Worry and the Illusion of Safety:

Evidence from a Real-Objects Experiment*

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Evidence from a Real-Objects Experiment

We analyze the impact of an individual's tendency to worry on willingness to pay (WTP) for a protective measure. We report on the results of a controlled experiment with real objects at stake. Worry was measured with the Worry Domains Questionnaire, an instrument determining an individual's tendency to (non-pathological) worry. Although the loss probability was relatively high and exactly specified, we find that the tendency to worry has in general a positive effect on WTP for protective measures. However when the objects at stake are given to our respondents, high worriers significantly reduce their WTP for protection whereas low worriers are unaffected. We call this tendency of high worriers a safety illusion and relate it to findings on automatic self- regulation, transitional objects in childhood, and studies on the illusion of control. High worriers appear to make more use of all these mechanisms than low worriers because they have more experience in easing their anxiety.

Introduction

This paper examines the impact of the trait "worry", i. e. worry as a personality variable, on willingness to pay (WTP) for a protective measure. The vast majority of studies on protective measures are questionnaire experiments with *hypothetical* objects and payments (see e. g. Slovic et al. 1978; Hogarth and Kunreuther 1985; Hogarth and Kunreuther 1995; Kunreuther, Onculer, and Slovic 1998). In a few studies, *real money* is at stake (see e. g. McClelland, Schulze, and Coursey 1993; Schade, Kunreuther, and Kaas 2001). This is the first controlled experiment of which we are aware where individuals are given *real objects* and face the possibility of finding them defective so that they are not usable.

In these experiments, individuals were given a Panasonic Walkman that they could lose if a "mechanical defect" --- simulated by the roll of a die --- occurred. Respondents were asked their maximum WTP for protection, for a so-called "warranty". The scenarios we utilized were designed to evoke two different mental accounting principles: *bundling* (potentially facilitating the aggregation of losses; see Thaler 1985), unbundling, and *no-claim rebates* (potentially facilitating the segregation of a gain; see Johnson et al. 1993). We also examined whether physically giving the Walkman to an individual had an impact on WTP for the warranty.

Contrary to our initial expectations, we find that mental accounting has no significant influence on the attractiveness of protection. The key factor which influences WTP is whether or not a person has a tendency to worry. Consistent with earlier studies on worry and "pessimism" (MacLeod et al 1991; MacLeod 1994), the tendency to worry has a *positive* effect on the maximum an individual is willing to pay for a warranty when the Walkman is **not** transferred to the individual before eliciting this WTP value. However, when the object is physically transferred to the individual prior to eliciting WTP, this action has a *negative*

effect on WTP for protection for high worriers. We label this phenomenon a "safety illusion" and relate this finding to studies on "automatic self regulation" (Bargh and Chartrand 1998), to earlier thoughts on "transitional objects" in childhood (Winnicott 1953), and to studies on the "illusion of control" (Langer 1975; Moghaddam and Studer 1998). We contend that high worriers have a greater need for reassurance than low worriers and are thus better trained in using simple mechanisms that ease their anxiety than low worriers. Interestingly, many of the reactions of people following the events of September 11, may be interpreted as such simple means to become reassured as we are going to argue below.

The paper proceeds as follows. The next section provides a brief theoretical definition of the personality trait worry and will describe how it is measured. We hypothesize that the tendency to worry should have a positive effect on WTP for protection. We then outline the experimental design and report on the basic findings of our study. The concluding section discusses the implications of all these findings for the adoption of protective measures and suggests directions for further research.

Worry and Protective Measures

You cannot prevent the birds of worry and care from flying over your head.
But you can stop them from building a nest in your head. (Chinese Proverb)

Worry has been characterized as the *cognitive part of anxiety* (Liebert and Morris 1967) and is closely related to *hypervigilance*. "Anxious individuals are inclined to scan their environment constantly for ambiguous or aversive stimuli. (...) Their focus is on threat (…)" (Schwarzer 1996). They scan their surroundings in a *broad fashion* when no specific danger is identified, but turn to a *narrow focus* after they have *detected* a threatening stimulus (Schwarzer 1996;

Eysenck, 1992). Obviously, worry should therefore be relevant to decisions on protective measures given that there is a threat of a potential loss.

MacLeod (1994) argues that worry may lead to a so-called "explanation-based pessimism" in the following sense: Individuals apply the *simulation heuristic* to judge the likelihood of events (see Kahneman and Tversky 1982), and worriers are more likely to access *negative scenarios* and will not engage in searching for counterarguments. Somewhat supportive experimental evidence can be derived from MacLeod et al.'s (1991) study (for more details see the discussion section).[1] Hence high-worriers should judge the occurrence of negative events more likely than low-worriers and should thus be willing to pay more for protection. Given this line of reasoning, one would predict that this difference in WTP between low and high-worriers would occur only if loss probabilities are ambiguous or unknown.

In other experimental situations actual behavior differs from this prediction. People tend to attach different subjective probabilities to outcomes even when the chance mechanism, such the rolling of a die, is clear to them. Schade, Kunreuther, and Kaas (2001) have shown that the degree a person is concerned or worried has an impact on the willingness to pay for insurance even if probabilities are specified precisely. This finding may not be judged surprising since many studies demonstrate that individuals have a hard time dealing with (technical) probability information or do not even ask for probability information when evaluating risky alternatives (for an overview, see Kunreuther et al. 2002). This leaves room for a simulation heuristic to work even with clearly specified probabilities. Hence, we expect WTP to be larger for high-worriers in our decision situation. In other words, we are relating a judgmental bias with well-specified probabilities to the personality variable worry.

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[1] See Hoch (1985), for the effect of counterfactual thinking on judgment.

We measure the trait variable *worry* using the Worry Domains Questionnaire (WDQ) of Tallis, Eysenck, and Mathews (1992), the only personality questionnaire for *non-pathological* worry of which we are aware.[2] In the 25 item version of this questionnaire developed by Tallis, Davey, Bond (1994), subjects are asked about the degree they tend to worry in five different domains of their life.[3] Examples of statements are: "I worry that my future job prospects are not good" and "I worry that I am not loved". Answers to all 25 statements have to be given on the following rating scale: "Not at all" (score: 0), "A little" (score: 1), "Moderately" (score: 2), "Quite a bit" (score: 3), and "Extremely" (score: 4).

The sum of all ratings defines the overall WDQ score that varies between 0 and 100. A higher WDQ score is associated with a higher tendency to worry. Subjects in the normal work force have a mean score of 23.1, students have a mean score of 26.6, while clinical subjects (persons undergoing a psychiatric treatment because of extreme worry) have mean scores as high as 50.7 (Tallis, Davey, and Bond 1994). The subjects in our study had a median of 25, implying that their worry scores are very close to the other studies on non-clinical subjects. Note that there is no "natural" score for a split between high-worriers and low-worriers. We discriminate between the two groups by classifying individuals as high-worriers if they are at or above the median value and low-worriers if they are below it.

Experimental Design and Results

Design of the study

A laboratory experiment was conducted in the spirit of experimental economics (see e. g. Camerer 1995) utilizing real objects and real payments and an incentive-compatible prefe-

[2] An important questionnaire for the measurement of *pathological worry* is the Penn State Worry Questionnaire (Meyer et al. 1990).

[3] The five domains are: relationships, lack of confidence, aimless future, work, and financial. The main experiment was carried out in Germany with the translation of Stöber (1996).

rence-revealing mechanism. The experiment was undertaken as a between-subjects design with four conditions. As part of the recruiting announcement, students were told that by participating in the experiment they would have a five in six chance of leaving with a Panasonic Walkman and that they would receive an additional payment of 10 DM whether or not they received a Walkman.

At the start of the experiment subjects were given 25 DM (worth approximately 15 US$ at the time of the experiment). They were obliged to buy a Walkman (WM) for 15 DM. However, before paying for the WM, respondents were told that there was a one in six chance that the WM would be declared "defective".[4] In this case, they would leave the room without the WM. More specifically, subjects were told that at the end of the experiment a die would be rolled for each participant to determine whether his or her WM was "defective": If a six came up, the product would be declared "defective".

A part of the remaining 10 DM could be used to purchase a warranty against the risk that the WM would be defective. Participants were informed in advance that they could keep portion of the 10 DM that they did not use for the warranty. A person who purchased a warranty would be guaranteed to take a non-defective WM home.[5] The four experimental conditions are reported in table 1.

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[4] The selling price of the Walkman was slightly lower than its objective value. Expected value of the risky Walkman is 5/6 of its store price of about 25 DM being equal to 20,83 DM. There was however no significant relationship between respondents' estimations of store prices of the Walkman and their WTP for protection in our experiment.

[5] Obviously, WTP for the warranty is therefore dependent not only on the desire to be protected but also on the attractiveness of the Walkman to the individual. There are three reasons why we do not think that this is a problem: (1) With real objects, the same would be the case in reality. A person who likes a painting would pay more for protection than a person who does not like it that much. (Hsee and Kunreuther 2000). (2) In a between-subjects design, the attractiveness of the Walkman (WM) should be randomly distributed between the conditions, and worry as a trait variable should be independent of it. (3) Respondents self-selected into the experiment: Since getting a WM was announced in the recruiting, we expected mainly those to participate, who were actually interested in obtaining a WM. Reactions of respondents (especially of those who eventually did not get the Walkman) clearly showed their interest in getting a WM. The

Condition	Mental accounting	Walkman transferred before WTP for warranty elicited
Condition 1: Basic	Unbundling, no rebates	No
Condition 2: Bundling	Bundling, no rebates	No
Condition 3: Rebates	Unbundling, rebates	No
Condition 4: Transfer	Unbundling, no rebates	Yes

Table 1: Experimental conditions

- Condition 1: In the basic condition, nothing was manipulated. The payments for warranty and Walkman were *not* bundled, there were *no* rebates, and the Walkman was *not* transferred to the subject before WTP was elicited.
- Condition 2: In the bundling condition, the warranty was offered and the person stated a maximum WTP for the warranty at the same time that the Walkman was purchased for 15 DM. In other words, the person was asked for WTP for the "bundle".
- Condition 3: In the rebate condition *half the warranty price* was returned to the person if the WM was found to be nondefective.
- Condition 4: In the transfer condition, the Walkman was given to each subject after it was purchased. The person then had to decide a maximum WTP for a warranty.

We used a modified Becker, DeGroot and Marschak (1964) mechanism for eliciting maximum WTP values. We did not use the standard BDM procedure in order to avoid the problems caused by a two-stage lottery (Safra, Segal, and Spivak 1990).[6] Instead of using an explicit, visible random mechanism to determine the actual selling price for the "warranty", a

experimenter was often asked on campus whether one could participate again in the experiment (one was not allowed to), and persons expressed regret as to not having paid enough for the warranty to get it.

[6] Individuals have been shown to "mix up" the two lotteries, i. e. they apply the reduction axiom without obeying to the independence axiom.

secret price was pre-selected and placed in a sealed envelope.[7] Prior to running the experiment, the secret price was randomly picked from a price interval based on E(loss) as well as anticipated mean WTPs determined from pretests of the mechanism. Prices were picked from an interval between 2.50 and 5.00 DM in the basic and transfer conditions and within an interval between 4.00 DM and 10.00 DM in the rebate condition. In the bundling condition where the warranty is purchased with the WM the price of the WM coupled with the warranty ranged 15.00 DM to 20.00 DM.

The mechanism was carefully explained to the subjects to make sure they understood that it was designed to elicit the maximum prices they would be willing to pay for a warranty. We explained that if they bid too high they might end up paying that high price, and if they bid too low they might end up without the protection they would have wanted. Subjects were permitted to ask questions on the procedure and the mechanism was explained a second time if necessary. Respondents were then asked to write their maximum buying price for the warranty on a card that they placed in an envelope and then to complete the Worry Domains Questionnaire. We also had seven statements with 5-point rating scales on the arguments people used to determine their WTP for the warranty (these statements were similar to those used by Hogarth and Kunreuther (1995) in their study of warranties).[9]

The experiment took approximately 90 minutes. It was carried out in groups of 6-10 respondents situated in separate booths. The instructions and preference-revealing mecha-

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[7] A distribution-independent proof of the incentive-compatibility of the secret price mechanism is available on request.

[8] Individuals have been shown to "mix up" the two lotteries, i. e. they apply the reduction axiom without obeying to the independence axiom.

[9] We added standard questions on age, field of study and knowledge, the Social Desirability Scale of Crowne and Marlowe (1960), and open-ended questions. These variables did not interact with those examined in the hypotheses.

nisms were pre-tested at the University of Pennsylvania, Philadelphia/USA, in March and April 1998. The experiment was run in 1998 at Goethe-University, Frankfurt/Germany with 129 participants partitioned into four treatment groups with 34, 32, 32, and 31 respondents in in the basic, bundling, rebate, and transfer conditions, respectively. Most participants were business and economics students.

Results

Normalized WTP values (i.e., WTP/E(loss)) were utilized so that all conditions can be compared directly.[10] We first examine conditions 1, 2 and 3, since here differences can be ascribed only to mental accounting. Then we compare the transfer condition (condition 4), where the Walkman was transferred before the respondents were asked how much they are willing to pay for the warranty, with the other conditions. Note that except for the transfer, condition 4 is identical with the basic condition, i. e. neither the aggregation of losses nor the segregation of a gain are facilitated as it is the case in conditions 2 and 3, respectively.

Mental accounting conditions

Without differentiating between high and low worriers, the differences between the basic, bundling, and rebate conditions are statistically non-significant (p-level (ANOVA): .403, two-sided; p-level (KW): .550). As shown in Figure 1, bundling seems to have a tendency to make

[10] WTP would objectively have to be higher for the rebate warranty (condition 3) since the person is getting something back in many cases. Suppose the warranty price was determined by calculating its expected value (EV). In this case the no-rebate warranty would be priced at 2.50 DM and the rebate warranty at 3.54 DM. The EV of a no-rebate warranty (conditions 1, 2, and 4) is EV= 1/6 (15) = 2.50 DM while a rebate warranty (condition 3) where a person receives half the price of the warranty back if the WM is not defective would have an EV= 2.50 + 5/6 (1/2) (2.50) = 3.54. We normalized WTP values by dividing WTP by the respective EV to makes answers comparable across the conditions.

a policy more attractive and no-claim rebates seem to have the opposite effect.[11] In a joint analysis of the effects of these conditions as well as the tendency to worry, the treatment effect remains non-significant (p-level (ANOVA): .068, two-sided). However, as shown in Figure 1 the tendency of a person to worry has a positive, significant effect on predicted means of WTP/E(loss) for the subgroups, based on the specified linear model (y-axis) across all three conditions (x-axis) (p-level (ANOVA): .015, two-sided). The interactions effect is non-significant, here (p-level (ANOVA): .934), i. e. the tendency of a person to worry has no impact on how much a person is influenced by mental accounting. The basic results also hold in an ordinal regression with only the main effects included.[12] Here, the p-level is .046 for worry and .370 for mental accounting.

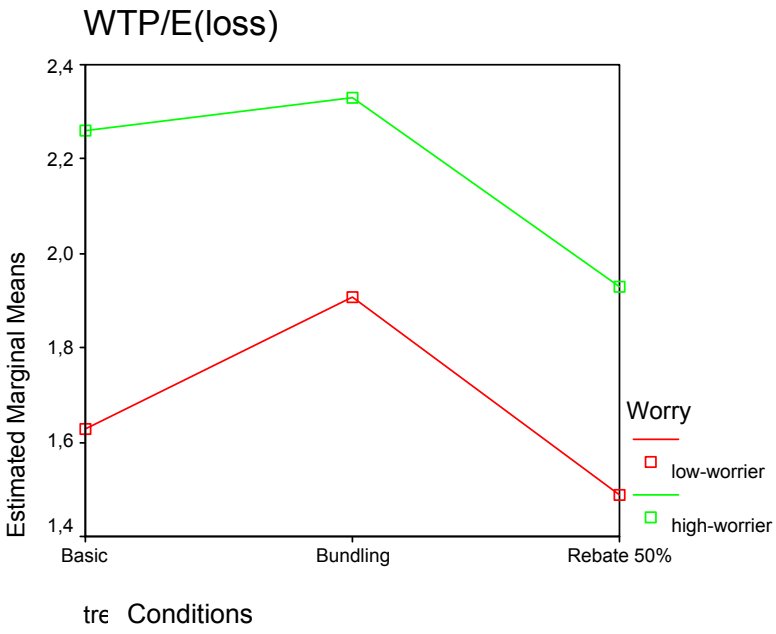

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Figure 1: Effects of mental accounting and worry on WTP/E(loss)

[11] The higher attractiveness of a bundled warranty is consistent with aggregation of losses according to Thaler (1985), the negative effect of rebates differs from earlier findings of Johnson et al. (1993). Since the effects are non-significant, we are not dealing with a more detailed interpretation of these findings in this article.

[12] The ordinal regression was run with SPSS GOLDMineR 2.0 (for the underlying method see Magidson 1996, 1998).

There are also a group of individuals who specify WTP=0. We label this decision as "threshold behavior" since it implies that they perceive the probability as zero because it is below a threshold level of concern. The tendency to worry has a significant impact on those who exhibit this behavior. The total percentage of individuals who set WTP = 0 within the group of low worriers is 17.8% compared to only 4.3% of high worriers. (p-level (chi-square, exact): .035, one-sided). Note since mean WTP/E(loss) >> 1 for the non-threshold people, this implies pronounced risk aversion on their part. The most frequent WTP values are 0, 5, and 10 DM. These results are consistent with the large number of WTP=0 and the high WTP/E(loss) ratios found by McClelland, Schulze, and Coursey (1993) in their insurance experiments.

Transfer Condition and Worry

We now analyze differences in WTP between the group of individuals where the WM was given to the individual before they state their maximum price for the warranty (*the transfer condition)* and when they were not given the WM and asked to state their WTP (*the non-transfer group)*[14]. As shown in Figure 2 there is a significant interaction effect between worry and transfer on WTP/E(loss) (p-level (ANOVA): .025) while the main effects are non-significant (p-levels: .583 for transfer and .905 for worry) (the y-axis can be interpreted in the same way as the y-axis in figure 1). In an ordinal regression with the two main and the interactions effects, the main effect of transfer remains non-significant (p-level: .72), the main

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[14] Since the three mental accounting conditions do not differ significantly, even when adding the worry variable, these conditions were collapsed to a non-transfer group.

effect of worry almost reaches significance (p-level: .051), and the interactions effect is again significant (p-level: .022).[15]

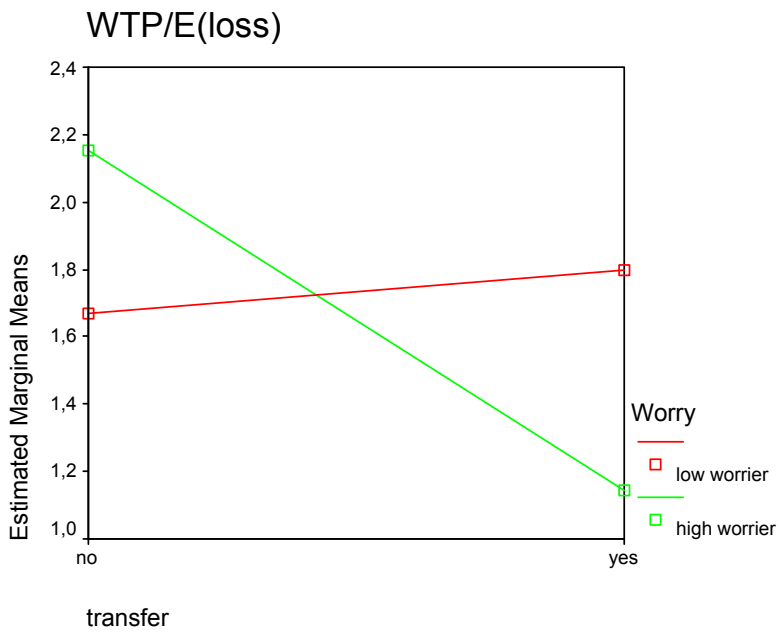

Figure 2: Effects of transfer of the Walkman and worry on WTP/E(loss)

The most interesting finding in Figure 2 is that the WTP for high worriers drops when the WM is transferred to these individuals. The percentage of *threshold* persons is also higher in this condition (25.8% for the transfer group as compared to 11.2% in the non-transfer groups) but the difference is non-significant (p-level (chi-square, exact): .077, two-sided). More important, in the transfer condition the percentage of threshold persons also does not differ significantly between high and low worriers: 23.1% in the group of low worriers and 27.8% in the group of high worriers did not want to pay anything for protection (p-level (chi-square, exact): 1.000, two-sided; not that a p-level of 1.0 means that the difference is a chance event with a probability of 100%). In other words, the interactions effect appears to be driven by positive WTP. Again, the interactions effect is significant (p-level (ANOVA: .028), the main effects of worry (p-level (ANOVA): .838) and transfer (p-level (ANOVA): .491) are not. That

[15] We gain used SPSS GOLDmineR 2.0 for this analysis (see above).

means that leaving out the zeros, worry still has a significant impact on the effect, the transfer of the Walkman has on WTP/E(loss) for the warranty: with high-worriers, the transfer has a negative effect, whereas low-worriers are unaffected by the transfer.

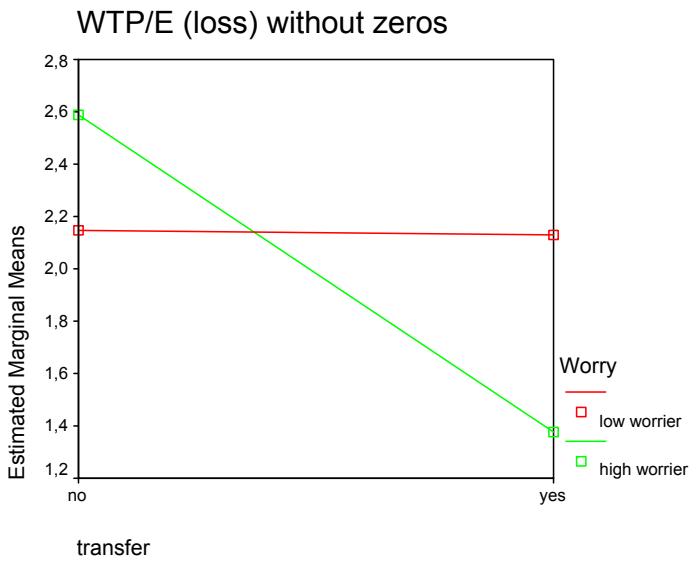

Figure 3: Effects of transfer and worry on WTP/E(loss) without the zeros

Discussion

Two findings from our study have to be explained: (1) Why do high-worriers pay **more** for protection than low worriers when they do not hold the Walkman? (2) Why do high worriers **reduce** their WTP when they hold the Walkman in their hands?

Data from a study by MacLeod et al. (1991) provide some insights into the first question. Chronic worriers (n = 18) provided higher subjective probability estimates for negative events such as "your health will deteriorate" than matched controls (also n = 18).[16] The most anxious

[16] Individuals were matched in age and gender, i.e. there was the same age and gender structure for the 18 high-worriers and as the 18 controls.

worriers took significantly longer to generate *con reasons* than *pro reasons* (p-level < .01).[17] Anxious worriers also show a trend toward generating more pro reasons than con reasons ($p < .1$) and found it more difficult to think of con rather than pro reasons ($p < .05$).

In our experiment loss probabilities are specified exactly with a mechanism that everyone can understand---tossing a die. This should leave no room for individuals to generate either pro or con reasons, i. e. to use a simulation heuristic. However, many individuals may not have much of an intuition for the stochastic nature of even well-understood probabilities like 1 in 6. In fact, they often do not even ask for probability information in evaluation tasks on risky alternatives (Huber, Wider, and Huber 1997). In this case, their subjective "feeling" of how probable if will be that they will lose the Walkman will differ from the objective value.

With respect to the second question, worry together with the physical transfer of the Walkman to the respondent lowers the WTP for protection. To gain insight into this behavior we turn to an analysis of the responses by high and low worriers in transfer and non-transfer groups to seven statements characterizing how they made their decision on how much to pay for the warranty. These statements, presented in the appendix, were based on the arguments that Hogarth and Kunreuther (1995) found were important to people making decisions on whether or not to purchase warranties against defects of consumer durables.

ANOVA's were carried out using the importance ratings (1 = not important at all; 5 = very important) of each of these statements as dependent variables with "worry" and "transfer condition" as independent variables. The only significant interactions effect (p-level (ANOVA): .007) of worry and transfer was found with the statement: "I calculated the expected value of

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[17] A con reason in this context is why something negative might **not** happen, whereas a pro reason in this context is why something negative might happen.

the loss."[18] As shown in Figure 4, the importance of this statement is rated lower by high worriers in the transfer condition than in the non-transfer conditions.

The Need for Reassurance by High Worriers

We do not believe that many respondents actually relied on the mathematical value of E(loss) in making their decisions. Rather they perceive this statement as a proxy for *how careful* or *how consciously* the decision has been made. Based on this interpretation, high worriers' decisions are made less carefully or less consciously in the transfer than in the non-transfer condition. High worriers appear to be **reassured** when they hold the Walkman in their hands. They behave as if their safety has increased. We therefore label this phenomenon a *safety illusion*.

Is there any evidence from the psychological literature that such a phenomenon could be expected? We relate this finding to different streams of research that suggest that the need for reassurance through a safety illusion is indeed plausible behavior for high worriers to exhibit.

[18] The main effects of transfer (p-level (ANOVA): .878) and worry (p-level (ANOVA): .655) are non-significant.

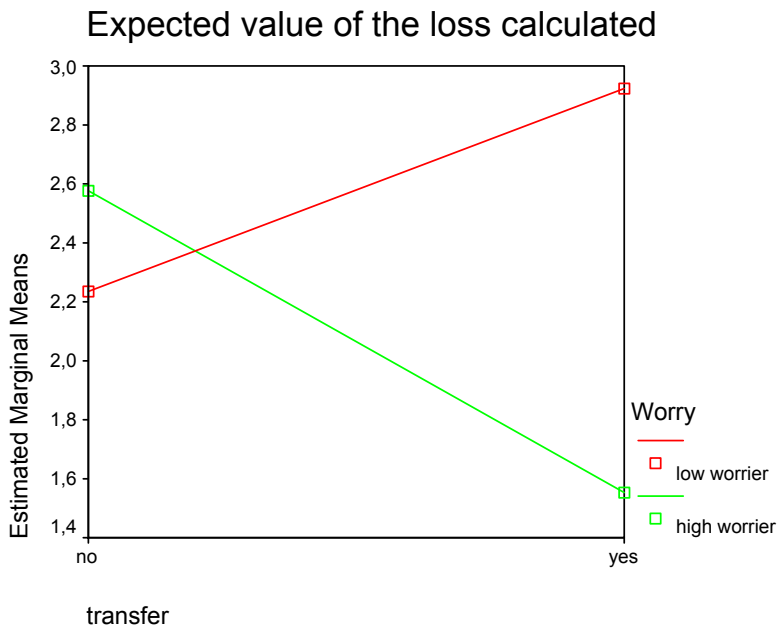

Figure 4: Effect of worry and transfer on statement "I calculated expected value of the loss"; estimated mean importance ratings are depicted on the y-axis (1 = not important at all; 5 = very important)

Bargh and Chartrand (1998) report and interpret a vast number of studies showing that many decisions are *automatic* instead of *conscious*. The degree that a decision is being made consciously is, roughly speaking, dependent on how "easy" the task is for the decision maker as well as how much experience and knowledge the decision maker has had in this area. If an individual is less concerned, it is more likely that the decision will be made without much thought. This in turn could explain why our subjects are judging "calculations" as less important to their decision when they are "relaxed " by holding the Walkman. But why should the transfer of the Walkman reassure high worriers?

The need for and mechanisms to find reassurance have been studied for depressive persons and those suffering from hypochondriasis (Speckens, Spinhoven, van Hemert, and Bolk 2000; Joiner, Katz, and Lew 1999; Joiner et al. 1999a,b) but also for those with generalized anxiety disorder that is closely related to worry (Townsend et al. 1999). There is clinical evidence for

generalized anxiety disorder patients exhibiting compulsive behavior such as checking the clock and telephoning family (MacKenzie, Christenson, and Kroll 1990), and other compulsive behavior such as making lists in an effort to seek reassurance or provide a distraction from their worries are reported in the empirical study of Townsend et al. (1999). According to Tallis, Davey, and Capuzzo's (1994) study on worrying, individuals use many mechanisms to overcome worry. Some superstitious respondents in their studies tend to "touch wood" or "cross fingers", others may exhibit more extreme behavior such as "not saying things to tempt fate" – it is quite plausible that predominately high worriers may engage in such practices to reduce stress.[19]

Second, children use *transitional objects* such as teddy bears to overcome their feelings of being alone or exposed (Winnicott 1953). However, adults are also known to sometimes carry their old teddies as a *talisman* when they present at conferences or take exams. Such objects make these individuals feel safer and more in control of the situation. This behavior could be explained by the well-documented *illusion of control* phenomenon whereby people believe their chances of success at a task are greater than would be warranted by objective analysis (Langer 1975).

In the context of our experiment, just holding the Walkman may lead high worriers to interpret this as a "sign" that it will not be defective and that they will leave the experiment with one in hand. High worriers may be more practiced in using such means to overcome their fears than low worriers. By having an illusion of control after they were given the Walkman, their subjective estimation of the risk has now decreased and their WTP for a warranty will now be lower than if they were **not** holding the Walkman.

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[19] Unfortunately, however, such a comparison between high and low worriers is not reported with respect to these reparative and preventive behaviors by Tallis, Davey, and Capuzzo (1994).

Implications and further research

The above explanation has relevance to the need for reassurance by individuals following the September 11th terrorist attacks. Many residents of NYC and Washington were searching for ways to overcome their fears and worries and were relieved when hearing words of reassurance from Mayor Guiliani and President Bush (e. g. Pooley and Tumulty 2001).

However for many others, reassurance is a more difficult process. "Around the country, normally well-adjusted people have found themselves jumping at shades, avoiding crowds, giving in to little rituals (take the subway to work but the bus home in the evening) that provide not a lot of real protection but somehow offer them an irrational reassurance that if another plane comes screaming out of the sky, maybe it won't be coming for them or their loved ones" (Kluger 2001).

Tharoor (2002) reports on a number of interesting individual attempts to overcome worries, some that are similar in spirit to those addressed in this paper: One New Yorker stashed a canoe in his closet in case he needs to escape Manhattan by river, one moved a heavy objet d'art into his office so that he can smash the window if a firebomb makes the elevator or the stairs impassable, a woman working on one of the lower floors of her office building has acquired a rope long enough to lower herself to the ground, one who works at the top of a skyscraper is looking into the purchase of a parachute, others have stocked up on such items as flame-retardant ponchos, anthrax-antidote antibiotics and heavy-duty gas masks. Although these approaches are highly unlikely to ever be utilized, they may have a positive impact by reducing worry.

Tharoor (2002) also reports on obsessive coping behaviors, that are not related to the risks of terrorism but appear to distract people from their concerns. These behaviors include

compulsive shopping, redecorating, drinking and self-medicating, exercising and moviegoing. In an anthropology-oriented study on changes in consumer behavior after September 11, Blinkoff et al. (2001) provide evidence for the greater importance people place on small things that are familiar to them. One mother e. g. reports that she is now reveling in daily rituals such as preparing meals for her children.

In a study extending the approach of Hoch (1985), MacLeod et al. (1991) asked worriers and non-worriers to think of reasons why negative events would happen (pro reasons) or would not happen (con reasons). Worriers showed significantly lower subjective probabilities for the negative outcomes if they were able to generate arguments that allow for the conclusion that a certain negative event will not happen. (i.e. con arguments). When subjects had difficulty in thinking of such reasons, their subjective probability judgment of the event was higher than if no reasons had been asked for. Realism may in fact not always be the best way to deal with potential threats, especially for high worriers, if you cannot do much to reduce the threats. A systematic search for simple means to overcome worries, to reassure people, may be the way to proceed in many such situations.

Our findings have implications for ways to promote protective mechanisms. From the perspective of the sellers, service contracts[20] should be offered at the time the product is purchased. Furthermore the salesperson should offer the warranty before pulling the product off the shelf. Using the Internet, Harrison (1999) argues the following way in a fact sheet warning customers not to purchase warranties at the point of purchase: "Most service contracts are sold to people at the same time they buy the appliance or car. People are more likely to buy it at this time because they are concerned about how well the purchase will perform and they are thinking about warranties, thus extended warranty has a real appeal. (…)

[20] For the difference between warranties and service contracts see Perry and Perry 1976.

Unless there is substantial savings, buy a service contract at the time the manufacturer warranty expires." (Harrison 1999).[21]

Further research should address when individuals need reassurance and when people exhibit a safety illusion. Does the phenomenon generalize to other decision situations, objects etc.? Are there emotional or cognitive processes involved that have not been measured in our experiment? How far can our result be pushed, and how stable is it if worriers are made aware of their, probably unconscious, behavior? Future controlled experimental studies and field surveys could shed light on these questions and enable us to better understand the role that worry plays in people's decision processes.

[21] For an option pricing approach to the consumer's decision to delay the purchase of extended service contracts, see Brooks and White (1996).

Appendix

Questionnaire on how WTP was determined:

Please rate between 1 and 5, how much the following statements reflect the way you determined your maximum buying price for the warranty with 1 = “not important” and 5 = “very important”.

1. It was rather an intuitive decision
2. The value of the product was important
3. The probability of the product being defective was important
4. I wanted to have peace of mind
5. I thought that my product would not be defective
6. I calculated the expected value of the loss
7. I always buy warranties

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