about what might have been may help people to learn from past mistakes and to develop intentions for the future (Markman, Gavanski, Sherman, & McMullen, 1993; Nasco & Marsh, 1999; Roese, 1994). It has also been associated with emotions such as guilt, shame, and regret (Landman, 1987; Niedenthal, Tangney, & Gavanski, 1994) and social ascriptions such as blame and responsibility (Miller & McFarland, 1986; Roese & Olson, 1997; Wells & Gavanski, 1989). When an action leads to an unwanted outcome, people often wish they had not acted and they wonder why they did. Most people tend to focus their "if only..." thoughts on controllable actions; that is, actions that depended on a decision they made, rather than on uncontrollable events (Girotto, Legrenzi, & Rizzo, 1991). For example, when participants were told that John arrived home too late to save his wife from dying because he was delayed by four events, one that was controllable (a decision to drink a beer in a bar), and several that were beyond his control (e.g., a flock of sheep crossing the road), they tended to think "if only..." about the controllable action.

People imagine alternatives to controllable actions more than uncontrollable ones, whether the actions are normal or exceptional (Girotto et al., 1991), whether they are based on traits or not (N'gbala & Branscombe, 1995), and whether they are perceived to have caused the outcome or not (Mandel & Lehman, 1996). They imagine alternatives to controllable actions more often than uncontrollable ones following a traumatic life event (Davis, Lehman, Wortman, Silver, & Thompson, 1995), as well as in games (Markman, Gavanski, Sherman, & McMullen, 1995). They tend to think "if only..." more often about socially unacceptable actions such as a drink in a bar rather than socially acceptable ones such as a visit to parents (McCloy & Byrne, 2000; N'gbala & Branscombe, 1995; see also Green, McClelland, Muckli, & Simmons, 1999).

On our account people imagine an alternative to an action because they think about two possibilities to understand it from the outset (Byrne, 2005; Byrne & McEleney, 2000). They think about the pre-action possibility (John did not go into a bar for a drink), and they think about the post-action

possibility (John went to the bar). When they imagine an alternative to the outcome, they can readily make use of the second possibility they have in mind, the pre-action, now counterfactual possibility (Byrne, 2005). We test this theory by addressing two key questions.

ACTIONS, REASONS, AND CAUSES

The first question we address is whether people think "if only" more often about an action, "if only John had not called to a bar for a beer", or about the reason that led to the action, "if only John had not been obliged to attend his boss's birthday celebration". Just as events tend to have causes, so people tend to act for a reason. For example, John may have gone to the bar for a drink because it was his boss's birthday and he felt obliged to join the celebrations. We predict that people can more readily imagine a counterfactual alternative to an action than to a reason, because they represent the action by thinking about two possibilities from the outset.

An alternative view is that people imagine alternatives to a reason–action sequence in the same way as they imagine alternatives to a cause–effect sequence. People tend to imagine alternatives to causes more than their effects (Wells, Taylor, & Turtle, 1987). When participants were given a scenario in which a man arrived too late to buy a stereo in a sale because he was delayed by four causally linked events, they tended to think "if only" about the first event more than the other three (Wells et al., 1987). Once the cause is known to have occurred its subsequent effects can seem inevitable and hence more immutable (see also Kahneman & Miller, 1986; Segura, Fernandez-Berrocal, & Byrne, 2002). If people imagine alternatives to a reason–action sequence in the same way as they imagine alternatives to a cause–effect sequence, then their "if only" thoughts should focus on the reason.

Are reasons like causes? Philosophers have identified three important properties of reasons. First, reasons *define* intentional actions: Intentional actions are those done for a reason whereas unintentional actions are not. A single action, such as turning on a light switch, can be described in other ways, such as lighting a room or alerting a burglar to the fact that someone is at home, not all of which may be intentional (Anscombe, 1963). When people are asked to explain a behaviour, they cite reasons when they believe it was intentional, but they cite causes when they believe it was unintentional (Malle, 1999). Second, reasons *explain* actions. A controllable action depends on the decision of an individual (Girotto et al., 1991). To understand an actor's reasons for an action, it may be necessary to understand their beliefs and desires (e.g., Davidson, 1963). Suppose James carries out an action, going to church, for a reason, to please his mother. The full explanation requires an account of what this reason means to the

individual, e.g., whether he enjoys pleasing his mother, or thinks it is his obligation to do so. Third, reasons *cause* actions (Davidson, 1963; Smith & Jones, 1986). In fact, there has been some debate about whether reasons cause actions or merely re-describe them. Suppose Jack carries out an action, opening the window, and he has a number of desires that could sensibly lead to such an action, wanting fresh air, wanting to speak to a friend outside, wanting to lift in a flowerpot from the window-sill outside. For a reason to explain an action it must do more than make the action comprehensible, it must actually cause the actor to act (Davidson, 1963, Smith & Jones, 1986).

In fact, there is considerable philosophical debate on whether reasons are like causes (e.g., Donnellan, 1967; Smith & Jones, 1986). Causes and reasons differ in important respects. People's everyday understanding of human behaviour tends to expect the relation between a reason and its action not to be as simple as the relation between a cause and its effect. One example is that actions can occur without reasons (people may act unintentionally, including actions brought about by absent-mindedness, mistakes, and so on), whereas effects are unlikely to occur without a cause. A second example is that reasons can occur without actions (people may fail to act despite having a very good reason to do so), whereas effects tend to occur when their cause occurs. A third example is that reasons can have a one-to-many mapping to their actions (a single reason can lead to various different actions; for example, a desire or obligation can be realised in a number of ways), whereas causes tend to be tied to their effects in a one-to-one mapping. Conversely, reasons can have a many-to-one mapping to their actions (a set of reasons can lead to a single action, and undoing one of the set will not undo the outcome). For example, people frequently cite a number of reasons for why they acted, and they may cite all of them even if fewer would have been sufficient for them to act. In contrast, people tend to refer to a single cause of an action. A final example is that the relation between reasons and actions is less consistent over time than the relation between causes and effects (Hart & Honore, 1959), because people can give priority to different desires at different times and they can change their beliefs. Of course, there are exceptions to these general tendencies, and some reasons may not fit this pattern whereas some causes may fit it, but overall these differences distinguish reasons and causes. On our account people do not think about reasons in the same way as causes. Some causes, such as strong causes, are understood by thinking about a single possibility (Goldvarg & Johnson-Laird, 2001), whereas other causes are understood by keeping in mind several possibilities (Byrne, 2005). Hence we predict that people will continue to imagine alternatives to an action, even when they know about reasons for it. Our experiments pit the predictions of these two alternative viewpoints against each other.

DIFFERENT SORTS OF REASONS

The second key question we test is whether people think "if only" about actions as often when they are given different sorts of reasons for the action. The answer is not yet known. There are some indications that reasons can change what people focus on in their "if only..." thoughts. Parents of children who died from sudden infant death syndrome, often thought "if only..." about decisions that may not have had good reasons, for example, the decision not to take a coughing baby to the doctor (Davis & Lehman, 1995). Sometimes when people know there was a good reason to act, they regret not acting. Often, when a bad outcome occurs (a soccer team loses its match), people imagine alternatives to an action (the coach's decision to field different players), rather than to an inaction (the coach's decision not to field different players; Kahneman & Tversky, 1982b). But when they know that there was a good reason to act (they know the soccer team lost previous matches), they judge that a coach who does not act will feel worse than one who acted (Zeelenberg, van den Bos, van Dijk, & Pieters, 2002; see also Byrne & McEleney, 2000; Gilovich & Medvec, 1994).

Reasons encompass a broad spectrum, as the quotation at the start of the paper illustrates. Philosophers have distinguished between two broad categories: external and internal reasons. External reasons include obligations, prescriptive rules, and norms such as community customs, fashions, and traditions—for example, "Bernard went to the ball because he was expected to help fundraise"—as well as communicative challenges such as orders, requests, and questions—for example, "Paul went to visit John because John invited him" (Von Wright, 1983). Internal reasons are those reasons derived from one's own desires and goals; for example, "Tom went to the gym because he likes it". The two categories of reasons differ in important respects, such as their sufficiency for an action, and sufficiency can affect counterfactual thoughts (Mandel & Lehman, 1996; N'gbala & Branscombe, 1995; Roese, Hur, & Pennington, 1999). The distinction between internal and external reasons may seem somewhat crude but it has empirical validity, as we will see shortly. Our aim is to establish not only whether people think "if only..." more about an action, or about the reason that led to the action but also whether people think "if only..." about an action differently when they know about different sorts of reasons for it, for example an obligation, or an internal reason. For example, do people think "if only..." more about internal reasons such as "if only John had not felt like a drink" or more about external reasons such as his obligation to go to the boss's party? On our account, people tend to view obligations as immutable (Byrne, 2005). To understand an obligation they think about what is permitted and what is not permitted. They mentally

change what is socially unacceptable to be what is permitted, e.g., "if only I had not stopped at a bar for a beer" (McCloy & Byrne, 2000). We predict that reasons based on obligations will be perceived to constrain actions more than other reasons.

EXPERIMENT 1: REASONS FOR ACTIONS AND CAUSES FOR EFFECTS

People imagine alternatives to causes more than to the effects that result from them. Do they imagine alternatives to reasons more than to the actions that result from them? We predict that people imagine alternatives to an action more than to a reason, because they represent the action by thinking about two possibilities from the outset. An alternative view is people imagine alternatives to a reason–action sequence in the same way as they imagine alternatives to a cause–effect sequence, and hence they imagine alternatives to reasons more than actions. We tested these alternative viewpoints in an experiment that compared reason–action sequences to cause–effect sequences. In the experiment we described an outcome, e.g., a tennis player does not train the day before a match. The outcome was the result of a reason–action sequence (e.g., a reason "he wanted to be fresh" led to an action "he decided to rest"), or it was the result of a cause–effect sequence (e.g., a cause "the courts were waterlogged" led to an effect, "the courts were closed").[1] We used internal reasons (e.g., he wanted to be fresh the next day). If reason–action sequences are like cause–event sequences, then people should imagine alternatives to reasons more than to the actions that result from them. However, those sequences may be represented differently.

We compared the reason–action sequences and cause–effect sequences to controls, in which the action was described without a reason (but with a filler description instead), and the effect was described without a cause (but with a filler description). For completeness, we also created "reason–effect" and "cause–action". We used six scenarios, about a tennis player's failure to win a match, a car accident on the way home from work, a car accident on the way home from school, an accident at work, a student's poor

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[1]In the scenarios, actions are occurrences performed by an individual (e.g., deciding to rest), and effects are occurrences not performed by an individual (e.g., the courts being closed). This distinction between actions and effects is somewhat similar to the distinction between controllable and uncontrollable occurrences (e.g., Girotto et al., 1991). The actions are intentional when they are performed for a reason, i.e., because of beliefs and desires (e.g., in a reason–action sequence), and the actions are unintentional when they are performed because of a cause (e.g., in a cause–action sequence), because the action was unintentional (it suggests that there was no desire to act).

performance in an exam, and a couple who drive off a collapsed bridge. The scenarios were based on existing ones in the literature (Kahneman & Tversky, 1982a; Klauer, Jacobsen, & Migulla, 1995; Morris & Sim, 1999; N'gbala & Branscombe, 1995; Roese & Olson, 1993; Wells & Gavanski, 1989), and the full set is given in the Appendix. We made sure that the causes and reasons were matched in important respects, such as their normality.

Method

Materials and design.   The six scenarios contained a series of factors that contributed to a negative outcome. We constructed six versions of each scenario. Half of the versions contained an action and the other half contained an effect (and these had the same subsequent outcome). In each case, the action or event was preceded by a cause, a reason, or a filler item. Participants received six different scenarios: a reason–action, cause–action, filler–action, reason–effect, cause–effect, or filler–effect scenario, in a within-participant design. They received the six scenarios instantiated in six different contents, which were allocated at random to the scenario versions for each participant. Each participant read the scenarios in a different random order. After reading each scenario, they completed a counterfactual thoughts task:[2]

1. As commonly happens in such situations, *the protagonist* often thought, "if only . . ." during the days and weeks that followed. Please list in the order of importance, four ways in which *he/she* may have completed this thought so that the outcome would be different.

Participants and procedure.   The 36 participants who took part in the experiment were members of Trinity College's psychology department participant panel (recruited from the general population through national newspaper advertisements), who were paid a nominal fee for their participation, as well as postgraduate and undergraduate volunteers. The participants were 16 men and 20 women who ranged in age from 18 to 78 years (mean age of 35). The participants were tested individually in a quiet room. They were given an eight-page booklet containing instructions in which they were asked to read the scenario carefully and to complete the questions, and they were informed that they could refer back to the scenario as often as they wished. The subsequent pages contained the six scenarios and a debriefing paragraph.

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[2]They also completed four subsequent tasks which are not reported here (see Walsh, 2001).

Results and discussion

Participants provided on average 3.9 counterfactual thoughts for each scenario. They thought "if only" about an action more than an effect (78% versus 59%, McNemar Test, $\chi^2 = 6.95$, $p < .01$), whether it followed a reason (83% versus 56%) or a cause (64% versus 56%), as Table 1 shows. Complementarily, people thought "if only" about causes more than reasons. They thought "if only" about the cause more than the reason (38% versus 11%), whether it led to an action (42% versus 14%, McNemar Test, $\chi^2 = 5.79$, $p < .02$) or to an effect (33% versus 8%, McNemar Test, $\chi^2 = 5.81$, $p < .02$). The result shows that people imagine alternatives to reason–action sequences differently from alternatives to cause–effect sequences. They tend to think "if only" about actions in a reason–action sequence, but they tend to think "if only" about causes in a cause–effect sequence.

For reason–action sequences, people imagined an alternative to the action more than the reason (83% versus 14%, McNemar Test, $\chi^2 = 19.86$, $p < .0001$). For cause–effect sequences, they imagined an alternative to the effect or to the cause and there was no reliable difference between them (56% and 33%, McNemar Test, $\chi^2 = 2.04$, $p = .15$). (And the same pattern of results holds when only the first counterfactual completions are considered.) Participants did not tend to think "if only" about the cause more than the effect, in contrast to previous research (Segura et al., 2002; Wells et al., 1987). We can speculate that the focus on causes was reduced by the context of several different sorts of sequences (e.g., reason–action, cause–effect, and so on).

The experiment provides the first direct comparison of reason–action and cause–effect sequences. It reveals the novel phenomenon that people

TABLE 1
Percentages of "if only" thoughts that focus on the antecedent (reason or cause) and on the consequent (action or effect) in the six scenarios in Experiment 1

| | *Type of antecedent* | | | |
Type of consequent	*Reason scenarios*	*Cause scenarios*	*Control scenarios*	*Overall*
Focus on the Antecedent (reason or cause)				
Action scenarios	14	42	–	
Effect scenarios	8	33	–	
Overall	*11*	*38*		
Focus on the Consequent (action or effect)				
Action scenarios	83	64	86	78
Effect scenarios	56	56	67	59

think ''if only'' about actions more than effects; they think ''if only'' about causes more than reasons. The result suggests that reasons are not like causes, at least in the way that people imagine alternatives to them. The result corroborates our prediction and provides support for the view that they represent the action by thinking about two possibilities from the outset. People may keep in mind two possibilities from the outset when they think about the action, and so they can readily imagine an alternative to the action, the past now counterfactual possibility before the action. The result confirms that there are important differences in the way that people think about reasons and causes. It answers the first question we posed earlier: people think ''if only'' more often about an action than about the reason that led to the action. In our next experiments, we address the second question we posed earlier: Do people think ''if only'' about actions as often when they are given different sorts of reasons for the action?

EXPERIMENT 2: SOCIAL OBLIGATIONS AND ACTIONS

In the second experiment we examined a scenario in which an action (Bernard went to a ball) led to a bad outcome (he performed poorly in a concert the next day). We aimed to replicate the findings from the first experiment to show that people prefer to mutate actions rather than reasons in this context. Our new aim in this experiment was to examine whether people think ''if only . . .'' about an action differently when they know about different sorts of reasons for it. The sorts of reasons that we gave for the action were either an obligation (the expectation of others that Bernard would participate in fundraising) or an internal reason (Bernard's goal to take the opportunity to meet a famous composer). A simple view is that actions are mutable regardless of the sort of reason given for the action. But we predict that the immutability of obligations will affect the mutability of an action.

People think about permissions and obligations often (Fiddick, Cosmides, & Tooby, 2000; Gigerenzer & Hug, 1992; Holyoak & Cheng, 1995; Manktelow & Over, 1991). They may think about obligations by keeping in mind the permitted possibility—Bernard helps with the fundraising by going to the ball—and they also keep in mind the forbidden possibility—Bernard does not help with the fundraising and he does not go to the ball—and they appreciate that this possibility is forbidden (Johnson-Laird & Byrne, 2002). When people understand an obligation they can readily make inferences that require an appreciation of the forbidden possibility (Quelhas & Byrne, 2003). They may find it easier to imagine an alternative by changing a forbidden possibility to be the same as the permitted one (if only John had not gone for a beer he would have arrived home on time), than to imagine a permitted possibility was the same as a

forbidden one (if only John had run a red light he would have arrived home on time) (Byrne, 2005). As a result, we predict that people will tend to think "if only Bernard had not gone to the ball" more often when they are given no reason, or an internal reason, than when they are given an obligation.

Method

Materials.   We constructed three versions of a scenario based on one used by Klauer et al. (1995). In one version the decision to attend a ball resulted from an obligation—that is, an expectation of others to participate in fundraising—in the second the decision resulted from an internal reason—a short-term goal to take advantage of an opportunity to meet a well-known violinist—and in the third no reason was given for the decision to attend (and a descriptive filler item was provided instead). The scenario is provided in the Appendix.

We obtained independent ratings of how internal or external the reasons were. We asked 22 graduate students from Trinity College Dublin University to read one of the three versions of the scenario and to rate the action (Bernard's decision to go to the ball) on four 7-point (0–6) scales that labelled the action as: "free", "influenced by external factors", "influenced by others", and "compelling". We added the four scores to obtain a combined "external" rating (where 0 is completely internally influenced and 24 is completely externally influenced).[3] The results showed that the action was rated as externally influenced more often in the obligation condition (mean = 20.6) than in the no-reason condition (mean = 14.1, $t = 3.48$, one-tailed $p < .002$). We used a one-tailed test for this comparison as there was a clear a priori prediction about the direction of the effect. The action was rated as externally influenced less often in the internal reason condition (mean = 10) than in the no-reason condition ($t = 2.07$, $p = .06$).

Design.   Participants were assigned one of the three scenarios at random, the obligation ($n = 69$), the internal reason ($n = 73$), or the no-reason scenario ($n = 72$), in a between-participants design. They completed a counterfactual thoughts task:

> As commonly happens in such situations, Bernard often thought, "if only…" during the days and weeks that followed the concert. Please list in the order of importance, four ways in which he may have completed this thought so that the outcome would be different.

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[3]We subtracted the "free" score from 6 so that for all ratings 0 was most internal.

Participants and procedure. The 217 undergraduate students who participated in the experiment voluntarily were 122 men and 95 women from various departments in the University of Dublin, Trinity College. They ranged in age from 17 to 45 years with a mean age of 21 years. Prior to the analysis, three participants were eliminated because they failed to follow the instructions correctly. The participants were tested in several large groups. They were given a four-page booklet containing instructions that were similar to those used in the previous experiment, one of three versions of the scenario, the counterfactual thoughts question,[4] and a debriefing paragraph.

Results and discussion

Participants provided on average 3.82 counterfactual thoughts, and overall they focused overwhelmingly on actions more than reasons in their counterfactual thoughts (75% versus 4%; McNemar Test, $\chi^2 = 124.3$, $p < .001$). The result indicates that reasons are not like causes, in the way that people imagine alternatives to them.

Participants thought "if only . . ." about the action when the actor had no reason more than when he was obliged to carry out the action (82% vs 67%, $\chi^2 = 4.33$, $n = 141$, one-tailed $p < .02$), as Table 2 shows. They thought "if only . . ." about the action as often when the actor had an internal reason as when he had no reason (75% vs 82% $\chi^2 = 0.94$, $n = 145$, $p < .33$). They thought "if only . . ." about the action somewhat more often when the actor

TABLE 2
The percentages of "if only" thoughts about an action and a reason in Experiments 2 and 3

		"If only" focus	
Type of reason	*Content*	*Action*	*Reason*
Experiment 2			
Obligation	(fundraising)	67*	6
Internal	(meet composer)	75	7
None		82	0
Experiment 3			
Obligation	(lose weight)	75*	21.5
Internal	(enjoy gym)	89	3
None		88	1.5

An asterisk indicates that the condition differs reliably from the control ("none") condition. The percentages are based on all counterfactual thoughts generated.

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[4]They also completed two subsequent tasks which are not reported here (see Walsh, 2001).

had an internal reason than when he was obliged to carry out the action (75% versus 67%) but the difference was not reliable ($\chi^2 = 1.30$, $n = 142$, one-tailed $p < .13$). Sometimes participants focused their "if only..." thoughts on the reason itself, and they focused more on the obligation and internal reason (6% and 7% respectively), than on the descriptive filler (0%, $\chi^2 = 4.30$, $n = 141$, $p < .025$ and $\chi^2 = 5.11$, $n = 145$, $p < .025$ respectively).[5] The result shows that people think "if only ..." about an action differently when they know about different sorts of reasons for it. They do not tend to think "if only..." about actions as often when the reason for it was an obligation.

The experiment replicates the novel finding of the first experiment that people tend not to imagine alternatives to reasons for actions. In this experiment we show that the result holds not only for internal reasons but also for external reasons. The experiment also provides a new finding: people think "if only..." about actions less often when they are the result of an obligation, compared to when they result from an internal reason, or when they are not told the reason for the action. The result supports the view that people understand an obligation by thinking about two possibilities, the permitted possibility and the forbidden possibility. They tend to imagine an alternative to a forbidden event by mentally changing it to be like the permitted event, but they do not tend to imagine an alternative to a permitted event by mentally changing it to be like the forbidden event (Byrne, 2005). The immutability of the obligation is inherited by the action, rendering it relatively immutable too.

An alternative possibility is that the expected utility of actions influences their mutability, and specifically that an action will be more mutable if undoing the action would lead to a small change in expected utility. However, we expect that giving up an action with an external reason would lead to a smaller change in expected utility for the actor than giving up an action with an internal reasons. Hence, this account predicts that actions should be more mutable when they have external reasons than internal reasons. The data from Experiment 2 do not support this prediction.

In this experiment we examined a social obligation. Social contracts may concern special sorts of permissions and obligations (e.g., Fiddick et al., 2000; Holyoak & Cheng, 1995). But there are many sorts of obligations based not on social and cultural conventions but on health and safety concerns, or legal and historical conventions. In our next experiment we aim to extend the findings for social obligations to obligations based on health concerns.

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[5]There were no differences in focus on the action in the first counterfactual thoughts generated (no reason: 51%; internal: 44%; obligation: 49%). Less than 1% of first counterfactual thoughts in each condition focused on the reason.

EXPERIMENT 3: HEALTH OBLIGATIONS AND ACTIONS

We aimed to replicate the findings of the second experiment and extend them to another sort of obligation, a health obligation. This experiment relies on a scenario in which an action, going to a gym, led to a bad outcome. The action was caused by an obligation derived from the maintenance of good health, expressed as the requirement to lose weight. In a second version, the action was caused by an internal reason, expressed as enjoyment (he went to the gym because he likes to). The third version contained no reason, just a descriptive filler. We expected that participants would keep in mind two possibilities to understand the obligation, the required possibility in which the protagonist attempts to lose weight, and the forbidden possibility, not losing weight. People tend not to imagine a counterfactual alternative to the required possibility, and so they will not tend to think "if only he had not had to lose weight" or "if only he had not gone to the gym", imagining instead a counterfactual alternative to the action.

Method

Materials and design. We constructed a scenario (based on Girotto et al., 1991) about an individual, Tom, who is delayed by several events on his way home from work, only to find he is too late to save his wife who is dying from a heart attack. The uncontrollable events were a flat tyre and a traffic jam, and the controllable event was going for a workout in a gym (rather than going for a drink in a bar, which is a special sort of controllable event; see McCloy & Byrne, 2000). We constructed three versions of the scenario: in one the action (going to the gym) was the result of a health obligation ("Tom is trying hard to lose weight"), in the second it was the result of an internal reason ("Tom really likes to go to the gym"), and in the third version no reason was given, just a filler item ("It is quite a large gym"). The scenario is given in the Appendix.

Once again, we obtained independent ratings of how external the reasons were from the same 22 graduate students who took part in the previous pre-tests. The pre-test was identical to the one described in the previous experiment. The results showed that on a scale of 0 (internal) to 24 (external), the action was rated as externally influenced more often when there was an obligation (mean = 13) than when there was no reason (mean = 9.3; $t = 1.85$, one-tailed $p < .05$). We used a one-tailed test for this comparison as there was a clear a priori prediction about the direction of the effect. The action was rated as externally influenced as often when there was an internal reason (mean = 9.7) as when there was no reason ($t = 0.19$, $p = .85$).

Participants were assigned to one of the three conditions at random in a between-participants design. They completed the same counterfactual thoughts task as described in the previous experiments.

Participants and procedure.   The 194 undergraduate students who participated in the experiment voluntarily were 78 women and 116 men from a number of departments in the University of Dublin, Trinity College. They ranged in age from 17 to 59 years with a mean of 25 years. Prior to analysis, four participants were eliminated because they failed to complete all three questions. The remaining 190 participants were randomly assigned to the obligation condition ($n = 61$), internal reason condition ($n = 63$), and the control condition ($n = 66$). The participants were tested in large groups. They were given a four-page booklet, which contained the instructions, one of three versions of the scenario, a question-and-answer sheet, and a debriefing paragraph.

Results and discussion

Participants provided on average 3.7 counterfactual thoughts each. They thought "if only ..." about the action when the actor had no reason more than when he was obliged to carry out the action (88% versus 75%, $\chi^2 = 3.32$, one-tailed $p < .04$). They thought "if only ..." about the action when the actor had an internal reason more than when he was obliged to carry out the action (89% versus 75%, $\chi^2 = 3.86$, $p = .05$), as Table 2 shows. They thought "if only ..." about the action as often when they knew about an internal reason as no reason (89% versus 88%, $\chi^2 = .032$, $p > .8$). The results replicate the findings of the first experiment and extend them to another sort of obligation about health matters rather than social matters.

As in the previous experiment, participants focused overwhelmingly on actions more than reasons in their counterfactual thoughts, whether the reason was an obligation (75% versus 21%, McNemar Test, $\chi^2 = 22.76$, $n = 61$, $p < .0001$), an internal reason (89% versus 3% McNemar Test, $\chi^2 = 50.16$, $n = 63$, $p < .0001$), or no reason (88% versus 1.5% McNemar Test, $\chi^2 = 55.02$, $n = 66$, $p < .0001$). The result confirms that reasons are not like causes in the ease with which people can imagine counterfactual alternatives to them.

Sometimes participants focused their "if only ..." thoughts on the reason itself, and they focused more on the obligation (trying to lose weight: 21%), compared to an internal reason (liking to go to the gym: 3%, $\chi^2 = 9.587$, $p < .002$) or no reason (the gym is large: 1.5%, $\chi^2 = 12.666$, $p < .0004$). There was no difference between the internal reason and no reason

(3% versus 1.5%, $\chi^2 = 0.39$, $p < .53$).[6] In fact, when participants focused on the obligation, they tended to wish that Tom had not got himself into the situation where he had to lose weight (if only I was not overweight) rather than to wish there was not an obligation to lose weight.

The experiment replicates and extends the results of the first two experiments. People think "if only . . ." more often about an action than about the reasons that led to the action. People think "if only . . ." about an action less often when it is the result of an obligation, whether a health obligation or a social obligation, compared to when it resulted from an internal reason, or when they were not told the reason for the action. The result is consistent with the view that people understand an obligation by thinking about two possibilities, the permitted possibility and the forbidden possibility. They tend to imagine an alternative to a forbidden event by mentally changing it to be like the permitted event, but they do not tend to imagine an alternative to a permitted event by mentally changing it to be like the forbidden event (Byrne, 2005).

The interpretation of reasons as internal or external may be influenced by the context in which they occur. Experiments 2 and 3 show that when an action is judged to be externally influenced in a particular context, people also generate fewer counterfactuals that focus on it. When someone does something that they are obliged to do, whether by social or health concerns, people do not tend to wish the person had not done it. They do not imagine "if only Bernard had not gone to the ball" when he had to help with the fundraising or "if only Tom had not gone to the gym" when he had to lose weight.

GENERAL DISCUSSION

People often imagine alternatives to their own controllable actions (Girotto et al., 1991; Markman et al., 1995). Our experiments show that people tend to think "if only . . ." about a controllable action even when they know about the reasons for it. The experiments address two key theoretical questions: Do people think about reasons in the same way that they think about causes, when they imagine counterfactual alternative to reality? And do different reasons have the same effects on the counterfactual alternatives that people imagine? The answer to both questions is negative. First, people do not imagine alternatives to reasons in the same way as they imagine alternatives to causes. The first experiment shows that in reason – action sequences people tend to think "if only . . ." about actions, in cause – effect

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[6]There were no differences in focus on the action in the first counterfactual thoughts generated (no reason: 41%; internal: 43%; obligation 39%). Less than 1.5% of first counterfactual thoughts in each condition focused on the reasons.

sequences they tend to think "if only" about causes. The second and third experiments replicate this finding: people think "if only..." more often about an action (e.g., if only Bernard had not gone to the ball) than about the reasons that led to the action (e.g., if only Bernard had not had to help with fundraising). Second, people do not tend to imagine counterfactual alternatives to actions that were carried out as a result of an obligation. The result occurs for a social obligation and for a health obligation.

According to our theory, people imagine counterfactual alternatives by thinking about possibilities. The principles that guide the possibilities they think about are based on the same sorts of principles that underlie reasoning (Byrne, 2005). They tend to think about true possibilities, and few possibilities (Johnson-Laird & Byrne, 2002). They think about counterfactual possibilities and can temporarily suppose that something they know to be false is true. They think "if only..." readily about a controllable action, such as Bernard decided to go to the ball, because they understand it by keeping in mind two possibilities from the outset—the pre-action possibility, Bernard was not at the ball, and the post-action possibility, Bernard went to the ball. They can readily imagine an alternative to the current situation, Bernard went to the ball, by thinking about the past, now counterfactual possibility that they have kept in mind from the outset, "if only Bernard had not gone to the ball" (Byrne & McEleney, 2000). They tend to think "if only..." about actions less often when the action was the result of an obligation because they also understand an obligation by thinking about two possibilities, the permitted possibility and the forbidden possibility (Johnson-Laird & Byrne, 2002; Quelhas & Byrne, 2003). They tend to imagine an alternative to a forbidden event by mentally changing it to be like the permitted event (McCloy & Byrne, 2000), but they do not tend to imagine an alternative to a permitted event by mentally changing it to be like the forbidden event. They do not tend to think, "if only Bernard had not been obliged to go to the ball".

The results support the commonsense conjecture that when people provide a reason for their behaviour, the behaviour can seem immutable. In everyday life, people often attempt to excuse their behaviour by presenting the reasons for it. The efficacy of their excuses may depend on their effects on counterfactual thoughts. The best excuses, as any child knows, are usually obligations ("I had to do it") rather than internal reasons ("I just felt like it"), and our research suggests it is because people cannot readily imagine an alternative to an obligation. The results may also have implications for understanding and influencing people's decisions. One important function of counterfactual thinking is to help us learn from our past mistakes. When people provide external excuses for their actions, they become more immutable. The effect may be to reduce guilt but it also reduces the chance of changing future behaviour (e.g., Buehler, Griffin, & Ross, 1994).

Our results suggest that emphasising internal reasons may encourage people to think about how they can change their actions.

Counterfactual thinking can also influence people's behaviour through its influence on anticipated regret. For example, people are reluctant to vaccinate their child if the vaccination could have negative consequences even when the consequences of not acting may be worse (Ritov & Baron, 1995). People anticipate more regret from actions than from failures to act. Our results suggest that these tendencies may be modified by the type of reasons considered. For example, we predict that in societies in which vaccination for certain childhood illnesses is obligatory, people may anticipate regret for the action less than in societies in which vaccination is not obligatory but is a matter of personal choice. The anticipated regret that a parent may feel could be reduced if external reasons are emphasised, such as social obligation to reduce the spread of the disease. Our results provide an initial step towards understanding how people's imagination of alternatives to their past actions affects their thoughts about the consequences of their future actions.

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APPENDIX

Scenarios used in the experiments (the sentences that varied in the different versions are presented in brackets).

Experiment 1 scenarios

1. Tom has been working in a bank in the city centre for the past few years. He lives with his wife on the outskirts of town. On Thursday, he left the office a bit later than usual. The traffic was quite heavy so his journey was slow. On his way home, Tom normally drives down Church Street. [*Reason for Action*: However on this day, he wanted to avoid the heavy traffic that was in the inside lane.] [*Cause of Action*: However on this day, he automatically swerved the car to avoid a dog.] [*Control*: . . . which is a busy road. However, on this day . . .] [*Action*: He pulled into the outside lane and as a result, he missed the turn.] [*Reason for Event*: However later that evening, there was going to be a bike race on Church Street. As a result . . .] [*Cause of Event*: However on this day, a tree had fallen across Church Street

and the traffic could not pass. As a result . . .] [*Control*: . . . which is a busy road. However on this day, . . .] [*Event*: The traffic was diverted onto a different route.] Tom turned onto Hill Street. As he approached a crossroads the lights changed to red and he stopped the car. As he began to cross after the lights changed, a truck charged through the lights at high speed and rammed Tom's car from the right. Tom was seriously injured.

2. Joe's son, David, attends a school in the suburbs of town. Every day at 2.30 p.m., Joe collects him from school. He normally leaves the house around 2 o'clock so that he arrives in time. However, on Thursday before he left . . . [*Action*: he let the hamster out of its cage into the living room.] [*Reason for Action*: He wanted to give her some exercise.] [*Cause of Action*: He accidentally let her escape when he opened the door to feed her.] [*Control*: The hamster runs very fast and . . .] [*Event*: the dog escaped from the garden out onto the street.] [*Reason for Event*: The dog wanted to chase a cat she had seen.] [*Cause of Event*: There was a hole in the fence which allowed the dog to escape.] [*Control*: The dog runs very fast and . . .] It took longer than usual to get her back into the cage/garden. As a result, he was late leaving the house. The traffic got stuck behind a learner driver so his journey was slower than usual. Because of the delay, Joe's neighbour who waited 15 minutes for Joe to show up, took the child home in his car. On the way home, the neighbour's car was struck by a drunk driver. Joe's son, the only seriously hurt victim, received severe leg injuries.

3. Eugene and Tina were a young married couple who lived in the country. Both were partially paralysed and confined to wheelchairs. They met four years before when Tina was a counsellor with the Irish Paraplegic Association, had fallen in love, and were married one year later. On this particular evening, Eugene had phoned to request a taxi to take them into town. However . . . [*Action*: the taxi-driver collected two other people who were waiting on the footpath.] [*Reason for Action*: One of them was injured and he wanted to take him home.] [*Cause of Action*: He collected them by mistake because they were waiting close to Eugene and Tina's house.] [*Control*: They were going on a short journey.] [*Event*: The taxi driver was delayed at a road block on the way to Eugene and Tina's house.] [*Reason for Event*: The police were checking tax discs.] [*Cause of Event*: There had been an accident on the road.] [*Control*: After a short while he was able to pass.] As a result, he didn't arrive at Eugene and Tina's house at the expected time. After waiting a while for the taxi, Eugene and Tina decided to take Tina's car which was equipped with special hand controls. In order to get into town from their house, they had to travel across Rupert river. A severe storm the night before had weakened the structure of the bridge. About 2 minutes before Eugene and Tina reached it, a section of the bridge collapsed. In the dark, Eugene and Tina drove off the bridge and plummeted into the river below. Both of them were badly injured.

4. Ned works as a safety inspector in a refrigerator manufacturing company. He is in his mid-60s and he has been working there for over twenty years. Ned's job involves carrying out inspections of the buildings on the plant. His rota is set by management at the beginning of each week. On Friday morning, he was supposed to inspect buildings 1 and 2, before going to the shipping department to oversee the loading of the trucks. However, he didn't check building 2 that morning as planned...[*Action*: Instead he went to inspect building 3] [*Reason for Action*: He wanted to check the wiring there.] [*Cause of Action*: He misread the rota and went there by mistake.] [*Control*: Building 3 is a large building.] [*Event*: because the building was closed.] [*Reason for Event*: This was to allow for repairs to the roof.] [*Cause of Event*: This was because of a water leakage.] [*Control*: Building 2 is a large building.] Instead, he decided to inspect Building 2 that afternoon. He finished his lunch a few minutes early and set off. Building 2 was located at the far side of the plant. As he walked past the loading dock on his way to building 2, a vehicle exploded, severely burning its driver and Ned.

5. Sam is an avid tennis player. Recently, he took part in an important tournament in France. On Sunday he was due to take part in the semi-finals. Normally, Sam does some training the day before an important match. However, on Saturday...[*Action*: he decided to rest instead.] [*Reason for Action*: He wanted to be fresh for the following day.] [*Cause of Action*: After the long journey, he was unable to stay awake.] [*Control*: He went to his room.] [*Event*: the courts were closed.] [*Reason for Event*: This was to save the lawn for the upcoming matches.] [*Cause of Event*: Heavy rain the night before meant that the courts were waterlogged.] [*Control*: He went to his room.] As a result, he didn't do any training that day. The day of the match was very hot. Although Sam had often played in hot conditions, he really didn't like it. That morning a draw was held to see which of the other three semi-finalists Sam would play. After the draw, Sam made a choice of two rackets, one made of synthetic material and one made of metal. He finally decided to use the metal racket because it is most suited to his opponent's manner of play. That afternoon, Sam played the match and lost. He was very disappointed.

6. Susan is a second year science student in university. She obtained good marks in her first year exams. Susan has an important exam on Friday in her chemistry course. She spent about her usual amount of time studying her class notes and assigned readings. Susan planned to study on the Tuesday night before the exam, however [*Action*: she went to her neighbour's party instead.] [*Reason for Action*: She wanted to meet some old friends from school.] [*Cause of Action*: She couldn't concentrate on her books with the loud music in the background.] [*Control*: She enjoyed the party very much.] [*Event*: that evening the library closed early.] [*Reason for Event*: This was to

allow for a reorganisation of the book shelving.] [*Cause of Event*: This was due to an expected shortage of library staff.] [*Control*: Once the library closed, she headed home.] As a result, she didn't study that night. On Thursday, Susan's mother was ill. As a result, Susan spent a lot of time on Thursday evening looking after her. On Friday morning, Susan was very nervous and she hoped that her anxiety would not interfere with her concentration. Susan sat the exam later that day and passed, but her marks were considerably lower than usual.

Experiment 2 scenario

Bernard is a famous violinist. At the moment, he is staying in Vienna where he has been invited to perform in an important open-air festival of classical music. In the course of this festival, Bernard intends to perform Beethoven's violin concerto. He knows the concerto well and his previous performances of it have been successful. Bernard will be accompanied by the well-known Geneva Chamber Orchestra. Since the accompanying orchestra plays a prominent role in the soloist's performance, Bernard and his agent had negotiations with several orchestras prior to the festival. The English Polyphonic Orchestra had been a real alternative, however, finally they decided on the Geneva Chamber Orchestra. The evening before the concert, there is a ball organised by the festival committee. [*External reason*: The ball is being run to help cover the festival expenses and therefore Bernard is obliged to attend.] *[Internal reason: Bernard will have a unique opportunity to meet a world-renowned violinist at the ball and this is his goal for attending.] [Control: The ball is being held in the Vienna City Ballroom.]*

Bernard goes to the ball and as a result he has a late night, something he doesn't usually do before a concert. The day of the concert Bernard thinks carefully about which violin he is going to use. He has the choice between a Stradivari and an Amati. He finally decides on the Amati because although he doesn't use it very often, he thinks that the timbre of this violin is best suited to Beethoven's concerto. At the concert that evening, Bernard's performance of the concerto was poor and the audience did not respond well. He was bitterly disappointed.

Experiment 3 scenario

Tom has been working in a bank in the city centre for the past few years. He lives with his wife on the outskirts of town. On Thursday, he left the office at the usual time. He was only a short distance down the road, when he drove over some glass and got a flat tyre. After changing it, he headed off again. Because of this delay however, he ran into the rush hour traffic which he usually managed to avoid. This meant that his journey was considerably

slower than usual. Tom passes a local gym on his way home every day. It is normally closed but because of his delays that day, when he got there it had already opened for the evening. *[Control: It is quite a large gym.] [Internal reason: He really likes to go to the gym.] [External reason: He is trying hard to lose weight.]* He decided to stop off for a quick workout. Thirty minutes later he was finished and he set off again. When he arrived home soon after, he found his wife lying on the floor. He realised that she had had a heart attack and that she was dying. He tried to help her, but his efforts were in vain.