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Effort Invested in Vain: The Impact of Effort on the Intensity of Disappointment and Regret¹

Wilco W. van Dijk,^{2,3} Joop van der Pligt,⁴ and Marcel Zeelenberg⁵

Two scenario studies investigated the impact of the investment of instrumental and noninstrumental effort on the intensity of disappointment and regret. The role of effort was investigated in the context of other determinants of disappointment and regret: the desirability of the outcome, its likelihood, and the perceived responsibility for (not) obtaining the outcome. Study 1 shows that after failure, disappointment is more intense after an investment of higher levels of instrumental effort, whereas regret is more intense an investment of less instrumental effort. Study 2 shows that both disappointment and regret are more intense after an investment of higher levels of noninstrumental effort. Further analyses suggest that the effect of instrumental effort on disappointment is due to a direct effect of the investment of effort. The effect of instrumental effort on disappointment was mediated by the perceived likelihood of attaining the outcome and also related to the perceived desirability of the outcome. The impact of instrumental effort on regret was found to be due to a direct effect of the investment of effort, and to the perceived responsibility for not attaining the outcome. The effect of the investment of noninstrumental effort on the intensity of both disappointment and regret was found to be due to a direct effect of effort. Desirability also affected disappointment (with increased desirability leading to higher levels of disappointment), whereas only regret was affected by perceived responsibility. Implications of these findings for the study of disappointment and regret are discussed.

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People's lives are full of expectations, goals, and desires, such as having great friends, having a terrific job, or perhaps just getting a good grade on an exam. Although people want lots of things, they do not always attain the things they want. Often this results in the experience of negative emotions. Not getting what you want is bad in itself. Sometimes, however, it can even be worse, for example, because you tried extremely hard to attain the desired outcome. Failing an exam is much more painful when you studied very hard for it. The role of effort in the amplification of emotional reactions has been acknowledged in the literature. Wyer and Srull (1989), for instance, state that negative affect is more intense after an investment of effort (in vain). To our knowledge this hypothesized effect of effort has not yet been the subject of empirical investigation. This article is a first attempt to do so. Although we recognize that people generally feel worse after having invested more effort in vain, we argue that conditions of *less* effort also can be associated with more intense negative emotions.

In this article we focus on two negative emotions that are frequently experienced in daily life: disappointment and regret. Whereas disappointment is one of the most frequently experienced emotions after failure on a task (Weiner, Russell, & Lerman, 1979), regret was found to be the most often named negative emotion in everyday language (Shimanoff, 1984). Apart from their negative valence and commonness, there are other similarities between disappointment and regret.

First, both disappointment and regret are considered to be counterfactual emotions (Ortony, Clore, & Collins, 1988; Zeelenberg, van Dijk, van der Pligt, Manstead, van Empelen, & Reinderman, 1998); that is, they both arise from a comparison between "what is" and "what might have been" (Loomes & Sugden, 1984). The difference between disappointment and regret is the *source* of comparison from which they arise. Disappointment is assumed to originate from a comparison between the actual outcome and a prior expectation; regret is assumed to stem from a comparison between the actual outcome and one that might have been had another option been chosen.

Second, both emotions are related to decision making and choice (see Zeelenberg, van Dijk, Manstead, & van der Pligt, in press). This relation was made explicit by Bell (1982, 1985) and by Loomes and Sugden (1982, 1986) in their regret and disappointment theories. Regret theory addresses the possible consequences of the anticipation of regret (see also Zeelenberg, 1999), whereas the possible effects of the anticipation of disappointment are part of disappointment theory (see also van Dijk, 1999). The assumption in both theories is that decision makers anticipate postdecisional emotions and take them into account when making decisions. If people anticipate disappointment and regret, research on the determinants of the intensity of these emotions could be helpful in understanding how these emotions could effect decision processes.

Apart from the similarities between disappointment and regret, there are also clear differences between these two emotions. For example, Zeelenberg, van Dijk, Manstead, and van der Pligt (1998) showed that disappointment and regret could

be regarded as two different discrete emotions. In their study the phenomenology, behaviors, and goals of disappointment were compared with those of regret. The results of this study showed that disappointment and regret differ in their experiential content. It was found that disappointment and regret can be distinguished with respect to the feelings, thoughts, action tendencies, actions, and motivational goals that comprise the two emotions. For example, the experience of disappointment could be differentiated from that of regret in terms of feelings of powerlessness, with the former involving more intense feelings of powerlessness. By contrast, the latter involved more intense feelings that one should have known better.

A number of studies focused on the possible causes of regret and related the intensity of regret to counterfactual thinking and/or attributional processes (e.g., Connolly, Ordóñez, & Coughlan, 1997; Gilovich & Medvec, 1995; Gleicher, Kost, Baker, Strathman, Richman, & Sherman, 1990; Kahneman & Tversky, 1982; Miller & Taylor, 1995; Zeelenberg, van Dijk, & Manstead, 1998; Zeelenberg, van Dijk, van der Pligt, Manstead, van Empelen, & Reinderman, 1998). There is, however, little empirical research on the possible causes of the intensity of felt disappointment after failure. Disappointment has been defined as the displeasure about the nonoccurrence of a desirable expected outcome (Ortony *et al.*, 1988; see also van Dijk, Zeelenberg, & van der Pligt, 1999), or as the psychological reaction to an outcome that does not match up to expectations (Bell, 1985; see also van Dijk & van der Pligt, 1997). The literature tends to focus on two possible determinants of the intensity of disappointment: likelihood and effort. Bell suggested that the *likelihood* of an outcome has an impact on the intensity of disappointment. Positive outcomes that were likely to be obtained give rise to more disappointment when they are not obtained than positive outcomes that were less likely (see also Landman, 1993; Ortony *et al.*, 1988). Van Dijk and van der Pligt (1997) provided empirical evidence for the assumed impact of likelihood on the intensity of disappointment. Another possible determinant of the intensity of disappointment that has been suggested in the literature is the *effort*⁶ invested in obtaining an outcome. More effort invested in obtaining a positive outcome is expected to lead to more disappointment if the desired outcome is not obtained (Ortony *et al.*, 1988).

In this article we focus on the impact of effort on disappointment and compare this with its impact on the intensity of regret. We expect that the effects of effort differ for disappointment and regret. Failing an exam, for example, can be extremely disappointing after having studied very hard for it. However, when you fail an exam and you did not study very hard you could also feel bad, because you regret not having studied harder. As mentioned before, Ortony *et al.* suggest that the investment of effort can intensify *disappointment*. If one fails to achieve something positive after trying hard, disappointment is likely to be more pronounced than if one fails after trying less hard. Why should this be the case?

⁶In the view of these authors effort is intended to include what Heider (1958) called exertion (i.e., physical or mental effort) as well as more materialistic kinds of investment (e.g., financial cost). In the present article we share this view.

First, the investment of *effort itself* might intensify disappointment. If one invests a lot of effort in attaining a desirable outcome and this outcome is not attained, all this effort has been a waste of time or money. The realization that all effort was invested in vain might amplify the disappointment about the nonattainment of the outcome.

Second, in most cases one expends effort because one believes that it increases the *likelihood* of attaining a desirable outcome. Trying hard makes the attainment of a desirable outcome more likely and thereby increase one's expectations. This increase of expectation level might make a failure to attain a desirable outcome worse, and hence amplify disappointment.

Third, the effect of effort on the intensity of disappointment could be due to the *perceived desirability* of the outcome. As Ortony *et al.* (1988) stated, "it is clear that people are likely to invest more effort in order to attain goals that they deem highly desirable than they are in attempting to attain goals that they consider less desirable" (p. 72). Thus, the more effort people invest in attaining an outcome, the more desirable they perceive the outcome. More desirable goals are likely to elicit more disappointment than less desirable goals when the goal is not attained.

Whereas we predict that the intensity of disappointment increases when *more* effort is invested, we predict that regret is likely to be more intense when *less* effort is invested. What seems essential for regret is the reflection on how one could have prevented one's failure. In the case of low-effort investments, it is easy to imagine that trying harder would have led to the attainment of the desirable outcome. The feeling of not having tried hard enough could make people feel more responsible for the nonattainment of a desirable outcome, and this feeling is likely to intensify regret. This is in line with research of Frijda, Kuipers, and Ter Schure (1989), who showed that regret scores high with respect to the appraisal of "self-agency" or perceived responsibility. Roseman, Antoniou, and Jose (1996) also showed that regret is associated with self-agency and self-responsibility. Finally, Zeelenberg, van Dijk, and Manstead (1998) showed that when people feel highly responsible for a negative outcome, this results in amplified regret. In Study 1 we test our hypotheses concerning the effect of investing effort on the intensity of disappointment and regret.

STUDY 1

In Study 1 we varied the amount of effort that was invested in attaining a desirable outcome. First, we expect that disappointment after not attaining the desired outcome will be more intense after having invested more effort. Furthermore, the effect of effort is expected to be mediated by the perceived likelihood of attaining a desirable outcome. The investment of more effort will raise the perceived likelihood

of attaining the (desirable) outcome, which will lead to more disappointment when the outcome is not attained. The effect of effort on the intensity of disappointment is also expected to be partly due to the relation between the investment of effort and the perceived desirability of attaining the outcome. More effort invested will be associated with increased desirability of attaining an outcome. This higher perceived desirability will give rise to more disappointment when the outcome is not attained.

Second, we expect that regret (as opposed to disappointment) is more intense after an investment of less effort in attaining a desirable outcome. This effect is expected to be due to the relation between effort and perceived responsibility. The less effort people invested in obtaining an outcome, the more they are expected to feel responsible for not attaining the outcome.

Method

Seventy-five students at the University of Amsterdam volunteered and were paid 10 Dutch guilders (approximately \$5) for their cooperation. They were randomly assigned to one of three conditions (low effort, medium effort, and high effort). There were 25 participants in each condition. This study was part of a larger paper-and-pencil session. All participants read a story in which a person was confronted with the nonattainment of a desirable outcome (not passing an exam). Participants in the high effort condition read the following story:

Ron is a student at the university and he is doing well. He has to do one more exam this year. Ron has put a great deal of effort in preparing for it and is confident about passing the exam.

In the medium effort condition the words "a great deal of effort" were replaced by "a reasonable amount of effort," and in the low effort condition by "a little amount of effort." After reading the story, participants were asked to rate how desirable the outcome (passing the exam) was for Ron. Second, participants were asked how likely it was that Ron would pass his exam. Next, participants were asked to read the story again and turn the page where the story continues as follows:

One week later Ron receives his score; he scored 5 out of 10 and thus did not pass the exam.
How would Ron feel?

Participants were first asked to give a rating of the general negative feelings that Ron would experience.⁷ Second, participants were asked to rate the

⁷This was done in order to prevent the possibility that participants' judgments about Ron's negative feelings in general would influence the ratings of the more specific emotions of disappointment and regret. When participants first have to rate disappointment, it is possible that their responses reflect not only disappointment but also in part their general negative feelings. This can be related to the part-whole bias (see Kahneman, 1986).

Table I. Means for the Dependent Variables for the Three Conditions in Study 1

Variable	Low	Medium	High	<i>F</i> (2, 72)	<i>p</i>
Negative feelings	5.80 ^a	6.80 ^b	7.52 ^b	6.39	.003
Disappointment	4.96 ^a	7.08 ^b	8.28 ^c	35.37	.000
Regret	7.16 ^a	6.20 ^a	4.48 ^b	11.79	.000
Desirability	6.04 ^a	7.12 ^b	8.48 ^c	20.41	.000
Likelihood	3.72 ^a	6.84 ^b	7.40 ^c	106.58	.000
Responsibility	7.88 ^a	6.56 ^b	5.68 ^c	12.96	.000

Note. All variables were measured on nine-point scales, with end-points of *not at all* (1) and *very much* (9). Means within the same row with a different superscript differ significantly at $p < .05$.

intensity of the more specific emotions: disappointment and regret. Finally, they were asked to rate how responsible Ron would feel about the outcome. All scales were nine-point scales, with a higher score implying a more intense experience of the rated emotions, higher desirability, higher likelihood, or increased responsibility.

Results and Discussion

Table I depicts the mean scores on the dependent variables. A multivariate analysis of variance (MANOVA) with a specific condition (low, medium, or high effort) as the independent variable, and negative feelings, disappointment, regret, desirability, likelihood, and responsibility, as dependent variables showed that there is a multivariate difference between the three conditions, $F(12, 136) = 10.71$, $p < .001$. Univariate tests showed significant differences for all dependent variables (see Table I for the *F* values and accompanying probabilities). Planned comparisons showed that disappointment, likelihood, and desirability ratings were higher when more effort was invested. Overall, ratings for regret and responsibility were lower when more effort was invested; planned comparisons revealed only a marginally significant difference ($p < .10$) for regret between the low effort condition and the medium effort condition.

We hypothesized that the effect of effort on the intensity of disappointment is partly due to an effect of effort on the likelihood of attaining a desirable outcome, and partly to the relation between investing effort and the desirability of the outcome. Furthermore, the effect of effort on regret was hypothesized to be partly due to an effect of effort on the responsibility for not attaining the outcome. As a way to test these hypotheses, a series of regression equations were estimated to test for the possible mediating role of likelihood, desirability, and responsibility. These tests were done separately for disappointment and regret.

The independent variable in these equations was the effort manipulation. The possible mediators were likelihood, desirability, and responsibility. The dependent variable was disappointment or regret after the nonattainment of the desirable outcome. To test for mediation one should first regress the mediator on the independent variable, then regress the dependent variable on the independent variable, and finally regress the dependent variable on both the independent variable and the mediator. Perfect mediation holds when (a) the independent variable affects the mediator in the first equation, (b) the independent variable affects the dependent variable in the second equation, (c) the mediator affects the dependent variable in the third equation, and (d) the independent variable has no effect when the mediator is controlled in the third equation (cf. Baron & Kenny, 1986).

The results of these regression equations are depicted in Figs. 1 and 2. The numerical values in these figures are standardized regression weights. Results of the regression equations confirm our predictions and show that the investment of effort is associated with a higher likelihood of attaining the desirable outcome and with a higher desirability of the outcome. In contrast, the investment of less effort is associated with a higher perceived responsibility for not attaining the desirable outcome. Furthermore, results show that the investment of more effort is associated with more disappointment after controlling for likelihood,

Results concerning disappointment (see Fig. 1) show that (a) the investment of more effort is associated with more disappointment (upper left-hand corner beta weight); (b) a higher likelihood of attaining the outcome is associated with more disappointment; and (c) a higher desirability of attaining the outcome is also associated with more disappointment. Responsibility was not associated with the intensity of disappointment. Furthermore, results show that the investment of more effort is associated with more disappointment after controlling for likelihood,

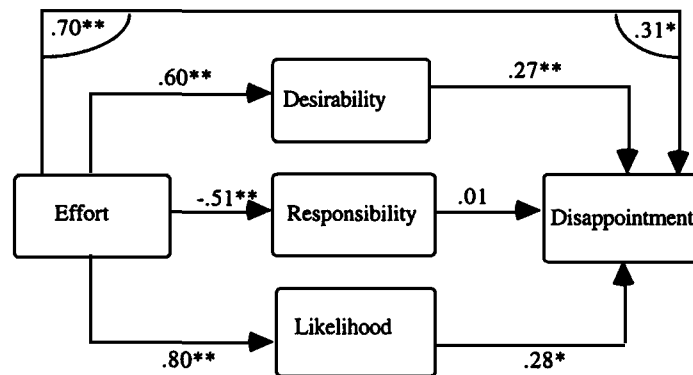


Fig. 1. Effects of instrumental effort on disappointment: the mediating role of likelihood, desirability, and responsibility (* $p < .05$, ** $p < .01$).

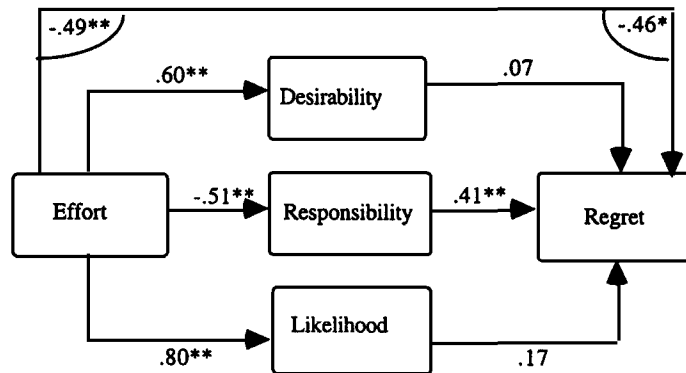


Fig. 2. Effects of instrumental effort on regret: the mediating role of likelihood, desirability, and responsibility (* $p < .05$, ** $p < .01$).

desirability, and responsibility (upper right-hand corner beta weight), although there was a significant decrease in beta weight.⁸

Results concerning regret (see Fig. 2) show that (a) the investment of less effort is associated with more regret (upper left-hand corner beta weight) and (b) more responsibility for the nonattainment of the outcome is associated with more regret. Neither likelihood nor desirability was associated with the intensity of regret. Overall, results show that the investment of less effort is associated with more regret after controlling for likelihood, desirability, and responsibility (upper right-hand corner beta weight).

In sum, results of Study 1 show that disappointment is intensified by the investment of more effort, whereas regret is reduced after having invested more effort. The effect on the intensity of disappointment is partly due to the relation between the investment of effort, and the likelihood and desirability of attaining an outcome. The investment of more effort is associated with a higher likelihood and a higher desirability of attaining the outcome. Although both increased likelihood and desirability were associated with more disappointment after the nonattainment of the outcome, results also show an additional *direct* effect of the investment of effort on the intensity of disappointment. Furthermore, results show that the effect on the intensity of regret is partly due to the relation between the investment of effort and the responsibility for not attaining the outcome. Finally, results show an additional direct effect of the investment of effort on the intensity of regret.

⁸The 95% confidence interval for the direct effect of effort on disappointment (.31) was $.09 < \beta < .50$; when the mediators (.70) were not controlled for the 95% confidence interval was $.56 < \beta < .80$. There is no overlap between the two intervals, which implies that these beta weights differ significantly from each other.

STUDY 2

Effort is not always independent of likelihood. A person often invests effort because he or she believes that the invested effort can change the likelihood of the occurrence of a desirable event. Study 1 showed that more effort invested in preparing for an exam was associated with a higher likelihood of passing the exam. When a student puts a great deal of effort into preparing for an exam, this effort is invested presumably because the student thinks that the likelihood of doing well on the exam will be increased. In these cases that effort is dependent of likelihood; that is, when the investment of effort can change the likelihood of the occurrence of an event, effort can be regarded as *instrumental*.⁹ There are cases, however, in which the investment of effort does not change the likelihood of the occurrence of an event; in these cases effort can be regarded as *noninstrumental*. For example, a person who expects to take a hiking vacation might expend effort in preparing for it without believing that the effort being invested will increase the likelihood of the vacation (e.g., training to get in better shape or buying a new pair of hiking boots). Of course, it may be the case that noninstrumental effort is purposeful. Thus, working out and buying new equipment are noninstrumental in the sense that they do not affect the likelihood of the vacation. They are purposeful in that they may maximize the enjoyment of the vacation in case it becomes reality.¹⁰ Ortony *et al.* (1988) stressed the importance of differentiating between instrumental and noninstrumental effort. They argued that “instrumental effort pertains to plans (actual or possible) for achieving (or avoiding) states, whereas noninstrumental effort pertains to plans (actual or possible) that are related to the state, but are carried out on the assumption that the state will be achieved” (p. 73). In Study 1 the investment of effort can be regarded as instrumental. Putting a great deal of effort in preparing for an exam increases the likelihood of passing the exam. As noted above, results of Study 1 revealed this relationship between effort and likelihood; the investment of extra effort increased the likelihood of attaining the outcome. In Study 2 we focus on the investment of noninstrumental effort. The scenario used in Study 2 describes a woman who has a date. She expends efforts in preparing for this date by buying a new dress and by going to the hairdresser. These efforts are noninstrumental in the sense that they do not increase the likelihood of going on a date, but are carried out on the assumption that the woman will go on a date. This distinction between instrumental and noninstrumental effort is important because we expect that the instrumentality of effort will have an effect on the various relationships tested in the first study.

⁹It should be noted that we see the instrumentality of effort as independent of whether a wanted outcome was obtained or not. In our view what makes effort instrumental or not depends on the relationship with likelihood and not on whether the effort was successful or not.

¹⁰We thank an anonymous reviewer for pointing this out.

Results of Study 1 showed that the investment of instrumental effort increases the intensity of disappointment, but decreases the intensity of regret. However, when the invested effort is noninstrumental we expect that *both* disappointment and regret will be intensified by the investment of more effort. We expect a direct effect of noninstrumental effort on the intensity of disappointment; investing more effort in vain might directly intensify disappointment. Furthermore, we also expect that noninstrumental effort will have a relationship with the desirability of the outcome. More effort invested will be associated with increased desirability. We expect no relationship between the investment of noninstrumental effort and the perceived likelihood of attaining the desirable outcome. In the case of investing noninstrumental effort, we also expect regret to be intensified by investing more effort. Not only will a person who invested a lot of noninstrumental effort feel disappointed, the person will also feel regret about having invested effort (e.g., time or money) in an unsuccessful outcome. Finally, we expect no relationship between the investment of noninstrumental effort and responsibility for the nonattainment of the outcome. Because the investment of noninstrumental effort does not increase the likelihood of attaining a desirable outcome, investing more effort could not have prevented the nonattainment of the desirable outcome.

Method

Fifty students at the University of Amsterdam participated in this study as part of a course requirement. They were randomly assigned to one of the two conditions (effort or no effort). There were 25 participants in both conditions. Participants in the effort condition read the following story:

Friday Susan has a date with a man she really likes. They would meet in a good restaurant, where they would have dinner. After dinner they planned to go somewhere else for a drink. Susan bought something new to wear and she even went to the hairdresser.

In the no effort condition the sentence about “buying something new and going to the hairdresser” was left out. After reading the story, participants were asked to rate how desirable the outcome (going on a date) was for Susan. Second, participants were asked how likely it was that the date would actually take place. Next, the participants were asked to read the story again and turn the page where the story continued as follows:

On Friday evening Susan gets a phone call from her date that he has to cancel the date because he has fallen ill. How would Susan feel?

Dependent measures were identical to Study 1.

Table II. Means Ratings for the Dependent Variables for Both Conditions in Study 2

Variable	Effort	No Effort	<i>F</i> (1, 48)	<i>p</i>
Negative feelings	7.12	6.52	2.02	NS
Disappointment	8.16	7.36	6.97	.011
Regret	4.32	2.84	7.11	.010
Desirability	7.88	7.76	0.18	NS
Likelihood	7.52	7.24	0.47	NS
Responsibility	1.96	1.64	0.89	NS

Note. All variables were measured on nine-point scales, with endpoints *not at all* (1) and *very much* (9).

Results and Discussion

Table II depicts the mean scores on the dependent variables. A MANOVA with a specific condition (effort or no effort) as the independent variable, and negative feelings, disappointment, regret, desirability, likelihood, and responsibility, as dependent variables showed that there is a marginal multivariate difference between the two conditions, $F(6, 43) = 1.88$, $p = .10$. Univariate tests showed that (as predicted) disappointment and regret ratings were higher when effort was invested (see Table II for the F values and accompanying probabilities). Results showed no differences between the two conditions for the ratings of likelihood, which supports our assumption that the investment of effort was noninstrumental. Furthermore, no differences between the two conditions were found for ratings of negative feelings, desirability, and responsibility.

As a way to investigate the different relationships between disappointment and regret and likelihood, desirability, and responsibility, a series of regression equations were conducted. The procedure was similar to that employed in Study 1. Results of these regression equations are depicted in Figs. 3 and 4. The numerical values in these figures are standardized regression weights. Results of the regression equations show that more effort is not associated with a higher likelihood of attaining the desirable outcome, and it is also not associated with a higher desirability of attaining the outcome. Similarly, investing less effort is also not associated with a higher level of responsibility for not attaining the desirable outcome.

Results concerning disappointment after the nonattainment of a desirable outcome (see Fig. 3) show that (a) the investment of more effort is associated with more disappointment (upper left-hand corner beta weight) and (b) a higher desirability of attaining the outcome is associated with more disappointment. Responsibility and likelihood were not related to the intensity of disappointment. Finally, results show that the investment of more effort is associated with more disappointment after controlling for likelihood, desirability, and responsibility (upper right-hand corner beta weight).

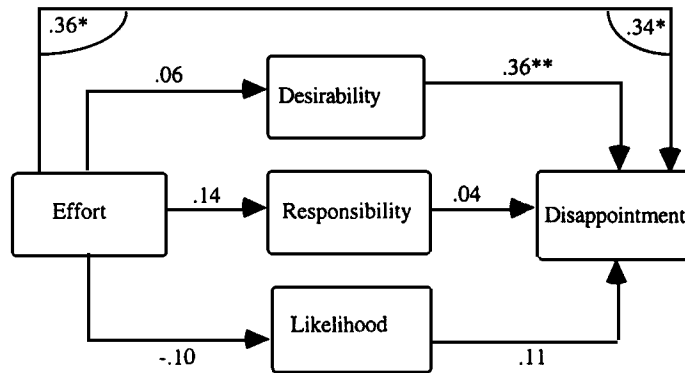


Fig. 3. Effects of noninstrumental effort on disappointment: the mediating role of likelihood, desirability, and responsibility (* $p < .05$, ** $p < .01$).

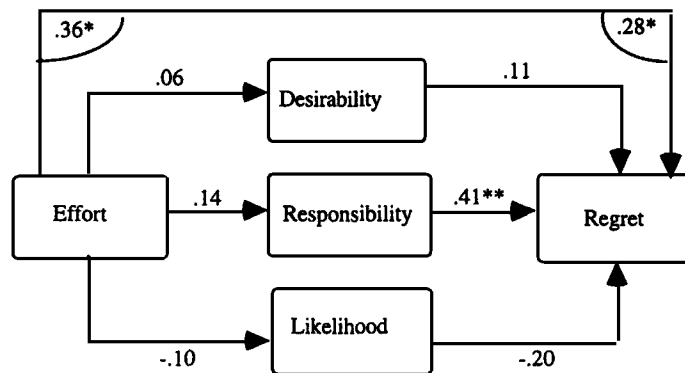


Fig. 4. Effects of noninstrumental effort on regret: the mediating role of likelihood, desirability, and responsibility (* $p < .05$, ** $p < .01$).

Results concerning regret after the nonattainment of a desirable outcome (see Fig. 4) show that (a) the investment of more effort is associated with more regret (upper left-hand corner beta weight) and (b) more responsibility for the nonattainment of the outcome is associated with more regret. Likelihood and desirability were not related to the intensity of regret. As expected, the investment of more effort is associated with increased levels of regret after controlling for likelihood, desirability, and responsibility (upper right-hand corner beta weight).

In sum, results of Study 2 show that both disappointment and regret are intensified by the investment of noninstrumental effort. The effect of the investment of noninstrumental effort is due to a direct effect of effort on the intensity of disappointment. Contrary to our expectations, we found no effect of effort on

desirability. This could be due to a ceiling effect; the means for desirability are very high in both conditions (see also Table II). Results did show that a higher desirability of the outcome intensifies disappointment. Finally, results show that the effect on the intensity of regret is due to a direct effect of the investment of effort. No significant relation was found between the investment of noninstrumental effort and the responsibility for not attaining the outcome, but increased responsibility did intensify regret.

GENERAL DISCUSSION

In this article we reported on two studies that were conducted to investigate the effect of the investment of instrumental and noninstrumental effort on the intensity of disappointment and regret. Study 1 shows that the investment of more instrumental effort in attaining a desirable outcome *intensified* the disappointment experienced after the nonattainment of this outcome, whereas regret is *reduced* when more instrumental effort is invested. Study 2 shows that *both* disappointment and regret are more intense when more noninstrumental effort is invested.

Furthermore, results show that the investing more instrumental effort in attaining a desirable outcome is associated with a higher likelihood of attaining this outcome and with increased desirability of the outcome. Higher expectations about the likelihood of the outcome and its desirability are associated with more disappointment when the outcome is not attained. Furthermore, results show that the investment of instrumental effort has a direct effect on disappointment and regret. More effort is associated with more disappointment and with less regret. Results also show that decreasing instrumental effort is associated with increased responsibility for the negative outcome, which amplifies regret. In the case of disappointment, people could be disappointed because all effort was in vain, whereas people will have less regret because they at least tried.

How should we interpret the relations between (instrumental) effort, likelihood, and desirability? Mostly, one expends effort because one believes that it increases the likelihood of attaining an outcome, and generally this will be the case. The relation between effort and likelihood is straightforward; more effort is associated with increased likelihood. However, the relation between effort and desirability is less clear. The direction of this relation can go either way. First, people are more willing to invest effort to obtain a more desirable goal. Second, people could also value a goal more when they put more effort in reaching that goal. Ortony *et al.* (1988) assumed that investing more effort in obtaining an outcome could raise the desirability of that outcome: "The possibility we are raising here is that the desirability of a goal can increase as a result of the effort expended in the implementation of plans to achieve it" (p. 73). Unfortunately, from the present studies no conclusions can be drawn with respect to the direction of the

relation between the investment of effort and the desirability of attaining the related outcome.

Results concerning noninstrumental effort show that both disappointment and regret are intensified by the investment of effort. The investment of noninstrumental effort had no effect on likelihood, desirability, or responsibility. However, a higher desirability still was associated with more disappointment, whereas more responsibility was associated with more regret. It is not surprising that noninstrumental effort had no effect on the likelihood of attaining the outcome. When effort is noninstrumental, investing more effort is not likely to help obtain the desirable outcome. Thus, people will not feel more responsible for the nonattainment of the outcome because investing more noninstrumental effort does not affect the likelihood of a better outcome.

The present findings are interesting in several ways. First, whereas it has been suggested that investing effort intensifies disappointment (Ortony *et al.*, 1988), no direct empirical evidence supporting this assumption is mentioned in the literature. The present findings provide a first empirical test of this assumption.

Second, our findings show that investing less effort can also amplify emotions; this qualifies Wyer and Srull's (1989) assumption that investing more effort (in vain) is associated with more intense negative effect. Our research shows that both high and low levels of effort can amplify emotional reactions. The effect of effort is dependent on both the instrumentality of the effort invested in vain and the specific emotion under investigation. The findings of the present studies show that investing more instrumental effort intensifies disappointment, whereas investing less instrumental effort intensifies regret. Furthermore, the investment of noninstrumental effort intensifies both disappointment and regret.

Third, the present findings also provide empirical support for another assumption suggested in the literature. Several authors have suggested that the likelihood of attaining a desirable outcome intensifies disappointment when the outcome is not attained (Bell, 1985; Landman, 1993; Ortony *et al.*, 1988). The present findings provide empirical evidence for this assumption and support the findings of van Dijk and van der Pligt (1997). These authors conducted a series of studies in which the likelihood of attaining a desirable outcome was varied. In these studies, participants were presented with lotteries that differed in magnitude and probability of outcomes. Results were comparable with those obtained in the present studies and showed that higher probabilities of attaining a prize lead to more disappointment when the prize is not attained.

Fourth, the present findings also show some interesting differences between disappointment and regret. First, as noted above, investing higher levels of instrumental effort intensifies disappointment and reduces the level of experienced regret. Furthermore, regret was found to be related to perceived responsibility for the outcome. This finding is in line with earlier research (Frijda *et al.*, 1989; Roseman *et al.*, 1996; Zeelenberg, van Dijk, & Manstead, 1988; Zeelenberg, van Dijk, Manstead, & van der Pligt, 1998). Disappointment, in contrast, was found to

have no relation with responsibility.¹¹ Another noticeable difference between disappointment and regret was that disappointment was related to likelihood, whereas regret was not. This is in line with Landman (1993), who argued that the “essential difference [between disappointment and regret] is disappointment’s, and not regret’s dependence on expectations (estimated probabilities)” (p. 47).

Fifth, our findings extend the (attribution) research on the relationships between effort, responsibility, and emotional reactions, first by incorporating the emotion of disappointment, an emotion that received little attention in the present literature. Second, our findings extend the research by making an explicit distinction between instrumental and noninstrumental effort and showing different effects of these kinds of effort on emotional reactions. In the attribution literature most attention is directed at the kind of effort we labeled instrumental, ignoring noninstrumental effort. Third, our findings show that instrumental effort can have a direct effect on regret over and above the effect mediated by perceived responsibility.

In sum, the findings of the present research provide empirical evidence and qualify several assumptions in the literature concerning the impact of effort on disappointment and regret; they also reveal some important differences between disappointment and regret, and extend the research on the relationships between effort, responsibility, and emotional reactions.

In closing, we would like to try to answer the question, Should people invest effort in attaining an outcome or should they not? In the case of *noninstrumental* effort, people who are reluctant to experience disappointment and/or regret should be cautious with investing effort. Investing noninstrumental effort does not have the advantage that it increases the probability of attaining an outcome, but it has the disadvantage of intensifying both disappointment and regret when the desired outcome is not attained. Perhaps these people should only invest noninstrumental effort when the probability of attaining the desired outcome is sufficiently high.

In the case of *instrumental* effort, the answer to the question whether or not to invest effort is more complicated. There are two major advantages in investing instrumental effort. First, investing effort generally increases the probability of attaining the desired outcome and therefore decreases the probability of experiencing disappointment or regret. Second, investing effort decreases the intensity of regret for not trying hard enough. People who are reluctant to experience regret therefore should invest effort. However, the disadvantage of investing effort is that disappointment will be more intense if it turns out that the effort was invested in vain. People who are reluctant to experience disappointment should make a trade-off between the advantage of investing effort (a lower probability of getting

¹¹In other research (Zeelenberg, van Dijk, & Manstead, 1998; Zeelenberg, van Dijk, van der Pligt, Manstead, van Empelen, & Reinderman, 1998), it has been found that disappointment and responsibility are negatively correlated. That is, in these studies less responsibility was associated with more disappointment. The relation between disappointment and responsibility is in our view less clear than the one between regret and responsibility. The correlations between disappointment and responsibility are often low or even absent (also see Ordóñez & Connolly, in press).

disappointed) and the disadvantage of investing effort (the possibility of more intense disappointment).

Of course the question whether to invest effort or not cannot be answered solely by focusing on the disappointment and regret experienced when a wanted outcome is not obtained. By making a decision about investing effort or not, one should take into account the experience of a broader range of emotions. For example, one should take into account the experience of other negative emotions such as shame and guilt. However, one should not focus solely on negative emotions. The experience of positive emotions when a wanted outcome is obtained should also be taken into account. That is, the effect of investing effort (that is not in vain) on the experience of, for example, elation, rejoicing, happiness, and pride should be considered.

We limit our focus here to the experience of the positive emotions of elation and rejoicing because these emotions are, in the literature, often regarded as the positive counterparts of disappointment and regret (Bell, 1982, 1985; Loomes & Sugden, 1982, 1986). Although elation and rejoicing are often treated as the positive counterparts of disappointment and regret, this does not mean that they are influenced by the same factors or influenced to the same extent by a factor as disappointment and regret are. Van Dijk and van der Pligt (1997), for example, showed that the likelihood of obtaining a desirable outcome has a different impact on disappointment and elation. That is, they found that disappointment is largely affected by the likelihood of obtaining a desirable outcome (the more likely obtaining a desirable outcome was, the more disappointed people were when the outcome was not obtained), whereas elation was not or only marginally affected by the likelihood of obtaining a desirable outcome. Although the present research does not give any answers to the question of the effect of effort on positive emotions, one should be very cautious about generalizing the effects of variables on negative emotions to their positive counterparts, even when positive emotions are affected to the same extent by effort as negative emotions. That is, if effort invested in vain leads to a similar increase in negative emotions as does effort that is not invested in vain in positive emotions, the question remains how people make a trade-off between a possible increase in negative emotions or a possible increase in positive emotions. We expect that, for most individuals, in weighing negative and positive anticipated emotions, more weight is put on the negative emotions. This prediction is based on the finding that people are, in general, more influenced by negative information than by positive information (Taylor, 1991), and on Kahneman and Tversky's (1979) conclusion that losses loom larger than gains. Moreover, recent research (e.g., Beattie, Baron, Hershey, & Spranca, 1994; Zeelenberg, Beattie, van der Pligt, & de Vries, 1996) found that whereas decisions are influenced by the anticipation of negative emotions, there was no consistent support for the anticipation of rejoicing as a decision motive. However, the exact question of whether the avoidance of negative emotions has a larger impact on the

decision to invest effort or not than the approach of positive emotions remains an interesting issue for future research.

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