

Available online at www.sciencedirect.com

SCIENCE @ DIRECT®

Organizational Behavior and Human Decision Processes 93 (2004) 155–168

 ORGANIZATIONAL
 BEHAVIOR
 AND HUMAN
 DECISION PROCESSES

www.elsevier.com/locate/obhdp

Consequences of regret aversion in real life: The case of the Dutch postcode lottery[☆]

Marcel Zeelenberg^{a,*} and Rik Pieters^{b,*}

^a Department of Economic and Social Psychology, Tilburg University, P.O. Box 90153, Tilburg 5000 LE, The Netherlands

^b Department of Marketing, Tilburg University, P.O. Box 90153, Tilburg 5000 LE, The Netherlands

Abstract

Although ample research has shown that decisions may cause regret and that the anticipation of regret may influence decision-making, this previous research was largely limited to hypothetical choices with student participants. The current research replicates and extends these findings for real life lottery participation decisions in non-student samples. Four studies are reported in which two lotteries in the Netherlands, the Postcode Lottery and the National State Lottery, were compared. The State Lottery is a traditional lottery in which one has to buy a ticket with a number printed on it. In the Postcode Lottery, one's postcode is the ticket number, and hence even if not participating one may still find out that one would have won had one played. As our research shows, this particular feedback that is present in the Postcode Lottery but absent in the State Lottery influences the level of anticipated post-decisional regret, and moderates the influence that anticipated regret has on lottery participation. Study 1, 100 street interviews, confirmed our expectations that the Postcode Lottery may elicit regret. Study 2 found under controlled conditions, that people anticipate more regret over not playing when there is feedback about the neighbors winning a prize in the Postcode Lottery than in the State Lottery. However, when this feedback is absent they anticipate equal amounts of regret over not playing. Study 3 replicated these findings for regret, while showing that the two lotteries do not differ with respect to envy and jealousy, emotions that might also be invoked in this context. Study 4 validated that, as we predicted, anticipations of post-decisional regret influence decisions to play the Postcode lottery, but not the State Lottery. These findings demonstrate the external and discriminant validity of anticipated regret for decision-making, and indicate its pragmatic relevance. The implications or recent developments in regret research are discussed.

© 2003 Elsevier Inc. All rights reserved.

Keywords: Regret; Decision-making; Lotteries; Theory of reasoned action

Gambling is one of the purest forms of decision behavior as the monetary outcomes and the associated probabilities are central, and the choices can be readily modeled mathematically. In many other of life's decisions the probabilities of the different outcomes and the values placed on those outcomes are much more

ambiguous. To overcome this, normative decision theorists often model real-life decisions as if they were a gamble or a lottery. An often-heard criticism, however, is that normative theory reduces decision-making to gambling. As a consequence many features of the decision context are overlooked, and normative decision theory does not fare well in predicting real life decisions. Interestingly, however, it also does not predict gambling behavior very well (e.g., Gilovich, 1983; Shapira & Venezia, 1992; Wagenaar, 1988).

Because of this limited predictive value, researchers have searched for other factors that may influence decision behavior and that may account for deviations from the normative model, one of them being emotion. The emotion that seems most relevant in the context of decision-making is that of regret (Bell, 1982; Loomes &

[☆] We thank CentER Data panel of Tilburg University for their assistance with data collection of Study 2 and Study 4 and Ron Broeders and Giovanni van der Wielen for the data collection of Study 1. We also thank Peter Ayton, Jon Baron, Rick Larrick, Ilana Ritov, Giovanni van der Wielen, two anonymous reviewers and Scott Highhouse for their valuable comments on an earlier version of the manuscript.

* Corresponding authors. Fax: +31-13-466-2067.

E-mail addresses: M.Zeelenberg@uvt.nl (M. Zeelenberg), F.G.M.Pieters@uvt.nl (R. Pieters).

Sugden, 1982). Of course, other emotions are relevant for decision-making as well, such as worry, fear, happiness, and elation. These emotions, however, may also occur in absence of a decision, since they are related to aspects of outcomes or to uncertainty. Regret is directly linked to the choice or decision at hand. Research has documented many instances in which regret may impact behavioral decision-making (for a review see, Zeelenberg, 1999). In this article we use recent knowledge about the psychology of regret, obtained in descriptive decision research, and return to the more traditional study of gambling decisions. In particular, we investigate the role of anticipated future regret in lottery participation decisions. Based on developments in regret research we expect regret to only exert an influence for lotteries that are designed in such a way that they have the potency to evoke severe regret. That is, we predict that the influence of regret on gambling decisions is conditional on specific lottery characteristics, rather than being uniform on lottery participation in general. Support for this prediction would not only attest to the consequences of regret aversion in real life decisions, but also point out specific conditions upon which regret aversion works. In addition, we predict that it is the anticipation of regret rather than other, related emotions in the context of lottery play, such as envy and jealousy, that accounts for the decision-making effects.

Hence the potential contribution of our present research is that it provides a “full-cycle” approach to the study of regret (Cialdini, 1980). Using a full-cycle approach may overcome some of the critique that decision research is mainly epiphenomenal and artificial. The full-cycle approach holds that one starts with natural observation, which provides the input for controlled experimentation. The outcomes of these can then be tested in real life, using again observation or field experimentation. This may of course result in further experimentation. In particular, because in real life other aspects of the decision situation, which often are not considered in the laboratory, play a role, and these aspects need to be identified and controlled for. This, in its turn, may stimulate new theorizing and deepens the original insights. Thus, real life generalization of principles that have been proven worthwhile in laboratory research is useful for gaining understanding of how people really make decisions, and for enriching decision-making theory.

Before we discuss this potential role of regret in lottery play, and before reporting on four empirical studies that test it, let us now turn to current insights in the psychology of regret.

Regret

Regret is a negative, cognitively based emotion that we experience when realizing or imagining that our

present situation would have been better, had we acted differently. It is an unpleasant feeling, associated with self-blame, the wish to undo the regretted event and a strong tendency to kick oneself. The core element of regret is cognitive in the sense that in order to experience regret one needs to *compare* the current state of affairs with what it would have been had one decided differently. This comparative aspect is central in regret theory (Bell, 1982; Loomes & Sugden, 1982), a theory of decision-making under uncertainty that assumes that decision makers *anticipate* the experience of regret and take it into account when making decisions. According to regret theory, people can anticipate emotions such as regret, because they compare possible outcomes of a choice with what the outcomes would have been, had a different choice been made. The decision maker anticipates to experience regret when the foregone outcome would have been better and rejoicing when the foregone outcome would have been worse. Thus, the tendency to avoid negative post-decisional emotions such as regret and self-recrimination, and to strive for positive feelings and emotions such as rejoicing and elation, are assumed to be important determinants of individual decision-making.

When, for some reason, one cannot compare the outcome of the chosen alternative to that of rejected alternatives, regret is not likely to occur and hence not likely to be anticipated. As a consequence, resolution of both the chosen and the non-chosen alternatives became a central element of regret research, in line with Bell's (1983, p. 1165) proposal that the effect of expected feedback “is the predicted phenomenon on which experimentation should be concentrated.” That research has shown that manipulations of feedback information about the non-chosen alternatives influences the extent to which people experience regret or its positive counterpart (Ritov & Baron, 1995) or more general outcome satisfaction (Boles & Messick, 1995; Inman, Dyer, & Jia, 1997; Mellers, Schwartz, & Ritov, 1999). It also demonstrated that decision-makers do indeed make choices that shield them from possible regret-causing feedback on foregone alternatives (Guthrie, 1999; Josephs, Larrick, Steele, & Nisbett, 1992; Larrick & Boles, 1995; Ritov, 1996; Zeelenberg & Beattie, 1997; Zeelenberg, Beattie, Van der Pligt, & de Vries, 1996).

Clearly, on the basis of the available data, regret seems to be a force to be reckoned with in decision-making. One may still doubt, however, the relevance of regret for real-life decisions, as the studies so far have mostly adopted a scenario methodology in which student participants make hypothetical choices. In addition, to our knowledge, the few available studies on the role of regret in real-life decision-making (Inman & McAlister, 1994; Van Empelen, Kok, Jansen, & Hoebe, 2001), have left the question unanswered whether the influence of regret indeed depends on the expected

feedback information about the non-chosen alternatives.

In the present research we test for such anticipated regret effects in real-life behavior, namely in lottery play. Lottery participation decisions are frequently made. Moreover, these decisions may have an enormous impact on one's life. This impact may not only stem from winning the lottery, because the huge amount of money may change one's life radically, but also from *not* winning the lottery, as the following tragedy demonstrates. In April 1995, a man took his own life after missing out on a £2 million price in the British National Lottery. He did so after discovering that the numbers he always selected, 14, 17, 22, 24, 42, and 47 were that week's winning combination. On this particular occurrence, however, he had forgotten to renew his five-week ticket on time. The ticket had expired the previous Saturday. Let us now discuss more systematic research efforts that have argued for a role of regret in lottery play. We will also link the concept of anticipated regret to feedback information that may be provided by the lottery.

“It Could Have Been You”: Regret and lottery play

The realization that one has missed a large prize because one decided not to participate in a lottery can clearly be awfully regretful. Playing the lottery may hence be a manifestation of regret aversion, as has been suggested before (e.g., Sheeran & Orbell, 1999; Wolfson & Briggs, 2002; Zeelenberg & Beattie, 1997). Landman and Petty (2000) describe how counterfactual thinking and the ensuing regret may contribute to lottery play and how counterfactual thinking is exploited in order to market lotteries. One strategy is that lotteries prompt consumers to think about the possibility of winning and about the pain they may feel when forgoing a win. An example is a commercial with the following song: “It could have been you, countin’ the dough... But what can I say? You just didn’t play. It could have been you” (p. 307). Another illuminating regret evoking advertisement is described by Clotfelter and Cook (1991):

A farmer is shown holding an instant game ticket. It blows out of his hand into the nearby cow pasture. He looks around, but is never able to find it. Several days later a luxurious stretch limo drives by his house, with one of his cows riding in the back seat. We are shown his dismay and regret when he realizes that his cow won the jackpot that would have belonged to him if he had been more careful. (p. 231)

“It Would Have Been You”: The Dutch Postcode Lottery

Encouraging people to counterfactualize about possible wins and near misses is only one way to exploit them. The Dutch Postcode Lottery has found a way that may even be more efficient in persuading consumers to

participate and to continue playing. This lottery is named after their specific procedure of selecting winners. The winning numbers are based on randomly drawn postcodes. A Dutch postcode is a unique combination of four numbers and two letters (e.g., 5037 ND), which denotes a specific group of adjacent addresses in a neighborhood. The complete postcode is normally shared by a group of 25 addresses in one single street. In some cases, especially in small villages with a limited number of houses in one street, one postcode may actually cover up to three streets (but always with a maximum of 25 addresses).¹

There is a variety of prizes to be won in this lottery, but the most important one is the weekly *Street Prize*. For this prize a random postcode is drawn and everyone with this postcode receives €12,500 per lottery ticket. By chance one of the ticket holders in that postcode area also obtains a brand new BMW. In addition, monthly the *Postcode Jackpot* is selected on the basis of a postal code. This prize may run up to €14,000,000, €7,000,000 for the winner and €7,000,000 (€1 ~ \$1) for the neighbors with the same postcode who also hold a ticket. There are also two big annual prizes, the *ZomerKanjer* (Summer Whopper) and the *PostcodeKanjer* (Postcode Whopper) that are allocated to randomly drawn postcodes and shared among the ticket owners.

The crucial aspect of this lottery, for our present purposes, is that it provides non-players with feedback about what they would have won, had they played the lottery. Namely, when one does not play and one's postcode is drawn, one knows that one would have won, had one played the lottery. This particular feedback is absent in most other lotteries. Hence the possibility to experience regret over not playing is a fairly unique characteristic of the Postcode Lottery. The organizers of the Postcode Lottery, of course, also realize the power of regret. Trying to persuade people to play this lottery, they state in their advertisements: “Don’t you have any tickets? Then your neighbors will win everything. So make sure that you buy some now.” In their direct mail

¹ Interestingly, this specific information about one's postcode does not seem to be common knowledge. Before, we were not aware of the exact number of addresses that one shares the postcode with, and contacted the postal service to find this out. An informal survey revealed that neither the students nor the colleagues in either of our departments were aware of this information. A more formal survey of 100 people (50 males and 50 females, age ranged from 14 to 77, $M_{\text{age}} = 39$, $SD = 17$) who were approached on the street and were asked to indicate the number of addresses that share a specific postcode resulted in a mean estimate of 126.75 ($SD = 310.90$). The estimates ranged from 2 to 2000 (only 5 provided the correct answer), indicating that people in general have no clue about this number. Also, the web site of the lottery (www.postcodeloterij.nl) does not mention this, although it is clearly relevant information. For that matter, it is also interesting to note that this web site does not provide any information about the probabilities of winning in the lottery (see also Shapira & Venezia, 1992; Wagenaar, 1988).

brochures and letters they emphasize: “Sour, that is how it feels when you miss an amount of at least 2 million by just an inch. Because seeing a multimillion prize fall on your own address, but winning nothing since you did not buy a ticket, that is something you do not want to experience.” We argue that this specific aspect of the postcode lottery, the fact that one may obtain feedback about missed opportunities to win millions of Euros, actually triggers the anticipation of regret, much like the feedback manipulations in the studies referred to earlier.

It is important to note here that there is a class of lotteries in which a similar kind of feedback may be present. This is the type of lotteries in which one picks the numbers to play with oneself. Such as in the British National Lottery example described earlier. Note that the relation between anticipated regret and the potential increased urge to play in such lotteries are not just of “academic” relevance. Clotfelter and Cook (1991, p. 231) noted a lottery using the following slogan: “Don’t let your number win without you”. On Wednesday 5 February 1997 the British National Lottery introduced a second weekly draw (The lottery itself—the Saturday draw—started on Saturday 19 November 1994). When the Wednesday draw was going to be introduced a group of members of the UK parliament (MPs) had signed an early day motion requesting that Camelot (the company that runs the lottery) avoid using numbers 1–49 for its midweek draw beginning in February (Guardian, November 23, 1996). The MPs argued that players who choose the same set of numbers each Saturday might feel obliged to enter the Wednesday draw as well fearing regret in case they miss out on a win with “their” regular numbers. Camelot said it would ignore the motion as players are “responsible people and make their own decisions.” The attempt failed and the same numbers are used (Peter Ayton, personal communication, October 31, 2002).

Wolfson and Briggs (2002) studied this particular occurrence in the British lottery industry and found support for the notion that anticipated regret influences lottery play. They found that people playing with a fixed set of numbers on Saturday were more likely to play in the Wednesday draw as well. Unfortunately, regret was not assessed in this study, and hence the hypothesis that this behavior was caused by the anticipation of regret could not be tested directly. Moreover, the main result that people who play with fixed numbers were more likely to enter the Wednesday lottery was confounded by the fact that these people were overall more likely to play (i.e., they were also more likely to play every week in the Saturday lottery). Of course anticipated regret may account for this, but also numerous other factors may do so. In addition, it has been found that gamblers in the British National Lottery report that using the same lottery numbers increases the likelihood of winning (Wood, Griffiths, Derevensky, & Gupta, 2002).

Years earlier, in the late 1980s, the state of Michigan offered a lottery called “The Zinger,” that also had a very clear regret inducing feature (Rick Larrick, personal communication, March 31, 2003). The set up of the lottery was as follows: When buying a lottery ticket for the regular Michigan lottery, one automatically received a set of numbers for a secondary lottery, the Zinger. An extra \$1 payment was needed to activate the Zinger numbers. The winning numbers of these lotteries were reported next to each other, so that one would always find out if one would have won in the Zinger. The idea was of course that players would use the opportunity to play the Zinger as well and thereby avoid the regret of finding out that they missed out on a big win.

Importantly, there is a crucial difference between the British National Lottery and The Zinger on the one hand, and the Postcode Lottery on the other hand. Feedback in the first two lotteries is limited to people who have actually already played with a fixed set of numbers (in case of the British Lottery) or who already play the regular lottery (in case of The Zinger), while feedback in the Postcode Lottery is relevant to non-players as well. Thus, in the first two lotteries one could escape the regret by simply not entering the lottery at all, whereas feedback in the Postcode Lottery is inescapable even for people who do not play or have never played at all.

Moreover, an additional component that is present in the Postcode Lottery, but not necessarily in the other lotteries is that in the Postcode Lottery one has to live with the winners next door (although they may win so much that they decide to move out). This brings in an element of social comparison, a factor that has been shown capable of amplifying regret (Boles & Messick, 1995). Social comparison may also stimulate other emotions, such as envy and jealousy (Salovey, 1991), when the neighbors rather than “we” win in the Postcode lottery, and it is thus crucial to establish that anticipated regret rather than these other emotions have the predicted effects on decision-making.²

Overview of the current research

In this article we investigate people’s reactions to and motivations for playing in the Postcode Lottery. In order to do so, we compare the Postcode Lottery to the other big lottery in the Netherlands, the National State Lottery. The lotteries are comparable in the sense that both are big national lotteries with prizes that easily run into millions of euros. Also both lotteries have frequent shows broadcasted on National Television during which

² We thank Rick Larrick for pointing this out.

the drawing is performed. The important difference for our purpose is the feedback structure of the two lotteries, since lottery numbers in the State lottery are randomly assigned and unique to participants (one simply buys a ticket with a number printed on it), rather than personalized and shared as in the Postcode Lottery. Thus, knowing the winning numbers in the Postcode lottery should be more conducive to regret, and this regret should promote behavioral intentions to participate.

Four studies were conducted to test the above predictions. Study 1 investigated what would be the dominant emotional reaction when one's postcode is the winning postcode, but one has failed to participate in the lottery. Studies 2 and 3 tested whether the specific structure of the Postcode Lottery is indeed more conducive to regret and other emotions than the State Lottery.

Study 4, our most important study, examined whether these effects of feedback on anticipated regret would extend to people's decisions about lottery participation. We did so by incorporating the notion of anticipated regret into a larger behavioral model of reasoned action. In this respect we built on the pioneering work of Richard, Van der Pligt, and de Vries (1995, 1996), who were the first to integrate the concept of anticipated affective reactions derived from Regret Theory (Bell, 1982; Loomes & Sugden, 1982) with an approach taken in a more general attitude-behavior model, the Theory of Reasoned Action (Ajzen, 1991, 1996; Fishbein & Ajzen, 1975). Richard et al. showed that anticipated negative affective reactions can be clearly differentiated from related concepts such as attitudes and general affective reactions. We build on this work by studying more specifically how anticipated

regret may account for a substantial amount of variance in behavior. According to the Theory of Reasoned Action, behavioral decisions are best predicted by intentions, and intentions are based on attitudes and subjective norms. Building on the Richard et al. (1995, 1996) studies and the current reasoning, we propose an extended model of reasoned action for predicting lottery play (see Fig. 1). The model incorporates the influence of anticipated regret on behavioral intentions. The arrow of Lottery Type intersecting the arrow from Anticipated Regret to Intention shows our expectation that the type of lottery moderates the effect of anticipated regret on the intention to play the lottery. The arrow from Lottery Type to Anticipated Regret indicates the expectation that the feedback structure of the decision situation affects the mean levels of anticipated regret directly.

We should note here that Sheeran and Orbell (1999) took a related, though different approach when studying the effects of descriptive norms and anticipated regret on intention to play the British National Lottery. They found that regret over not playing predicted intentions, over and above the other predictors in the theory of reasoned action. This particular study did not address, however, how the feedback structure of the decision situation influences the mean levels of regret (and possibly the other factors in reasoned action), and it did not examine the moderating effect of the lottery feedback structure, which is of crucial importance in the present research. The expectation of feedback on non-chosen alternatives is a central element in the anticipation of regret. It is this particular aspect of the decision situation that we consider to be of importance for a more complete understanding of the consequences of regret.

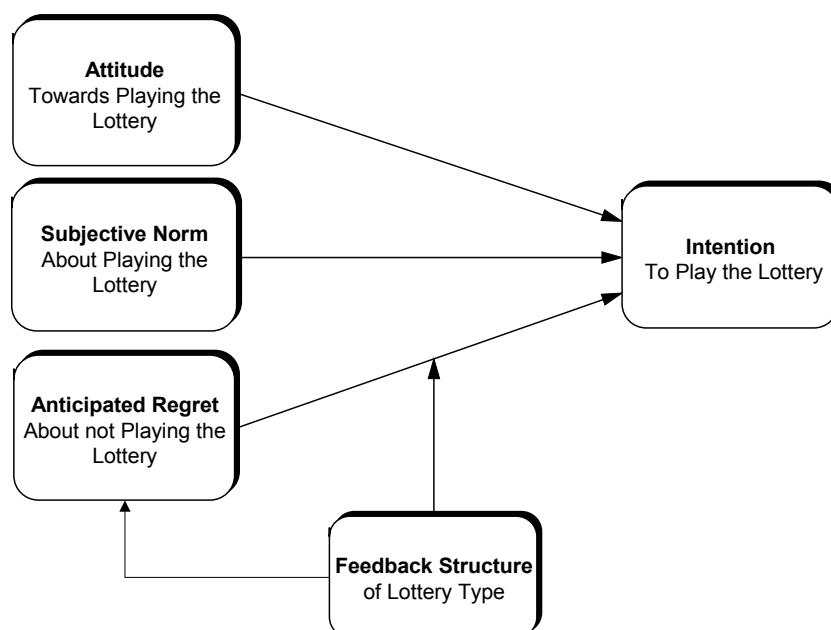


Fig. 1. An extended model of reasoned action for lottery play.

Study 1

Method

The participants in this study were 100 citizens (50 females, 50 males; $M_{age} = 38$ years, $SD_{age} = 16$ years, age ranged from 15 to 84 years) of Tilburg and Uden, two cities in the southern part of the Netherlands. Participants were approached at various locations in down town Tilburg or Uden, by one of two trained male interviewers. After having indicated their willingness to participate they were asked if they knew the Postcode Lottery (everybody did). Next they completed a one-page questionnaire, which described the following: “You considered playing the Postcode Lottery, but decided not to do so. Then it appears that your postcode is drawn in this lottery and that your neighbors win a prize. Because you decided not to play you win nothing.” After they had read this, they turned over the questionnaire and read the other side. On this page they were asked to indicate which emotion they would experience most intensely in this situation. They could answer this question by naming one of 15 emotion words that were printed on the questionnaire in alphabetical order. The emotion words that participants could choose from were: anger, disgust, elation, envy, fear, guilt, happiness, irritation, jealousy, pride, regret, relief, sadness, shame, and worry. After having mentioned an emotion, they were asked to indicate which emotion would be the second most intense, and then which would be the third most intense. Also, participants’ age was asked for (gender was coded by the interviewers).

Results and discussion

Table 1 shows the frequency with which the participants mentioned each of the 15 emotions. Regret was

Table 1
Named emotions in Study 1

	First	Second	Third	Total
Anger	1	12	13	26
Disgust	—	1	3	4
Elation	—	5	10	15
Envy	1	5	9	15
Fear	—	1	1	2
Guilt	1	3	4	8
Happiness	12	8	6	26
Irritation	19	17	7	43
Jealousy	4	14	19	37
Pride	—	—	2	2
Regret	61	18	7	86
Relief	—	5	3	8
Sadness	—	9	11	20
Shame	—	—	3	3
Worry	1	2	5	8

Note. Entries are the number of times the emotions are named as most, second most, or third most intense emotion felt when finding out that one’s postcode is the winning postcode in the Postcode Lottery, but one did not buy a ticket (whereas one’s neighbors did).

mentioned first by a 61% majority, and in total by 86% of the participants. Missing out on a prize in the Postcode Lottery evokes feelings of regret, and to a lesser extent also anger, irritation, jealousy, and sadness. Interestingly, some people also indicated that they would feel happy, presumably because they liked the fact that their neighbors won a large prize.

Next, emotion words received scores 1–4, for being mentioned respectively first, second, third, or not at all, and we submitted these data to an ordinal principal component analysis (implemented in SPSS). This enabled us to explore the relations between the different emotions in this particular situation. The results of this analysis in two dimensions (based on the scree plot, both dimensions with Eigenvalues over 1) are shown in Fig. 2. Vectors to each of the emotion words have been plotted to facilitate the interpretation. The length of a vector indicates how differentiated the response pattern of that emotion is relative to other emotions. An emotion with a response pattern that resembles the average response patterns of most other emotions would be located in the middle of the plot and its vector length would approach zero, while differentiated emotion words have long vectors. The angle between the vectors of two emotion words reflects their inter-correlation. The smaller the angle between the vectors of two emotion words, the higher and more positive their correlation is, with the correlation being zero when the vectors are orthogonal (90°), and negative when the angle is larger than 90° . Thus, inspection of Fig. 2 reveals that regret is a highly differentiated emotion (vector length), unrelated to emotions such as anger, guilt, irritation, and pride, and negatively correlated with emotions such as fear and

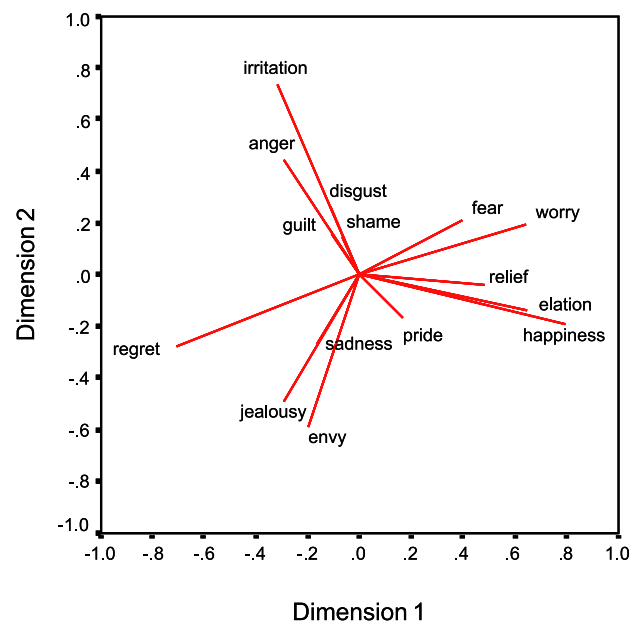


Fig. 2. Results of a principal component analysis for ordinal data on the emotion words mentioned in Study 1.

worry. Jealousy and envy are somewhat correlated with regret.

Jointly, these findings show that regret is indeed the dominant emotion in this context (not playing the Postcode Lottery and not winning, while the neighbors do on both accounts), and that the emotions jealousy and envy are also, but to a much smaller extent induced. In Study 2 we tested if regret would be equally intense in case of the State Lottery.

Study 2

Method

The participants in this study were members of the *CentER-Data Telepanel* of the Center for Economic Research of Tilburg University. Members of the Telepanel have been provided with a personal computer and a modem at home. Questionnaires are sent to the panel members by modem, completed on the pc during the weekend, and returned to CentER-Data by modem again. The CentER-Data Telepanel is representative for the Dutch population and consists of about 2500 people of 18 years and older. In total 200 members (102 females, 98 males; $M_{\text{age}} = 42$ years, $SD_{\text{age}} = 10$ years) of the Telepanel participated in the present study.

The study had the following between-subjects factorial design: 2 (Postcode Lottery vs. State Lottery) \times 2 (Feedback: Control vs. Neighbor Wins). There were 50 participants per cell. Participants Postcode [State] Lottery conditions were asked to imagine the following scenario: “Imagine, you have the possibility to participate in the Postcode [State] Lottery. You decide NOT to play. You win nothing.” Feedback was manipulated by asking participants in the Neighbor Wins conditions to imagine additionally that their neighbors did decide to play, and that they won a very big prize. In the Control conditions they were not asked this. Participants next indicated how much regret they would feel in that situation (1 = not at all, 9 = very much).

Results and discussion

The mean regret ratings per condition are depicted in Table 2. A 2×2 ANOVA revealed a Lottery main effect, $F(1, 196) = 16.94$, $p < .001$, and a Feedback main effect, $F(1, 196) = 32.23$, $p < .001$. These effects were qualified by the predicted Lottery \times Feedback interaction, $F(1, 196) = 10.66$, $p < .001$. Subsequent analyses showed that not winning a prize elicits equal amounts of anticipated regret in both lotteries when there is no feedback (i.e., the control conditions), $F(1, 196) = .36$, ns. However, as hypothesized, participants anticipate more regret about not winning a prize while receiving feedback about the neighbors winning a prize in the case

Table 2
Rated regret per condition in Study 2

Feedback information	Scenario			
	Postcode Lottery		State Lottery	
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
Control	2.02 ^{a,b}	(1.41)	1.78 ^a	(1.22)
Neighbor wins	4.54 ^c	(2.85)	2.46 ^b	(2.07)

Note. Ratings were made on a 9-point scale, with higher scores indicating more regret. Means with a different superscript differ significantly at $p < .05$.

of the Postcode Lottery compared to the State Lottery, $F(1, 196) = 27.24$, $p < .001$.

These results replicated and extended the finding from Study 1 that the particular set up of the Postcode Lottery (i.e., even if you do not play, your postcode can be the winning one) may amplify regret over not playing the lottery. The results also show that a more traditional lottery that does not provide such feedback, the State Lottery, has a lower potential for regret.

Study 3

An important and interesting aspect in the setup of the Postcode Lottery is that the feedback provided by the lottery is not simply individual, but also social. One may not only miss out on a large prize, but also find out that one's neighbors did win. Such social comparison information is important in many decisions, since people are very sensitive to the outcomes of others. Decision makers can be extra dissatisfied when others receive a better outcome. These social comparison effects can also contribute to the regret that people may feel in response to a decision that goes awry (Boles & Messick, 1995). As Larrick (1993) puts it:

dissatisfaction should be even greater when another person's outcome reflects directly on one's own decision-making ability. For example, if two people face the same decision but make different choices, then learning of the other person's superior outcome could lead to regret and envy. (p. 447)

The findings of our Study 1, in particular those resulting from the categorical principal component analysis, revealed that indeed regret and envy are empirically (not intrinsically) related due to the fact that the Postcode lottery offers feedback about one's potential gains even when one does not play (conducive to regret) and that the feedback is social (conducive to jealousy and envy). Thus, one may argue that we have been mixing the construct regret and envy in our Study 2. This is important since one may argue that the threat of envy and regret may produce similar strategies in decision makers. According to Larrick (1993):

One strategy for minimizing this threat is to avoid feedback on the other person's outcome (Brickman & Bulman, 1977). Another strategy is to choose the same option as the other person. The latter prevents the possibility of doing worse, and it guarantees that if the outcome is misery, there will at least be company. (p. 447)

In case of the Postcode Lottery it is very hard to avoid the feedback, since the winners of the lottery are shown on television and live close by. But, the second strategy could be attributable to the anticipation of regret as well as the anticipation of envy. Hence it is important to understand if the specific setup of the Postcode Lottery is also promoting envy. In order to do so we replicated Study 2 and included measures of regret, envy and jealousy. We decided to include jealousy as well since this emotion is very much related to envy (Parrott & Smith, 1993). Moreover, although Dutch makes a distinction between “jealousy” (*jaloersheid*) and “envy” (*afgunst*), in everyday language the word “jaloersheid” is used to describe a state that English native speakers would call “envy.”

Thus, there are theoretically and empirical (Study 1) reasons to believe that regret and envy are related in this context, and that the possible effects of the feedback in the Postcode Lottery may be attributed to the minimization of envy instead of regret. Therefore it is crucial to establish that regret is evoked in case of the Postcode Lottery and not the State Lottery, but that envy and jealousy are evoked both in the Postcode Lottery and in the State Lottery. Finding such a pattern of results would demonstrate the specificity of the feedback structure of the Postcode Lottery to the emotion of regret, and it would support the discriminant validity of the latter.

Method

This study had the same design and scenario as Study 2. Participants, 18 per cell, were 72 undergraduate psychology students (56 females, 16 males; $M_{\text{age}} = 22$ years, $SD_{\text{age}} = 3$ years) at Tilburg University. They participated in partial fulfillment of a course requirement. Participants rated the amount of regret, envy, and jealousy they would feel (1 = not at all, 9 = very much).

Results

The regret, envy, and jealousy ratings were submitted to 2×2 ANOVAs. The results are shown in Table 3 and described in detail below.

Regret

This analysis clearly replicated the findings of Study 2. The analysis revealed a Lottery main effect, $F(1, 68) = 7.06$, $p < .01$, and a Feedback main effect, $F(1, 68) = 142.91$, $p < .001$, which were qualified by the predicted

Table 3
Rated regret, envy, and jealousy per condition in Study 3

Feedback information	Scenario			
	Postcode Lottery		State Lottery	
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)
<i>Regret</i>				
Control	1.56 ^a	(1.29)	1.89 ^a	(1.08)
Neighbor wins	7.39 ^c	(1.38)	5.06 ^b	(2.34)
<i>Envy</i>				
Control	1.94 ^a	(1.59)	2.28 ^a	(1.71)
Neighbor wins	4.83 ^b	(2.12)	4.39 ^b	(2.03)
<i>Jealousy</i>				
Control	2.06 ^a	(1.59)	2.61 ^a	(1.85)
Neighbor wins	6.61 ^b	(1.79)	6.39 ^b	(1.88)

Note. Ratings were made on a 9-point scale, with higher scores indicating more regret, envy, and jealousy. Means per emotion with a different superscript differ significantly at $p < .05$.

Lottery \times Feedback interaction, $F(1, 168) = 12.55$, $p < .001$. Subsequent analyses showed that not winning a prize elicits equal amounts of anticipated regret in both lotteries when there is no feedback (i.e., the feedback control conditions), $F(1, 68) = .39$, ns. However, as hypothesized, participants anticipate more regret about not winning a prize while receiving feedback about the neighbors winning a prize in the case of the Postcode Lottery compared to the State Lottery, $F(1, 68) = 19.21$, $p < .001$.

Envy

As predicted, the results for envy were quite different. Here the analysis only showed a Feedback main effect, $F(1, 68) = 31.96$, $p < .001$, such that more envy would be felt when the neighbors win a large prize ($M_{\text{Feedback Present}} = 4.61$), compared to when there is no information about the neighbors ($M_{\text{Feedback Absent}} = 2.11$). The Lottery main effect, $F(1, 68) = .02$ and the Lottery \times Feedback interaction, $F(1, 168) = .77$, were clearly not significant.

Jealousy

The results for jealousy were quite the same as those for envy. The analysis again only showed a main effect for Feedback, $F(1, 68) = 98.48$, $p < .001$, indicating more jealousy when there was feedback present about the neighbors winning a prize ($M = 6.50$) than when feedback was absent ($M = 2.33$). The Lottery main effect, $F(1, 68) = .16$ and the Lottery \times Feedback interaction, $F(1, 168) = .86$, were both non-significant.

Discussion

The results of this study again show that the specific structure of the Postcode Lottery, may amplify regret. At the same time, however, the study also shows that

this amplification effect does also occur for the emotions envy and jealousy, two emotions that are relevant in the context of lotteries, especially when one may compare oneself to winners. However, for envy and jealousy the amplification occurs irrespective of the type of lottery. Envy and jealousy are amplified as soon as one hears about neighbors winning a large prize in a lottery. Regret is only amplified if this feedback information reflects on the choice that one had made earlier. Thus, it also showed that only regret, and not envy and jealousy, shows the across-lottery differences. Hence, envy and jealousy could not explain possible across-lottery differences in participation.

Taken together, the results of the first three studies clearly provide support for the notion that the Postcode Lottery may induce feelings of anticipated regret, more so than the State Lottery. In the introduction we argued that this particular aspect of the Postcode Lottery could motivate consumers to play the lottery. This specific, crucial prediction was tested in Study 4, in which both Postcode Lottery players and State Lottery players were surveyed.

Study 4

Method

The study had a two-group design (Participant plays in: Postcode Lottery vs. State Lottery). Participants were, as in Study 2, members of the CentER-Data Telepanel. In total 400 panel members were selected for the present study (158 females, 242 males; $M_{\text{age}} = 50$ years, $SD_{\text{age}} = 13$ years). Two hundred of the participants played in the Postcode Lottery, the other two hundred in the State Lottery. None of them had participated in Study 2.

The questionnaire was based on the research by Richard et al. (1996), and included measures of attitude, subjective norms, anticipated regret, and behavioral intentions with respect to playing the Postcode Lottery or the State Lottery. *Attitude* was measured by having participants evaluate playing in the Postcode Lottery or in State Lottery on three 9-point semantic differential scales: pleasant–unpleasant, good–bad, nice–awful. These were combined in a 9-point scale ($\alpha = .88$), with higher numbers indicating a more favorable attitude. *Subjective norm* was measured by the following two questions ($\alpha = .57$): “If I would participate in the Postcode Lottery [State Lottery], most people and organizations that are important to me would find this” (1 = very negative, 9 = very positive), “Most people and organizations that are important to me would recommend me to participate in the Postcode Lottery [State Lottery]” (1 = absolutely not, 9 = very much so). *Anticipated regret* was measured by asking participants to indicate how much regret they would feel when they decided NOT to play and discovered that their neighbor

did play and won a very big prize (1 = not at all, 9 = very much). *Behavioral intention* ($\alpha = .44$) was measured by asking how likely it was that they would participate in the Postcode Lottery [State Lottery] in the coming months (1 = not very likely, 9 = very likely), and by asking them whether they would participate when explicitly asked by letter or over the telephone (1 = not very likely, 9 = very likely).³

Results

Table 4 shows the mean scores on the dependent variables for the Postcode Lottery players and the State Lottery players. A MANOVA with lottery condition (Postcode Lottery vs. State Lottery) as the independent variable and the scales as dependent variables revealed a significant multivariate difference between the two conditions, $F(4, 395) = 49.49$, $p < .001$. More importantly, univariate tests showed that a significant difference existed for 2 of the 4 ratings (see Table 4). The two groups did not differ with respect to subjective norm and behavioral intention, but they did so with respect to attitude and anticipated regret. The attitude toward playing the lottery was less positive for Postcode Lottery players than for State Lottery players. This less positive attitude towards the Postcode Lottery may suggest that people dislike being put in the position in which they may end up regretting their decision not to play. Or it suggests that there may be other motivations underlying the participation in this lottery. Anticipation of future regret can be such a motivation. In support of our reasoning, Postcode Lottery players anticipate significantly more regret over not playing ($M = 6.39$) than do State Lottery players ($M = 3.07$).

Regression analyses

Did anticipated regret indeed predict the behavioral intention? In order to test this we regressed the behavioral intention on attitude, subjective norm, and anticipated regret, for the Postcode Lottery players and the State Lottery players separately. We used the hierarchical procedure and entered attitude and subjective norm in the first step and anticipated regret in the second step. The results are shown in Table 5. Step 1 of both regression analyses shows that the behavioral intention can be predicted on the basis of attitude, whereas subjective norm does not significantly add to the prediction. These findings are consistent with those of Sheeran and Orbell (1999), who found that, while

³ The Theory of Reasoned Action is aimed at predicting behavioral intentions. There is strong evidence, however, that behavioral expectations are better predictions of behavior than behavioral intentions (Hartwick, Sheppard, & Warshaw, 1988), and hence measures of behavioral intentions are often replaced by measures of behavioral expectations. We have followed this approach.

Table 4

Means and standard deviations of measures for Postcode Lottery players and for State Lottery players in Study 4

Dependent variables	Postcode Lottery		State Lottery		<i>F</i> (1,398)	<i>p</i>
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)		
Attitude	6.44	(1.76)	7.05	(1.15)	11.891	.001
Subjective norm	5.82	(1.45)	5.79	(1.19)	.029	.865
Anticipated regret	6.39	(2.66)	3.07	(2.40)	171.224	.001
Behavioral intention	6.35	(2.29)	6.42	(2.17)	.098	.754

Note. All variables range from 1 to 9.

Table 5

Results of regressions analyses predicting behavioral intention for Postcode Lottery players and for State Lottery players in Study 4

Predictor	Postcode Lottery			State Lottery		
	β	<i>t</i>	<i>p</i>	β	<i>t</i>	<i>p</i>
<i>Model 1</i>						
1. Attitude	.365	5.47	.001	.222	3.01	.003
2. Subjective norm	.066	.98	.326	.126	1.71	.089
<i>Model 2</i>						
1. Attitude	.313	4.85	.001	.227	3.08	.002
2. Subjective norm	.102	1.59	.113	.117	1.59	.114
3. Anticipated regret	.291	4.54	.001	.095	1.39	.164
<i>Model 2 fit</i>						
$R^2, F(3, 196), p$.226	19.112	.001	.096	6.934	.001
<i>Model 2 improvement</i>						
$R^2, F(1, 196), p$.081	20.601	.001	.009	1.947	.164

attitude predicts intentions to play the lottery, there were no reliable effects for subjective norm.

In support of our hypothesis, when anticipated regret was entered on Step 2 of the regression analysis, only the fit of the model for the Postcode Lottery increased significantly. That is, in the case of the Postcode Lottery the β of anticipated regret was significant and almost as large as that of attitude. In the case of the State Lottery the β of anticipated regret was not significant, and the fit of the model did not improve by adding this variable.

Next, we performed a direct test of the differences between the β s for anticipated regret obtained in the regression analyses reported in Table 5. We did this by regressing the behavioral intention on attitude, subjective norm and anticipated regret, using the whole sample ($N = 400$). This analysis also included a dummy variable (1,0) for lottery condition and a term for the interaction between lottery condition and anticipated regret. As expected, this interaction was significant, $\beta = .202$, $t(394) = 2.03$, $p < .05$, clearly demonstrating the differential impact of anticipated regret in both lotteries.

Discussion

In this final study we adopted a quasi-experimental design, using actual lottery players, in order to compare the factors that might motivate people to play the

Postcode Lottery and the State Lottery. We combined the correlational approach that has been successful in showing the potential impact of anticipated regret in causing behavior, with the natural manipulation of lottery structure. The results of this study support the prediction that anticipated regret is an important factor in decisions to play the Postcode Lottery, but not in the State Lottery, over and above the effects that other determinants of Reasoned Action, such as attitude and subjective norm have. It establishes the discriminant validity of anticipated regret relative to related determinants of decision-making, and its pragmatic relevance for real life decisions.

We need to acknowledge that although the participants are drawn from a panel that is representative for the Dutch population, we cannot rule out some sort of self-selection. It may be the case that people who end up playing the Postcode Lottery are more inclined to feel regret, or to anticipate regret, in comparison to people who do not play at all or play in other lotteries. In other words, there could be individual differences that explain or covary with our findings. If this were to be the case, it would still be consistent with our reasoning that regret may promote playing the postcode lottery, but the implications of our findings would then be limited to those individuals who score high on such a "regret proneness" scale. Still, the findings of Study 3 are consistent with the

current results, and that Study did have random assignment. A second potential limitation that stems from the usage of real lottery participants is that the correlational nature of the data does not allow real causal conclusions. It could, for example, be the case that the people who are not likely to play during the coming months (those who had a low behavioral intention), were able to convince themselves that they would not regret it when their postcode would be drawn during these months. We think this is not likely, but even if were the case, it would underscore the relation between the anticipation of regret and playing the Postcode Lottery. A final limitation of the present study stems from the fact that we did not include measures of envy and jealousy. Although Study 3 showed that the specific structure of the Postcode Lottery (and not the of the State Lottery) is especially conducive to regret, we cannot rule out the possibility that envy and jealousy are predictors of lottery play (in both lotteries) or draw conclusions about the between lottery differences in these relations.

General discussion

Regret is felt when we realize in retrospect that we should have chosen differently. Feedback information about what would have happened had we chosen differently is therefore a crucial factor in regret. The present research has shown, in a series of four studies, that a specific lottery that provides such information to their (potential) players, the Postcode Lottery, may evoke anticipations of regret and that these anticipations may hence influence participation decisions. Interestingly, a lottery that does not provide such feedback, in our study the Dutch National State Lottery, did not show the same potential for evoking regret. Moreover, no relation between anticipations of regret and lottery play was found for this lottery. As such, our research has documented the consequences of regret aversion for lottery play, a frequently made real life decision. Moreover, it has shown how this influence of anticipated regret on decision-making is conditional upon the feedback structure of the decision situation, and independent of potential other determinants of decision-making in real life such as attitudes and subjective norms.

Below we discuss our findings in relation to other types of gambling. We also address the implications of our findings for current discussions about the relation between regret and risk aversion, the role of regret in the action sequence and the regrets following actions and inactions.

Regret and gambling

The concept of regret thus appears to be an important factor in lottery play. And the current studies under-

score the relevance of feedback information about non-chosen courses of action as a crucial factor. This fear for unpleasant knowledge of “what would have been” may explain more types of gambling behavior. Let us describe just a few.

In a recently introduced lottery in the Netherlands, called *Dayzers*, a similar anticipated regret argument may apply. In this lottery, part of your lucky number is a date (e.g., 01-13) that you pick yourself. The organizers stimulate you to play with dates that are important to you, like your birthday, your wedding day, or the birthday of your children. Of course, one of your dates may be picked, even when you do not play. The realization of this fact may urge you to play, similar to what happens in the Postcode Lottery. However, what we think could be a crucial difference between *Dayzers* and the Postcode Lottery is that the potential feedback in *Dayzers* may be less threatening. Since the organizers stimulate you to play with multiple dates, they indeed increase the probability of regret (Ritov, 1996). At the same time the potential regret may be explained away much easier, causing the regret to be less threatening. Although many dates may be important to you (e.g., birthday, wedding day, birthday of partners or children, the day that Elvis permanently “left the building”), it seems foolish to play with all of them. The mere fact of having to make a selection may be enough to realize that it is unavoidable that one day one of your dates will be selected in this lottery. This realization of the inescapability of regret may take away the urge to play in order to prevent it. Because of this, we conjecture that anticipated regret of not-playing *Dayzers* would be lower than of not-playing the Postcode Lottery, and that anticipated regret’s influence on participation in the former is smaller as well.

Some of the success of slot machines, as noted by Larrick and Boles (1995, p. 89, footnote 2), may also stem from regret inducing tactics. Slot machines are often designed such that one could play with more coins, enabling more winning combinations. Players will always see these combinations, also when not to playing them. This could lead to severe regret, upon noticing that one would have won if one had paid more. The regret-minimizing strategy thus would be to play with more coins. Likewise, players who stop and see the next player win, may feel regret of having waited insufficiently for the machine to start paying back.

The casino card game of *blackjack* may also be relevant here. In blackjack the players play against the dealer and the objective of the players is to obtain a greater total than the dealer, but not more than 21. If the total value of the cards exceeds 21, players bust and lose their bet. Wagenaar (1988) studied 112 blackjack players and found that they play very conservatively and adopt strategies that avoid busting. They may do so in order to avoid regret. Regret over busting may be more

intense than the regret of not taking a card and losing because the dealer has higher total. Passing “the control to over the outcome to the dealer can thus minimise the possible regret” (Wagenaar, 1988, p. 24). Studies by Taylor (1989, 1991; unpublished but described in Miller & Taylor, 1995) are consistent with these ideas.

Finally, Loftus and Loftus (1985) proposed a regret mechanism to account for excessive video game playing. In their book about the psychology of video games they argue that the experience of regret may be an important factor in decisions to continue playing video games:

In most situations regret is something that you just have to live with. But that is not true with video games. Often when playing a video game, the game ends because you’ve made a mistake, and you immediately know exactly what you’ve done wrong. “If only I hadn’t eaten the energizer in this game before trying to grab that cherry,” you say to yourself. “I knew it was the wrong thing to do, and I did it anyway.” But now you don’t have to sit there being annoyed and frustrated. Instead you can play the game again and correct the mistake. So in goes another quarter. But in the process of playing again, you make another mistake. And spend another quarter to correct it. And so it goes. (p. 30)

In sum, the anticipation of future regret and the experience of regret stemming from earlier play may both influence people’s future gambling decisions. This emotion may thus play an important role in the psychology of gambling.

Regret aversion vs. risk aversion

The fact that the anticipation of future regret promotes lottery play and other gambling behaviors is also interesting for the question whether regret promotes risk aversion. Risk aversion is expressed by preferring a safe option to a risky option with the same expected value. For example, in a choice between \$50 for certain (safe option) or \$100 depending on whether a coin falls on heads or on tails (risky option), people often prefer the safe option. Playing the lottery has the same underlying structure. Not playing provides one with a certain outcome (safe option) and playing provides one with an uncertain outcome (risky option). One either loses the prize of the ticket or wins a prize.

Although wisdom tells us to “better be safe than sorry,” research has provided evidence for both risk avoiding and risk seeking tendencies as a consequence of the anticipation of regret. Larrick and Boles (1995) were the first to find that the anticipation of regret might actually promote risky (or better, less risk averse) offers in a negotiation context. Ritov (1996) found such risk seeking tendencies in choices between gambles. Zeelenberg et al. (1996; Zeelenberg & Beattie, 1997) showed that people are *regret averse* (rather than risk-averse) and that they are therefore motivated to make *regret-minimizing* choices. Regret-minimizing choices may be

either risk-avoiding or risk-seeking. The expectation of future feedback information about the different courses of action will determine which of these are regret-minimizing. The current findings are consistent with these earlier ones and show that also in real life the anticipation of regret stemming from possible future feedback may promote risky behavior (playing the lottery, with an uncertain outcome) over safer ones (keeping one’s money in the pocket).

Regret in the action sequence

The implications of our findings go beyond the effects of regret on gambling. The fact that anticipated regret may promote participation and “lock” people in their current behavior, suggests that it is worthwhile to view decisions not in isolation, but instead embedded in an action sequence. In such a sequence possible actions are taken into consideration, evaluated, chosen and finally implemented, all in relation to prior and future behaviors and outcomes. Thus far, only few studies have investigated the more dynamic aspects of regret. Recently, Zeelenberg, Van den Bos, Van Dijk, and Pieters (2002) found that after a past behavior had led to negative outcomes, a change of the behavior that led again to negative outcomes was generally less regretful than a continuation of the past behavior that led to the same negative outcomes. In other words, active attempts to avoid future losses after the past losses had materialized were considered least regretful, independent of the valence of the outcomes. Zeelenberg et al. examined repeated choices in scenarios about football coaches winning or losing games. The duration of events such as football games is fixed and outside the coaches’ control, and after ending the outcomes of the games are (usually) certain. Yet, in many other cases the duration of events is under behavioral control, and under such conditions the gains and losses materialize only when the decision-maker decides to end the event. This condition occurs, for instance, in the stock market where investors determine when to sell winning or losing stocks. The anticipation of regret may play an important role in investment decisions, not only in what but also in when to buy or sell stocks. It has been commonly observed that investors tend to hang on too long to losing stocks (Shefrin & Statman, 1985), which may partly be accountable to regret-minimizing strategies. Investors might wait to sell stocks that have gone down in order to avoid the pain and regret of having made a bad investment. As long as the stock is retained the financial loss is virtual and has not materialized yet, and the stock may still go up and regret may not be experienced (yet). However, in their effort to avoid current regrets, such investors may increase the likelihood of future regrets. These investors mimic Postcode Lottery participants, who minimize current and future regrets by sticking to

participation, thus being locked in. Thus, under certain conditions the motivation to minimize regret may in fact increase the likelihood that it experienced in the long run, which we believe to be an important avenue for further research.

Implications for action and inaction effects

A recurring issue in the psychology of regret is the question of whether we regret actions more than inactions. Although it has been repeatedly found that actions produce more regret than inactions, this conclusion has not gone unchallenged (Baron & Ritov, 1994; Connolly & Reb, 2003; Feldman, Miyamoto, & Loftus, 1999; Gilovich & Medvec, 1995; Prentice & Koehler, 2003; Zeelenberg et al., 2002). The present research speaks to this discussion. We do need to keep in mind though, that in most studies “The consequences [of action and inaction] are precisely known and precisely matched, the regretted outcome is recent, and the emotion may be fairly intense” (Kahneman, 1995, p. 389). In this respect our study resembles more the studies that focused on action and inaction regrets in daily life, where such control is absent, and action vs. inaction may be confounded with other factors (Feldman et al., 1999; Gilovich & Medvec, 1995).

Keeping that in mind, our results show that the anticipation of regret can clearly promote action (i.e., playing the lottery), and that the extent to which action is promoted is contingent on the specific structure of the lottery (i.e., the presence or absence of feedback). For people who did not play the Postcode Lottery yet (inaction), receiving feedback that the neighbors had won was regret promoting (Studies 2 and 3). For people who played the Postcode Lottery but not for people who played the State Lottery, the anticipation of regret promoted continuation of participation (Study 4). In other words, in the situation that one’s postcode is selected to be the winning postcode in the Postcode Lottery, inaction was more regret promoting than action. Yet, at the same time, the present research starts to disentangle action/inaction effects and status quo effects. Continuing playing the lottery is an action in comparison to not playing, but at the same time it is a decision to stick to the status quo, as compared to switching. Our research thus underscores recent research findings that call into question the universal link between action vs. inaction and regret. It indicates that the link is dependent upon the specifics of the decision context (here, the absence or presence of feedback information).

Coda

Before closing, let us return to one of the major questions that motivated our current research. Could we

find support in real life decision-making for the operation of an anticipated regret mechanism? The current studies show an anticipated regret effect in lottery participation decisions. Moreover, it shows that these effects are dependent on the feedback structure of the lotteries. By adopting a full-cycle approach—taking research out of the laboratory and showing the contingency of regret on expected feedback about non-chosen alternatives—these studies broadened the scope of regret research. The current research also makes evident the possibility of using (or abusing) the psychological mechanisms of regret aversion and the associated feedback avoidance as potential powerful influence tactics. Hence, this research clearly demonstrates one of the consequences of regret aversion in real life.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–210.
- Ajzen, I. (1996). The social psychology of decision making. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 297–325). New York: Guilford Press.
- Baron, J., & Ritov, I. (1994). Reference points and omission bias. *Organizational Behavior and Human Decision Processes*, 59, 475–498.
- Bell, D. E. (1982). Regret in decision making under uncertainty. *Operations Research*, 30, 961–981.
- Bell, D. E. (1983). Risk premiums for decision regret. *Management Science*, 29, 1156–1166.
- Boles, T. L., & Messick, D. M. (1995). A reverse outcome bias: The influence of multiple reference points on the evaluation of outcomes and decisions. *Organizational Behavior and Human Decision Processes*, 61, 262–275.
- Cialdini, R. B. (1980). Full-cycle social psychology. In L. Bickman (Ed.), *Applied Social Psychology Annual* (vol. 1, pp. 21–47). Thousand Oaks, CA: Sage Publications.
- Connolly, T., & Reb, J. (2003). Omission bias in vaccination decisions: Where’s the “omission”? Where’s the “bias”? *Organizational Behavior and Human Decision Processes*, 91, 186–202.
- Clotfelter, C., & Cook, P. (1991). Lotteries in the real world. *Journal of Risk and Uncertainty*, 4, 227–232.
- Feldman, J., Miyamoto, J., & Loftus, E. F. (1999). Are actions regretted more than inactions? *Organizational Behavior and Human Decision Processes*, 78, 232–255.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Gilovich, T. (1983). Biased evaluation and persistence in gambling. *Journal of Personality and Social Psychology*, 44, 1110–1126.
- Gilovich, T., & Medvec, V. H. (1995). The experience of regret: What, when, and why. *Psychological Review*, 102, 379–395.
- Guthrie, C. (1999). Better settle than sorry: The regret aversion theory of litigation behavior. *University of Illinois Law Review*, 1999, 43–90.
- Hartwick, J., Sheppard, B. H., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for future modifications and future research. *Journal of Consumer Research*, 15, 325–343.
- Inman, J. J., Dyer, J. S., & Jia, J. (1997). A generalized utility model of disappointment and regret effects on post-choice valuation. *Marketing Science*, 16, 97–111.

- Inman, J. J., & McAlister, L. (1994). Do coupon expiration dates influence consumer behavior? *Journal of Marketing Research*, *31*, 423–428.
- Josephs, R. A., Larrick, R. P., Steele, C. M., & Nisbett, R. E. (1992). Protecting the self from the negative consequences of risky decisions. *Journal of Personality and Social Psychology*, *62*, 26–37.
- Kahneman, D. (1995). Varieties of counterfactual thinking. In N. J. Roese & J. M. Olson (Eds.), *What might have been: The social psychology of counterfactual thinking* (pp. 375–396). Mahwah, NJ: Erlbaum.
- Landman, J., & Petty, R. (2000). “It could have been you”: How states exploit counterfactual thought to market lotteries. *Psychology and Marketing*, *17*, 299–321.
- Larrick, R. P. (1993). Motivational factors in decision theories: The role of self-protection. *Psychological Bulletin*, *113*, 440–450.
- Larrick, R. P., & Boles, T. L. (1995). Avoiding regret in decisions with feedback: A negotiation example. *Organizational Behavior and Human Decision Processes*, *63*, 87–97.
- Loftus, G., & Loftus, E. F. (1985). *Mind in play*. New York: Basic Books.
- Loomes, G., & Sugden, R. (1982). Regret theory: An alternative theory of rational choice under uncertainty. *Economic Journal*, *92*, 805–824.
- Mellers, B. A., Schwartz, A., & Ritov, I. (1999). Emotion-based choice. *Journal of Experimental Psychology: General*, *128*, 346–361.
- Miller, D. T., & Taylor, B. (1995). Counterfactual thinking, superstition and regret. In N. J. Roese & J. M. Olson (Eds.), *What might have been: The social psychology of counterfactual thinking* (pp. 305–331). Mahwah, NJ: Erlbaum.
- Parrott, W. G., & Smith, R. H. (1993). Distinguishing the experiences of envy and jealousy. *Journal of Personality and Social Psychology*, *64*, 906–920.
- Prentice, R. A., & Koehler, J. J. (2003). A normality bias in legal decision making. *Cornell Law Review*, *88*, 583–650.
- Richard, R., Van der Pligt, J., & de Vries, N. K. (1995). Anticipated affective reactions and prevention of AIDS. *British Journal of Social Psychology*, *34*, 9–21.
- Richard, R., Van der Pligt, J., & de Vries, N. K. (1996). Anticipated affect and behavioral choice. *Basic and Applied Social Psychology*, *18*, 111–129.
- Ritov, I. (1996). Probability of regret: Anticipation of uncertainty resolution in choice. *Organizational Behavior and Human Decision Processes*, *66*, 228–236.
- Ritov, I., & Baron, J. (1995). Outcome knowledge, regret and omission bias. *Organizational Behavior and Human Decision Processes*, *64*, 119–127.
- Salovey, P. (1991). Social comparison processes in envy and jealousy. In J. Suls & T. A. Wills (Eds.), *Social comparison: Contemporary theory and research* (pp. 261–285). Mahwah, NJ: Erlbaum.
- Shapira, Z., & Venezia, I. (1992). Size and frequency of prizes as determinants of the demand for lotteries. *Organizational Behavior and Human Decision Processes*, *52*, 307–318.
- Sheeran, P., & Orbell, S. (1999). Augmenting the theory of planned behavior: Roles for anticipated regret and descriptive norms. *Journal of Applied Social Psychology*, *29*, 2107–2142.
- Shefrin, H., & Statman, M. (1985). The disposition to sell winners too early and ride losers too long: Theory and evidence. *Journal of Finance*, *40*, 777–790.
- Van Empelen, P., Kok, G. J., Jansen, M. W. J., & Hoebe, C. J. P. A. (2001). The additional value of anticipated regret and psychopathology in explaining intended condom use among drug users. *AIDS Care*, *13*, 309–318.
- Wagenaar, W. A. (1988). *Paradoxes of gambling behavior*. Hove: Erlbaum.
- Wolfson, S., & Briggs, P. (2002). Locked into gambling: Anticipatory regret as a motivator for playing the National lottery. *Journal of Gambling Studies*, *18*, 1–17.
- Wood, R. T. A., Griffiths, M. D., Derevensky, J. L., & Gupta, R. (2002). Adolescents’ accounts of the UK national lottery and scratch cards: An analysis using Q-sorts. *Journal of Gambling Studies*, *18*, 161–183.
- Zeelenberg, M. (1999). Anticipated regret, expected feedback and behavioral decision-making. *Journal of Behavioral Decision Making*, *12*, 93–106.
- Zeelenberg, M., & Beattie, J. (1997). Consequences of regret aversion 2: Additional evidence for effects of feedback on decision making. *Organizational Behavior and Human Decision Processes*, *72*, 63–78.
- Zeelenberg, M., Beattie, J., Van der Pligt, J., & de Vries, N. K. (1996). Consequences of regret aversion: Effects of expected feedback on risky decision making. *Organizational Behavior and Human Decision Processes*, *65*, 148–158.
- Zeelenberg, M., Van den Bos, K., Van Dijk, E., & Pieters, R. (2002). The inaction effect in the psychology of regret. *Journal of Personality and Social Psychology*, *82*, 314–327.

Received 10 January 2003