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Regret in Cancer-Related Decisions

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ABSTRACT

Decision-related regret is a negative emotion associated with thinking about a choice one has made or is about to make. Its focus may be the choice itself, the outcome of the choice, or the process leading to the choice. The thinking component in each case generally takes the form of a wish that things were otherwise, and involves a comparison of what actually did or will take place with some better alternative – a “counterfactual thought”. For pre-decisional (anticipated) regret, the thinking involves a mental simulation of the outcomes that might result from different choice options. Most research to date has focused on regret associated with decision outcomes, addressing especially (a) the comparison outcome selected and (b) whether or not the outcome was the result of action or inaction. More recent research has started to consider also the regret that may be associated with the choice itself, and with the decision process leading to that choice. Interest here has focused on the individual’s ability to justify the choice made or the process used. In this paper we review current research on decision-related regret and propose several directions for extending this research to cancer-related decisions.

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REGRET IN CANCER-RELATED DECISIONS

Despite the everyday observation that decisions and their consequences are often the focus of a variety of intense emotions, most decision researchers have, until recently, largely omitted emotions from their models of the decision process. Feelings such as hope and dread may, of course, be associated with the assessment of the uncertain consequences of one's choices; and the evaluation of decision outcomes is rooted in the feelings associated with experiencing those outcomes. For most decision researchers, however, the practice has been to fold these emotional issues into concepts of probability and utility and to examine primarily the cognitive and quasi-rational aspects of decision making. Most studies of decision making have been studies of decision making *thought*, not of decision making *affect*.

The last decade has seen growing interest in the role of emotions in decisions (see Loewenstein, Weber, Hsee, & Welch, 2001; Slovic, Finucane, Peters, & MacGregor, 2002, for partial reviews). Decision-related regret and related emotions such as disappointment (and their positive counterparts elation and rejoicing) have attracted considerable research interest, and no comprehensive survey of the literature is possible here. Instead we provide an illustrative sampling of the major issues and findings in regret research to date. Our special focus will be on decisions associated with cancer and its treatment, an area in which understanding the role of regret offers significant promise of illuminating the choice process and improving decision making.

The paper is organized as follows. In the next section we review some of the main issues in research on decision-related regret, including a recent model with which we have been involved, Decision Justification Theory (Connolly & Zeelenberg, 2002), and some of the empirical

evidence associated with it. In the second part of the paper we outline several directions for future research on regret in decisions associated with cancer control and treatment. To date, little research has examined this issue (though see Clark, Wray, & Ashton, 2001; Hu, Kwan, Saigal, & Litwin, 2003; Montgomery et al, 1999; Payne, Biggs, Tran, Borgen, & Massie, 2000; and, for an example of research on the role of general affect in cancer-related decisions, see Schwartz, Peshkin, Tercyak, & Valdimarsdottir, this issue). This research has made important contributions by showing that regret can be an important consequence of decisions about cancer screening and treatment and by identifying some of the factors associated with such regrets. However, in our view, much is left to be learned about the role of regret in cancer-related decisions.

We interpret the term “decision” rather broadly here, to include action choices made after little or no deliberation as well as those to which the decision maker gives extensive thought. In the cancer context, for example, decisions on what course of treatment to follow (e.g. Kaplan, Ganiats, & Frosch, 2004) and whether or not to undergo a screening test (Briss et al, 2004) would typically involve conscious decisions taken after much thought and discussion. Action choices such as whether or not to smoke (Fuchs, 1974) or to comply with a difficult treatment regimen (Rachman & Eyrl, 1989) might, in contrast, result from momentary impulses and involve almost no conscious thought at all. It remains to be shown whether regret plays a similar role across this entire spectrum but, as a starting point, we will assume that it may be broadly involved.

Different researchers have used very different definitions of the term “regret”, ranging from very broad (“a more or less painful cognitive and emotional state of feeling sorry for misfortunes, limitations, losses, transgressions, shortcomings, or mistakes”; Landman, 1993) to quite narrow (“a psychological reaction to making the wrong decision”; Bell, 1985). Most

definitions acknowledge (a) that regret is aversive and is avoided if possible; (b) that it involves an intimate interplay of thought and feeling; (c) that it is at least somewhat distinct from other specific emotions such as disappointment, and from general negative affect; and (d) that it involves a comparison of some event or process with another, better event or process that “might have been”. Our own usage corresponds closely to everyday English usage, and is typically operationalized as the response to a questionnaire item of the form “How much regret do you feel concerning [some event or process]”.

MODELS OF REGRET

Several economic choice theorists (Bell, 1982; Loomes & Sugden, 1982; Savage, 1951) offered models of decision-related regret and experimental data in support of them. Much of this experimental work was later found to be flawed by a procedural artifact (Humphrey, 1995; Starmer & Sugden, 1993) and has largely been abandoned. Unfortunately one of the core ideas from these conceptualizations has crossed over into psychological research: the notion that regret is associated only with comparing an outcome with a better one that would have been received if one had made another choice. (Disappointment, in contrast, is thought to come from comparing one’s outcome with what one would have received if one had been luckier). According to this model a patient diagnosed with lung cancer might experience both regret for having smoked (comparing her actual illness with her presumed good health if she had decided not to smoke) and disappointment (comparing her actual illness to her luckier friends who smoked and did not contract cancer). Despite the intuitive appeal of these assertions, the only direct test of which we are aware (Connolly & Butler, 2004) fails to confirm them. As we will see below, the actual antecedents of regret and disappointment are more complex.

Regret for Action versus Inaction

Psychological interest in decisional regret was stimulated by an experiment by Tversky and Kahneman (1982), who asked participants to consider the feelings of two investors, each of whom loses a moderate amount of money when a particular stock declines. One investor had recently bought the stock, the other had simply retained it in his portfolio. A very large majority (92%, reported in Kahneman & Miller, 1986) judged that the active investor would feel more regret than would his passive counterpart. This result was interpreted as demonstrating an important general tendency: bad outcomes resulting from action are more regretted than similar outcomes resulting from inaction.

The result attracted considerable interest, not least in studies of medical decisions, since it suggested that outcomes would be valued differently if they resulted from active intervention rather than from passive waiting. For example, Ritov and Baron (1990) reported evidence suggesting that parents would vaccinate their children only if risk of side-effects from the vaccine were markedly lower than risk of the disease against which it protects. Similarly respondents in Spranca, Minsk, and Baron (1991) reported that patients would choose surgery only if its risks were much less than the risk from the disease it was intended to cure. Baron proposed that these choices were distorted by a general tendency, which he labeled “omission bias”, and that this tendency may be driven by the regret differential associated with taking action. Such a bias would clearly be relevant to cancer decisions in such issues as passive watchful waiting versus a more active treatment (e.g., surgery) after diagnosis of early prostate cancer (Clark et al, 2003) or a positive genetic screening test result (Payne et al, 2000).

Recent evidence, however, raises serious doubts as to the existence of this bias (Connolly & Reb, 2003). The original finding that poor outcomes are regretted more when they result from action rather than from inaction has itself been brought into question (N'gbala & Branscombe,

1997). The action/inaction debate was further stimulated by the finding of Gilovich and Medvec (1995) that there may be a temporal reversal, with action more regretted in the short term, inaction in the longer term. Given the variety of cancer-related decisions in which treatment alternatives differ in the extent to which they involve active intervention, studies of possible patient bias against active treatments would appear to be an early research priority.

Targets of Regret

In addition to being a noun, “regret” is also a transitive verb: One typically regrets *something*. In the decision context we consider three possible types of regret, distinguished by their targets:

- 1) *Outcome regret*, in which the target of regret is the outcome of a decision: “I regret that my cancer has recurred, or that I am experiencing residual pain from the surgery” (e.g., Payne et al, 2000).
- 2) *Option regret*, in which the target of regret is the decision alternative chosen: “I regret that I chose the treatment I did for my prostate cancer” (e.g., Hu et al, 2003).
- 3) *Process regret*, in which the target of regret is the decision process preceding the choice: “I regret having made a hasty, ill-informed decision with regard to my treatment options”.

In each case the regret may be actually experienced or anticipated ahead of time (and thus perhaps avoided). Regret scales currently used in assessing treatment-related regret in cancer patients (e.g. Brehaut et al, 2003; Clark et al, 2001) will need further development to reflect the multiplicity of regret types.

Each type of regret will have its distinct antecedents and consequences, and one might experience one type but not another. One might, for example, regret having a recurrence of one’s

cancer without necessarily regretting one's decision to forego adjuvant therapy, or regret having used a poor decision process while still feeling that the actual treatment choice was a good one. Sugden (1985) offers the example of a party-goer who drives himself home despite having had too much to drink, and makes the trip safely. Clearly he will not regret the good outcome but, Sugden suggests, may later be tortured with regret over his decision to drive. It is not clear how typical Sugden's retrospectively self-critical party-goer really is. Considerable evidence suggests that only negative outcomes stimulate the search for causes and criticism of choices (Peeters & Czapinski, 1990; Taylor, 1991), while good outcomes tend to elicit little cognitive activity¹. There is good evidence that different types of regret are driven by quite different mechanisms. Outcome regret, for example, appears to rely primarily on comparison and reference effects of the sorts envisioned by the economic choice models, though the range of reference outcomes is much broader than the "outcome of foregone alternative" (OFA) those models generally assume. Mellers and her colleagues (Mellers, 2000; Mellers, Schwartz, & Ritov, 1999) have proposed an elegant model, Decision Affect Theory, that predicts outcome regret in a number of simple gambling choices, and provides a good fit to their data. Similar OFA effects have been demonstrated by Larrick and Boles (1995) in a negotiation context and by Zeelenberg and Pieters (2004) in real-world lottery-purchase decisions. Reference standards other than OFA have been demonstrated by Connolly, Ordóñez, and Coughlan (1997), where the participants' pre-decision status quo was the salient referent; by Coughlan and Connolly (2001), where the expected outcome was salient; and by Ordóñez, Connolly, and Coughlan (2000), where the key referent was the outcomes received by others. The psychological mechanisms involved appear to be those of reference point theory and of counterfactual thinking research (Roese & Olsen, 1995). New

research will be needed to establish what reference states are commonly implicated when patients express regret at the outcomes of their cancer treatments.

Regret and Justification

In contrast to outcome regret, option and process regret appear to be more centrally concerned with mechanisms of self-criticism and justification, and we have labeled our theorizing on the subject “Decision Justification Theory” (DJT) (Connolly & Zeelenberg, 2002). The core idea of this theory is that, faced with a poor decision outcome, we tend to ask ourselves whether or not the decision, or the process that led up to it, was justified. If it was partially or entirely unjustified, we feel regret, the intensity of which is increased by the seriousness of the outcome.²

Numerous studies illustrate this justification mechanism at work. For example, Simonson (1992) found that students who had been primed to think about regret were more likely to choose a name-brand product than a cheaper, unfamiliar one, and to take advantage of a current sale rather than wait on a later, possibly better one. The regret priming apparently led them to seek justifications for their choices, and thus to choose the safer brand and the guaranteed sale. Seta, McElroy, and Seta (2001) used the two-investors problem described above, (in which both lose money, one by holding a certain stock, the other by buying the same stock) but included brief personality descriptions of the protagonists. When the investor was described as a cautious risk-avoider, the original results were replicated. However, when the investor was described as a bold risk-taker, more regret was expected for a bad outcome following *inaction*. Behaving in character thus appears to provide a justification for the investors’ behavior, and regret is reduced. Zeelenberg, van den Bos, van Dijk, and Pieters (2001), again following the action/inaction design, asked respondents to assess the regret a soccer coach would feel if his team lost after he

had either changed the team or kept it unchanged. The results were contingent on the team's prior record. If the team had been losing, a change was apparently seen as justified, and more regret was associated with inaction than with action. If the team had been winning change was unjustified, and more regret was expected from action than from inaction. Inman and Zeelenberg (2002) found similar results for consumers who changed brands and got poor results. Regret was substantially lower when experience with the original brand had been poor than when it had been good. The issue, clearly, is not simply action (change) or inaction (don't change), but whether or not the change is justified by prior experience.

Measures of overall regret include mixtures of the three types of regret. Connolly et al. (1997) used a scenario in which three students end up in a mediocre course section after initial assignment to excellent, mediocre, or poor sections of the same course. In some conditions the students chose to make the change, in other conditions they are arbitrarily reassigned by a computer. Respondents expected that students who moved from the bad to the mediocre section would feel more rejoicing, and those who moved from the good to the mediocre section would feel more regret, than those who stayed put, though all three received the same outcome and knew of the same OFAs. The status quo was clearly the key referent. Interestingly, respondents expected that even computer-assigned students who moved to a worse section would feel considerable regret (presumably outcome regret only, since they made no decision), though they expected those who made the choice for themselves would feel even more (presumably adding self-blame and thus process and/or option regret to their regret over the poor outcome). These findings provide strong support for DJT's assertion of multiple independent components of anticipated regret. They also suggest that separate measures of each regret component may be

preferable in many studies to single, overall measures, since each component has different antecedents and consequences.

In a recent study we explored the joint effect of the normality (Kahneman & Miller, 1986) and of the justifiability (DJT) of the option chosen on anticipated regret. Results (Reb & Connolly, 2004) indicate that, when both justifiability and normality are specified, the effect of justifiability overwhelms that of normality. Regret is high when a poor outcome results from an abnormal process, but the effect disappears if the decision process is also described as careful and thorough (i.e. as justified). This finding suggests that the oncologist should take special care in explaining to patients the rationale justifying consideration of a novel (abnormal) treatment, to minimize possible option regret later. It also suggests that anti-smoking campaigns might usefully emphasize the unjustified (and thus regret-increasing) nature of the habit to counter the fact that smoking is still relatively commonplace (and thus normal, and regret-reducing).

THE ROLE OF REGRET IN CANCER-RELATED DECISIONS

Several studies have established that patients can feel substantial regret as a result of their cancer-related decisions (e.g., Hu, Kwan, Saigal, & Litwin, 2003; Montgomery et al, 1999). For example, Clark et al (2003) found that 16% of men who underwent treatment for early prostate cancer felt at least somewhat regretful about their treatment decision (and this result was independent of the type of treatment they chose). Clark et al (2001) found that 23% of men treated for metastatic prostate cancer with surgical or chemical castration expressed regret over their treatment decision. Payne et al (2000) found that 5% of women who had bilateral prophylactic mastectomy reported significant regrets. Post-decision regret is thus not unusual in cancer patients, suggesting that further research would be useful in this context. We propose several lines of research below.

1) *Regret and persuasion.* Considerable research and applied effort has been devoted to persuading people either to desist from activities such as smoking that increase cancer risk or to engage in activities such as getting appropriate screening tests that reduce it. To the extent that these efforts have relied on emotions rather than on rational choice models, they seem to have involved mainly fear of the deleterious consequences. These fear messages appear to have had uneven success (Loewenstein et al, 2001). There may be potential in persuasive efforts based, instead, on evoking the regret one would feel if the bad outcome eventuates. For example, Richard, van der Pligt, and de Vries (1996) manipulated regret salience by changing time perspective. They asked respondents about either their feelings *about* unsafe sex or the feelings they would anticipate *after having had* unsafe sex. Participants in the second condition reported “safer” behavioral expectations immediately, and less risky sexual behavior in the five months following the experiment. Regret, as we have seen, includes both emotional and cognitive elements woven tightly together, so that an evocation of regret may be persuasive because it is immediately accompanied by thoughts of what might be done to reduce it.

This line of research suggests studies that examine regret as an input to cancer-related decisions, especially with respect to decisions related to cancer prevention. Such research could manipulate regret salience, as Richard et al (1996) did, and measure the effect on cancer-related behaviors and decisions as compared to a control condition.

2) *Regret, justifiability, and vigilant decision making.* Janis and Mann (1977) proposed that anticipated regret might serve to motivate attentive, thoughtful decision making based on improved information gathering and careful thought – what they referred to as “vigilant decision making”. The mechanism they proposed is very much along the lines sketched here: Anticipating the self-blame that will arise if a hasty, ill-considered decision were to lead to a bad outcome, the

decision maker turns instead to a more justifiable decision process, vigilant decision making, presumably improving her chances of a good outcome. There does not appear to have been any substantial research following up on Janis and Mann's suggestion, but the idea seems to us highly promising. We should explore ways in which the possibility of post-decisional regret is made salient to the decision makers in time to affect their actual pre-decisional deliberations. Suggestion (1), above, proposed that anticipation of *option* regret might be useful in changing *option* choices. We hypothesize here that anticipation of *process* regret could lead to improved decision *processes*.

In clinical practice, how careful a decision process is will often depend on the interaction between patient and physician. There is continuing interest in alternative models of involving patients and physicians in treatment-related decisions (Frosch & Kaplan, 1999). Common arguments for significant patient involvement include improved quality of choices and stronger patient commitment to carrying through with the chosen treatment. In addition, such involvement may increase perceived justifiability of the decision process, thus helping to reduce post-decision regret when outcomes are poor (Connolly & Reb, 2001). However, more patient involvement might imply stronger self-blame in case of a bad outcome, leading to more regret (Sheridan, Harris, & Woolf, 2004). Empirical studies will be needed to establish an appropriate balance.

Some evidence from cancer research suggests the importance of careful, well-informed patient decision-making. Clark et al (2001) found that among men treated for metastatic prostate cancer those who expressed regret more were more dissatisfied with their role in the decision making process, thought they had received less information than they needed, and were more likely to feel that they did not have much of a choice. Hu et al (2003) found that less educated men were more regretful about their localized prostate cancer treatment decisions. It is unclear

whether these men were poorly informed about their treatment options or were unable to fully use the information they were given, but they do appear to have felt in hindsight that their treatment decisions were inadequately justified.

We suggest that research should further explore how aspects of the decision process (e.g., amount of information gathered) affect later regret in cancer patients. More research is needed, especially addressing individual variations in these appropriateness judgments and how feasible the decision processes that patients see as appropriate are in the world of busy physicians and technically complex diagnostic and treatment options. (See Schwartz et al, this volume, for an example of complex decisions associated with genetic testing and cancer prophylaxis). In addition, experimental research should manipulate the salience of decision process regret and examine the effects on the decision process, decision quality, and satisfaction with decision consequences.

3) “*Regret therapy / management*”. Regret is often experienced as both painful and long-lasting (Gilovich & Medvec, 1995). Benjamin Franklin, who lost a favorite four-year-old son to smallpox after neglecting to have him vaccinated against the disease, reports sadly that, even decades later, he could not think of the boy “without a sigh” (Issacson, 2003). It is possible that such persistent distress might contribute to depression and associated ill-health and poor quality of life. Regret about treatment decisions was associated with worse current health-related quality of life in men with localized prostate cancer (Hu et al, 2003) and to worse generic and prostate-cancer related quality of life and emotional well-being in men treated for metastatic prostate cancer (Clark et al, 2001), although the causal direction of the relationships found in these studies remains uncertain.

The model of regret outlined here provides straightforward suggestions for a therapeutic model for regret reduction. For outcome regret, develop alternative, less damaging reference comparisons; for process and option regret, develop better justifications. Researchers could identify the reference comparisons and self-blame of patients with regrets and test whether interventions aimed to introduce regret-reducing reference comparisons and justifications do, in fact, reduce regret and improve health-related quality of life.

There is some evidence that many people may actually be quite good at “managing their regrets”. Bonadona et al (2002) interviewed cancer patients who received a positive test result of genetic cancer susceptibility. While 8 out of 19 participants thought that the disadvantages of knowing their genetic status outweighed the benefits, only 1 person expressed regret about having undergone genetic testing. Similarly, Di Prospero et al (2001) found that although most of their 24 participants who had undergone genetic breast cancer screening reported a significant increase in worries and cancer risk perception, none regretted their decision to undergo screening. These results may be in part at least caused by patients’ perception that they “did the right thing” to undergo screening. Winer et al (1993) found that among women with a history of breast cancer who had undergone breast reconstruction with silicone implants, 34% said they would now be completely unlikely to choose silicon implants (and only 27% now would be completely likely to choose them), but only 16% reported regrets about the reconstruction. It would be interesting to learn whether, in cases such as these, most patients never experience regret or do initially experience regret but learn to manage it.

3. Misprediction of regret. There is good evidence that decisions can be influenced by anticipations of regret, but there is little evidence as to how accurate these anticipations will be. The findings of Crawford, McConnell, Lewis, and Sherman (2002) suggest that they may be seriously in

error. Several lines of research (e.g. Brickman, Coates, & Janoff-Bulman, 1978; Loewenstein, 1987) suggest that our ability to make predictions of our future emotional states, including regret (Gilbert, Morewedge, Risen, & Wilson, 2004) is often poor. It is thus likely that, in extended sequences of related decisions such as those often needed in cancer care, complex interactions will arise between regret anticipation that influences earlier decisions, experience of actual regret resulting from those decisions, and anticipations of regret during subsequent decisions. For research on cancer-related decisions, this means that in addition to measuring experienced (and expressed) regret after the decision consequences have materialized researchers need also to measure decision makers' predictions of regret before the choice and before outcomes are received. While such repeated measurement would obviously make data collection more difficult, it offers a better understanding of the relation between experienced and anticipated regret in complex decisions.

The studies sketched in the preceding paragraphs do not appear to pose any unusual methodological challenges. Measurement of the core construct, regret (both experienced and anticipated), has so far mainly relied on simple one- and two-item scales. More sophisticated measures may eventually be needed, but simple scales have obvious appeal at the present early stage of the work. Recent studies in the DJT tradition have moved from single, overall measures of regret to pay closer attention to the focus of what is regretted, distinguishing process, option, and outcome components, again using simple scales. Particular studies will, of course, pose their own specific problems of sampling, timing and experimental design, but none that are uniquely associated with including regret ideas. The studies proposed here are essentially straightforward extensions of existing studies of patient and physician decision making, to include new concepts and measures related to regret. Studies of decisions, either

prospective or retrospective, commonly involve consideration of the decision processes used, the options selected, and the consequences of these choices. Regret theory in general, and DJT in particular, aims to extend these considerations to include possible regret as an important aspect of each of these aspects of decision. The work thus extends, rather than supplanting, existing conceptualization and methodology.

CONCLUSION

Decision-related regret is currently a very active research field. In the last few years it has made considerable progress, both theoretically and empirically, and promises to develop rapidly. There seems to be every prospect that this progress will open up fruitful opportunities for research and application in cancer-related decisions. In our reading research on regret in cancer-related decisions has relied mostly on survey studies of experienced regret. Additional research should examine on the role of anticipated regret in cancer-related decisions. We believe that the research directions outlined above could lead to significant advances in our understanding of the relation between cancer-related decisions and regret and ultimately help people make better decisions leading to less regrettable outcomes.

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FOOTNOTES

1. A reviewer of an earlier draft suggests the important and plausible hypothesis that outcome regret is a prerequisite for the experience of either process or option regret.
2. A reviewer points out the links to existing theorizing such as dissonance theory (Festinger, 1997) and self-regulation theory (Cameron & Leventhal, 2003). We agree, but have chosen for reasons of length not to develop these theoretical issues here.