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When ignorance is not bliss: How feelings of discomfort promote the search for negative information

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Abstract

Recent decision-making research established that the experience of regret leads to post-decision information search [Shani, Y., & Zeelenberg, M. (2007). When and why do we want to know? How experienced regret promotes post-decision information search. *Journal of Behavioral Decision Making, 20*, 207–222]. It has been argued that people search information in hope to alleviate their negative feelings by excluding the possibility that unfavorable decision was made. Paradoxically, by seeking information people expose themselves to information that may confirm their negative feelings. The willingness to seek out potentially painful information was examined in three studies. Experiment 1 demonstrated that the tendency to seek definite knowledge about the attractiveness of a forgone opportunity is mediated by the emotional discomfort associated with remaining ignorant, and influenced by the probability that the search will uncover aversive information. This finding was replicated in Experiment 2 in a lab setting. Experiment 3 demonstrated that definite knowledge is less-aversive than uncertain ignorance, even when one finds out that one had missed a superior opportunity.

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1. Introduction

The famous English poet Thomas Gray suggested that ignorance is bliss and that it is folly to be wise, because knowledge may be emotionally painful (Gray, 1891). Is this true? Consider for example a person who practiced unprotected sex with a number of partners and is now considering taking an HIV test. Would ignorance still be blissful or would it be a haunting purgatory? As painful as it is to find out that one is HIV positive, not having this information is also not without costs. In the domain of potential negative outcomes, uncertainty which is unpleasant (Loewenstein, 1994; Van den Bos & Lind, 2002; Wilson, Gilbert, & Centerbar, 2002). Thus, people might prefer to seek out potentially negative information, not because they welcome exposing themselves to an unpleasant experience, but because the state of ignorance is in itself disconcerting.

Nowadays, with the extensive developments of the internet, we have an abundance of available opportunities as well as an easier access to information about these opportunities (Schwartz, 2004). We can easily log on the internet and make investment decisions. We can also easily find out if our decision not to invest in a specific stock was in fact a big mistake. Knowing that we have missed an attractive opportunity is unpleasant and is likely to trigger feelings of regret and disappointment. The realization that an attractive action opportunity was missed is likely to influence our future judgments, decisions, and actions. For example, research on the 'Inaction-Inertia' effect demonstrated in many choice situations that individuals are less likely to act on an attractive opportunity, if they know that they had missed a similar opportunity that could have guaranteed superior outcomes (Tykocinski & Pittman, 1998; Tykocinski, Pittman, & Tuttle, 1995; Zeelenberg, Nijstad, Van Putten, & Van Dijk, 2006). Instead, people will sometimes switch brands of consumer goods in an attempt to disassociate current opportunities from those which were already missed (Zeelenberg & Van Putten, 2005).

Weighed against the cost of knowing of a failure is the cost of ignorance. In general, people are uncertainty averse (Loewenstein, 1994; Van den Bos & Lind, 2002; Wilson et al., 2002) and loss averse (Kahneman & Tversky, 1979). Hence, they are likely to experience discomfort when they believe that they have missed an opportunity. Without definite knowledge about what would have been, they are left to entertain the nagging thought that our circumstances could have been better if only they had acted on past opportunities. This is particularly true, in view of the affective forecasting literature which suggests that people tend to over-estimate the intensity and duration of the emotional distress they expect to experience as a result of negative events (Sieff, Dawes, & Loewenstein, 1999; Wilson & Gilbert, 2003).

Recent research established that the experience of regret triggers post-decision information search (Shani & Zeelenberg, 2007). The authors argued that this search represents an attempt to gather information that would hopefully eliminate the possibility that an inferior decision was taken, thus relieving the nagging suspicion that one made a mistake.

Ironically, by seeking information people expose themselves to information that may instead confirm their initial negative feelings, as they may find that indeed they could have obtained superior outcomes. Thus, for individuals who decided to search information that is potentially negative, obtaining definite knowledge about a forgone outcome (i.e., knowing for sure that the outcome would have been positive or negative), must seem less or at least equally (but not more) painful than the unpleasant emotional state that is associated with ignorance.

As both information seeking and information avoidance are emotionally costly, we sought to clarify which of the two burdens is heavier, and what are the factors that are involved in the decision to seek or avoid information. More specifically, we investigated whether definite knowledge about forgone outcome (e.g., knowing for sure that an attractive opportunity was missed or not) is indeed less painful than ignorance (i.e., not knowing whether an attractive opportunity was missed or not) and how the likelihood of uncovering this information influences people's negative emotional state and the willingness to learn more about the missed opportunity.

Research on information gap theory had demonstrated that smaller gaps in knowledge increase curiosity as well as discomfort (Litman, Hutchins, & Russon, 2005; Loewenstein, 1994; Van de Ven, Zeelenberg, & Van Dijk, 2005; Van Dijk & Zeelenberg, 2007). The closer we are to "knowing" the more curious we feel and the more dissatisfied with the state of ignorance. A high likelihood that an attractive opportunity was missed resembles a smaller information gap, compared to a situation in which an information search is not likely to ascertain that one had missed an attractive opportunity. Thus, we expected that one's feelings and willingness to acquire information will be influenced by the probability that the search will uncover unpleasant information; low probability was expected to elicit less discomfort associated with remaining ignorant and consequently a lower tendency to seek out information. In contrast, high probability that one had missed an attractive opportunity was expected to elicit more discomfort and a stronger tendency to seek information.

2. Experiment 1

In Experiment 1 participants were asked to imagine that they had missed taking part in a lottery because they forgot to send in their already filled in lottery form. The probabilities of having missed the prize as well as the size of the prize were manipulated. Although missing an opportunity to win a large amount of money may be more distressing than the loss of a small amount, past research had demonstrated that when evaluating the importance of probability and payoff in near-future events, probabilities are evaluated as more important than payoffs (Sagristano, Trope, & Liberman, 2002; Van Dijk & Van der Pligt, 1997). Thus, we expected that the likelihood (i.e., probability) of finding out that an opportunity was missed had a greater effect on experienced discomfort and willingness to search information about the lottery than the actual payoff.

2.1. Method

2.1.1. Participants and design

Eighty students (62 females, $M_{age} = 23$ years) at Ben-Gurion University volunteered to participate in this study. The participants were randomly assigned to one of the four

conditions of the 2 (Missed Prize: 500 NIS vs. 500,000 NIS[1]) × 2 (probability: high vs. low) factorial design.

2.1.2. Procedure and measures

Participants were approached individually at several locations on the university campus. They were given a questionnaire containing the scenario and the dependent measures. The scenario read as follows (values for high probability and large prize appear in parentheses):

> You have been filling-out lottery tickets regularly. A week ago you filled out your lottery ticket as usual, but forgot to send it in. This morning, you glanced at the newspaper and noticed the numbers that won the 500 NIS (500,000 NIS) prize.
>
> You realized that two (five) out of the six lottery numbers were identical to the numbers you had on your unsent form. You were not sure regarding the rest of the numbers and the lottery ticket is in your house.

After reading the scenario, participants were asked to indicate how much discomfort they would feel in this situation, thinking that they may find out that an opportunity to win the lottery was missed (0 = *not at all*, 10 = *very much*). Next, participants indicated the likelihood that they would approach information that would disclose whether the numbers on their unsent form are indeed the winning numbers (0 = *not likely*, 10 = *very likely*).

2.2. Results

The data were analyzed using 2 (missed prize) × 2 (probability) ANOVAs. The results are shown in Table 1. Participants reported feeling more discomfort when the probability to find that an opportunity was missed was high ($M = 6.85$, SD = 2.31) than when it was low ($M = 5.35$, SD = 2.15), as is revealed by a main effect of probability, $F(1,76) = 8.79$, $p < .01$, $\eta^2 = .10$. A similar pattern was found for information seeking. Participants showed a stronger tendency to acquire information regarding the missing number(s) when the probability of finding out that an opportunity to win the lottery was missed was high ($M = 6.97$, SD = 2.88) than when it was low ($M = 5.20$, SD = 3.58), $F(1,76) = 5.72$, $p < .05$, $\eta^2 = .07$. The magnitude of the prize one might have missed (i.e., missed prize) and its interaction with probability had no effect for feelings of discomfort and information seeking.

To test the hypothesis that feelings of discomfort associated with ignorance trigger information seeking, we conducted a regression analysis. The results revealed that the more discomfort people felt with the thought of having missed a gain, the more they wanted to know whether the rest of the numbers on their unsent form are the winning numbers, $\beta = .35$, $t(76) = 3.36$, $p < .01$.

2.2.1. Mediation analysis

The central question of this experiment is whether information seeking is mediated by feeling discomfort. To test for mediation, a series of regression models were estimated (Baron & Kenny, 1986). The results are presented in Table 2. Because one of the require-

[1] At the time of the study, equivalent to $111 and $111,111, respectively.

Table 1
Means and standard deviations of feeling of discomfort and information seeking as a function of the missed prize and missing probability (Experiment 1)

Dependent variables	Missed prize	Probability			
		Low		High	
		M	SD	*M*	SD
Feeling discomfort	500 NIS	5.33	(2.03)	6.76	(2.11)
	500,000 NIS	5.36	(2.33)	6.94	(2.57)
Information seeking	500 NIS	4.47	(3.81)	6.90	(2.77)
	500,000 NIS	6.00	(3.21)	7.05	(3.08)

Note: Entries are means on 11-point scales (0–10), with higher values indicating more intense feelings and more information seeking.

Table 2
Mediation results of Experiment 1

Predictor variables	Mediators	Dependent variable	Mediation tests
	Feeling discomfort	Information seeking (no mediators)	Information seeking (with feeling discomfort)
(Missed) Probability	.32**	.26*	.16
Feeling discomfort			.30**
R^2	.10**	.07*	.15**

Note: Standardized β coefficients are reported.
* $p < .05$.
** $p < .01$.

ments of testing mediation effects is that the independent variables significantly affect the dependent variable in the absence of the mediator, the probability variable served as a sole predictor in this model, with feeling discomfort as the hypothesized mediator and the tendency to acquire the information as the dependent variable. We found that probability predicted discomfort feeling (column 1). Next, we found that probability predicted information seeking (column 2). Finally, we found that information seeking is affected by feeling discomfort and not by probability (column 3). A Sobel test (1982) revealed that the effect of probability on information seeking is mediated by experienced discomfort, $Z = 2.01$, $p < .05$.

2.3. Discussion

The results of Experiment 1 supported the hypothesis that feeling discomfort mediates the tendency to search information regarding the lottery missing number(s). The results confirm that feeling discomfort is influenced by the initial probability of winning the lottery. The magnitude of the prize had no significant effect on either feeling discomfort or the willingness to acquire information. It seems that when confronted with potential negative information implying that an opportunity was missed, the likelihood (i.e., probability) that an opportunity was indeed missed weighed heavier than the actual sum that was lost. These findings are consistent with the findings of Van Dijk and Van der Pligt (1997) who showed that the experience of disappointment is mainly determined by the probability

of undesirable outcome, rather than by the magnitude of desirable outcome. In Experiment 2, we sought to replicate this result in a lab setting.

3. Experiment 2

Participants in this experiment learned that they had just missed an opportunity to participate in a lottery with either a high or low probability of winning. They were asked to decide whether they wanted to wait for information concerning the lottery outcome (i.e., finding out whether they could have won the lottery if they had participated in it).

3.1. Method

3.1.1. Participants and design

Seventy three students at Tilburg University participated for course credit. They were randomly assigned to one of the two conditions (probability: high vs. low).

3.1.2. Procedure and measures

Participants entered the lab and were told that they would participate in several computer based experiments. After being assigned to a cubicle, the experimenter said: "When the experiment begins, you will be offered by the program to participate in a lottery. It is my responsibility to make sure that you understand that this lottery is no longer running". The experimenter then explained that the reason for the lottery cancellation is that all prizes were already given out, and that in order to avoid unpleasant incidents where people claim prizes that are not available, he had to make sure that they understood it. Participants were told that because the lottery program was still installed, they will be asked to insert their participant number (either 3 or 78), which also serves as their lottery number and wait for the lottery results. The experimenter made it clear to the participants that they did not have to wait for the lottery results and that they could call the experimenter in order to quit the waiting period and proceed to the next screen.

After the introduction, the experimenter started the program and the experiment began. Participants read:

> *Computer screen 1*: "Please insert your Participant Number. You will use this number at the end of the experiment to collect your winnings".
> *Computer screen 2*: "You are participating in a lottery in which you can earn 20 to 500 Euros. You are participant number 3(78) out of 80. None of the participants in the current session won any prizes yet. This means that you have 1:78(3) chance to win a prize!!! Soon you will be able to know whether you have the winning number". After inserting their Participant Number and reading the instructions, participants completed a filler task. Next they read:
> *Computer screen 3*: "It takes the program 3 min to find out whether your Participant Number is the lottery winning number."

The participants then had to decide whether they want to wait for the lottery results (3 min), or call the experimenter in order to continue with the experiment. The waiting time (maximum 180 s) was our dependent variable.

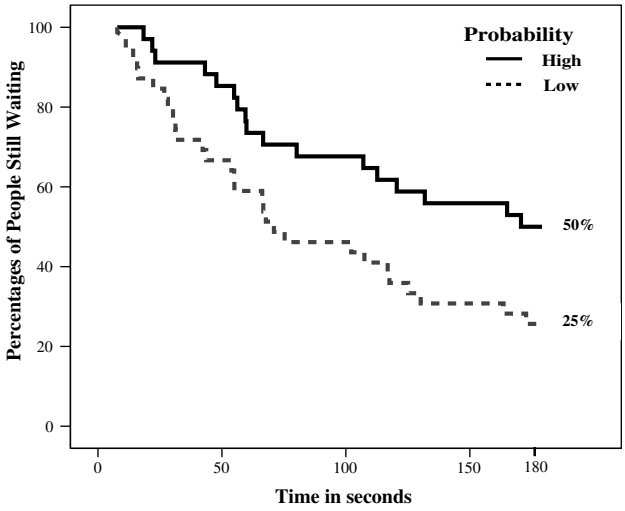

Fig. 1. Kaplan–Meier survival estimates for participants still waiting for information regarding the lottery results, by probability (Experiment 2).

3.2. Results and discussion

The time participants had to wait for the lottery results was 180 s. This time period gave the participants 179 s to withdraw from the waiting period (when they decided to ignore the information). Fig. 1 shows the non-parametric Kaplan–Meier survival functions; steps indicate a decision to quit the waiting process. The survival function describes when people stopped waiting during 180 s as a function of the probability level of having the winning number. As can be seen in the figure, participants in the low probability condition dropped out at a greater pace than those in the high probability condition. The log-rank test for the equality of the survival functions was significant, $\chi^2(1, N = 73) = 6.67$, $p < .01$.[2]

The relatively low withdrawal rate of participants in the high probability condition illustrates how determined they were to find out conclusive information, regardless of the waiting period and the fact that the lottery was no longer playing. In sum, Experiments 1 and 2 provided a strong support to our hypothesis regarding the willingness of individuals to acquire information, even when it has a high potential to be negative.

4. Experiment 3

As suggested earlier, we believe that discomfort drives people to gather information in the hope that this information would allow them to relinquish the nagging possibility that they had missed an attractive opportunity. Paradoxically, the same high likelihood of winning the lottery, which makes ignorance uncomfortable, also increases the chances that the search will uncover that the opportunity was indeed missed. Thus the initial goal of finding

[2] Note that this difference between conditions remains significant when only looking at the number of participants that withdrew from the waiting session before the 180 s were over. When probability was high, 17 out of 34 withdrew, but when probability was low, 29 out of 39 withdrew, $\chi^2(1, N = 73) = 4.62$, $p = .03$.

relief is unlikely to materialize without assuming that for individuals who decided to search this information, definite knowledge is experienced as less or at least equally, but not more painful than the unpleasant feeling that is associated with continued ignorance.

Certainty, even when it is afforded at the cost of ascertaining negative or painful knowledge has a positive value. Individuals usually expect to feel better under certain conditions than uncertain ones (Wilson, Centerbar, Kermer, & Gilbert, 2005). If definite negative knowledge would have left people feeling worse then we should expect them to try to avoid information that has high probability of proving negative. However, according to our analysis and the findings of Experiments 1 and 2 this is not the case. In Experiment 3 the hypothesis that when negative information is expected, definite negative knowledge is in fact less-aversive than uncertain ignorance, is tested directly.

4.1. Method

4.1.1. Participants and design

Sixty students (35 females, $M_{age} = 22$ years) at Tilburg University volunteered to participate in this study. Participants were randomly assigned to one of the three levels of missing an opportunity to win a lottery (probability: high vs. low vs. certain) between-participants design.

4.1.2. Procedure and measures

Participants were approached individually at several locations on the university campus. They were provided with a lottery scenario similar to the one used in Experiment 1. In addition to the *low* or *high* probabilities of finding out that an opportunity was missed, one third of the participants were provided with definite knowledge that they had the winning ticket but failed to send it in.[3] Thus, we were able to compare people's discomfort due to uncertainty to discomfort due to having certain negative knowledge.

After reading the scenario, participants were asked to indicate to what extent they would feel discomfort, regret, disappointment and a tendency to ruminate in this situation ($0 = \textit{not at all}$, $10 = \textit{very much}$). These items were highly related ($\alpha = .90$) and were therefore averaged to create a general index of psychological discomfort.

4.2. Results and discussion

The results were analyzed using a one-way ANOVA and are reported in Table 3. There were significant differences in the intensity of psychological discomfort, $F(2, 59) = 4.70$, $p < .05$. Participants reported significantly more discomfort when the probability of finding out that a prize was missed was high rather than low, which could be expected. Most importantly, however, participants indicated more discomfort in the high probability condition than in the condition in which they had certain knowledge that an opportunity to win the lottery was missed.

These results confirm the expectation that high probability of finding out that an opportunity was missed is more disconcerting than entertaining the same possibility with a lower probability. More interesting, however, is the fact that knowing for sure that one had missed an attractive opportunity is experienced as less-aversive than high probability

[3] Participants were told that the prize in this lottery was €250.

Table 3
Means and standard deviations of the negative feeling index as a function of probability (Experiment 3)

Probability condition	*M*	SD
Low probability	5.86_a	1.64
High probability	7.40_b	1.40
Certainty	6.26_a	2.10

Note: Ratings were made on 10-point scales, with endpoints labeled *not at all* (0) and *very much* (10). Means with different subscripts differ at $p < .05$, LSD post-hoc tests.

uncertain knowledge. These results are consistent with our assumptions concerning the role of negative affect in motivating information search. That is, people seek post-decision counterfactual information simply because it feels better than being ignorant and *suspecting* that this information is negative.

5. General discussion

We demonstrated how the probability of uncovering negative information influences the decision to pursue this information. We focused our research on the emotional costs of avoiding and obtaining the negative knowledge. Counter-intuitively we predicted and found that individuals are willing to search and expose themselves to information that may confirm a negative inkling, particularly under those circumstances where confirmation is highly likely. We explained these findings by demonstrating that the negative emotional burden of uncertainty is particularly heavy when it is highly likely that an attractive opportunity was missed, and in fact – it is less emotionally costly to know for sure even when the news one discovers, is unfavorable. It seems that individuals are willing to search the potentially negative information, not because they enjoy exposing themselves to painful knowledge, rather because it is frustrating not knowing.

Of course, there are other motives that may encourage post-decision information search. The desires to learn, improve ourselves or protect our self-esteem are all examples for such possible motives. The dilemma underlying these different motives is, however, the same – to know or not to know, which would be more painful? Our findings suggest that when expecting negative feedback, the unpleasant feelings associated with being ignorant are far more painful than the negative feelings associated with definite knowledge. Thus wanting to learn or boost the self-esteem even at the cost of searching potential negative information, should be interpreted not only by the desire to improve ourselves or our feelings *despite* the emotional costs of knowing, but rather *because of* the disconcerting feelings associated with being ignorant.

One explanation why ignorance is experienced more aversively than definite negative knowledge may have to do with definite knowledge allowing individuals a mental closure that shields them from further rumination. This would enable psychological immune systems to decrease the impact of negative information by activating psychological defenses. Indeed *immune neglect* studies, a major source of the impact bias, provide further support for this reasoning by demonstrating psychological immune systems, which accelerate people's recovery from negative experiences (Gilbert, Driver-Linn, & Wilson, 2002; Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998). Being unaware of their immune system, these processes allow individuals to recover from their negative emotional state by means of rationalization and sense making (Gilbert et al., 1998; Wilson & Gilbert, 2003). In this

sense, post-decision information search may be interpreted as a sense making technique by which individuals attempt to cope with their negative emotional state, for example by eliminating the possibility that a regrettable decision was made (Shani & Zeelenberg, 2007), or by providing a mental closure that immediately activates the immune system. In this respect, the decision to search negative information is just another step in the processes of reducing dissonance and feeling better. This argument is also consistent with previous explanations for the lack of evidence of information avoidance in the literature. As stated: "Avoidance of further dissonant information merely hinders any increase in the existing dissonance. It does not, however, decrease the dissonance itself" Frey's (1986, p. 70).

It could be argued that the use of scenarios with no actual monetary consequences limits the generalizability of our findings. Although real losses and real gains typically enhance stronger emotions than non-losses and non-gains would (Idson, Liberman, & Higgins, 2000). It is important to bear in mind that it is people's initial expectation for supportive or non-supportive information that intensifies the need to reassure themselves that their situation is optimal. As long as the comparison is made between one's current states to even worse scenarios, real money would probably intensify emotions and the search of information, but unlikely to change directions (i.e., information avoidance), as it is the probability that counts rather the absolute monetary of the loss.

In the present manuscript, we demonstrated how the probability of encountering negative information influences the decision to obtain this information. We focused our research on the emotional costs of avoiding and obtaining the negative knowledge. We found that individuals are willing to expose themselves to information that may confirm their negative feelings, particularly when they are likely to encounter one. We explained this allegedly masochistic behavior by demonstrating that individuals are willing to search the potential negative information, not because they enjoy exposing themselves to the unpleasant information, but because it is frustrating not knowing this information.

In his novel "The curious incident of the dog in the night-time", Haddon (2003, p. 215) expressed this frustration from the point of view of Christopher, an autistic 15-year-old boy:

> And it is best if you know a good thing is going to happen, like an eclipse or getting a microscope for Christmas. And it is bad if you know a bad thing is going to happen, like having a filling or going to France. But I think it is worst if you do not know whether it is a good thing or a bad thing which is going to happen.

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