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Pers Soc Psychol Bull 2008 34: 1346 originally published online 8 July 2008

DOI: 10.1177/0146167208320556

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Insurance, Risk, and Magical Thinking

Orit E. Tykocinski

Interdisciplinary Center (IDC) Herzliya

The possession of an insurance policy may not only affect the severity of a potential loss but also its perceived probability. Intuitively, people may feel that if they are insured nothing bad is likely to happen, but if they do not have insurance they are at greater peril. In Experiment 1, respondents who were reminded of their medical insurance felt they were less likely to suffer health problems in the future compared to people who were not reminded of their medical insurance. In Experiment 2a, participants who were unable to purchase travel insurance judged the probability of travel-related calamities higher compared to those who were insured. These results were replicated in Experiment 3a in a simulation of car accident insurance. The findings are explained in terms of intuitive magical thinking, specifically, the negative affective consequences of “tempting fate” and the sense of safety afforded by the notion of “being covered.”

Keywords: *magic; risk; insurance; intuition*

The goal of the current research was to examine the ways in which the possession of an insurance policy may affect perceptions of relevant risks. Two effects are considered: the sense of safety that is gained by the possession of an insurance policy and the sense of greater peril associated with “tempting fate” by being uninsured against misfortune.

An insurance policy is in essence a contract by which a company undertakes to guarantee the insured party against losses that may be incurred by specified peril. As the name of the practice implies, the possession of an insurance policy makes the insured party feel safer in the knowledge that one’s personal risk of potential losses are now shifted away from oneself onto the insurance company. There is, however, another factor that could contribute to this sense of safety. I argue that the possession of an insurance policy diminishes the threat of potential misfortune not only by cutting down on the severity of the potential negative outcome but also psychologically, by reducing its perceived probability.

To understand how the state of insurance may influence evaluations of the probability of misfortune, we should consider the role of affect in making these evaluations. In recent years, several researchers have emphasized the dual nature of human cognition (Chaiken & Trope, 1999; Epstein, Lipson, Holstein, & Huh, 1992; Kahneman, 2003; Slovic, 1996). People are capable of logical reasoning and deliberative analysis, but their decisions and subsequent behavior may also be influenced by intuition and gut feeling. The intuitive system is quick, experiential, and affect based. Whereas deliberative risk analysis is based on an assessment of the likelihood and perceived severity of different consequences, intuitive risk analysis is based on feelings that are present when making a decision concerning a risky choice (e.g., apprehensions, anxiety, fear, worry).

In 1983, Johnson and Tversky demonstrated that when people are in a bad mood, they tend to judge negative events as more likely. The authors explained that people tend to make judgments that are compatible with their current mood. That same year, Schwarz and Clore (1983) introduced the concept of “feelings as information” and showed that people can simplify complex judgments by asking themselves “How do I feel about it?” Several researchers elaborated on the distinction between risk as analysis and risk as feelings (i.e., affect heuristic) and considered the reciprocal effects of the two modes of thinking as well as their independent contribution to behavioral responses to risk (Slovic, Finucane, Peters, & MacGregor, 2004; Slovic & Peters, 2006). In

Author’s Note: I wish to thank Hadas Brantz, Liat Rotenberg, Rachel Yiremicho, Shir Bul, Shirley Durchin, Ofri Ben Yishai, and Yael Silberberg for their assistance in constructing the questionnaires and collecting the data. I would also like to thank Bradley Ruffle, Gary Bornstein, Ehud Lehrer, Andreas Ortmann, Ravit Nussinson, and Lesley Terris for their insightful comments. Correspondence regarding this article should be directed to oritt@idc.ac.il

PSPB, Vol. 34 No. 10, October 2008 1346-1356
DOI: 10.1177/0146167208320556

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their risk-as-feelings model, Loewenstein, Weber, Hsee, and Welch (2001) draw attention to the fact that cognitive and affective evaluations have different determinants. Anticipatory feelings experienced at the moment of deliberation are influenced by factors such as vividness and immediacy that have little effect on the cognitive appraisal process. As a result, it is possible for the two processes to produce divergent consequences to judgment and behavior (Loewenstein et al., 2001).

The different models describing the role of affect in risk assessment share the proposition that people are capable of judging risk intuitively based on their affective state at the time of making these judgments. I suggest that the possession of a relevant insurance policy can moderate anticipatory emotions and thus influence judgments of perceived risk (i.e., subjective probability of misfortune). The rationale underlying this hypothesis is based on the intuitive sense of safety that people associate with insurance, and patterns of magical thinking, specifically, the notion of tempting fate.

When people buy insurance policies, they are in a sense buying peace of mind. From an economic perspective, this sense of safety originates from the knowledge that in case of misfortune, the insured will be compensated; thus, the severity of potential negative outcomes is greatly reduced. The sense of safety associated with having a shield against potential damages is captured by the term "coverage." However, it is interesting to note that from a linguistic perspective, the term *insurance*, or in French *assurance*, with its root in the word *sure*, implies certainty and could be interpreted as a reduction in the actual probability of harm rather than in its magnitude.

Many of the images used in commercial insurance ads focus on this aspect of possessing an insurance policy. Ads promoting the purchase of travel insurance depict happy couples on golden beaches lined by palm trees rather than images of people being compensated for lost luggage. In insurance commercials, it is more common to see happy families than hospitalized patients or horrific traffic accidents. It appears that people have learned to associate insurance with a sense of safety, and therefore the apprehension that is experienced when one considers possible misfortune is abated by the awareness that one is insured against these calamities. It is therefore hypothesized that when people are making intuitive judgments, the reduction in anxiety afforded by possessing an insurance policy will be apparent in lower estimates of the probability of misfortune.

In contrast, when people are aware that they are not insured against some misfortune, not only do they lack the sense of safety afforded by the policy but they may also feel increased apprehension and anxiety resulting from magical beliefs concerning the consequences of "tempting fate." Although people may hesitate to admit

to being influenced by magical thoughts, especially when they come in conflict with formal logic, magical thought patterns are rather common (Jahoda, 1969; Nemeroff & Rozin, 2000; Rozin & Nemeroff, 2002; Zusne & Jones, 1989). Many people are familiar with the folklore that taking an umbrella on the advice of a forecast makes rain less likely but if one fails to take the umbrella it is bound to rain heavily. Although it is rare to find someone who truly believes that their actions could influence weather systems, it is not rare to encounter people who would ponder this superstition and decide to take an umbrella. Likewise, people may dismiss suppression on a rational level and at the same time feel a slight unease when crossing the path of a black cat or walking under a ladder.

The act of not taking an umbrella falls in the category of tempting fate or "tempting the gods." In folk traditions, human acts that ignore the role of fate are considered hubris, acts of vanity and presumption, which are likely to be punished. This belief is captured in the proverb "If you want to hear God laugh, tell him your plans." Recently, Risen and her collaborators (Risen & Gilovich, 2006, 2007; Risen, Gilovich, Kruger, & Savitsky, 2007) have demonstrated that many people believe that if you tempt fate, bad things are bound to happen. For example, participants in one of the experiments reported by Risen and Gilovich (2006) indicated lower chances of being accepted to a prestigious university for an applicant who tempted fate by wearing the university t-shirt before being officially admitted, compared to an applicant who did not wear the shirt. In another experiment, the authors demonstrated that students believe that if they did not prepare for class, they are more likely to be called on by the professor than when they had done the readings (Risen & Gilovich, 2007, Experiment 2). Actions that tempt fate create unease, and in addition they automatically bring to mind negative outcomes that in turn increase their perceived likelihood to occur (Carroll, 1978; Sherman, Cialdini, Schwartzman, & Reynolds, 1985). In line with this reasoning, if one contemplates the fact that he or she is tempting fate by not being insured against natural disasters, visions of fires, earthquakes, tornadoes, lightning bolts, and floods come rushing to mind, gain accessibility and vividness, increase anxiety and apprehension, and consequently seem more likely to happen.

Three experiments were conducted to test the effects of insurance on evaluations of the probability of misfortune. In the first experiment, commuters on a train were asked to evaluate the likelihood of future health-related problems. It was expected that reminding commuters of their health insurance will be associated with lower evaluations of personal risk (i.e., lower probability of health-related problems in the future).

In the second and third experiments, participants were asked to estimate the probability of a negative event against which they were either insured or not insured. In these laboratory experiments, however, an important element was added. Some of the students were allowed to decide if they wanted to purchase insurance, whereas the insurance state of the remaining students was nonvolitional, resulting from conditions outside their control. The circumstances leading to the insurance state were hypothesized to be a crucial determinant of the mode of thinking that will be employed, and consequently the resulting patterns of probability judgments. Because people are generally motivated to appear consistent and logical, it was expected that a salient, deliberate decision to buy or not to buy insurance will produce risk assessments that are guided by reasoning or formal logic rather than affect-based intuition or magical thinking. However, under nonvolitional circumstances, in the absence of a salient, deliberate decision to guide probability evaluations, it was expected that people will rely on intuition in making risk assessments, and therefore probability judgments will reflect magical or intuitive thought patterns.

EXPERIMENT 1

Method

Participants. Forty train commuters on a train heading from Beer Sheva to Tel Aviv, ages 25 to 55, agreed to participate in the experiment in exchange for a small gift. Of these, 23 were women, 14 men, and 3 did not specify their gender.

Procedure. Participants were randomly assigned to one of the two questionnaire conditions, reminded and not reminded (20 respondents in each group), and were handed the appropriate questionnaire form.¹

Materials. Participants were asked to judge the likelihood of seven hypothetical future events. For each event, the respondents rated the probability that the specified event will take place during the next 5 years. These ratings were made on a scale ranging from 1 (*almost zero*) to 5 (*very high probability*). The first three events were personal and health related: Participants rated the probability that during the next 5 years they will undergo a serious operation, will require physiotherapy, or will be in need of comprehensive nursing care. Of the four remaining items, two were negative (the probability that the respondent will lose a substantial amount of money and the probability of a war breaking out in Europe) and two were positive (the probability that the respondent

will win the lottery and the likelihood that Israel and Palestine will sign a peace treaty).

In addition, participants were asked three questions concerning their medical insurance. They were asked to indicate the name of their health insurance plan and indicate whether they have chosen to supplement the basic plan and add comprehensive insurance. Participants then rated the extent to which they were satisfied with their medical insurance on a 5-point scale ranging from 1 (*not satisfied at all*) to 5 (*completely satisfied*). These three medical insurance questions appeared either as the first or as the last questions on the questionnaire, thus creating the reminded and not reminded versions, respectively.

Results

Medical insurance. All the participants indicated that they possessed one of the four major medical insurance plans in Israel, and 33 indicated that they had chosen to add supplemental insurance. Mean satisfaction level was 3.45, and there was no significant difference in satisfaction level between the reminded and the not-reminded conditions ($M_s = 3.35$ vs. 3.55), $F < 1$.

Probability evaluations. Mean evaluations of the probability of seven future events are shown in Table 1. The three health-related items were analyzed in a repeated-measure design with the reminder condition (reminded and not reminded) as a between factor. As predicted, this analysis revealed that participants who were reminded of their medical health insurance tended to rate the probability of health problems significantly lower than those who were not reminded, $F(1, 38) = 5.85$, $p < .02$, $\eta^2 = .13$.

The two nonmedical negative events (monetary loss and war in Europe) were also influenced by the insurance manipulation. These two items were analyzed in a repeated-measures design with the reminder condition as a between factor. The analysis revealed that reminding people of their health insurance was associated with assigning lower probability ratings to negative nonmedical future events, $F(1, 38) = 5.19$, $p < .02$, $\eta^2 = .14$. This result suggests that the sense of safety inspired by being reminded of one's medical insurance may have generalized to other negative prospects as well.

Finally, the insurance manipulation had no significant effect on ratings of the probability of positive events (winning a lottery and signing a peace treaty), $F < 1$.

Discussion

Insurance state may affect perceptions of relevant risks in two ways: Possession of an insurance policy provides a sense of safety, which was hypothesized to

TABLE 1: Experiment 1: Mean Probability Ratings for Seven Future Events in the Reminded and Not Reminded Conditions

	Condition		F	p
	Reminded	Not Reminded		
N	20	20		
Operation	1.65 (0.87)	2.15 (0.87)	3.26	.07
Physiotherapy	2.60 (0.88)	3.05 (1.05)	2.15	.15
Nursing care	1.5 (0.68)	2.10 (1.12)	4.17	.04
Wining the lottery	1.85 (1.18)	1.80 (0.95)	0.02	<i>ns</i>
Monetary loss	1.85 (0.67)	2.20 (0.83)	2.14	.15
Peace treaty	1.85 (1.18)	1.80 (0.95)	0.47	<i>ns</i>
War in Europe	2.00 (0.97)	2.65 (1.23)	3.45	.07

NOTE: Participants rated the likelihood for each of the seven future events on a scale ranging from 1 (*almost zero*) to 5 (*very high probability*). Standard deviations are in parentheses.

reduce the perceived probability of risk, whereas the realization that one is not insured against misfortune was suggested to increase apprehension and therefore induce a greater sense of peril. Experiment 1 explored the first effect—the reassuring qualities of insurance.

It was suggested that people had learned to associate the possession of an insurance policy with a sense of safety. Reminding people that they are insured against medical problems was expected to reduce the apprehension or anxiety triggered by imagining possible negative events. In the absence of any logical cue to assess the probability of these misfortunes, people were expected to infer the probability of negative medical events intuitively from their affective state at the time of making the judgment. It was therefore expected that risk estimates will reflect the hypothesized differences in affective state between those who were reminded of their insured state and those who were not.

The results were consistent with this analysis. Train commuters who were reminded of their medical insurance tended to judge future medical calamities as less likely compared to those who were not reminded. Interestingly, the sense of safety afforded by insurance generalized, at least to some extent, to negative non-medical events as well. Although this effect was not predicted, it is nevertheless consistent with the hypothesized processes of intuitive, affect-based judgment. The use of a heterogeneous nonstudent sample questioned in a natural setting about their actual health prospects and insurance has obvious advantages. This setting, however, does not allow for the manipulation of insurance

state or mode of thinking. The next two experiments were therefore conducted in the laboratory with psychology students as participants.

Experiment 2a included a variable that was expected to influence the extent to which the participants will rely on intuition in making judgments regarding the probability of travel-related calamities against which they were either insured or not insured. The insurance state of half of the participants was self-determined. For these participants, it was expected that judgments concerning the probability of misfortune will be logically consistent with the decision. Thus, it was hypothesized that people who were told that they had decided not to buy insurance will infer the probability of misfortune from their own decision and judge it to be lower than those who decided to purchase the policy. The state of insurance of the remaining participants was determined by circumstances. In the absence of a salient decision to serve as a cue, the probability judgments of these students were expected to reflect patterns of magical thinking, and specifically, the realization that one may be tempting fate by being uninsured against relevant misfortune. Thus, in the nonvolitional condition, it was expected that students who did not possess insurance would judge the probability of misfortune higher compared to those who were insured.

EXPERIMENT 2A

Method

Participants. One hundred eighty-eight introductory psychology students (144 women and 44 men) at Ben-Gurion University and Sapir College volunteered to participate in this study.

Procedure. The experimental session was conducted in several large classes. Participants were randomly assigned to one of four groups in a 2 × 2 design and were asked to read and respond to a scenario concerning travel insurance. The design included two levels of insurance status (insured, uninsured) and two levels of control over the circumstances leading to the possession of the insurance policy (volitional, nonvolitional).

Materials. The scenario consisted of two short paragraphs. The first paragraph was identical in all groups and read as follows:

The summer vacation has started and you decide to take a trip to the Far East with friends. You plan to take a direct El-Al flight to Bangkok. Your travel agent recommended that you take out a travel insurance policy that covers medical costs (including hospitalization), loss or damage to luggage, and rescue services in case of an

accident. It occurs to you that in the airport you will have enough time to stop at the insurance company desk, obtain the details of the policy from the company representative, and decide on the spot if you want to buy travel insurance.

The second paragraph of the scenario was different for each of the groups as follows:

Volitional, insured: “On the day of the flight, you check in, walk over to the insurance company desk, read the policy, and decide to buy travel insurance.”

Volitional, uninsured: “On the day of the flight, you check in, walk over to the insurance company desk, read the policy, and decide not to buy travel insurance.”

Nonvolitional, insured: “On the day of the flight, you check in and walk over to the insurance company desk, but before you have the time to read the policy and decide, your mother calls you on your mobile and tells you that she and your father have already bought travel insurance for you.”

Nonvolitional, uninsured: “On the day of the flight, you check in and walk over to the insurance company desk, but before you have the time to read the policy and decide, your friend calls you on your mobile to say goodbye, and by the time you finish the conversation, you must rush to board the airplane without having the opportunity to buy travel insurance.”

All the participants were then asked to rate the likelihood of three travel-related negative events: the likelihood that your luggage will be stolen or damaged during the flight or the trip; the likelihood that during the trip you will require medical attention or hospitalization due to an illness; the likelihood that during the trip you will have an accident that will require medical or rescue services.

Participants indicated their responses on a scale ranging from 0% (*not at all likely*) to 99% (*extremely likely*). These ratings were later averaged to create the negative event index score.

Results

Means for the negative event index score are shown in Figure 1. An ANOVA on the index scores revealed a significant interaction, $F(1, 184) = 8.58, p < .003, \eta^2 = .04$. As predicted, in the volitional condition participants who purchased insurance rated the probability of a negative event as more likely compared to those who decided not to purchase travel insurance ($M_s = 38.24$ vs. 30.47), $F(1, 184) = 4.61, p < .03, \eta^2 = .02$. In contrast, participants in

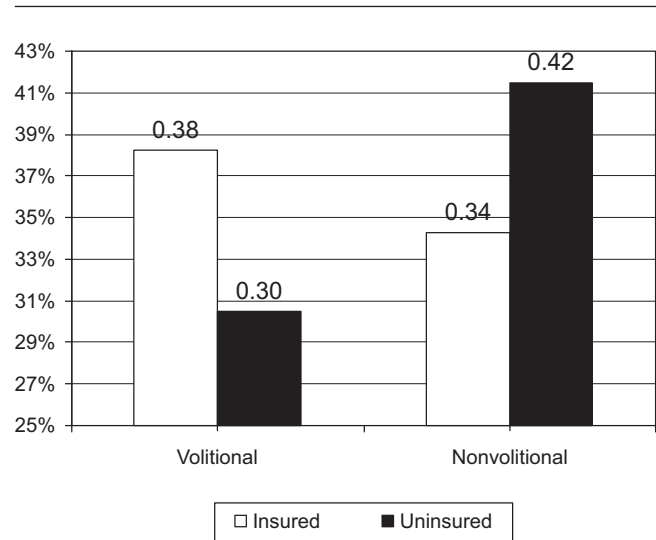


Figure 1 Experiment 2a: Mean Ratings of the Probability of Travel-Related Misfortune (averaged index score)

the nonvolitional condition showed a reversed risk assessment pattern. As predicted, those who did not have insurance believed that the likelihood of misfortune was higher compared to those who were insured ($M_s = 41.51$ vs. 34.27), $F(1, 184) = 3.99, p < .04, \eta^2 = .02$. As can be seen in Table 2, this interaction pattern that was found for the averaged index score was apparent for all three specific dependent measure items.

EXPERIMENT 2B

To further investigate the effect of insurance on perceived probability of misfortune, the scenario that was used in Experiment 2 was again administered to a separate sample of students who were asked to read the scenario and complete a sentence.

Participants. Eighty-four students (53 women and 31 men) at Bar Ilan and Tel Aviv University volunteered to participate in this study.

Procedure and materials. The experimental session was conducted in several large classes. Participants were randomly assigned to one of the four groups and were handed the appropriate version of the scenario. After reading the scenario, all participants were asked to complete a sentence that was phrased according to the insurance condition. In the uninsured condition, participants were asked to complete the sentence “The fact that I don’t have insurance makes me feel . . .” In the insured condition, the sentence read “The fact that I have insurance makes me feel . . .”

TABLE 2: Experiment 2a: Mean Likelihood of Misfortune Ratings in the Four Groups

	<i>Volitional</i>		<i>Nonvolitional</i>	
	<i>Insured</i>	<i>Uninsured</i>	<i>Insured</i>	<i>Uninsured</i>
<i>n</i>	47	47	46	48
Luggage	52.00 (26.04)	35.57 (21.17)	41.85 (22.07)	48.19 (20.80)
Hospitalization	38.51 (22.87)	34.23 (22.24)	36.65 (18.39)	45.41 (21.73)
Rescue	24.21 (21.12)	21.62 (20.27)	24.32 (17.83)	30.92 (21.67)

NOTE: Participants rated the likelihood for each of the three negative events on a scale ranging from 0% (*not at all likely*) to 99% (*extremely likely*). Standard deviations are in parentheses. The index score was created by averaging the ratings for the three dependent questions for each group.

A separate coding scheme was developed for each version of the sentence. The coding was conducted by two independent judges, with 91% agreement rate. Following are the coding categories for the uninsured versions, listed, with examples, according to the category frequency, which appears in parentheses.

1. Negative emotions (38): “afraid,” “anxious,” “apprehensive,” “vulnerable.”
2. Practical thoughts (8): “I have to be extra careful.” “I will try to arrange insurance once I get to Bangkok.”
3. Neutral (6): “nothing special,” “normal,” “ok.”
4. Self-reproach (3): “I made a mistake.” “I was irresponsible.”

The coding categories for the “insured” condition were

1. Positive emotions (25): “good,” “reassured,” “safe,” “covered.”
2. Positive insurance-related thoughts (9): “I will be compensated.” “I will not have to pay out of my own pocket.” “If something happens I will submit a claim.”
3. Negative insurance-related thoughts (8): “The insurance will not cover my damages.” “Insurance will not compensate for the distress.” “There will be so much bureaucracy to get reimbursed.”
4. Negative emotions (5): “worried about what might happen.”
5. Neutral (5): “nothing special.”
6. Self-congratulation (4): “I was responsible.” “I took the right measures.”

Results

Uninsured

Only one of the coding categories was frequent enough to allow analysis. Uninsured participants in the nonvolitional condition tended to list more negative emotions than uninsured participants in the volitional condition (24 vs. 14). This difference was found significant in

an ANOVA, ($M = 1.42$, $SD = 0.57$ vs. $M = 0.70$, $SD = 0.47$), $F(1, 39) = 7.27$, $p < .01$, $\eta^2 = .19$. In addition, of the 21 participants in the uninsured nonvolitional condition, 19 listed at least one negative emotion, compared to only 12 participants in the uninsured volitional condition. This difference in proportion was found significant in a one-tailed Fisher’s exact nonparametric test, $p < .02$. Although indirect, these findings are consistent with the hypothesized role of affect in intuitive assessment of risk.

Insured

The only coding category frequent enough to allow quantitative analysis was positive emotions. However, participants in the volitional condition and the nonvolitional condition were not significantly different in their tendency to list positive emotions (13 vs. 12), $F < 1$. Differences in the proportion of participants in each group expressing at least one positive emotion were similarly insignificant.

Discussion

It was suggested that when risk judgments are affect based, the realization that one is not insured against some misfortune could increase apprehension and subjective perception of risk. When one has to rely on “gut feelings” in evaluating the probability of misfortune, being uninsured takes the implications of tempting fate, which brings to mind related adversity and renders even an esoteric catastrophic event, such as being in need of rescue services, more probable. Evidence for this kind of magical thinking pattern was observed in Experiments 2a and 2b. Participants in the nonvolitional condition who had to rely on their intuition in making judgments concerning the probability of misfortune felt that the probability of misfortune was greater when they were not covered.

A different pattern emerged in the volitional condition where participants could have inferred the probability of misfortune from the decision they were said to have made. In the volitional condition, probability ratings logically followed the decision and resulted in a reversed pattern.

Consistent with the idea that affect plays an important role when one has to rely on intuition in making probability judgments, the analysis of the thought-listing task in Experiment 2b revealed that uninsured participants listed significantly more negative emotions when their state of insurance was determined by circumstances than by a deliberate decision. In the insured condition, however, participants did not differ in their tendency to list positive emotions. It is possible that the realization that one is insured inspires a general sense of safety, regardless of whether one relies on one’s affective state to render probability judgments.

Although the results of Experiments 2a and 2b are consistent with the idea of tempting fate, it could be argued alternatively that the enhanced sense of peril experienced by the uninsured was not due to magical thinking but rather due to anticipated regret (Miller & Taylor, 1995). Regret is experienced when people feel responsible for negative outcomes and realize that they should have acted differently. Hypothetically, students in the nonvolitional uninsured condition could have blamed themselves for wasting time on the phone instead of focusing on the task of evaluating the merits of the insurance policy. Although this explanation is inconsistent with the relative infrequency of self-reproach thoughts that could indicate regret, it was nevertheless important to try to replicate the findings under circumstances where being uninsured nonvolitionally was not associated with behavior that could be considered negligent or irresponsible.

In addition, one limitation of Experiments 2a and 2b stems from lack of absolute symmetry between the conditions. Unlike the two volitional groups, which were entirely symmetrical, the nonvolitional groups were different not only in the resulting state of insurance but also in the causes leading to that state: careless time wasting versus caring parents. It was important, therefore, to conduct another experiment under circumstances that were better matched.

Another limitation of Experiments 2a and 2b is the fact that the students in the volitional condition did not make an actual choice, but rather they were told that a certain choice was made by them. It is therefore possible to argue that the probability ratings reflect a post-decision dissonance-reduction process rather than a simple inference from a deliberate decision. To address this limitation, the third experiment set (3a and 3b) allowed for real deliberation and actual choice. In these experiments, participants had the opportunity to obtain an insurance policy covering car accidents, simulated by drawing balls from an urn. The experiments included actual monetary costs and rewards to render the experience more realistic and involving.

EXPERIMENT 3A

Method

Participants. One hundred nineteen introductory psychology students (93 women and 26 men) at Ben-Gurion University participated in this study in return for course credit.

Procedure. Students were invited to the laboratory individually. Upon arrival, they were given 20 shekels (about US\$5) and were told that they would be asked to draw 10 balls out of a large urn. Each ball represented a

day trip in their car. The white balls indicated an uneventful trip; the blue balls a traffic accident. The urn, which contained many white balls and a few (10%) blue balls, was briefly presented to the participants and then covered and placed behind a screen. The students were not told how many balls were inside the urn nor the ratio of white to blue balls. Next, the experimenter explained the insurance terms, which were also presented on a large board. For those without insurance, if they have even one accident (that is, draw even one blue ball among the 10 balls that they draw from the urn), they lose the 20 shekels we gave them, but if they have no accidents, they can keep the full sum. Buying insurance will cost them 10 shekels. If they are insured and they do not have any accidents, they keep the remaining 10 shekels. If however, they have even one accident, they pay a 5-shekel deductible and can keep the remaining 5 shekels.

Half of the participants were randomly assigned to the volitional condition, and at this stage they were asked to consider and decide if they wanted to buy insurance. The other half was asked to roll a die. It was explained that if they get an odd number they have to purchase insurance, and if they get an even number they are assigned to the uninsured condition. The resulting allocation reflected a 2×2 design similar to the one in Experiment 1, with two levels of insurance status (insured, uninsured) and two levels of circumstances (volitional, nonvolitional). After drawing 10 balls from the urn and putting them 1 by 1 in a small jar placed behind a screen, participants were asked to respond to a questionnaire. Only when they completed the questionnaire did the experimenter remove the screen to reveal the jar, and the payments were settled according to its contents. It is interesting to note that although based on our insurance terms the expected value of the no-insurance option was slightly preferable to that of the insurance option, we had underestimated our students' risk aversion, and the majority of the participants in the volitional condition decided to purchase insurance ($n_s = 40$ vs. 21). Less expected was the fact that our die was risk seeking and favored the uninsured condition so that the majority of the participants in the nonvolitional condition were randomly assigned to that group based on die roll ($n_s = 36$ vs. 22).

Materials. Students were first asked to indicate their insurance condition. This question served as a manipulation check and was answered correctly by all the participants. They were then asked to rate the likelihood that they had at least one traffic accident in the 10 trips they took, that is, that among the 10 balls that are now in jar behind the screen there is at least 1 blue ball. Participants indicated their response on an 11-point scale ranging from 0 = *almost zero* to 10 = *highly likely*.

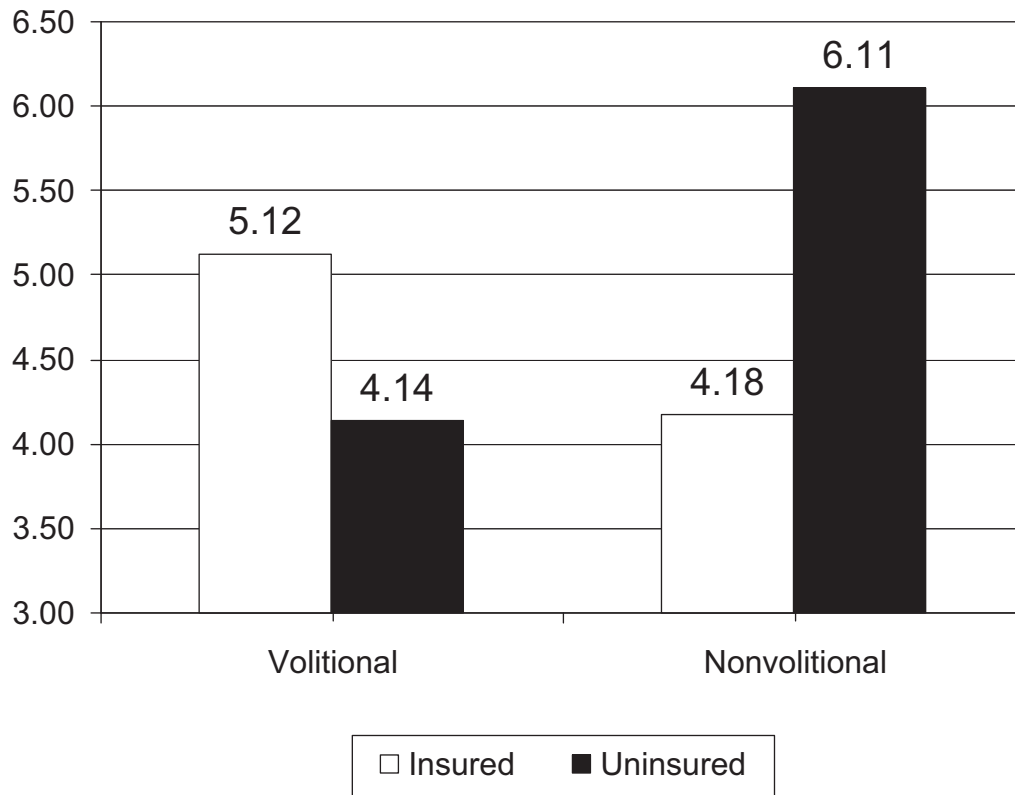


Figure 2 Experiment 3a: Mean Ratings of the Likelihood of at Least One Traffic Accident

Finally, participants completed a seven-item superstition questionnaire that probed beliefs in the existence of the supernatural, belief in fate, the power of charms, astrology, life after death, telepathy, and telekinesis. Participants rated the extent to which they believed in each of these entities on an 11-point scale ranging from 0 = *not at all* to 10 = *strongly believe in it*. These ratings were later averaged to create a superstition index score.²

Results

Risk assessments. Figure 2 shows the mean ratings in the four groups for the likelihood of at least one traffic accident. An ANOVA on these means yielded a significant interaction, $F(1, 115) = 8.31, p < .005, \eta^2 = .07$. The pattern of the interaction was similar to the one found in Experiment 2. Participants who chose to buy insurance rated the likelihood of an accident higher compared to those who chose not to purchase insurance ($M_s = 5.12$ vs. 4.14), although this difference was not statistically significant in simple comparison, $F(1, 115) = 1.9, p < .17, \eta^2 = .02$. The predicted reversed pattern was found in the nonvolitional condition. Participants who were randomly selected, based on the roll of the

die, into the uninsured condition rated the likelihood of an accident significantly higher than those who were selected into the insured condition ($M_s = 6.11$ vs. 4.18), $F(1, 115) = 7.27, p < .008, \eta^2 = .06$.

Superstition. An ANOVA on the mean superstition ratings in the four groups yielded marginal interaction, $F(1, 115) = 2.84, p < .09, \eta^2 = .02$. These differences originated from the fact that participants in the volitional condition who decided to buy insurance had higher superstition rating than those who decided not to buy insurance ($M_s = 4.99$ vs. 3.86), $F(1, 115) = 3.42, p < .06, \eta^2 = .03$. Not surprisingly, superstition ratings were not different in the nonvolitional condition ($M_s = 4.50$ vs. 4.83), $F < 1$. To test whether superstition had an effect on risk assessment in specific conditions, the superstition score was entered as a continuous predictor in a general linear model together with the two categorical predictors. The contribution of superstition scores to the prediction of risk assessments was not statistically significant, $F < 1$. In addition, separate correlations between superstition scores and risk assessments were calculated for each of the four groups. The correlations ranged from $r = .14$ (for

nonvolitional uninsured) to $r = -.26$ (for volitional, insured) but none of the correlations was significant, nor were they significantly different from one another.

Discussion

Experiment 3a largely replicated the findings of experiment 2a, using a different manipulation, actual monetary outcomes, and a different insurance domain. Although the differences in probability assessments in the volitional condition were not significant, they followed the expected direction. When the state of insurance was determined by the roll of the die, participants who found themselves in the uninsured condition felt that they were at greater risk of a traffic accident compared to those who were randomly selected into the insured group. Since this time the nonvolitional state of insurance was determined by luck, rather than controllable behavior, it is unlikely that anticipated regret played a role in the evaluation of risk.

While level of superstition seems to affect the extent to which people were interested in buying insurance, risk assessments were not affected by superstition. This finding suggests that insurance-related magical thinking patterns are rather general and not unique to individuals who are particularly naïve or gullible (Gmelch & Felson, 1980; Pronin, Wegner, McCarthy, & Rodriguez, 2006; Singer & Benassi, 1981).

In Experiment 3a, participants in the volitional condition were not asked to imagine that they had made a choice but were given the opportunity to make this deliberate choice after considering the cost of the insurance and outcomes contingent on the different prospects. In order to make the choice rationally, the students should have contemplated the risk. Unlike the scenario-based Experiments 2a and 2b, it is less likely in this setting that the reported probability judgments reflected postdecision dissonance, or an attempt to justify a decision that was already made. Nevertheless, to address the dissonance-reduction alternative explanation more directly, an additional experiment was conducted.

EXPERIMENT 3B

Method

The design of Experiment 3b was identical to that of Experiment 3a, with an addition of a baseline risk estimate. The baseline (predraw) estimate, which was identical to the one used in Experiment 3a, was collected in the beginning of the experiment when the urn was placed behind the screen, before the students were asked to decide if they wanted to purchase insurance. A second estimate (postdraw) was collected after the balls

were drawn and placed in the small jar also veiled by the screen. The modified design allowed a close examination of the relationship between perceived risk and insurance decision, as well as the possibility of detecting any changes in risk estimates following insurance purchase decisions.

Thirty-eight students (31 women and 7 men) participated in this experiment. Of these, 24 chose to purchase insurance and 14 declined.

Results and Discussion

Data were analyzed using a mixed-model ANOVA with time of risk estimate (predraw vs. postdraw) serving as a repeated measure and insurance decision (purchase vs. decline) serving as a between-subjects variable. The results revealed a significant effect of insurance decision, $F(1, 36) = 4.32, p < .04, \eta^2 = .12$. As expected, students who decided to purchase insurance made higher risk estimates than did students who did not. This finding was evident both prior to the drawing ($M = 4.21, SD = 0.42$ vs. $M = 2.92, SD = 0.56$) and after the drawing ($M = 4.50, SD = 0.49$ vs. $M = 2.85, SD = 0.64$). Analysis revealed no effect of time of estimate (predrawing vs. postdrawing) on risk estimates and no interaction, $F < 1$. The absence of an effect of timing of estimate suggests that the findings of Experiments 2a and 3a cannot be explained in terms of postdecision dissonance reduction.

GENERAL DISCUSSION

The concept of insurance can be traced back to transactions of medieval merchants who would pay an extra sum to guarantee loans taken against goods shipped by sea. Other types of insurance were established as people recognized the need. Fire insurance, for example, gained popularity in the United States after the great New York fire in 1835. The interest in life insurance in the United States developed with an ideological shift from trying to ensure a blissful afterlife by donating to the church to finding comfort by ensuring the safety of one's family in this life by buying life insurance. People who were hesitant to issue life insurance, suspecting that this very act may provoke early demise, were told that by rejecting life insurance they were in fact "inviting the vengeance of providence" (Zelizer, 1978).

From a magical thinking perspective, by buying insurance people are, symbolically, "appeasing the gods." In ancient times, people would offer sacrifice to the gods not so that they would be compensated in case of a flood or fire but in the belief that this act was instrumental in preventing natural disasters—the expression of the gods' wrath. Remnants of this kind of

magical thinking seem to lurk in the back of our minds today. Intuitively, the realization that one is not covered against specific misfortune seems to be one step away from feeling exposed, vulnerable, and at a greater peril. In contrast, as was demonstrated in the first experiment, when people are reminded that they are covered, they feel safer and less likely to experience misfortune.

In Experiments 2a and 3a, patterns of magical thinking were only apparent when the state of insurance was not volitional. A deliberate decision concerning the purchase of insurance is probably accompanied by an attempt to evaluate the risks one is trying to insure against. In the volitional condition, this process of logical risk assessment was presumably inferred and reconstructed by the participants in Experiment 2a and could be recalled from memory by the participants in the third experiment. In both cases, a deliberate decision could serve to guide the students in their assessments of the likelihood of misfortune. In the absence of this salient cue, however, participants in the nonvolitional condition had only their past experiences and their intuition to guide them. Magical thinking patterns were evident when one had to rely on one's intuition and was free from the pressure to produce judgments that are logically consistent with a prior decision.

In their daily lives, people often find themselves in situations where they become aware that they are not insured against specific misfortunes. This realization can take place when they read about domestic accidents or natural disasters or when they hear about friends who suffered some misfortune. In an attempt to nurture business, insurance companies may initiate such reminders. For example, travelers who decide to take advantage of the free travel insurance offered by some credit companies may find out that the free policy provides only minimum coverage. When calling the insurance agency to activate the free policy, these customers will hear about calamities that are not covered by this free basic insurance, and as they picture these disasters, the agent will offer an upgrade for just a few dollars a day. Refusing the added coverage at this point may be conceived of as an act that tempts fate. All of sudden, the possible risk of being hit by a tornado while vacationing in Rome seems plausible.

By purchasing insurance, people are buying a sense of safety; the threat is diminished by both the realization that someone else will cover potential damages and the intuitive and magical belief that calamity is less likely to happen when one is insured against it. With this sense of safety, people may become careless. Thus, a homeowner who is covered by property insurance may be less likely to install burglar and smoke alarms or hide valuable possessions. In this sense, the insurance policy creates a moral hazard, defined as "the tendency whereby people expend less effort protecting those goods which are

insured against theft or damage" (Frank, 1991, p. 193). Moral hazard is often explained in terms of the reduction in prospective loss. The insured individual is less likely to take the trouble of exercising vigilance or investing in preventative measures, knowing that the consequences of this negligent behavior will be borne by the insurance company. The introduction of deductibles and copayments is one measure used by insurance companies to counteract this moral hazard (Arrow, 1963; Pauly, 1968). However, whereas a deductible may be an effective way to offset the diminishing magnitude of the potential negative outcomes, if people intuitively believe that the probability of misfortune is reduced when they are insured, deductibles are unlikely to eliminate the problem of moral hazard.

NOTES

1. The original stimulus materials for all of the reported experiments were written in Hebrew and were translated into English here by the author.

2. Forty-three respondents were also asked to rate their personal luck on a scale ranging from 0 = *not lucky at all* to 10 = *very lucky*. Because this item was added as an afterthought, it did not appear in all the questionnaires. As most of the participants in the volitional condition preferred to buy insurance, it could be argued that the perception of greater peril in the nonvolitional, uninsured group originated from a sense of being unlucky due to the outcome of the die that "sentenced" them to a less desirable insurance state. However, a two-way ANOVA on the self-ratings of luck revealed no significant differences, $F < 1$.

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Received February 12, 2007

Revision accepted March 10, 2008