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Regret aversion and the reluctance to exchange lottery tickets

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ABSTRACT

The current research finds that people are willing to forego a direct material gain, if that protects them from future regrets. In two experiments participants endowed with a lottery ticket were offered to exchange their ticket for another ticket from the same lottery. Even though they could receive a bonus for exchanging, many participants chose not to do so. Experiment 1 finds that a manipulation that prevented the anticipation of regret by offering the ticket in a sealed envelope made more participants exchange their ticket. Experiment 2 finds that an increased potential of regret over not-exchanging made more participants exchange as well. In both experiments the effect of the manipulation on choices is mediated by anticipated regret. The experiments show that people are willing to forego a material gain to prevent future regrets and that the reluctance to exchange lottery tickets is (partly) caused by regret aversion.

1. Introduction

Regret arises when one realizes that the present situation would have been better, had another choice been made. Ample research provided support for the idea that decision makers may anticipate regret before a decision is made and that their decisions are influenced by this (for a review see Zeelenberg & Pieters, 2007). Research is sparse, however, with respect to the question whether the motivation to prevent regret can be strong enough for people to forego a direct material gain if that helps to prevent experiencing regret. We are not aware of any publication that reports on experiments that used real incentives and in which regret aversion results in suboptimal choices from a rational, utility-maximizing viewpoint. Research has either been correlational or has been limited to hypothetical situations (regret studies using real incentives were later discarded due to a confound in the design, Starmer & Sugden, 1993).

Our experiments set out to test whether people would knowingly forego a material gain, if that could lessen the possibility of later regret. This critically tests regret theory (Bell, 1983; Loomes & Sugden 1982, see also Humphrey, 2004). In

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addition, we explicitly assessed anticipated regret, both as a manipulation check and to see whether it mediates choice. Such evidence for mediation would not only be new, but also provide direct support for the role of regret in decision making.

The paradigm we used to study regret aversion is based upon the well-established reluctance to trade lottery tickets. Ample research (e.g., Knetsch & Sinden, 1984; Langer, 1975; Risen & Gilovich, 2007) found that people do not like to exchange one lottery ticket for another, even if they get a bonus for doing so. Bar-Hillel and Neter (1996) already discussed the possible role of anticipated regret as a cause of this reluctance. However, they did not find systematic effects of regret in the lotteries they conducted. The second main goal of this manuscript is therefore to test the hypothesis of Bar-Hillel and Neter that anticipated regret (partly) causes the reluctance to trade lottery tickets.

The paradigm makes use of the importance of expected feedback for anticipated regret. Bell (1983) suggested that the anticipation of certain feedback is necessary for anticipated regret to influence decisions. Zeelenberg, Beattie, Van der Pligt, and De Vries (1996) showed in choices between gambles that decision makers indeed shield themselves from regret-inducing feedback. Neuropsychological research found that adding feedback over non-chosen outcomes activates brain regions associated with regret (Coricelli et al., 2005). The reluctance to exchange lottery tickets might stem from asymmetry in feedback, which makes regret aversion a likely explanation. Imagine a person who has to decide whether or not to exchange a lottery ticket. The person knows that if he chooses to exchange the ticket for another one, he could later find out that his old ticket was the winning one. He also knows that with a decision not to exchange, he will only know whether his existing ticket wins or not, not what would have happened if he had decided to exchange. He might therefore only anticipate experiencing regret over this decision, and therefore this asymmetry in feedback is important for the reluctance to exchange lottery tickets.

In the present research we investigated whether decision makers would forego a material gain to prevent the possibility of future regrets. In two experiments the participants received a lottery ticket that could be exchanged for another ticket in the same lottery (with an equal probability of winning). If they exchanged they would receive a bonus: a ballpoint imprinted with the university logo. In Experiment 1 we decreased potential regret over exchanging by putting the originally owned ticket in a sealed envelope, thereby preventing its number being known. This resolved the asymmetry in feedback, because now neither after exchanging, nor after not-exchanging feedback is present on the outcome of the alternative option. In Experiment 2 we did the opposite; we increased potential regret over *not*-exchanging. We did this by announcing the number of the lottery ticket the participant could exchange the originally owned ticket for. This resolved the asymmetry in feedback, because now after both exchanging and not-exchanging feedback is present on the outcome of the alternative option. Both manipulations were predicted to increase the rate of ticket exchange relative to a standard control (in which the originally received ticket's number is known whether replaced or not, and the replacement ticket is unknown unless accepted). The first manipulation did so by preventing regret over exchanging, the second by adding regret over not-exchanging.

1.1. Experiment 1

1.1.1. Method

A total of 230 psychology students (189 females, M_{age} = 20 years) took part in this experiment, in seven groups of 21–39 students. Students were approached at the beginning of a seminar, and asked whether they would be willing to participate in a lottery study. In this lottery one of the participants in each seminar group would win a €15 book voucher (worth approximately $25 in 2003 when we ran this study). All students (except one) were willing to participate.

Each seminar group was randomly assigned to one of the two conditions (Baseline vs. Sealed Envelope). The Baseline condition (106 participants from 3 seminar groups,) was as follows: After being endowed with their numbered lottery tickets, participants were offered the opportunity to exchange their lottery ticket for another ticket from the same lottery. Those who did would receive a ballpoint imprinted with the university logo (retail value = €1).[2] The Sealed Envelope condition (124 participants from 4 seminar groups) was similar to the baseline, but participants received their lottery ticket in a sealed envelope so they could not see the number. The rationale was that if they did not know their number, they could not later find out that their old ticket had won and therefore anticipated regret is unlikely. After all, in order to feel regret one should be able to compare what is to what might have been, and not knowing the ticket number prevents this. All instructions were provided in writing and read aloud to the participants.

After receiving the instructions both orally and on paper, participants indicated individually on a single page questionnaire whether they wanted to exchange their lottery ticket or not. They were instructed to only turn the page after they had made their choice whether or not to exchange, and all participants followed this instruction. Then, on the reverse side of the page the participants responded to the question "I took the possible regret that I might feel if I would exchange the lottery ticket into account when making the decision" (on a 7-point scale, ranging from 1 = did not take into account 7 = did take into account). After this, those who wanted to exchange put their ticket back into the ticket box, and when all had done so, the tickets were randomly redistributed and those who exchanged received a new ticket and a pen.[3] Finally, a winning number was drawn and one person in each group won the book voucher.

[2] The value of the bonus for exchanging was higher than the expected value of the lottery, which ranged from €0.38 (€15/39) to €0.71 (€15/21) depending on group size. Although group size did influence the expected value of a lottery ticket, it had no influence on the choice to exchange.

[3] A total of 40 lottery tickets was used in this experiment, therefore the total number of lottery tickets was always higher than the number of people that took part in the lottery. If we had used the exact number of tickets as there were participants present, it could have been the case that if only one participant wanted to exchange no other tickets were available to exchange it with. Because more tickets were present than there were participants, it could happen that during the drawing of the winning number we had to draw multiple numbers before we had a winner. Participants knew this in advance.

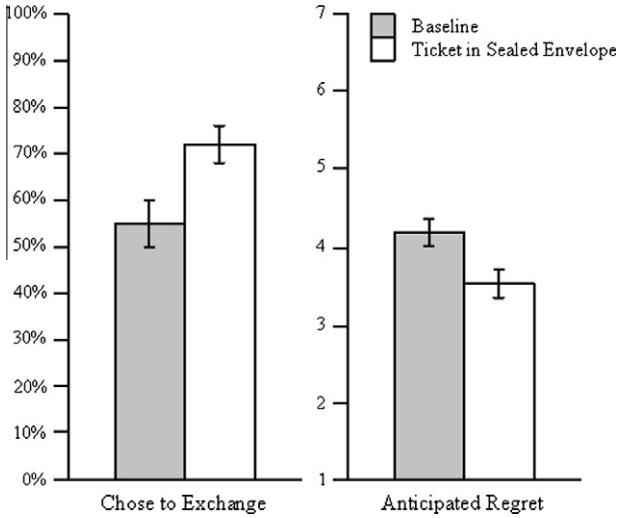

Fig. 1. Percentage of participants who exchanged their lottery ticket and mean anticipated regret of exchanging per condition in Experiment 1. Error bars represent standard errors.

To summarize, we predicted that more participants in the Sealed Envelope condition would exchange their ticket than in the Baseline condition, because not knowing the number of the ticket prevented them from anticipating regret. If the number of the lottery ticket is known (as in the Baseline condition) and one exchanges the ticket, one could find out whether the original ticket was the winning ticket (resulting in regret). If the number is not known (as in the Sealed Envelope condition) one cannot find out that the original ticket would have won. Finally, we also predicted that these results would be mediated by the level of anticipated regret experienced by the participants. In other words, we expected that the difference in the percentage of participants that exchanged would be caused by differences in anticipated regret.

1.1.2. Results

Fig. 1 shows the results of Experiment 1. It shows the percentage of participants exchanging their lottery ticket, for both the Baseline condition (56%, 59 out of 106) and the Sealed Envelope condition (73%, 90 out of 124). Consistent with our predictions, participants in the Sealed Envelope condition were significantly more likely to exchange their lottery ticket than those in the Number condition[4], $\chi^2(1, N = 230) = 7.17$, $p = .007$, $\Phi = .47$.

Also consistent with our reasoning is the finding that participants indicated more anticipated regret in the Baseline condition ($M = 4.17$, $SD = 1.91$) than in the Sealed Envelope condition ($M = 3.56$, $SD = 1.94$), $t(228) = 2.41$, $p = .017$, $d = 0.32$. More importantly, mediation analysis (Baron & Kenny, 1986) revealed that this effect of our manipulation on the choice to exchange is mediated by anticipated regret (presented graphically in Fig. 2). The results of this first experiment support the idea that regret aversion is so powerful that people are willing to forego a direct gain to prevent future regret.

The results of this first experiment support the idea that regret is related to exchanging lottery tickets due to asymmetry in the feedback structure. A treatment that reduced the potential regret associated with exchanging (by not revealing the number of the lottery ticket) resulted in a higher percentage of exchanging. In the next experiment we employed a treatment that we predicted would increase the regret associated with not-exchanging, and this should increase exchanging as a result.

1.2. Experiment 2

1.2.1. Method

This experiment used a similar procedure as Experiment 1. Again, 180 psychology students (126 females, $M_{age} = 20$ years) took part in a lottery, in which a €15 book voucher could be won (in 7 seminar groups ranging from 23 to 31 participants). The participants were recruited in the same way as in Experiment 1 and all students voluntarily agreed to participate.

All participants were endowed with a numbered lottery ticket and were offered to exchange their ticket for a new ticket with a pen as bonus. Since all had a numbered ticket, all could regret exchanging their ticket. The Baseline condition ($n = 74$, 3 seminar groups) formed was identical to that in Experiment 1. Participants received a numbered lottery ticket and were offered the opportunity to exchange their lottery ticket for another, not yet specified ticket from the same lottery. The treatment condition was the New Number Known condition ($n = 106$, 4 seminar groups), which was different in the sense that participants were individually offered a specific number as the ticket that they could exchange their original ticket for (e.g., their original ticket had number 17, and the ticket they could exchange it for had number 32).

[4] Adding gender and age as covariates does not change any of the results presented in this article, so these are left out for ease of presentation.

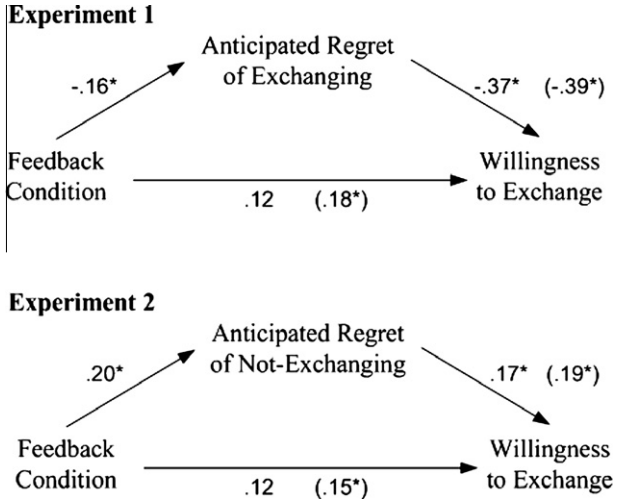

Fig. 2. Anticipated regret of exchanging (Experiment 1) and not-exchanging (Experiment 2) as mediators for the influence of the feedback manipulation on the choice to exchange (0 = no, 1 = yes). Feedback condition was dummy-coded (Experiment 1: Baseline = 0, Sealed Envelope condition = 1; Experiment 2: Baseline = 0, New Ticket Known = 1). All numbers are standardized β-weights. Numbers in parentheses are direct relations, other numbers are the weights for a model regressing the choice to exchange on all predictors simultaneously. Asterisks indicate $p < .05$.

The reasoning behind this treatment was that if they knew the number of the newly offered ticket, they could also end up regretting not-exchanging (when they would find out that the new number was the winning number). Because of this treatment, the participants could regret both keeping and exchanging the original ticket, so therefore they could best exchange to at least receive the bonus of the pen. Again, all instructions were provided in writing and read aloud to the participants.

After having received the instructions, participants indicated whether they wanted to exchange their lottery ticket for a new ticket. After answering this question, they proceeded to a question asking whether they had taken the anticipated regret over exchanging into account, and a second question asked whether they had taken the anticipated regret over not-exchanging into account. Both questions were answered on a 11-point scale, ranging from 0 (not at all) to 10 (very much so). After answering these questions the exchange took place and those who exchanged received a pen. Finally, the lottery was played out and one person in each group won the book voucher.

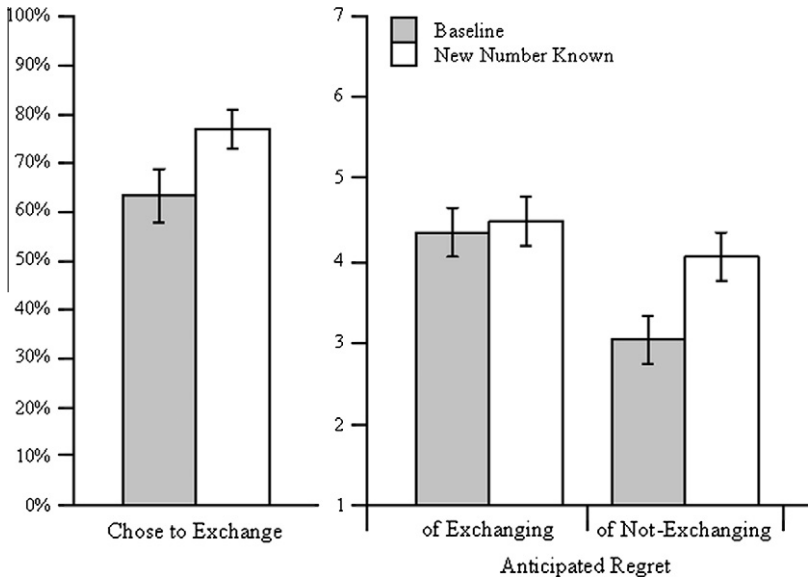

Fig. 3. Percentage of participants who exchanged their lottery ticket and mean anticipated regret of exchanging and not-exchanging per condition in Experiment 2. Error bars represent standard errors.

In short, all participants could regret exchanging their original lottery ticket (of which they knew the number), but only the participants in the New Number Known condition could also regret not-exchanging (because only they knew the number of the new ticket). We thus expected more participants to exchange their original ticket in the New Number Known condition. For the regret measures, we expected no differences between conditions for the indicated influence of the anticipated regret of exchanging, as this is present in both conditions. A difference was expected for the indicated influence of anticipated regret of not-exchanging, higher scores were predicted for the New Number Known condition. We also predicted that these choice results would be mediated by the level of anticipated regret over not-exchanging experienced by the participants.

1.2.2. Results

The results are presented in Fig. 3, and are consistent with our predictions. Significantly more participants exchanged their ticket when they could end up regretting both exchanging and not-exchanging their ticket (New Number Known condition: 77%, 82 out of 106), compared to participants that could only end up regretting exchanging their original ticket (Baseline condition: 64%, 47 out of 74), $\chi^2(1, N = 180) = 4.11$, $p = .043$, $\Phi = .31$. Thus, adding the possibility of anticipating regret of not-exchanging one's ticket increased the number of people who exchanged their ticket. We would also like to note that the two similar baseline conditions in the two experiments do not differ from each other, $\chi^2(1, N = 180) = 1.11$, $p = .293$, $\Phi = .08$, which supports the robustness of the findings.

As expected, there was no between condition difference in anticipated regret regarding exchanging (because participants could find out that their original ticket might have won in both conditions) ($M_{\text{New Number Unknown}} = 4.36$, $SD = 2.62$; $M_{\text{New Number Known}} = 4.51$, $SD = 2.76$, $t(178) = 0.35$, $p = .72$, $d = 0.05$). However, there was a significant difference between conditions in the anticipated regret for not-exchanging ($M_{\text{New Number Unknown}} = 3.08$, $SD = 2.49$; $M_{\text{New Number Known}} = 4.15$, $SD = 2.71$, $t(178) = 2.69$, $p = .008$, $d = 0.40$). The results of both experiments indicate that anticipated regret influences people's decisions, and can lead people to take or avoid action dependent on the option one could regret. As in Experiment 1, this latter difference in anticipated regret mediated the effect of condition on the decision to exchange the lottery tickets (see Fig. 2).

2. Conclusions and discussion

Two experiments found that people are willing to forego a direct material gain if that helped to prevent regret. This supports the notion of Bell (1983), that people are willing to pay a "regret premium" to prevent future regrets. A regret premium is defined as the utility that people are willing to give up, to prevent the possibility of regret later on. We systematically varied the feedback participants received and found that depending on what could be regretted later on, people took or avoided an action if that helped to prevent potential future regrets. Finally, the current experiments support Bar-Hillel and Neter's (1996) idea that regret is (at least one of) the causes of people's reluctance to trade lottery tickets.

2.1. The reluctance to exchange lottery tickets

The current research shows that anticipated regret is partly responsible for the reluctance to exchange lottery tickets. This reluctance seems a deviation from rational decision making, as exchanging a ticket to get a bonus seems a smart option: nobody would doubt the wisdom of exchanging a pen for an identical pen with another pen as a bonus. Still, for lottery tickets this reluctance exists. Besides regret aversion, other factors are likely to contribute to this effect (such as a belief in faith or distorted chance perceptions, Risen & Gilovich, 2007).

An interesting question is why Bar-Hillel and Neter (1996) did not find such regret effects. They intended to test for these effects in two of their experiments (2 and 3). In these experiments participants wrote their name on a ticket. If they wanted to exchange, they handed in this ticket and received a new one. In one condition participants could not learn whether their old ticket would have won, in another condition ('private regret' condition) they would receive feedback if their old ticket had won. If we combine the "private regret" conditions of those studies (which are relatively similar to our Baseline conditions), a pattern does seem to exist that is consistent with our findings. Less participants who could regret their decision to exchange seemed to do so (33%) than those who could not regret it (44%), $\chi^2(N = 152) = 1.94$, $p = .164$. Although this is not a significant difference, the pattern is fully consistent with our findings. A possible reason why this effect is less strong than ours is that for our manipulation that prevented regret it really was impossible to find out that one's ticket would have won if it had been presented in a sealed envelope. In Bar-Hillel and Neter's experiment participants wrote their name on a ticket and these names were crossed out if they wanted to exchange. Such a ticket could then be handed out to other participants, who could still see the name of the old owner. This led to the (small) possibility that in the no-regret condition a winner would know if and by whom the winning ticket had been pre-owned, who might later tell this to the previous owner. Regret was thus possible (though not likely) which might have made their results less strong as ours.

Note that Bar-Hillel and Neter (1996) also had a public regret condition, in which it was publicly announced if someone missed out on the price because he or she chose to exchange. Regret is indeed possible here, but other factors might play a role here as well: People could even be more likely to exchange their ticket, as they for example might expect sympathy from classmates if they turn out to be the losers.

2.2. Implications for regret theory

Besides investigating a possible cause of the reluctance to exchange lottery tickets, another goal of the current manuscript was to address a hole in the regret literature. Although regret aversion has often been found to influence choices in hypothetical situations, the published work using experiments using real incentives is scarce and subject to some serious limitations (Starmer & Sugden, 1993). The current research shows that people knowingly reject a direct material gain if that helps them to prevent potential future regrets and thereby provides valuable support for regret theory (Bell, 1983; Loomes & Sugden, 1982). To our knowledge, one study used actual incentives that is consistent with regret aversion. Larrick and Boles (1995) had people negotiate, but only 1 in 25 participants was actually paid for their decisions. Furthermore, since anticipated regret was not assessed, it remains uncertain whether regret aversion was actually the motive behind this difference.

Other research asked participants to choose between gambles manipulated whether they expected feedback, and found that choices were significantly impacted by anticipated regret (e.g., Ritov & Baron, 1995; Ritov, 1996; Zeelenberg et al., 1996). Hoelzl and Loewenstein (2005) found that participants continued to investing longer when they expected feedback about their investments, while Zeelenberg and Van Dijk (1997) found that such escalation of commitment does not occur when the 'safe' alternative is accompanied by potential regret-inducing feedback. These findings on the effect of feedback on the escalation of commitment are very important for understanding behavior regarding continuous investments, but still did not answer the question whether people would directly forego a gain if that helps to prevent the possibility of future regret.

Zeelenberg and Pieters (2004) did study "real-life" decisions, in which incentives were present and high. They surveyed 400 lottery players in two lotteries in the Netherlands—the Postcode Lottery and the National State Lottery. The State Lottery is a conventional lottery in which participants buy a ticket carrying a unique number. In the Postcode Lottery, one's postal zip code is one's lottery number, and hence even if one has not paid the participation fee, one can still find out whether one would have won had one played. The research shows that because of the particular type of feedback present in the Postcode Lottery, players in that lottery (and not State Lottery players) anticipate regret over not playing, and their participation decisions are related to this anticipation. Although this research was no longer hypothetical, it has its own limitations as it used a correlational survey design and relied on reported behavior. At present, to our best knowledge, experimental research that shows effects of anticipated regret on consequential choices (with real monetary incentives) was still lacking and our current work fills this gap.

2.3. Envy aversion

An interesting alternative or additional explanation for the reluctance to exchange lottery tickets is envy aversion; the idea that people would not like it if another person would win with their old ticket because that could elicit envy in them (see also Hoelzl & Loewenstein, 2005; Zeelenberg & Pieters, 2004). Envy can be felt when someone else is better off. Although envy can lead to negative behavior toward the envied or to a motivation to do better, it is always a frustrating experience (Van de Ven, Zeelenberg, & Pieters, 2009, 2010). In our first experiment a very small chance existed that another person would win with one's old ticket in the Baseline condition, which could lead to envy. However, this was not the case in Experiment 2. Here participants were offered the original ticket and the ticket they could exchange it for. If a participant chose to hand in the original ticket, it could not end up in the hands of another student. Because the two Baseline conditions did not differ across experiments it seems unlikely that envy aversion was present in Experiment 1.

2.4. Conclusion

In two experiments we find that people are regret averse, and that they are willing to forego a direct material gain to prevent possible future regret. The current studies also show that people's reluctance to exchange lottery tickets is (partly) caused by the desire to prevent future regret.

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