Emotional Hazard and Real Effort in a Power-to-Take Game: An Experimental Study*

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Abstract

This paper experimentally investigates whether agents behave differently if their own earnings are at stake (effort experiment) or a budget that is provided to them like a sort of manna from heaven (no-effort experiment). We use the so-called power-to-take game, employed by Bosman & Van Winden (1999) to study the impact of emotions on economic behavior. Players are randomly divided into pairs consisting of a take authority and responder. Both players in each pair have an endowment. The game consists of two stages. In the first stage, the take authority decides how much of the endowment of the responder that is left after the second stage will be transferred to the take authority (the so-called take rate). In the second stage, the responder can punish the take authority by destroying (part of) his or her endowment. Our main findings are the following: (1) responders destroy more often and a greater amount on aggregate in the no-effort experiment; (2) responders more often choose an intermediate amount of destruction in the no-effort experiment; (3) the behavior of take authorities does not depend on effort; (4) responders expect lower take rates in the no-effort experiment; (5) in addition to the take rate, responders` expectations of the take rate have a significant effect on the probability of punishment in both the effort and no-effort experiment. We explain these results with the help of emotion theory.

1. Introduction

In developed economies, economic surpluses are often generated via the entitlement of managers to the use of a budget. Through the bureaucratization of society in the form of large private and public organizations, budgets have become an important social economic phenomenon. However, recent developments like privatization, the formation of governmental agencies, the downsizing and network organization of private firms, and the upsurge of small businesses, point at a kind of reverse trend where reliance on earnings directly linked to an agent's own past effort plays a more important role.

An interesting question in this context is whether agents, *ceteris paribus*, behave differently if their own earnings (capital) are at stake or a budget that is provided to them like a sort of manna from heaven. Although, according to standard economic theory, past effort should not count as such, the well-known 'anomaly' of the sunk-cost effect (see e.g. Thaler, 1980) suggests that it may affect economic behavior. Motivational factors not accounted for in the standard theory – like emotions – seem to be important in this respect. In fact, Schumpeter alluded to this, in a broader and much more dramatic sense, in his magnificent work *Capitalism, Socialism, and Democracy* when he argued that substituting salaried managers and absentee owners for owner-entrepreneurs would profoundly affect a capitalist economy by taking "the life out of the idea of property" (Schumpeter, 1947, p. 142). In contrast with owner-entrepreneurs, the mere holder of a title "loses the will to fight, economically, physically, politically, for 'his' factory and his control over it, to die if necessary on its steps" (ibid.). Clearly, Schumpeter was referring to *emotional attachment* as a distinguishing factor. In recent years, the role of emotions in human decision making has attracted growing attention in economics (Frank, 1988; Elster, 1996, 1998; Loewenstein, 1996). It is more and more acknowledged that emotions are an important factor for understanding – and modeling – economic behavior (Loewenstein, 2000).

In this paper, we want to study experimentally whether it makes a difference if a budget is at stake or one's own earnings, and the role of emotions. As our vehicle of research we use the so-called power-to-take game employed by Bosman & van Winden (1999) to investigate the behavioral impact of emotions. In this game one subject can be considered as the 'take authority' (with endowment E_{take}) who is paired to another subject, the 'responder' (with endowment E_{resp}). The game consists of two stages. In the first stage, the randomly chosen take authority decides on the so-called take rate $t \in [0,1]$, which is the part of the responder's endowment after the second stage that will be transferred to the take authority. In the second stage, the responder can decide to destroy a part d of E_{resp}, with $d \in [0,1]$. For the take authority the payoff of the game is thus equal to the transfer $t(1-d)E_{resp}$, generating total earnings out of the experiment of $E_{take} + t(1-d)E_{resp}$. For the responder, the payoff equals $(1-t)(1-d)E_{resp}$, which also determines her or his total earnings. In their experimental study, Bosman & van Winden (BvW) had subjects earn their own endowment through a computerized individual real effort task, before they had to play (and got informed about) the game. The effort task was set up such that (practically) all subjects ended up with the same earnings from performing the task, so that $E_{resp}=E_{take}$

held in the ensuing game. This was to avoid equity considerations triggered by an inequality in the endowments subjects started out with. Interestingly, BvW found that behavior of the responder is discontinuous: They typically destroy nothing or everything. Furthermore, they found that negative emotions (particularly, irritation and contempt) drive punishment behavior (destruction), and that the difference between the actual and expected take rate determines the probability of punishment. The average take rate turned out to be almost 60% (the modal rate was 70%).

The main question to be addressed in this paper is whether behavior in the power-to-take game will change if endowments are simply provided to the players like manna from heaven, instead of being based on own earned income. The power-to-take game is an appealing game in this perspective, because of its simplicity and economic relevance. It captures an important aspect of taxation. For example, the take authority can be regarded as a government that by means of taxation may want to appropriate part of the endowment, or economic value that it can produce, of a private agent (the responder). The agent may retaliate by destroying part of the endowment (Aumann & Kurz, 1977).[1] Destruction triggered by emotions would entail a new source of efficiency cost, which could be dubbed *emotional hazard*. Now, would it matter if the private agent's own income or capital is at stake or 'just' a budget provided by someone else? Another example concerns the wider issue of principal-agent relationships. The principal can be seen as the take authority who decides on the incentive scheme for the agent (the responder). The scheme involves a claim on the value product that can be generated by the working capital that the agent has at her or his disposal. If offended by the scheme, the agent may feel emotionally urged to punish the principal by producing less value, which is also costly for the agent when it conflicts with the material incentives provided by the scheme (another case of emotional hazard).[2] The question that we are here interested in is whether it would matter if the working capital is provided in terms of a budget or, instead, directly determined by the agent's own past effort. As a final example of the economic relevance of the power-to-take game, we refer to monopolistic pricing. The price selected by the firm entails a claim on the consumer surplus. If the buyer feels that the price is outrageous, an emotional response may induce the buyer to punish the firm by buying less than the rational 'text book' buyer would do (see Okun, 1981; Kahneman et al., 1986). Would it make a difference here if the buyer had to make an effort (like searching) for finding out about this opportunity to reap a consumer surplus, or not?

Because of the novelty of the power-to-take game, there exist no studies that are directly related to the research question we are interested in. However, there are some studies showing the (potential) importance of expenditure of effort for bargaining outcomes. Most of these studies focus on

[1] In case of taxation, the agent may also retaliate by investing less effort to generate income or by shifting to the shadow economy. In the effort experiment such form of retaliation is not possible because players only learn about the power-to-take game after they have completed the effort task (see also section 2 where we discuss the experimental design in more detail).

[2] A reason for contracts to be accepted at first, but retaliated against once operational, is that agents "tend to underestimate the impact of future visceral factors on their own behavior " (Loewenstein, 2000, p. 429). There is also experimental evidence for this type of behavior; see Fehr & Gächter (2000). In the studies surveyed by Fehr & Gächter agents simply choose a (costly) effort level without doing any real effort. Since we are interested in the role of real effort, we do not further

the role of entitlements (property rights), which are either obtained by chance or by doing some form of effort (e.g., a competitive quiz). Bargaining outcomes appear to depend on the way entitlements are acquired (Burrows & Loomes, 1994; Frey & Bohnet, 1995; Hoffman & Spitzer, 1985; for early studies in psychology see, e.g., Mikula, 1972, or Mikula & Uray, 1973). For example, Hoffman et al. (1994, 1996) confirm the importance of earned entitlements in dictator and ultimatum games, where the amount offered decreases if the role of dictator or proposer is 'earned' in a competitive quiz instead of being assigned randomly. Interestingly, rejection rates in the ultimatum game remain virtually the same under both conditions. Apparently, proposers (mistakenly) assume that responders are satisfied with less when proposers are entitled. Typically, the results of these studies are in line with equity theory (Pritchard, 1969, Walster et. al., 1973), that is, outcomes tend to be proportionally related to the input (effort) of the subjects involved. Fahr and Irlenbusch (2000), for instance, study the role of entitlements in a trust game (similar to the investment game of Berg et. al., 1995). In one treatment the trustor is entitled to his endowment by cracking walnuts whereas the trustee does not have to work. In the second treatment only the trustee has to crack walnuts, which entitles the trustee to a triple of the amount sent by the trustor. In the third treatment both the trustor and the trustee have to crack walnuts so that none of them is entitled more than the other. Fahr and Irlenbusch find that the induced entitlement has a strong influence on behavior that is in line with the predictions of equity theory.

In contrast with the aforementioned studies, this paper focuses on the way that endowments – rather than entitlements to a specific role – are obtained. Subjects *either* do not have to work for their endowment *or* have to make the same amount of real effort to obtain their endowment, prior to the power-to-take game, whereas the roles of take authority and responder in the game are assigned by chance. Consequently, for our study, equity theory would predict the same outcome under both conditions.

The organization of the paper is as follows. In section 2 we discuss the research questions and present our experimental design. Results are given in section 3, while section 4 follows with a discussion. Section 5 concludes.

2. Research questions and experimental design

Research questions

Before subjects played the power-to-take game in the BvW experiment (and received instructions about it), they first had to earn their endowment E_i by doing an individual real effort task on the computer.[3] This task was set up such that (almost) all earned an equally sized endowment. In the no-

discuss this line of work.

[3] The task was an individual two-variable optimization task that lasted for 30 minutes. It consisted of 10 periods, where in each period subjects had to search for a maximum value. This maximum, which varies over the periods, can be imagined as the top of a mountain. The payoff for a period is related to the position on the mountain at the end of the period, with a

effort experiment both the take authority and responder are simply given this endowment, without having to do any effort for it. Our first research question is whether the behavior of responders and take authorities is influenced by (sunk) effort. A second research question, which becomes particularly interesting if a difference in behavior is observed, deals with the impact of responders' emotions on their behavior. From a psychological point of view, the degree of "ego-involvement" becomes higher when responders have to do real effort. There appear to be two opposing ways in which more ego-involvement , implying a stronger concern (interest), may influence a responder's decision. On the one hand, it makes responders more emotional when something is taken away from them, enhancing the propensity to destroy (Lazarus, 1991). On the other hand, more ego-involvement makes responders feel more attached to their endowment which, psychologically, makes it more costly to destroy one's endowment. Theoretically, it is hard to predict which effect will dominate. The experiment should be informative in this respect. Furthermore, since the effects of ego-involvement on responder behavior are ambiguous, it is also hard to predict how take authorities will react to real effort. Possibly, they see responders as rational persons who ignore sunk costs completely. If so, take rates should be the same in the effort and no-effort experiment. However, if take authorities anticipate that more ego-involvement through effort raises responders' propensity to destroy, one would expect them to demand lower take rates in the effort experiment than in the no-effort experiment. If take authorities expect the stronger psychological attachment to prevail and, consequently, a lower propensity to destroy, it should be the other way round. Finally, we will investigate whether effort influences responders' expectations of the take rate, and the consequences thereof. Psychological studies (e.g. van Dijk et al., 2000) suggest that greater ego-involvement may affect people's expectations as a way of emotional self-protection. In the case at hand, this should then show up in a higher expected take rate in the effort experiment.

Experimental Design

The no-effort experiment was set up exactly as the effort experiment of BvW, except that endowments were not earned first but were directly given to subjects before they received instructions of the power-to-take game (a translation of the instructions is provided in the appendix). In total 80 subjects, almost all undergraduate students from the University of Amsterdam and the University of Innsbruck, participated in the experiment. Half of the experimental sessions were run in Innsbruck (Austria) in November 1999 and the other half in Amsterdam (The Netherlands) in January 2000. About 60% of the subjects were students of economics. The other 40% were students from various fields such as chemistry, mathematics, law, and psychology. The game was framed as neutral as possible, avoiding any suggestive terms like take authority. Subjects received a show-up fee of 15 Dutch guilders/90 Austrian Schillings (approximately 7.5 U.S. dollars), independent of their earnings in the experiment,

maximum of 1 guilder and 50 cent. The task was set up such that most subjects were able to find the maximum value within the time limit of three minutes

and the same amount as endowment.[4] On average, subjects were paid out 28 guilders in total. The whole experiment took about one hour and 15 minutes.

Before subjects played the one-shot power-to-take game, they were randomly divided into two groups. One group was referred to as participants A (the take authorities) and the other as participants B (the responders).[5] Subsequently, random pairs of a responder and a take authority were formed by letting take authorities draw a coded envelope from a box. The envelope contained a form on which the endowment of both participant A and participant B was stated (a specimen of this form can be found in the appendix). The take authorities then had to fill in a take rate and put the form back in the envelope again. After the envelopes were collected, we asked the take authorities to report their emotions as well as their expectation of what the responder would do. The envelopes were brought to the matched responders who filled in the part of their endowments to be destroyed. The envelopes containing the forms were then returned to the take authorities for their information. Immediately afterwards, we asked subjects to fill out a questionnaire with, for the responders, questions concerning their expectation of the take rate and the emotions they experienced when they learned about the decision of the take authority, and, for all subjects, questions regarding their motivations and social background.[6] When subjects completed these questionnaires, the envelopes were again collected and brought to the cashier, who paid out the subjects in private. It is noted that the experimenters were not able to see what decisions subjects made in the take game and how much they earned. Subjects were privately paid outside the laboratory by the cashier who was not present during the experiment. We have chosen for this 'double blind' procedure in order to minimize any possible distortions of subject behavior due to experimenter observation.[7]

Emotions were measured in the following way. We used a list of eleven emotion names and asked subjects to report the experienced intensity of each emotion on a 7-point scale, ranging from "no emotion at all" to "high intensity of the emotion". The list included the following emotions: Irritation, anger, contempt, envy, jealousy, sadness, joy, happiness, shame, fear, and surprise. Note that the list not only includes the (negative) emotions that one may expect to be particularly relevant for the

[4] This show-up fee is the same as in the experiment of BvW.

[5] All subjects completed two individual exercises (to check their understanding of the procedures) before they played the power-to-take game.

[6] We trust that the information provided by these questionnaires is reliable. Psychologists claim that "subjects have no special reason to disguise their true preferences" (Kahneman & Tversky, 1979). Another concern that readers may have is the lack of financial incentives for reporting expectations truthfully. There is, however, evidence that providing financial incentives for probability estimates does not change the data much: " When one examines subjects' choices and decisions the observed effects of financial incentives were with one exception not dramatic. Subjects with financial incentives appeared to perform somewhat better than their counterparts without such incentives, but the differences were not great, were generally not statistically significant and did not hold in every case" (Grether, 1992, p.54). We will return to these issues later on in the text.

[7] In our take game, for example, subjects may be concerned about being judged as greedy or vengeful by the experimenter. Bolton & Zwick (1995) tested whether a double blind procedure affects behavior in an ultimatum game and concluded that "the small distortion of subject behavior that may be attributed to experimenter observation is not decisive in the sense that the basic character of the data is unchanged when the distortion is filtered out" (p. 113-4). Hoffman et al. (1994), on the contrary, found that in a dictator game double blindness does matter, leading to more greedy behavior of the dictator.

responders in our setting. Both positive and negative emotions are included, in order to avoid that subjects are 'pushed' in a particular direction.

3. Results

In this section we investigate whether, and if so, how effort influences behavior, experienced emotions, and expectations in the power-to-take game. Results concerning the effort experiment are taken from BvW. Furthermore, in the analysis that follows, the Amsterdam and Innsbruck data are pooled, since we found no significant differences in behavior.[8]

Behavior

A summary of individual data is given in table 1 ("effort") and table 2 ("no-effort). Our first result deals with the behavior of the take authorities.

[TABLES 1 & 2]

RESULT 1: *Take rates do not differ between "effort" and "no-effort".*

Support. Using a Mann-Whitney and Kolmogorov-Smirnov test, the hypothesis that the take rates are drawn from the same distribution cannot be rejected at $p<0.05$. On average, the take rate with effort is 58.5% and without effort 59.9%.

We now turn to the responders. Responders in the effort experiment destroyed on aggregate 18.7% of their endowment whereas responders in the no-effort experiment destroyed on aggregate 24.7%. Moreover, with effort responders typically destroyed everything or nothing, in contrast with the no-effort experiment. This brings us to the second result.

RESULT 2: *Without effort, responders destroy more often, in particular an intermediate amount.*

Support. Using a Pearson Chi square test for table 3, the hypothesis that the proportion of responders who destroy everything, part, or nothing of their endowment is the same under "effort" and "no-effort" is rejected ($p=0.029$; two-sided).

[TABLE 3]

[8] Using a Mann-Whitney and Kolmogorov-Smirnov test, the hypothesis that the take rates (destruction rates) are drawn from the same distribution cannot be rejected at $p<0.05$. In addition, the hypothesis that the proportion of responders who destroy everything, part, or nothing of their endowment is the same in Amsterdam and Innsbruck cannot be rejected (Fisher exact test; $p=0.159$, two-tailed).

Although the proportion of responders who destroyed everything is more or less the same in both experiments, the number of responders who destroyed part of their endowment is higher in the no-effort experiment. Note, however, that the behavior of take authorities does not depend on whether endowments are earned with effort or not.

Experienced emotions

Intensity score measures concerning the emotions experienced by the responders are presented in table 4 ("effort") and 5 ("no-effort").[9] The data show that both responders who destroyed and those who did not destroy experienced a variety of emotions. Especially, negative emotions, such as anger, contempt, irritation, and envy obtain a relatively high score. If we look at the overall differences in reported emotion (without considering the take rate) between "effort" and "no-effort", it turns out that responders who destroyed in the effort experiment experienced significantly more irritation than responders who destroyed in the no-effort experiment (Mann-Whitney test, $p<0.05$).[10] Since take rates do not differ between "effort" and "no-effort", this is a first indication that effort makes (some) responders more emotional. No difference in reported emotion is found for responders who destroyed nothing.[11] We will now investigate how emotions are related to the amount taken, how emotions influence the responder's decision, and how these matters relate to effort.

[TABLES 4 & 5]

RESULT 3: *The intensity of negative (positive) emotions experienced by the responder is positively (negatively) related to the take rate. This result holds for both "effort" and "no-effort".*

Support. We have estimated an ordered logit model for each emotion separately. The dependent variable is the intensity of an emotion and the explanatory variable the take rate. Significant results with the expected sign are found for irritation, contempt, sadness, happiness, and joy ($p<0.05$). In the no-effort experiment significant results are also found for anger.

Concerning the relation between the intensity of emotion and the amount destroyed the following results are obtained.

[9] Although the behavior of take authorities is the same in the effort and no-effort experiment, the effect of effort on their experienced emotions cannot be determined because there is no data on these emotions in the effort experiment. We, therefore, do not discuss the reported emotions of the take authorities in the no-effort experiment.

[10] Note that anger and irritation are strongly correlated (the Spearman rank-order correlation coefficient for the effort experiment is 0.71 and for the no-effort experiment 0.49). This suggests that anger and irritation refer to the same underlying emotion.

[11] If we look at all responders, there is no significant difference in reported emotion between the effort and no-effort experiment. At the 10% significance level, responders in the effort experiment reported more envy and fear.

RESULT 4: W*ith effort, the probability of destruction (1=destroy part or everything; 0=otherwise) depends positively on the intensity of irritation and contempt. Without effort, the probability of destruction depends positively on the intensity of anger and contempt, and negatively on the intensity of happiness and joy.*

Support. As used for the effort experiment by BvW, we have estimated a binary logit model for each emotion separately, with the probability to destroy as dependent variable. Significant results are obtained for the above mentioned emotions ($p<0.01$).

Result 4 shows that similar negative emotions drive destruction behavior in the effort and no-effort experiment. The intensity of positive emotions, on the other hand, only appears to be relevant for destruction when no effort has been expended by the responder. As a corollary of the previous two results, we test next whether there is also a relation between the amount taken and destruction.

RESULT 5: *The probability of destroying income is positively related to the take rate but also depends on effort.*

Support. Using again a binary logit model, we find that the estimated coefficients (0.14 for "effort" and 0.05 for "no-effort") and constants (-11.29 and -3.41, respectively) are significant at the 5% level. Furthermore, if we take the observations of the effort and no-effort experiment together, the model that includes effort as a dummy variable performs significantly better than the model without this dummy (Likelihood ratio test; $p=0.0517$).

For illustration, the logit functions of result 5 are depicted in figure 1. The figure shows that the estimated probability of destruction in case of "no-effort" is clearly higher than in case of "effort" at low and moderate take rates. As can be read from table 1, in the no-effort experiment there are responders who already destroy everything at a relatively moderate take rate of 60%. In the effort experiment a more step-wise relationship is obtained, with a strong increase in the probability of destruction for take rates between 60 and 80 percent.

[FIGURE 1]

The following result on experienced emotions deals with those responders who destroyed either everything or only part of their endowment. It provides a further piece of evidence that the intensity of experienced negative emotions matters for destruction.

RESULT 6: *Responders who destroy everything experienced more irritation from learning about the take rate than responders who destroy only a part.*

Support. A Mann-Whitney test rejects the hypothesis that reported irritation is drawn from the same distribution ($p<0.05$).

Expectations

Figures 2 and 3 provide information about responders' expectations of the take rate and the actual rates chosen by the take authorities.[12] Before we investigate the role of expectations, we first check whether expectations of the take rate are correlated with the actual take rate. Because expectations were assessed after responders were informed about the take rate, it is possible that those who were too optimistic (or pessimistic) find it hard to admit that they were wrong. These responders may have been inclined to present themselves as realistic (i.e. as having had more or less correct expectations). If such a bias exists, then there would be a correlation between the take rate and expected take rate. However, using the Spearman rank-order coefficient, it turns out that this correlation is very low (0.04) and not significant ($p=0.83$). We conclude, therefore, that in this respect there is no systematic bias in the reported expectations of the take rate.[13]

From figures 2 and 3 one can see that for most responders expectations were not consistent with the actual take rate. Dots above the 45° line indicate that responders were too optimistic, that is, the expected take rate turned out to be lower than the actual rate. Dots below the 45° line indicate that responders were too pessimistic. Moreover, the figures suggest that expectations are not the same in the effort and no-effort experiment. The following result bears this out.

[FIGURE 2 & 3]

RESULT 7: *Responders in the effort experiment expect lower take rates than responders in the no-effort experiment.*

[12] A proportion of responders (8 out of 40) explicitly reported not to have any expectation. Some responders reported an interval rather than a unique number. In the analysis we have used the median of this interval as the reported expectation. In the analysis we will not go into the expectations of the take authorities. The reason is that a direct comparison of the expectations of take authorities under "effort" and "no-effort" is somewhat complicated by the fact that under "effort" subjects were asked to assign a probability to an interval of possible destruction rates (quartiles) whereas under "no-effort" they had to select a single rate. As it turned out, under "effort" the mean probability of destruction reported by the take authorities was in the interval [0%, 25%] 67.5% (and the next three intervals, respectively, 9%, 6%, and 10%). Under "no-effort" the mean of the expected destruction rate was 15.3%. We conclude that the reported information under "effort" and "no-effort" appears to be consistent and does not suggest that take authorities' expectations depend on effort.

[13] The responders' expectation of the take rate as well as the take authorities' expectation of how much responders will destroy of their endowment does not differ between Amsterdam and Innsbruck (a Mann-Whitney and Kolmogorov-Smirnov test shows no significance at $p<0.05$).

Support. Using a Mann-Whitney test, the hypothesis that the expected take rates of responders are drawn from the same distribution is rejected ($p<0.01$, two-tailed). A Kolmogorov-Smirnov test gives further support that responders' expectations are not drawn from the same distribution ($p<0.05$).

The average expected take rate with effort is 66% and without effort 48%. Since the actual mean take rate with and without effort is about 60%, responders in the effort experiment are (on average) too pessimistic whereas responders in the no-effort experiment are (on average) too optimistic. More ego-involvement thus appears to make responders more pessimistic. In our concluding discussion in the next section, we will come back to this result. We will now look at the relation between expectation, emotion, and (destruction) behavior.

RESULT 8: *In the effort experiment, responder's expectation of the take rate has a significant effect on the probability of destroying the earned endowment, but not on the intensity of experienced emotions. In the no-effort experiment, responder's expectation of the take rate has a significant effect on the probability of destroying (part of) the endowment and on the intensity of experienced emotions (anger, contempt, and joy).*[14]

Support. To investigate whether expectations influence the intensity of experienced emotion, BvW compared each model of result 3 with a model that includes both the take rate and the responder's expectation of this rate. Somewhat surprisingly, it appears that expectations have no predictive value for the intensity of experienced (negative or positive) emotions in the effort experiment. Using the same extended model for the no-effort experiment, it turns out that the expected take rate is negatively related to anger and contempt and positively to joy. In the next section we offer an explanation for these results. To analyze whether expectations influence behavior, we estimated (as in BvW) a logit model with "Destroy" as the dependent variable (equal to 1 if a responder destroyed income, and zero otherwise), and the take rate and expected take rate as independent variables. For this model the number of observations is smaller than the full sample, because we have only included those responders who explicitly reported an expectation. The regression results show that the model including expectations is significantly better than model which does not include expectations, both for "effort" and "no-effort" (likelihood ratio test, $p<0.05$). However, there is a difference in the estimated coefficients for the take rate and expected take rate. The hypothesis that the estimated coefficients are the same is rejected ($p=0.03$) for "no-effort", but not rejected for "effort" (the coefficients for "effort" are 0.17, while the coefficients for "no-effort" are 0.06 for the take rate and –0.04 for the expected rate). This difference in estimated coefficients suggests that when responders have 'realistic'

[14] In figure 3, the proportion of optimistic responders that destroy is significantly different from the proportion of realistic/pessimistic responders that destroy (Pearson chi square, $p=0.045$).

expectations (i.e. an expected take rate equal to the actual take rate), the marginal effect of the take rate on the probability of destruction is higher in case of no-effort.

We have also investigated whether behavior or experienced emotions in the no-effort experiment are influenced by gender, educational background (economics or not), or experience in economic experiments. Like in the effort experiment, none of these factors turn out to have an effect on behavior or emotions.

4. Discussion

Our results show that responders behave differently in the power-to-take game if their own earnings are at stake (effort-experiment) compared to the situation where they have a budget at their disposal which required no effort (no-effort-experiment). Whereas the take rates selected by the take authorities are not affected, in case of no-effort, responders destroy more often and a greater amount on aggregate, while they also choose more frequently an intermediate rate of destruction. Moreover, although expectations and emotions appear to play a qualitatively similar role in their decision to destroy, we found evidence of differences between the two experiments in the emotional experience of responders as well as in the expectations they had regarding the take rate. How to explain and link up these results?

As our starting point, we take the argument presented in section 2 that ego-involvement (and therefore the individual concern or interest) is stronger if the product of own effort is at stake. This induces two opposing forces (cross-pressure) on a responder confronted with a positive take rate. On the one hand, it makes responders more emotional, which enhances the propensity to retaliate with destruction (Lazarus, 1991). However, greater ego-involvement may also lead to a stronger emotional attachment to an endowment (see the Introduction), which makes it psychologically more costly to destroy. This ambiguity may help explain why the behavior of the take authorities is similar in the two experiments. An additional and more basic reason for the behavior of take authorities is the empirical observation that people underestimate the influences of visceral factors in a state they are not currently in themselves ("hot-cold empathy gaps"; see Loewenstein, 2000).

Greater ego-involvement when own earnings are at stake also explains why responders expected higher take rates in the effort-experiment. In fact, with effort responders on average were too pessimistic whereas without effort they were too optimistic. Psychological studies show that the anticipation of aversion arousing events may lead to preparatory behavior (like bracing oneself; see Frijda, 1986, p. 292). In the same vein it appears that people lower their expectations (i.e. become less optimistic/more pessimistic) when something becomes more self-relevant, and in this way avoid negative emotions (van Dijk et al., 2000). In this light, expecting a substantial take rate can be seen as a form of *emotional hedging*, to protect oneself. Since the emotional impact of a particular take rate

will be stronger if more is at stake psychologically, higher expected take rates in the effort-experiment can be explained in this way.[15] Following this line of thinking, one would furthermore expect that, given the actual take rate, the expected take rate has a negative effect on the intensity of (at least some) experienced negative emotions. This is indeed observed in the no-effort experiment, but, surprisingly, not in the effort-experiment. One reason for this lack of evidence in the effort experiment may be that the expected take rate has an asymmetric effect on emotional intensity, since responders turned out to be too pessimistic (on average) in the effort experiment and too optimistic in the no-effort experiment. Given the relatively few responders that appeared to be too optimistic in the effort experiment, its negative effect is then difficult to measure. An alternative, or additional, explanation would be a declining marginal effect of the expected take rate on emotional intensity in combination with the substantially higher expected rates in the effort-experiment (cf. figures 2 and 3).

We now turn to our major finding that responders in the no-effort experiment not only destroy more frequently but also more often select an intermediate rate of destruction. Our statistical analysis indicates that in both the effort and no-effort experiment the actual and expected take rates have a similar (respectively, positive and negative) effect on the propensity to destroy. This effect is mediated by the influence of these rates on experienced negative emotions (where the expected take rates as such are already influenced by anticipated negative emotions, as argued above). Thus, given the observation that the distribution of actual take rates is the same in both experiments and the relatively lower (too optimistic) expected take rates in the no-effort experiment, we can explain the higher frequency of destruction in case of "no-effort". To explain, finally, why there is more intermediate destruction in the no-effort experiment, note first that a responder must deal with two conflicting urges when the take rate is positive: the emotional satisfaction of retaliation versus the satisfaction of monetary gain. Next, recall our finding that those responders who destroyed everything show a higher negative emotional intensity (irritation) than those who destroyed a part. Note, furthermore, that in case of "no-effort" the psychological cost of destruction is smaller than in case of "effort". Now, psychologists claim that at higher intensities, visceral urges progressively seize command over behavior, instead of being compromised with what is best to do based on a cognitive analysis of the consequences (e.g., Loewenstein, 2000, p. 428). Lower intensities would allow of a compromise between these conflicting intrapersonal urges. In the effort experiment such a compromise at low emotional intensity does not occur because of the relatively large psychological cost of destruction. In the no-effort experiment, however, the psychological cost of destruction is smaller and this may explain the observed intermediate rate of destruction at lower emotional intensity.

[15] It would also help explain the finding of (overall) no clear differences in the intensity of emotions experienced by responders once they were informed about the actual take rate.

5. Conclusion

In the introduction we discussed several applications of the power-to-take game concerning taxation, principal-agent relationships, and monopoly pricing. The research question we raised was whether the reaction of a tax payer, agent, or consumer to an (implicit) claim by, respectively, a tax authority, principal, or monopolistic firm would be different if the result of own effort by the former were at stake or not. Our experimental results from the power-to-take game suggest an affirmative answer. To establish the precise consequences for these institutionally richer economic environments becomes an interesting issue for future work. What are, for example, the efficiency costs of emotional hazard in these different settings? Would it be possible to manipulate the expectation of the responder such that the probability of retaliation decreases? And would experience (via repeated play) or more information (about selected take rates) matter? At this stage we do not know the answers. Note, for instance, that the relevant expectations may be determined by relatively stable moral standards of behavior.[16] Furthermore, the behavioral sensitivity to deviations from these expectations may change with more experience or information. Regarding the manipulation of expectations one should also take into account the possibility that responders become even more emotional when they find out that they are being manipulated. Other interesting issues for future research concern the possibility of cooling off (by delaying the decision to be taken) and delegation (having someone else decide). Again, it is unclear as yet how these issues would work out. Delaying a decision does not necessarily mean that emotions will not play a role once the decision has to be made, since similar concerns can be expected to be at stake. In case of delegation, on the one hand, the concerns (and implied emotions) of the agent to whom the decision is delayed start to play a role and, on the other hand, the emotional reaction of the delegator to the decision taken (which may not be accepted ex post, for instance). A lot of work remains to be done, but hopefully these experiments have shown that by investigating emotions in a controlled environment we may get a better picture of the different and often delicate ways they shape our decisions.

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[16] There is evidence (referred to by BvW on p. 12) from an empirical study on fairness in the market place by Kahneman et al. (1986) that expectations are closely related to norms: "(…) the gap between the behavior that people consider fair and the behavior they expect in the marketplace tends to be rather small (p. 731)".

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Table 1

Summary of individual data of effort experiment

Case (#)	Y_{take}	Y_{resp}	t (%)	d (%)	Case (#)	Y_{take}	Y_{resp}	t (%)	d (%)
1	15	15	0	0	21	15	15	70	0
2	15	15	0	0	22	15	15	70	0
3	15	12	0	0	23	15	15	70	0
4	15	13.5	25	0	24	15	13.5	70	30
5	15	15	30	0	25	15	15	70	0
6	15	15	30	0	26	15	15	70	0
7	15	15	30	0	27	15	15	70	0
8	15	15	35	0	28	15	15	70	100
9	15	15	40	0	29	15	15	70	100
10	15	15	50	0	30	15	15	70	0
11	15	15	50	0	31	15	15	70	0
12	15	15	50	0	32	15	15	75	100
13	15	15	50	0	33	15	15	75	0
14	15	13.5	60	0	34	15	15	80	0
15	15	15	65	0	35	15	9	80	99
16	15	15	65	0	36	15	13.5	80	100
17	15	15	65	0	37	15	15	90	100
18	15	15	65	0	38	15	15	90	0
19	15	15	66	0	39	15	15	100	100
20	15	15	66.7	0					

Note: Reproduced from BvW. Y_{take} denotes the effort-task income of the take authority, Y_{resp} the effort task income of the responder (both incomes in guilders), t the take rate and d the part of Y_{resp} destroyed by the responder. Cases are ordered by the take rate.

Table 2

Summary of individual data of no-effort experiment

Case (#)	t (%)	d (%)	Case (#)	t (%)	d (%)
1	0	0	21	0	0
2	50	0	22	40	0
3	50	0	23	40	5
4	50	0	24	40	0
5	50	0	25	44	0
6	50	55	26	50	0
7	50	0	27	50	0
8	50	0	28	50	70
9	60	100	29	50	0
10	60	0	30	55	5
11	60	100	31	60	0
12	67	0	32	60	70
13	70	0	33	60	10
14	70	0	34	70	0
15	75	0	35	70	0
16	75	33	36	75	88.8
17	75	100	37	80	0
18	75	0	38	90	100
19	80	0	39	100	50
20	95	100	40	100	100

Note: Y_{take}=Y_{resp}=15 guilders/90 Schillings. t denotes the take rate and d the part of Y_{resp} destroyed by the responder. Cases 1-20 refer to Amsterdam and cases 21-40 to Innsbruck.

Table 3

Proportion of responders who destroyed everything, nothing, or part in the effort and no-effort experiment

	Effort	No-effort	Total
Destroy everything	7	6	13
Destroy part	1	9	10
Destroy nothing	31	25	56
Total	39	40	79

Table 4

Intensity scores of experienced emotions of responders in effort experiment

Emotion	Responders who destroyed (n=8)		Responders who did not destroy (n=31)	
	Mean*	stand. dev.	mean*	stand. dev.
Irritation	5.88	1.13	3.58	1.95
Contempt	5.25	1.28	2.42	1.86
Anger	4.00	1.51	3.32	2.04
Surprise	4.25	2.38	3.06	2.13
Envy	4.00	2.07	3.58	1.98
Jealousy	2.75	1.58	3.77	2.25
Sadness	3.00	1.60	2.87	1.84
Happiness	1.75	1.39	2.23	1.78
Fear	1.63	1.06	1.94	1.36
Joy	1.63	1.41	2.19	1.58
Shame	1.63	1.77	1.65	1.28

Note: Reproduced from BvW. * The intensity scale ranges from 1 (no emotion) to 7 (high intensity)

Table 5

Intensity scores of experienced emotions of responders in no-effort experiment

Emotion	Responders who destroyed (n=15)		Responders who did not destroy (n=25)	
	Mean*	stand. dev.	mean*	stand. dev.
Irritation	3.67	2.38	3.52	2.35
Contempt	4.00	2.27	2.28	1.93
Anger	5.00	1.89	3.20	2.18
Surprise	3.93	2.12	3.12	1.86
Envy	2.73	1.79	3.44	2.04
Jealousy	2.33	1.63	3.00	2.10
Sadness	2.40	1.84	2.28	1.74
Happiness	1.14	0.36	2.64	1.87
Fear	1.27	0.46	1.48	0.96
Joy	1.47	0.83	2.56	1.83
Shame	1.33	0.82	1.44	1.36

Note: * The intensity scale ranges from 1 (no emotion) to 7 (high intensity)

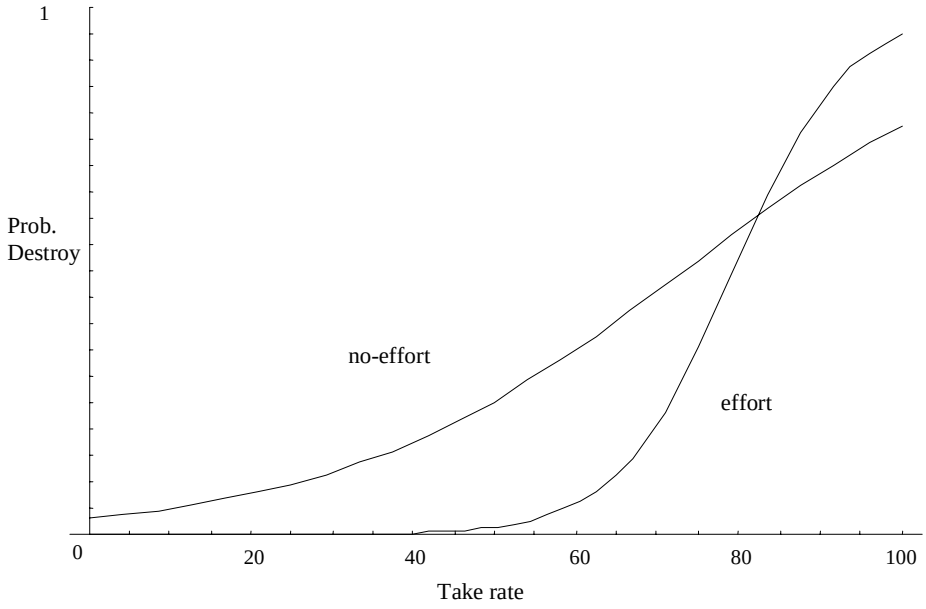

Figure 1. logit estimates of the probability to destroy as a function of the take rate

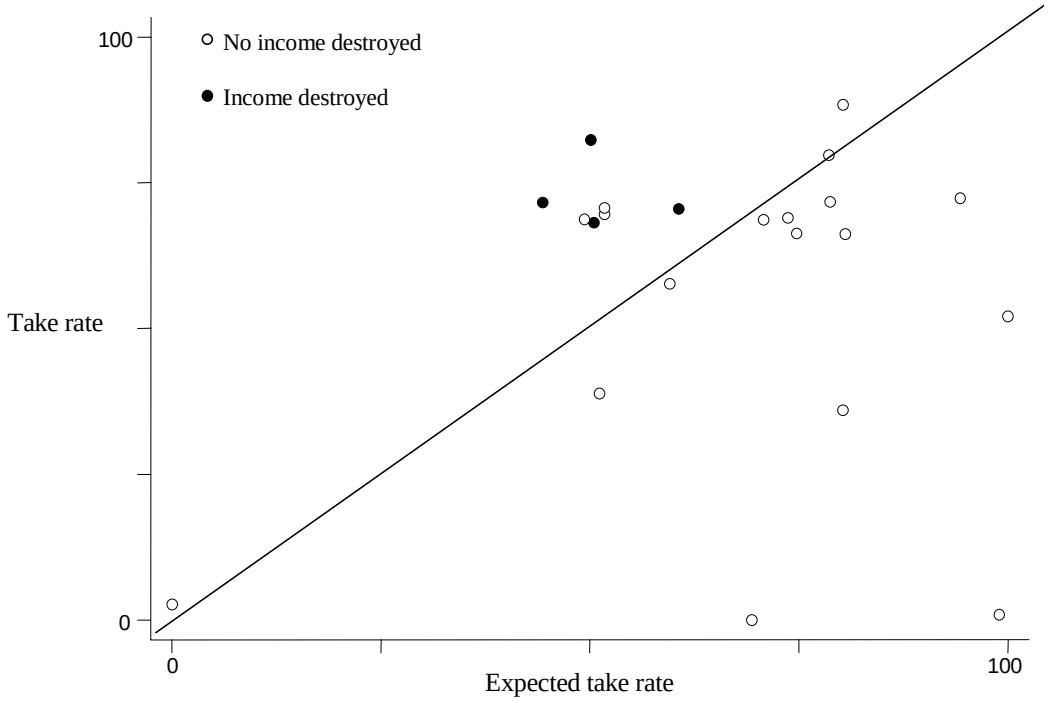

Figure 2. Scatter diagram of actual and expected take rates in the effort experiment (reproduced from BvW)

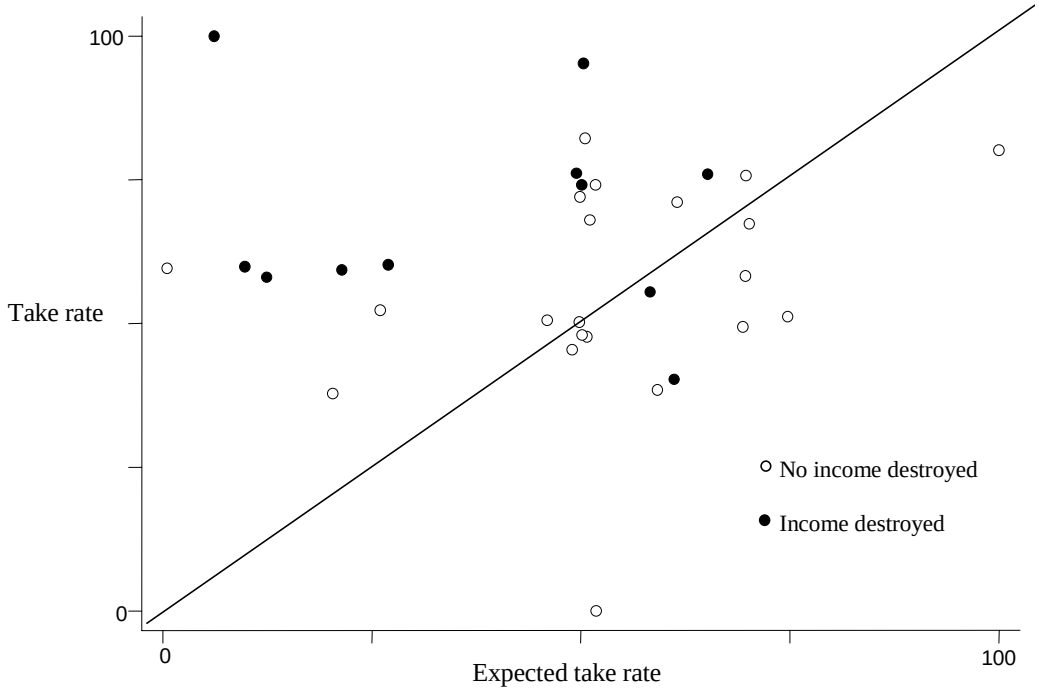

Figure 3. Scatter diagram of actual and expected take rates in the no-effort experiment

Appendix

Instructions (translation)
In this experiment each participant, participant A as well as participant B, will receive an endowment of 15 guilders. This endowment is unrelated to the show-up fee of 15 guilders that, as you know, is independent of the experiment

Two phases
The experiment consists of two phases. In phase 1 only participant A must make a decision whereas in phase 2 only participant B must make a decision. Every participant thus makes one decision.

Phase 1: participant A chooses percentage
In this phase, each participant A will be paired with a participant B. This will be done by letting participant A draw a coded envelope. With the help of the code only we know which seat numbers are paired. Both participant A and B are thus anonymous. The envelope contains a form. Participant A must choose a percentage and fill this in on the form. This percentage determines how much of participant B's endowment after phase 2 will be transferred to participant A. The percentage chosen by participant A must be an integer in the interval [0, 100].

When participant A has completed the form, it must be put in the envelope again. After this we will collect the envelopes and bring them to the participants B who are paired with the participants A by means of the code.

Phase 2: participant B chooses percentage
In this phase participant B has to fill in on the form which percentage of his or her *own* endowment will be destroyed. The percentage chosen by participant B must be an integer in the interval [0, 100]. The transfer from participant B to participant A will be based on the endowment of participant B that

is left. Note that the transfer equals the percentage chosen by participant A of the endowment of participant B that is left after phase 2.

When participant B has completed the form, it must be put in the envelope again. After this we will collect the envelopes and bring them to the participants A who are paired with the participants B. Participant A will take note of the decision of participant B and, subsequently, puts the form back into the envelope. Finally, the envelopes will be collected for the payment procedure which will be clarified below.

Example how to determine one's payoffs

We will now give an example for the purpose of illustration. As you know both participant A and participant B have an endowment of 15 guilders. Suppose participant A decides that *60%* of the endowment of participant B will be transferred to him or her (participant A). In the second phase, participant B can destroy part or everything of his or her endowment. Suppose participant B decides to destroy zero percent of his or her endowment. The transfer from B to A is then equal to 9 guilders (60% of 15 guilders). The total payoff for B at the end of the experiment is equal to 21 guilders (namely, the show-up fee of 15 guilders plus the endowment of 15 guilders minus the transfer of 9 guilders. The total payoff for A at the end of the experiment is equal to 39 guilders (namely, the show-up fee of 15 guilders plus the endowment of 15 guilders plus the transfer of 9 guilders)

Now suppose that in this example participant B had decided to destroy 50% of his or her own endowment. In this case the transfer from B to A is only 4 guilders and 50 cent (namely, 60% of the remaining endowment of participant B after phase II, which is 60% of 7 guilders and 50 cent). The total payoff for A at the end of the experiment is equal to 34 guilders and 50 cent (namely, the show-up fee of 15 guilders plus the endowment of 15 guilders plus the transfer of 4 guilders and 50 cent) and for participant B 18 guilders (namely, the show-up fee of 15 guilders plus the remaining endowment of 7 guilders and 50 cent after destruction minus the transfer of 4 guilders and 50 cent.

In summary

In phase 1, each participant A will be paired with a participant B by drawing an envelope. The envelope contains a Form. Participant A fills in a percentage that indicates how much of participant B's endowment will be transferred to participant A. When participant A has completed the form, it will be brought to participant B. In phase 2, participant B decides which percentage of his or her *own* endowment will be destroyed, and fills this in on the Form. Subsequently, the Form will go to participant A who takes note of the decision of participant B. Then, the Form will be collected and the payment procedure follows. Note, that the pairing is anonymous so that nobody knows whom he or she is paired with.

Other information

Completing the Form

The decision of both participant A and B will be filled in on a Form. You have received a specimen of this Form. In phase 1, participant A completes the blue block. In phase 2, participant B completes the yellow block. The Forms must be completed with the pen that you find on your table in the laboratory. If a Form has been completed with another pen, the Form will be invalid and you will not be paid. Finally, for making calculations you can make use of the electronic calculator that is on your table.

The payment procedure

When participant A has taken note of the decision of participant B in phase 2, the envelope containing the Form will be collected and brought to the cashier. Next, the participants will go to the reception room of the laboratory one by one. The cashier, who will not be present during the experiment, will pay the participants in the reception room. The cashier determines the payment of each participant with the help of the Form and the codes that are linked to the seats. In this way, anonymity is secured with regard to who earned what.

Exercises
We ask you to do two exercises in order to become familiar with the procedures. These exercises consist of completing the Form for an imaginary situation and determining the payoffs. You are not actually paired with another participant during these exercises. Your earnings in these exercises will not be paid out to you. When the exercises have been finished, you have the opportunity to ask questions again. After this the experiment will start.

Finally
To secure anonymity, participants A and B will be partially divided by a sliding wall. The instructions on the table will be available to you during the experiment. At the end of the experiment you are asked to fill in a short questionnaire. Anonymity is again secured. After this, you are asked to leave the laboratory one by one. You must be silent and refrain from communication with others until you have left the laboratory.

Code: xxx

FORM

<u>Participant A fills in this block</u>:

Endowment of participant A: 15 guilders

Endowment of participant B: 15 guilders

I (participant A) decide that ……. % of the endowment of participant B will be transferred to me.

<u>Participant B</u> fills in this block:

I (participant B) destroy ……. % of my endowment.