

Emotional Reactions to the Outcomes of Decisions: The Role of Counterfactual Thought in the Experience of Regret and Disappointment

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Regret and disappointment are emotions that can be experienced in response to an unfavorable outcome of a decision. Previous research suggests that both emotions are related to the process of counterfactual thinking. The present research extends this idea by combining it with ideas from regret and disappointment theory. The results show that regret is related to behavior-focused counterfactual thought in which the decision-maker's own actions are changed, whereas disappointment is related to situation-focused counterfactual thought in which aspects of the situation are changed. In Study 1 participants ($N = 130$) were asked to recall an autobiographical episode of either a regretful or a disappointing event. When asked to undo this event, regret participants predominantly changed their own actions, whereas disappointment participants predominantly changed aspects of the situation. In Study 2 all participants ($N = 50$) read a scenario in which a person experiences a negative event. Participants who

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were instructed to undo the event by changing the person's actions reported more regret than disappointment, while participants who were instructed to undo the event by changing aspects of the situation reported more disappointment than regret. Study 3 ($N = 140$) replicated the findings from Study 2 with a different scenario, and a design in which regret and disappointment were measured between rather than within subjects. In the discussion we address the relation among counterfactual thinking, attributions and affective reactions to decision outcomes, and the implications for decision research. © 1998 Academic Press

Decision outcomes often evoke emotional reactions. For example, one can be disappointed when finding out that the outcome of a chosen option is worse than what was initially expected, or one can feel regret upon discovering that one would have obtained a better outcome had one chosen another option. Of course, these emotional reactions influence our satisfaction with the obtained decision outcome, or, in other words, its utility. Thus, when buying a new VCR, the satisfaction or utility derived from that particular VCR depends not only on the attributes of VCR itself but also on how it compares to the prior set expectations and the attributes of unchosen alternatives. This psychological process of comparing the obtained outcome with other possible outcomes has become known as counterfactual thinking.

In the present paper we focus on how these counterfactual thoughts about "what might have been" influence specific emotional reactions to decision outcomes. We argue that the content of the counterfactual thoughts (i.e., the specific alternative outcome to which the obtained outcome is compared) has an impact on which emotion is experienced. Studying how these psychological processes cause these specific emotional reactions is not only interesting for its own sake. As shown by recent empirical research, people anticipate emotions, and take them into account when making decisions (e.g., Beattie, Baron, Hershey, & Spranca, 1994; Inman & Zeelenberg, 1998; Larrick & Boles, 1995; Ritov, 1996; Zeelenberg & Beattie, 1997; Zeelenberg, Beattie, van der Pligt & de Vries, 1996). Knowledge about the role of counterfactual thought in the experience of emotions can therefore help us understand the role of emotions in decision-making.

COUNTERFACTUAL THINKING

Counterfactual thinking involves mentally mutating one or more aspects of a past event. It includes thoughts in which current reality is changed into what might, could, would, or should have been. By mentally simulating what happened and comparing it to what might otherwise have happened, an individual can come to an understanding of how reality came about. An individual can rerun what has happened, while changing aspects of his or her own actions, and see if, and how, this would have made a difference. In these simulations

one can also change aspects of the situation and examine whether these differences could have prevented something from happening, or would have promoted the occurrence of other events. In this way counterfactual thinking may influence an individual's attributions for the current reality (Kahneman, 1992; Kahneman & Miller, 1986; Wells & Gavanski, 1989).

In addition to this influence on attributions, counterfactual thinking has also been shown to influence individuals' emotional reactions to outcomes and events (e.g., Boles & Messick, 1995; Kahneman & Tversky, 1982; Medvec, Madey, & Gilovich, 1995). For example, if one wins a small prize in a lottery, satisfaction with this prize is not always easily predicted. How satisfied one feels depends very much on which alternative to reality (or default) comes to mind. Where winning a larger prize is the alternative to reality, one would be less satisfied than if winning no prize at all is construed as the alternative. Thus, by constructing alternatives with which reality is contrasted, counterfactual thinking can influence the intensity of an emotional reaction; this has been referred to as *emotional amplification* (Kahneman & Miller, 1986).

In the present research we build upon Niedenthal, Tangney, and Gavanski's (1994) recent work on the effects of counterfactual thinking. These authors showed that counterfactual thought can influence emotional reactions to events in a way that goes beyond mere amplification. Specifically, they argued that "... counterfactual thinking mediates affect, and ... that through its role in assessments of causation, *counterfactual thinking helps to shape the specific emotions* an individual experiences in reaction to a situation" (p. 585, italics added). In their research Niedenthal *et al.* focused on the emotions guilt and shame, emotions that have the same negative valence but different phenomenologies. They found that experiences of shame were related to counterfactual thoughts in which aspects of the self were mutated, whereas experiences of guilt were related to counterfactual thoughts in which aspects of one's behavior were mutated. In the present research we focus on two related emotions: *regret* and *disappointment*. These emotions share with guilt and shame the characteristics that valence is negative, and that they are associated with mental undoing (Frijda, Kuipers, & Ter Schure, 1989; Zeelenberg, van Dijk, Manstead, & van der Pligt, 1998c). However, they also differ from guilt and shame in important respects (cf. Landman, 1993; Zeelenberg, 1996). Experiences of guilt and shame generally arise when some norm, moral or social, is violated. Regret and disappointment are related to social or moral norms to a much lesser extent. These emotions are more utilitarian, that is, they are more related to the hedonic value of decision outcomes or events. This presumably is why disappointment and (in particular) regret have attracted so much attention in research on individual decision-making (see e.g., Beattie *et al.*, 1994; Bell, 1982, 1985; Gull, 1991; Kelsey & Schepanski, 1991; Inman, Dyer, & Jia, 1997; Inman & McAlister, 1994; Inman & Zeelenberg, 1998; Janis & Mann, 1977; Josephs, Larrick, Steele, & Nisbett, 1992; Larrick & Boles, 1995; Loomes & Sugden, 1982, 1986, 1987; Mellers, Schwartz, Ho, & Ritov, 1997; Richard, van der Pligt, & de Vries, 1996; Ritov, 1996; Ritov & Baron, 1995; Taylor, 1997; van Dijk & van der Pligt, 1997; Zeelenberg *et al.*, 1996; Zeelenberg & Beattie, 1997;

Zeelenberg, van der Pligt, & Manstead, 1998a). This decision research has shown that both regret and disappointment have clear behavioral consequences. These consequences may arise from both the anticipation of these emotions and from their experiences. Although decision research (often implicitly) suggests that different sorts of counterfactual thinking give rise to regret and disappointment, empirical studies that focus explicitly on the antecedents of regret and disappointment are relatively sparse. Before addressing these proposed differences in the antecedents of the experience of regret and disappointment in more detail, we focus on the experience itself.

ARE REGRET AND DISAPPOINTMENT DIFFERENT EMOTIONS?

Our key prediction is that the difference between regret and disappointment resides in the differential counterfactual thought processes giving rise to the emotions. An important question is whether regret and disappointment differ with respect to experiential content. In other words, are regret and disappointment really two distinct emotions, each with its own characteristics, or are they essentially similar experiences that go by different names? Emotion researchers argue that emotions can be differentiated on the basis of the *appraisals* associated with the specific emotions (e.g., Frijda *et al.*, 1989; Roseman, Antoniou, & Jose, 1996), and on basis of their *phenomenologies* (Roseman, Wiest, & Swartz, 1994). We recently addressed whether regret and disappointment could be differentiated on the basis of their appraisals and their phenomenologies (see, van Dijk, van der Pligt, & Zeelenberg, 1998; Zeelenberg *et al.*, 1998c).

Appraisal theorists state that each emotion can be related to specific patterns of evaluations and interpretations of events ("appraisals"). Some theorists argue for a strong causal relationship between appraisals and emotions (e.g., Lazarus, 1991). Others argue that although appraisals do not always cause the emotions or determine which specific emotion is experienced, they may *characterize* emotions (Parkinson, 1997). In our appraisal study we focused on the appraisal pattern of several different negative emotions, but for the sake of brevity we will only discuss the relations between regret and disappointment (see, van Dijk *et al.*, 1998). We asked participants to recall and describe a situation in which they felt either intense regret or intense disappointment, and subsequently assessed their appraisals. Eight different appraisal dimensions were included: unexpectedness, motivational state, situational state, probability, control potential, legitimacy, problem source, and agency, the last of which was measured by three items (self-agency, other-person-agency, and circumstances-agency). Roseman *et al.* (1996) found that these appraisal items differentiated clearly between different emotions. Our study showed significant differences between regret and disappointment on five appraisal dimensions, namely: unexpectedness, motivational state, control potential, legitimacy, and agency (self-agency and circumstances-agency). Disappointment received higher ratings with respect to unexpectedness, wanting something pleasurable, thinking that one was morally right, and causation by circumstances beyond

anyone's control. Regret, on the other hand, received higher ratings with respect to thinking that one could do something about the event, and self-causation.

In our study on the phenomenological experience of regret and disappointment we also asked participants to recall an instance of intense regret or disappointment, and to indicate what they felt, thought, felt like doing, did, and wanted during this experience (Zeelenberg *et al.*, 1998c). We asked about these five different aspects of an emotional experience (i.e., feelings, thoughts, action tendencies, actions, and emotivations) because previous research had shown that discrete emotions can be differentiated on the basis of these aspects (Roseman *et al.*, 1994). There were several significant differences between regret and disappointment in each category. These differences were most pronounced for action tendencies (referring to what participants felt like doing during the experience) and for emotivations (referring to specific emotional motives or goals that participants had during the experience). More specifically, we found that the experience of regret could be differentiated from that of disappointment in that the former involves feeling more intensely that one should have known better, thinking about what a mistake one has made, feeling a tendency to kick oneself and to correct one's mistake, wanting to undo the event and to get a second chance. We also found that the experience of disappointment, more than that of regret, involves feeling powerless, feeling a tendency to do nothing and to get away from the situation, actually turning away from the event, and wanting to do nothing.

Taken together, we found that regret and disappointment are associated with different appraisal patterns and that they have different phenomenologies. Although we acknowledge that regret and disappointment have a much in common (both are related to risky decision making and uncertain outcomes, and originate in a comparison process in which the outcome obtained is compared to an outcome that might have been), we interpret the findings of these studies as indicating that regret and disappointment are different emotions.

REGRET AND DISAPPOINTMENT THEORIES

Ideas about the role of regret and disappointment in decision-making were formalized by the economists Bell (1982, 1985) and Loomes and Sugden (1982, 1986, 1987). In their *regret* and *disappointment theories* they explicitly state that decision-makers can experience emotions as a consequence of a decision. Regret and disappointment theories also state that people anticipate these post-decisional emotions, and take them into account when making decisions. The major difference in the antecedents of regret and disappointment, according to these theories, is the *source of comparison* from which the emotions arise. Although regret and disappointment both stem from a comparison between "what is" and "what might have been," regret is assumed to originate from comparisons between the factual outcome and an outcome that might have been *had you chosen another action*; disappointment is assumed to originate from a comparison between the factual outcome and an outcome that might have been *had another state of the world occurred*. This difference can

be illustrated by the choice depicted in Table 1, where the outcome of the two actions (A or B) depends on the occurrence of one of four possible states of the world. According to regret theory, a decision-maker will feel regret after having chosen action A, and state of the world S2 occurs. Regret occurs because the decision-maker knows that given this state of the world, action B would have resulted in a much better outcome. An example in which a decision-maker will feel disappointment, according to disappointment theory, will be when he or she chose action B, and state of the world S4 were to occur. The outcome obtained in this combination, \$25, is worse than the majority of outcomes which would have occurred in another state of the world. Note that although one should experience disappointment when confronted with this outcome, one should not experience regret, since the outcome of the rejected action was even worse.

NORM THEORY, REGRET, AND DISAPPOINTMENT

The ideas in regret and disappointment theory concerning the causes of regret and disappointment are easily combined with the counterfactual thinking approach derived from *norm theory* (Kahneman & Miller, 1986; see also Kahneman, 1992). Norm theory proposes that every outcome or event brings its own post-computed norm, or frame of reference, into being by the process of counterfactual thought. Evaluative reactions to outcomes are based on a comparison between these outcomes and the post-computed norm. In regret and disappointment theory it is assumed that the decision-maker has prior knowledge of all possible actions and the related outcomes for each state of the world. In other words, for each decision the decision-maker knows a decision table similar to the one depicted in Table 1. The decision outcomes are then evaluated in relation to the other possible outcomes. In most real-life decisions, however, not all possible actions or states of the world are known. In these cases, as norm theory suggests, decision-makers can *imagine* possible outcomes that would have occurred, had things been different; that is, they can generate counterfactuals. Evaluative reactions to the factual outcome can then be based on the comparison of this outcome to the post-computed counterfactual alternatives.

Regret and disappointment theories suggest that two different sorts of counterfactuals produce regret and disappointment. Recall that according to regret

TABLE 1
Outcomes of Actions A and B for Each Possible State of the World

Actions	States of the world			
	S1 (25%)	S2 (25%)	S3 (25%)	S4 (25%)
A	\$100	\$50	\$25	\$0
B	\$0	\$100	\$50	\$25

Note. This table depicts a choice between actions A and B, for which the outcomes depend on the state of the world that occurs. Each state of the world has a probability of 25%.

theory, regret is caused by comparing the outcomes of different actions given a certain state of the world. The decision-maker controls which action is chosen. Thus, undoing the outcome implies changing the decision-maker's choice. In counterfactual thinking terms, this implies that one feels regret when one generates a counterfactual in which the outcome is undone by changing something that was under one's personal control (e.g., one's reasoned actions or decisions). Henceforth, we will refer to these counterfactuals as *behavior-focused counterfactuals*. According to disappointment theory, disappointment is caused by comparing the outcomes of different states of the world given a chosen option. Undoing the outcome implies changing the states of the world. This implies that one feels disappointment when one generates a counterfactual in which the outcome is undone by changing something that was *not* under one's control (e.g., another person's behavior or something in the situation). Henceforth we will refer to these counterfactuals as *situation-focused counterfactuals*.

In sum, we argue that the emotions regret and disappointment have different causes. Based on a combination of regret theory and disappointment theory, on the one hand, and norm theory, on the other, we propose that regret is the result of the generation of behavior-focused counterfactuals, and that disappointment is the result of the generation of situation-focused counterfactuals. This reasoning is nicely illustrated by the following citation in which the emotional reaction to an event depends heavily upon what is thought to be mutable: "The child is *disappointed* when the Tooth Fairy forgets his third lost tooth. The child's parents *regret* the lapse" (Landman, 1993, p. 47).

STUDY 1

In Study 1 we investigate counterfactual thinking about real-life events. Participants were asked to recall and describe an event from their own lives in which they experienced either intense regret or intense disappointment. Next they were asked to undo the event by generating four counterfactuals. These were then coded as addressing behaviors (i.e., things that were under the participant's control), or as aspects of the situation, or the participant's character (i.e., things that were not under the participant's control). We expected that regret participants would predominantly mutate things that *were* under their control, whereas disappointment participants would predominantly mutate things that *were not* under their control.

We also assessed ratings of emotions felt during the experience of the event. We asked for ratings of regret, disappointment, and general affect. We expected that regret participants would report a high level of regret, that disappointment participants would report a high level of disappointment, and that regret and disappointment ratings would be negatively related to each other (see also Zeelenberg, van Dijk, & Manstead, 1998b). We hoped that both groups of participants would report the same level of general negative affect, so that possible differences between the two groups would not be confounded with differences in overall negativity. Ratings of guilt and shame were also assessed.

Like regret and disappointment, these emotions are related to counterfactual thinking (Niedenthal *et al.*, 1994). Inclusion of these variables enabled us to examine the relationships among these four negative emotions. We expect these two emotions to be more closely related to regret than to disappointment, because regret, guilt and shame all share a sense of responsibility for the negative outcome or event.

The last set of variables included in this study related to internal and external attribution. Niedenthal *et al.* (1994) argued that the shaping of emotions through counterfactual thinking might occur through the role played by counterfactuals in assessments of causation. However, in their study attributions were not assessed. Research by Wells and Gavanski (1989) shows that people use counterfactual thinking in assessing the causal role of events (see also Lipe, 1991). In their first experiment, Wells and Gavanski asked participants to read a vignette in which a woman dies from an allergic reaction to a dish ordered by her boss. The boss was described as having considered the ordered dish and an alternative dish. When the alternative dish did *not* contain the allergic ingredient, the boss' role in the woman's tragic death was judged as more causal than when the other dish also contained the allergic ingredient. It appears that people attribute outcomes to those factors that are imagined to covary with those outcomes. Thus counterfactual thoughts about how an outcome was achieved can influence the attributions that people make. This, in turn, could influence the affective reaction to the outcome (cf. Weiner, 1982, 1986).

In short, we suggest that the effects of behavior-focused counterfactuals on regret is more strongly mediated by internal attributions, and that the effects of situation-focused counterfactuals on disappointment is more strongly mediated by external attributions (cf. Zeelenberg *et al.*, 1998b).

Method

Design and participants. The study had a 2-group between-subjects design (Regret vs. Disappointment). Students at the University of Amsterdam ($N = 130$) participated in this experiment, which was part of a larger experimental session. There were 65 participants per condition. They were paid 10 Dutch Guilders (approximately \$6.50 at the time of the study) for their participation.

Procedure and material. Booklets containing the questionnaires were randomly distributed among the participants. The experiment lasted about 15 min. Depending upon the condition they were in, participants were asked to describe an occasion in which they felt either intense regret or intense disappointment. The complete instruction in the regret [disappointment] condition read (translated from the original Dutch): "We would like you to recall an event from your own life in which you felt intense regret [disappointment]. Provide a detailed and comprehensive description of this event. You may use the whole page for your description. If you need more space, please continue on the reverse of this page. Provide a description that is comprehensive enough for the person who reads it, to experience it in the same way as you did."

Next, on the subsequent page, mutations were measured by asking the participants to complete four "If only . . ." stems. The complete instruction read (translated from the original Dutch): "The event you described could, of course, have had a better ending. What could have been different about yourself, your behavior, or the situation so that the event would have had a better ending? Please describe four things that would have resulted in a better ending if only they were different."

Then, on again a subsequent page participants were asked to rate on the scales below the extent to which they experienced the emotions regret, disappointment, guilt and shame during the event. These were measured on 10-point scales with endpoints labeled *none* (1) and *very much* (10). A general affective reaction was assessed by asking how the event made them feel in general. This was measured on an 11-point scale, with endpoints labeled *very good* (-5) and *very bad* (5).

Attributions were assessed on the next page. Participants were asked "How responsible do you find yourself for the event?" to be answered on a 10-point scale with endpoints labeled *not responsible* (1) and *very responsible* (10). They were also asked "To what extent did you cause the event?" and "To what extent did external factors cause the event?" These questions were to be answered on 10-point scales with endpoints labeled *a very small extent* (1) and *a very great extent* (10).

Half the participants completed the procedure in the order described above, while the other half was asked first for the ratings, and then for mutations. Since there were no order effects, data from the two groups were analyzed together.

Results

Mutations. The main hypothesis was that participants in the regret condition would prefer to mutate things that were under their own control, and thus generate behavior-focused counterfactuals, whereas participants in the disappointment condition would prefer to mutate things that were not under their control, and thus generate situation-focused counterfactuals. In order to test this prediction two independent judges, blind to the experimental conditions, coded the "If only" completions as addressing the participant's behavior, their character, or aspects of the situation. For example, completions in which acts or non-acts of the participant were mutated (e.g., those that took the form of "If only I had invited more people, my party would have been successful") were coded as addressing behavior. Completions focusing on more or less chronic or enduring aspects of the participant, or who or what s/he is, were coded as character mutations (e.g., "If only I was more persistent, he would have wanted to go out with me"). Finally, the completions relating to external forces were coded as addressing situational aspects (e.g., "If only the exam would have been easier, I would have passed"). The interrater agreement for these judgments was 86%; disagreements were resolved by discussion. The data set contained a total of 486 mutations (not all participants completed all

TABLE 2

First (within Parentheses) and Total of Mutations by Category for the Regret and Disappointment Conditions (Study 1)

Condition	Mutations			Mutation index
	Behavior	Character	Situation	
Regret	132 (44)	34 (8)	76 (13)	-.113 (-.354)
Disappointment	91 (26)	44 (10)	98 (29)	.246 (.200)

Note. The mutation index is a mean score of the mutations generated, in which the mutations of behavior were coded as -1 and the mutations of character and situation as $+1$. This mutation index could range from -1 , if only behaviors were mutated, to $+1$, if only aspects of the situation or their character were mutated. The mutation index based on only the first mutation is shown within parentheses.

four 'If only' stems). Only 11 out of the 486 (2.4%) were uncodable. All analyses were done using the remaining 475 mutations. Table 2 shows the results for both the first mutations generated and for the total number of mutations generated. Separate analyses were carried out on the first mutations generated because these presumably reflect the most accessible beliefs about alternatives to reality (cf. Niedenthal *et al.*, 1994). It can be seen that, for both the first and the total number of mutations, behavior was mutated most often in the regret condition, and situation was mutated most often in the disappointment condition.

For purposes of statistical analyses we coded the mutations of behavior as -1 , and mutations of situational aspects and mutations of the participant's character as 1 . We decided to combine the mutations of situational and character because both mutations focus on things that are not directly under the volitional control of the decision-maker (cf. Markman & Weary, 1997). In contrast, mutations of behavior focus on actions of the decision-maker that were under his or her control. These uncontrollable and controllable aspects can be seen respectively as related to the decision-maker's actions and to the possible states of the world depicted in Table 1.¹ A Chi-square test for 2×2 tables with first mutations as dependent variables shows that participants in the Regret condition tended to mutate the controllable aspects (i.e., behavior) more often, and that that participants in the Disappointment condition tended to mutate the uncontrollable aspects (i.e., situation and character) more often; $\chi^2(1) = 9.95, p < .01$. Next, the data for all mutations were analyzed. This was done by computing a mean mutation index (both *mutation indices* are depicted in Table 2), in which all mutations per participant were summed and divided by the total number of mutations generated by that participant. This analysis yielded the same result, $t(128) = 3.37, p < .001$.

¹ Alternatively, one might argue that mutations of ones character should be coded as 0 because they fall in between mutations of behavior and mutations of situation (character mutations could be regarded as the mutation of things that are not really controllable, but neither uncontrollable). We reran all analyses with this alternative coding, and found that the results were unaffected by it.

Ratings. Table 3 depicts the mean responses on the five emotion and four attribution rating scales. Regret was the dominant emotion in the regret condition: Within this condition ratings of regret were significantly higher than ratings of all other emotions, all $t_s(64) > 2.62$, $p_s < .05$. In the Disappointment condition, ratings of disappointment were significantly higher than ratings of all other emotions, all $t_s(64) > 11.90$, $p_s < .001$.

Moreover, a MANOVA with condition (Regret vs. Disappointment) as the independent variable and the emotion and attribution scales as dependent variables revealed a significant multivariate difference between the two conditions, $F(8,121) = 21.97$, $p < .001$. Univariate tests showed that a significant difference existed for 7 of the 8 ratings (see Table 3). All differences were in the predicted direction.

Participants in the Regret condition reported more regret than did those in the Disappointment condition, and participants in the Disappointment condition reported more disappointment than did those in the Regret condition. The high levels of regret and disappointment reported in the corresponding conditions show that participants did indeed recall events in which they experienced intense regret or disappointment. It is important to note that in both conditions the recalled events were associated with the same level of general negative affect.

As anticipated, participants who recalled an experience of intense regret reported having experienced more guilt and shame than did participants who recalled an experience of intense disappointment. This suggested that guilt

TABLE 3
Means for the Dependent Variables in the Regret and Disappointment Conditions (Study 1)

Dependent Variables	Condition		$F(1,128)$	$p <$
	Regret	Disappointment		
Emotions				
Regret	8.32	4.65	76.51	.001
Disappointment	6.49	9.02	64.35	.001
Guilt	7.48	4.03	54.52	.001
Shame	6.66	4.43	18.15	.001
General Affect	3.28	3.26	0.01	<i>ns.</i>
Attributions				
Responsibility	7.85	5.15	35.60	.001
Internal attribution	7.75	4.92	39.93	.001
External attribution	5.29	7.28	19.68	.001

Note. Entries for regret, disappointment, guilt and shame are mean answers on 10-point scales with endpoints labeled *none* (1) and *very much* (10). Entries for General Affect are mean answers on a 11-point scale, with endpoints labeled *very good* (-5) and *very bad* (5). Entries for attributions are mean answers to "How responsible do you find yourself for the event?", measured on a 10-point scale with endpoints labeled *not responsible* (1) and *very responsible* (10), and mean answers "To what extent did you cause the event?" and "To what extent did external factors cause the event?" measured on a 10-point scale with endpoints labeled *a very small extent* (1) and *a very great extent* (10).

and shame are more closely related to regret than to disappointment. Support for this was also found in the correlations between the different emotions (see Table 4 for correlations among the dependent variables). Regret, guilt and shame were all positively correlated, whereas the correlations between these emotions and disappointment were all negative. Moreover, the absolute magnitude of the correlations of regret with guilt and shame are greater than those for disappointment with guilt and shame.

Attribution ratings were also in accordance with our predictions. Regret participants judged themselves as more responsible for the event than did Disappointment participants. Regret participants also judged the extent to which they caused the event to be greater than did Disappointment participants. Disappointment participants judged the extent to which external factors caused the event to be greater than did Regret participants.

Relation among mutations, attributions, and emotions. The central argument in this paper is that regret and disappointment are related to different types of counterfactual thinking. We argue that regret is related to behavioral-focused counterfactual thinking, and that disappointment is related to situation-focused counterfactual thinking. As can be seen in Table 4, the significant correlations between the mutation index and the reported regret and disappointment support this reasoning. The negative correlation between the mutation index and regret indicates that as the mutations become more behavior-focused, regret becomes more intense. The positive correlation between the mutation index and disappointment indicates that as the mutations become more situation-focused, disappointment becomes more intense.

Niedenthal *et al.* (1994) argued that the effects of counterfactual thinking are *mediated* by attributional processes. However, they did not assess attributions, and were therefore unable to test this argument. Attributions were measured in the present study. As shown in Table 4, the correlations between regret and the different attribution measures were significant and in the predicted direction (positive correlations with internal attribution and responsibility, and a negative correlation with external attribution), indicating that more internal attributions were associated with more intense regret. For disappointment these correlations showed the reverse pattern, indicating that more external attributions were associated with more intense disappointment. For further analyses we combined the three attribution ratings, after reverse scoring the measure of external factors, into one measure (Cronbach's $\alpha = 0.88$). This new attribution scale could range from 1 to 10, with higher scores implying more internal attributions.

A series of regression equations were calculated to test for mediation (cf. Baron & Kenny, 1986). These tests were done separately for regret and disappointment, using the whole data set for both analyses. The predictor variable in these equations was the mutation index, the mediator was the score on the attribution scale, and either regret or disappointment served as the outcome variable. To test for mediation we first regressed the mediator on the predictor variable, then regressed the outcome variable on the predictor

TABLE 4
Correlations among the Dependent Variables (Study 1)

	Regret	Disappointment	Guilt	Shame	General Affect	Responsibility	Internal Attribution	External Attribution	Attribution Scale
Disappointment	-.29**	—							
Guilt	.60**	-.32**	—						
Shame	.42**	-.22*	.52**	—					
General Affect	.19*	.08	.18*	.22**	—				
Responsibility	.55**	-.19*	.56**	.44**	.07	—			
Intern Attr.	.51**	-.22*	.55**	.42**	.08	.78**	—		
External Attr.	-.43**	.15*	-.46**	-.38**	-.07	-.61**	-.76**	—	
Attribution Scale	.55**	-.22*	.58**	.46**	-.08	.89**	.94**	-.87**	—
Mutation Index	-.29**	.20*	-.27**	-.10	-.05	-.40**	-.40**	.37**	-.43**

*p < .05, **p < .01; The Attribution Scale is a combination of the variables Responsibility, Internal Attribution, and External Attribution (reverse scored). The Mutation Index is the mean score of the mutations generated.

variable, and finally regressed the outcome variable on both the predictor variable and the mediator. Perfect mediation holds when: (a) the predictor affects the mediator in the first equation; (b) the predictor affects the outcome in the second equation; (c) the mediator affects the outcome in the third equation; and (d) when the predictor has no effect when controlling for the mediator in the third equation.

The results of these regression equations are depicted in Fig. 1. The values in this figure are standardized regression weights. The upper half of this figure shows results for regret. These show that: (a) mutations predict attributions; (b) mutations predict regret (upper left-hand corner beta weight); (c) attributions predict regret; and (d) mutations have no predictive power when controlling for attributions (upper right-hand corner beta weight). Attributions can therefore be said to mediate the influence of mutations on regret. Similar results were found for disappointment (see lower half of Fig. 1).

Discussion

The results of this study confirm the hypothesis concerning the role of counterfactual thinking in regret and disappointment. Regret experiences were more associated with counterfactuals addressing behavioral actions, whereas disappointment experiences were more associated with counterfactuals addressing situational factors. It should be noted, however, that in spite of the significant differences in mutation focus, participants in the regret condition also mutated a considerable number of uncontrollable aspects of the situation, and that participants in the disappointment condition also mutated their own behaviors. This might be regarded as detrimental to our hypotheses. However, it should be remembered that participants were explicitly asked to mutate things about themselves, their behavior, or the situation that would have prevented the regretted event. A more formal analysis of regret-eliciting situations shows

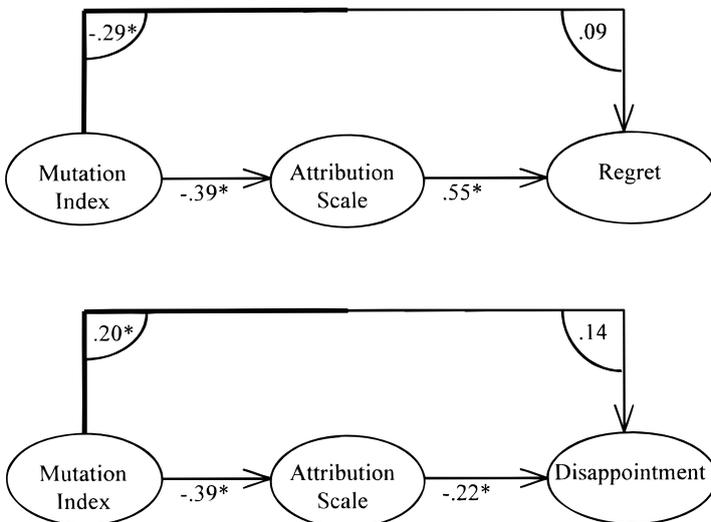


FIG. 1. Models testing for the mediating role of attributions ($*p < .05$).

that regret can be undone by mutating one's choice or the state of the world that occurred. For example, the most regretful situation in Table 1 would be choosing action B after which state of the world S1 occurs. After this happens the decision-maker can mutate the choice of action B, but also the occurrence of S1, since both would have prevented this situation from happening, and both are thus equally valid answers to the question asked.

Moreover, outcomes of real-life decisions are almost always multiply determined. A feature of a cause is that had it been different, the event would not have occurred. Hence, in real life one can mutate a large number of things, of which one's own behavior is a small, but of course salient, subset. Finally, there are also several other factors that influence what gets mutated. For example, people are more likely to mutate causes that are proximal in time to the focal event than causes that are more distal in time (e.g., Miller & Gunasegaram, 1990), and they are more likely to mutate things that are under their own control (e.g., their behaviors) than things that are not under their own control (Giroto, Legrenzi, & Rizzo, 1991; Markman, Gavanski, Sherman, & McMullen, 1995; Roese & Olson, 1995). We regard it as telling that we found significant differences in mutation focus for regret and disappointment, despite the fact that what gets mutated is known to be influenced by all these other factors.

Additional findings were that experienced regret was primarily related to internal attributions and mutations of behavior, whereas experienced disappointment was primarily related to external attributions and mutations of the situation. Mediation analyses revealed that attributions mediated the effects of counterfactual thinking on the experience of regret and disappointment.

Summarizing, the findings support the idea that regret and disappointment are associated with different types of counterfactual thought. These findings suggest that counterfactual thinking not only amplifies affect, but also shapes it. According to our reasoning, regret is shaped by the generation of behavior-focused counterfactuals, whereas disappointment is shaped by the generation of situation-focused counterfactuals.

STUDY 2

In Study 1 we showed that the experience of regret and disappointment is related to two different types of counterfactuals. Although we argue that these qualitatively different counterfactuals shape the experience of regret and disappointment, and the results of mediation analyses were consistent with this reasoning, Study 1 did not provide a direct test of this causal relationship. The present study was developed to provide such a test. Participants in this study had to imagine themselves in a situation that could elicit either regret or disappointment (or a combination of the two). Half the participants were instructed to undo the event by mutating aspects of their behavior, while the other half were instructed to undo the event by mutating aspects of the situation. Next, all participants were asked to indicate the level of regret and disappointment they would feel in such a situation. We predicted that after mutating behavior participants would feel more regret than disappointment, but that

they would feel more disappointment than regret after mutating situational aspects.

Method

Design and participants. The experiment had a two-group between-subjects design (Mutate: Behavior vs. Situation). Dependent variables were ratings of disappointment and regret. Students at the University of Amsterdam ($N = 50$) participated in this experiment, which was part of a larger experimental session. There were 25 participants per condition. They were paid 10 Guilders (approximately \$6.50) for their participation.

Procedure and material. All participants were presented with the same scenario. They were asked to vividly imagine the events in the scenario as happening to them, and to read the scenario twice. The scenario read as follows (translated from the original Dutch):

Some time ago you signed up for a day trip. The trip included a visit to several buildings that are normally not open to the public, but which were opened especially for this occasion. You found this very attractive. You paid a non-refundable deposit of 25 Dutch Guilders.² At 9.30 a.m. you had to be at Amsterdam Central Station where a special bus would leave.

The evening before the trip you met a friend in a bar. At first, you did not intend to make it very late. As soon as the two of you were in the bar you started having a great time, and quite a few drinks. It was getting late and although you realized this you decided to stay a little longer.

Things do not go smoothly the next morning. You intended to set the alarm clock yesterday, but forgot to do so. You have to hurry. You quickly eat something and jump on your bicycle. Since you spent too much money yesterday you have to get some cash. You have some money left, but you want to be sure that it is enough for the whole day. The first cash dispenser on your route happens to be out of order. You decide to go to another one, although it is not on your route to the station. You withdraw your money and continue your journey. There are road works on the way to the station. You decide to ignore these. This is not good for your tires, and you get a puncture. You abandon your bicycle and walk to a tram stop. The tram has just departed. You take the next one and finally you're on your way. Just before you reach the station the tram is stopped by a group of protesters. All passengers have to get out. You think of running to the station, but calculate that it should be possible to continue walking at a normal pace. You decide to walk because you don't want to feel sweaty while sitting in the bus. When you arrive at the station you see that your calculation was wrong. You are too late. The bus is just turning the corner and disappearing from view.

After reading the scenario, participants in the Mutate Behavior condition were stimulated to generate behavior-focused counterfactuals. This was done by asking them to complete two sentence stems, starting with: *If only I* The explicit instruction read (translated from the original Dutch): "Complete the following two sentences by indicating how aspects of your own choices, decisions, or behavior could have been different so that the event would have had a better ending." Participants in the Mutate Situation condition were stimulated to engage in situation-focused counterfactual thinking. This was done by asking them to complete two sentence stems, starting with: *If only*

² Twenty-five Dutch Guilders equaled approximately \$16 at the time the study was ran.

. . . . The explicit instruction read (translated from the original Dutch): “Complete the following two sentences by indicating how aspects of the situation, thus things that you could not influence yourself, could have been different so that the event would have had a better ending.” Then participants rated the amount of disappointment and regret they would feel after experiencing the event. These were measured on 10-point scales with endpoints labeled *none* (1) and *very much* (10).

Results and Discussion

The mean ratings are depicted in Table 5. Participants' answers were submitted to a 2 (Mutate: Behavior vs. Situation) \times 2 (Emotion: Regret vs. Disappointment) ANOVA, with Emotion as a within-subjects factor. This analysis yielded a main effect for Mutate, $F(1,48) = 6.42$, $p < .005$. More interestingly, the analysis also yielded the predicted Mutate \times Emotion interaction, $F(1,48) = 9.89$, $p < .005$. As expected, participants in the Mutate Behavior condition reported more regret than disappointment, $F(1,48) = 5.85$, $p < .05$, while participants in the Mutate Situation condition reported more disappointment than regret, $F(1,48) = 4.11$, $p < .05$.

These findings are therefore supportive of the conclusion drawn from Study 1 that regret is the dominant experience when counterfactual thoughts undo the outcome of an event by changing aspects that are under personal control, such as one's own choices, decisions or behavior. Disappointment, on the other hand, is the dominant experience when counterfactual thoughts undo the outcome of an event by changing things that are beyond one's control, that is, aspects of the situation.

It needs to be noted that the level of disappointment was similar in both mutation conditions, suggesting that only regret is differentially influenced by the two sorts of counterfactual thoughts. However, we should take note of the fact that participants in Study 2 had to indicate both the level of disappointment and the level of regret they would feel, and they did so in this particular order. It may have been the case that these ratings influenced each other (cf. Niedenthal *et al.*, 1994), and that this reactivity helped to produce the obtained results. In order to rule out this possibility, and in order to replicate the results of Study 2 using a different scenario, we conducted a third study.

TABLE 5
Mean Regret and Disappointment Ratings (Study 2)

Condition	Rating	
	Regret	Disappointment
Mutate Behavior	8.04 _a	7.00 _b
Mutate Situation	5.80 _b	7.04 _a

Note. Entries are mean responses to the questions: “How much regret [disappointment] would you feel when experiencing the event?” Participants could answer both questions on 10-point scales, with endpoints labeled *none* (1) and *very much* (10). Means within rows not sharing a common subscript differ significantly ($p < .05$).

STUDY 3

In Study 3 participants again read a scenario that could have elicited both regret and disappointment. Half the participants were instructed to undo the event by mutating aspects of their behavior, while the other half were instructed to undo the event by mutating aspects of the situation. Next, participants reported *either* the level of regret *or* the level of disappointment they would feel in such a situation. By making the measurement of these emotions a between-subjects factor, we avoided possible problems of reactivity in their assessment. We predicted that after mutating behavior participants would feel more regret than disappointment, and that after mutating situational aspects participants would feel more disappointment than regret.

Method

Design and participants. The experiment had a 2 (Mutate: Behavior vs. Situation) \times 2 (Emotion rated: Regret vs. Disappointment) between-subject factorial design. Students at the University of Amsterdam ($N = 140$) participated in order to gain course credit. There were 35 participants per condition.

Procedure and material. Participants were again asked to read a scenario in which a person experiences a negative event, and were instructed to vividly imagine the situation happening to them. The scenario read as follows (translated from the original Dutch):

A few months ago you went into town one morning to buy a VCR. VCRs are generally quite expensive, and because you do not have too much money, you have given careful thought to this purchase. You consulted some friends, visited a few shops, and eventually you decided to buy a Sony. Although it is quite expensive, it came out as one of the best in tests. Moreover, one of your friends has the same model and is very happy with it. You arrive at the shop and see that they are holding an autumn sale. They have some models at reduced prices, but sadly enough not the one you had chosen to buy. You decide to check which models are on sale now. The salesperson tells you that the Ariston is a very good purchase. It is a very beautiful model, and now especially good value. Although you had originally resolved to buy the Sony, now you have some doubts. You would save a lot of money if you bought the Ariston, and the quality of the two probably does not differ that much. You are unsure about which one to buy and you discuss this with the salesperson. The salesperson advises you to buy the Ariston. This is what you eventually do. You do partly for the reasons given by the salesperson, but also because you can take the Ariston home immediately, whereas the only Sony left is the display model. If you were to buy the Sony you would have had to wait until the weekend, when a new shipment is due to arrive.

You go home excited, and install your VCR right away. Soon you discover that the sound quality is not to your liking, but you know that because it was an item on sale you cannot get your money back. This is not the only drawback: After four months the VCR breaks down. You return to the shop and the salesperson tells you that the warranty on sales items only lasts three months. You can have your VCR repaired, but it will cost you at least two hundred Dutch Guilders.³

³ Two hundred Dutch Guilders equaled approximately \$130 at the time the data were collected.

After reading the scenario, participants were asked to generate behavioral or situational counterfactuals. The mutation instructions were identical to those used in Study 2. Then participants rated either the amount of regret or the amount of disappointment they would feel after experiencing the event. These were measured on 10-point scales with endpoints labeled *none* (1) and *very much* (10).

Results and Discussion

Mean regret and disappointment ratings are depicted in Table 6. These were submitted to a 2 (Mutate: Behavior vs. Situation) \times 2 (Emotion rated: Regret vs. Disappointment) ANOVA. This analysis yielded only a significant interaction effect, $F(1,136) = 8.31, p < .005$. Simple main effects analyses revealed that participants who were instructed to mutate their behavior reported more regret than disappointment, $F(1,136) = 4.01, p < .05$, and that participants who were instructed to mutate situational aspects reported more disappointment than regret, $F(1,136) = 4.30, p < .05$. The findings of Study 2 were therefore replicated.

GENERAL DISCUSSION

The present research shows that experiences of regret and disappointment are caused by counterfactuals that vary in focus. Counterfactual thoughts in which decisions, choices, or reasoned actions are mutated, which we called *behavior-focused counterfactuals*, result in the experience of *regret*. Counterfactual thoughts in which aspects of the situation, or things that are beyond the actor's control are mutated, which we called *situation-focused counterfactuals*, result in the experience of *disappointment*. This finding corroborates the assumptions of regret and disappointment theory concerning the causes of these emotions. Moreover, it extends these theories to situations in which the decision-maker does not know all possible options or states of the world. Our research shows that in these situations people are able to imagine other possible outcomes (cf. Sugden, 1985), and that these imagined outcomes influence their emotional reaction to the real outcome.

TABLE 6
Mean Regret and Disappointment Ratings (Study 3)

Condition	Rating	
	Regret	Disappointment
Mutate Behavior	8.17 _a	7.37 _b
Mutate Situation	7.67 _b	8.49 _a

Note. Entries are answers to the questions: "How much regret [disappointment] would you feel when experiencing the event?" Participants answered the regret or the disappointment question. Participants could answer on a 10-point scale, with endpoints labeled *none* (1) and *very much* (10). Means within rows not sharing a common subscript differ significantly ($p < .05$).

In Study 1 we focused on real-life regret and disappointment. We asked participants to recall an event from their own life in which they experienced intense regret or disappointment. When asked to undo this event by changing any aspect they wanted, participants who had reported a regret event mainly mutated their own actions. However, participants who had reported a disappointment event mainly mutated aspects in the situation. In addition we found that the effects of these mutations on regret and disappointment were mediated by attributional processes.

In Study 2 we focused on emotional reactions to hypothetical events. Participants read a scenario in which a person experiences a negative outcome. The cause of this outcome could in principle be construed as residing in the person's own actions, and/or in aspects of the situation. In accordance with our hypothesis and consistent with Study 1, participants instructed to generate behavior-focused counterfactuals reported more regret than disappointment. Likewise, participants instructed to generate situation-focused counterfactuals reported more disappointment than regret.

In Study 3 we replicated the findings from Study 2 using a different scenario and a design in which the measurement of regret and disappointment was a between-subjects factor. We again found that participants instructed to generate behavior-focused counterfactuals reported more intense regret than disappointment, and that participants instructed to generate situation-focused counterfactuals reported more intense disappointment than regret.

Implications for Norm Theory

The present research extends the ideas about *emotional amplification* proposed in norm theory (Kahneman & Miller, 1986). Most previous research on the influence of counterfactual thinking on emotion has shown that counterfactual thoughts affect the *intensity* of affective reactions to outcomes. The easier it is to generate a counterfactual outcome, the stronger is the affective reaction to the factual outcome. The present research, together with that of Niedenthal *et al.* (1994), shows that counterfactual thinking influences affective reaction not only in this *quantitative* way, but also in a *qualitative* way. The *type* of counterfactual thoughts, that is, their *content* and *focus*, determines which specific emotion is felt.

We are only beginning to understand the role of counterfactual thought in the causation of emotion, and there are still many unresolved questions. For example, a comparison of the present findings with those of Niedenthal *et al.* (1994) reveals that regret and guilt both result from the generation of behavior-focused counterfactuals, thereby suggesting some fundamental similarities between these emotions. However, other researchers, working within an appraisal theory tradition, have shown that guilt and regret are different emotions (see, e.g., Frijda *et al.* 1989; Roseman *et al.*, 1994). The difference between regret and guilt probably lies in the fact that guilt (in contrast with regret) is more related to the violation of social or moral norms, or that guilt is more associated with the perception of harming another person (or, conceivably, a living being).

It might therefore be useful to look not only at what gets mutated (behavior, character, or situation), but also at what gets undone by this mutation (e.g., does a normal behavior get undone, or does a violation of a social or moral norm or the harming of another person get undone?).

Another way in which the present findings contribute to our understanding of the role played by counterfactual thinking in the generation of emotions concerns disappointment. Disappointment was found to be associated with the generation of situation-focused counterfactuals. Levine (1996) has recently suggested that disappointing events can result in sadness or anger, depending on how the event is appraised. In keeping with this we argue that disappointment is likely to be associated with feelings of sadness when the situation-focused counterfactuals concern things that were under no-one's control (e.g., the weather), and with feelings of anger when the situation-focused counterfactuals concern other persons' behaviors.

Implications for Decision Research

Our findings concerning the role of counterfactual thinking seem relevant for decision research as well. Although research on counterfactual thinking initially focused on post-decisional reactions to outcomes or events, some researchers have suggested that counterfactual thinking also influences future decision-making (Boninger, Gleicher, & Strathman, 1994; Gleicher *et al.*, 1995; Miller, 1991; Taylor & Pham, 1996). When making decisions people sometimes run a sort of mental simulation of what might happen before they actually make the decision. In this way decision-makers 'pre-compute the post-computed thoughts' (cf. Miller, 1991). As a result of these thoughts people may anticipate the future regret and disappointment they might feel as a consequence of their decision. This is exactly what is assumed in regret and disappointment theory (Bell, 1982, 1985; Loomes & Sugden, 1982, 1986, 1987). Following the line of reasoning developed in the present paper, we suggest that when decision-makers pre-compute behavior-focused counterfactuals, the possible future regret will be made salient, and regret aversion will be promoted. Likewise, when they pre-compute situation-focused counterfactuals, the possible future disappointment will be made salient, and disappointment aversion will be the result. How might decision-making processes be influenced the generation of these different types of pre-decisional counterfactuals? In our view the pre-computed behavior-focused thoughts and the pre-computed situation-focused thoughts would have different effects on preference and choice.

There is considerable evidence concerning the role of anticipated regret in decision-making. For example, Simonson (1992) asked consumers to imagine the regret they would feel after deciding between two options and then finding out that the *other choice* would have been a better one. Asking consumers to generate these behavioral-focused thoughts made them more likely to purchase an item that would shield them from this possible regret (i.e., a higher-priced, well-known brand), over a potentially better item (a less expensive, but lesser-known brand; see also Richard *et al.* [1996] for similar findings concerning

decisions to engage in safe sex). More recently Zeelenberg *et al.* (1996; Zeelenberg & Beattie, 1997) showed that decision-makers who anticipate post-decisional counterfactual feedback choose to minimize the possible regret that could stem from comparing what is with what might have been. By doing so they made risk-seeking as well as risk-avoiding choices, depending on which choice minimized the possible regret. We therefore predict that people who pre-compute behavior-focused counterfactuals will anticipate future regret, and will consequently choose the regret minimizing-option.

Research on anticipated disappointment is sparse. We predict, however, a relationship between the anticipation of this emotion and risk aversion. If one agrees with Bell's definition of disappointment as a "psychological reaction to an outcome that does not match up to expectations" (Bell, 1985, p. 1), it is clear that risky options have a large potential to create disappointment (see also, van Dijk & van der Pligt, 1997). Safe options are ones that lead to a certain outcome that is known in advance carry no risk of disappointment. One already knows the outcome, and therefore the outcome *is* the expectation (cf. Zeelenberg *et al.*, 1998c). In risky options, by contrast, the outcome can exceed or fall short of the expectation level, and disappointment is therefore possible. We would thus predict that people who pre-compute situation-focused counterfactuals will anticipate this disappointment, and will consequently reduce the amount of risk they are willing to take.

Conclusions

The present research focused on emotional reactions to decision outcomes. The results show that different types of counterfactual thought about how these decision outcomes came about give rise to qualitatively different emotions. Behavior-focused counterfactuals, in which the decision-maker's behavior is mutated, result in feelings of regret, whereas situation-focused counterfactuals, in which things that were not under the decision-maker's control are mutated, result in feelings of disappointment. This extends previous thinking about the role of counterfactual thinking in emotional experiences, where the focus was on emotional amplification. Extending the findings from the present research on counterfactual thinking to that of the "pre-computation" of these thoughts, resulted in testable hypotheses about the effects of this type of thinking, via the anticipation of regret and disappointment, on decision-making. The pre-computation of behavior-focused counterfactuals is hypothesized to result in regret-minimizing choices, while the pre-computation of situation-focused counterfactuals is hypothesized to result in disappointment-minimizing choices.

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