Emotions and Economic Behavior: An Experimental Investigation
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Chapter 3

The power-to-take experiments

3.1 Introduction

In this chapter three experiments on the power-to-take game are discussed. In this simple two-player game one subject can be considered as the 'take authority' (with endowment \( E_{\text{take}} \)) who is paired to another subject, the 'responder' (with endowment \( E_{\text{resp}} \)). 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 only action that the responder can take is to decide on \( d \in [0,1] \), the part of \( E_{\text{resp}} \) that will be destroyed. For the take authority the payoff of the game is thus equal to the transfer \( t(1-d)E_{\text{resp}} \), generating total earnings from of the experiment of \( E_{\text{take}} + t(1-d)E_{\text{resp}} \). For the responder, the payoff equals \((1-t)(1-d)E_{\text{resp}}\), which also determines her or his total earnings. Note that in this game the responder can only destroy his or her own prior-to-the-take endowment (\( E_{\text{resp}} \)) and not that of the take authority (\( E_{\text{take}} \)). Furthermore, it follows that only if \( t=d=0 \) experimental earnings for both players will be equal to the endowment; otherwise, the responder will always get less than \( E_{\text{resp}} \), whereas the take authority gets at least \( E_{\text{take}} \).

In this chapter we are primarily interested in how emotions influence responder behavior. Emotion theory and self-reports will be used as instruments. In the first experiment, subjects first have to earn their endowment by doing an individual real effort task on the computer before the power-to-take game is played. In the second experiment, the endowment is simply given to subjects as manna from heaven. In the last experiment, groups instead of individuals play the power-to-take game. We believe that our design provides an interesting environment to study how emotions generate economic behavior. To study a complex issue like emotions, a simple experimental game is helpful as a
starting point. The power-to-take game is very straightforward. For example, if the responder feels angry about the take authority, then (s)he can punish by destroying (part of) the endowment. Punishment, however, is costly for the responder. An interesting feature of this game is that punishment is a continuous variable, since the responder can destroy any part of his or her own (prior-to-the-take) endowment. In this way it is possible to learn more about how subjects trade off emotional satisfaction of punishment against monetary gain.\footnote{The frequently studied ultimatum game, where emotions are likely to play a role as well, is less suited for this purpose. In this game punishment is a discrete choice since the responder can either reject (punish the proposer) or accept the ultimatum.}

Moreover, the power-to-take game is of economic interest in itself. The game models in a simple, abstract, but fundamental way situations where one agent can (potentially) appropriate part of the endowment (effort) of another agent. A first example that comes to mind concerns taxation.\footnote{The power-to-take game captures two basic aspects of taxation. First, taxes are coercive transfers since the government can force one to pay taxes. Second, the tax payer can affect the tax base, as is argued for example by Aumann & Kurz (1977, p.1139): "... we consider a basic ingredient of a democratic society ... that every agent can, if he wishes, destroy part or all of his endowment. It goes without saying that the part that is destroyed cannot be taxed. If one thinks of one's endowment as labor, then the above means that there is no forced labor: an individual may, if he wishes, "destroy" his labor, by simply working less (or not at all)".} In fact, the game can be seen as an elementary version of the tax model of Aumann & Kurz (1977, 1978) (see also Gardner, 1981; Peck, 1986). The take authority can be regarded, in an admittedly simplistic way, as a majority coalition (government) that by means of taxation can appropriate part of the endowment of the minority (the responders). The minority can retaliate by destroying part of the endowment. In case the endowment stands for the returns on the supply of a production factor, “destruction of the endowment” could stand for a diminished supply of the factor. If destruction is indeed emotion driven, this would imply a new source of efficiency cost of taxation, which may be called emotional hazard.

Another situation resembling the power-to-take game is monopolistic pricing. In case of a monopoly, the monopolist first decides on how much to take from the surplus by setting the price. Subsequently, the buyer decides how much to buy, given the price chosen by the monopolist. If the buyer feels that the price is outrageous, an emotional response may induce the buyer to punish the monopolist by buying less than the rational “text book” buyer would do. A third situation where emotional hazard may be important...
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

concerns principal-agent relationships. The principal can be seen as the take authority who decides on the incentive scheme for the agent. The agent takes notice of the scheme and subsequently decides on his or her effort level. The agent may feel emotionally urged to punish the principal by choosing a low effort level, which is costly for the agent because it conflicts with the material incentives provided by the principal. These examples show that the power-to-take game is not only interesting to study from an emotion theoretic but also economic point of view.

Although a thorough analysis of the way economic behavior is influenced by emotions is lacking, there are a few experimental studies referring to emotions that should be mentioned in this chapter. In an ultimatum game experiment, Pillutla & Murnighan (1996) manipulate information about the pie size and outside option, and find that responders reject more when proposers know the value of the outside option. Their explanation is that intentional low offers lead to wounded pride, feelings of anger, and, ultimately, spiteful behavior.\(^3\) Related to this study is an ultimatum experiment by Blount (1995) where the offer to the responder is determined by either an interested party, a third neutral party, or randomly by a computer. This study shows that intentional low offers lead to more rejections than randomly determined low offers.\(^4\) Charness and Grosskopf (1999) investigate whether a person's level of (self-reported) happiness influences concern for social comparisons in variants of the dictator game. They do not find a strong correlation between happiness and payoff inequity aversion. However, they report some correlation between unhappiness and the willingness to lower another person's payoff below one's own payoff. Kirchsteiger et al. (2000) investigate the effect of mood on decision-making in a two-person gift exchange game. They induce good and bad mood by showing subjects a funny movie and a sad movie, respectively. They report that their mood induction procedure is effective and that the second players' (i.e. those who may reciprocate) behavior is dependent on their mood. In particular, they find that bad mood

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\(^3\) This is the only study on the ultimatum game we are aware of where emotions were measured. Responders were asked to answer the open question "how do you feel?" Subsequently, two independent raters coded the responders' answers on a 6-point scale for the emotion anger. Note that our measurement of emotions differs in two important ways (see also 3.2.2). First, we ask responders directly to report the intensity of experienced anger by giving them a 7-point intensity scale. Second, we do not limit our measurement to anger only but measure other potentially relevant emotions as well. In addition, we measure responders' expectations of the take rate and relate them to the intensity of experienced emotions.
leads to stronger reciprocal behavior whereas good mood induces more generosity. Finally, we mention an interesting video experiment by Hennig-Schmidt (1999), showing that emotions (indicated by the use of emotion loaded words) play a crucial role in breaking up group bargaining.

The organization of this chapter is as follows. In 3.2 the research questions, experimental design, and results of the effort experiment are discussed, while in 3.3 the no-effort experiment is discussed in a similar way. Section 3.4 addresses the research questions, experimental design, and results of the group experiment. Section 3.5 follows with a discussion and addresses the issue whether existing economic models can explain the experimental results of the power-to-take game. Finally, section 3.6 concludes.

### 3.2 The effort experiment

#### 3.2.1 Research questions

A responder who is confronted with a positive take rate faces a tradeoff between the emotional satisfaction of punishment and the satisfaction of monetary gain. An important research question is how responders deal with these conflicting motivations. Two mechanisms of decision-making are possible. First, if emotional intensity is low, we would expect responders to make a compromise between these conflicting intrapersonal urges, and to choose (in general) an intermediate level of punishment.\(^6\) Second, if emotional intensity is very high, a compromise may not be feasible and we would expect responders to destroy everything. The reason is that at higher intensities visceral urges such as emotions progressively seize command over behavior, instead of being compromised with what is best to do based on a cognitive analysis of the consequences (see e.g. Loewenstein, 2000, p. 428). Using a metaphor, one may view the decision-making of the responder as the outcome of an election with two competing parties. One party is in favor of punishment whereas the other favors income. Behavior of the

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\(^4\) See also Offerman (forthcoming) who finds a similar result (i.e. intentional harm leads to more negative reciprocity than random harm) in some variant of a trust game.

\(^5\) This section is based on Bosman & van Winden (forthcoming).

\(^6\) In economic terms, this compromise entails an outcome where the marginal rate of substitution between punishment and income (or other consumption) equals the price ratio. Note that the price ratio depends on
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

Responder can be seen as the policy resulting after the election. The first mechanism would then resemble a representative election system, and the second one a plurality system. Our experimental design will tell us which of these two mechanisms of decision-making is more important. Other important research questions that we will address are: Which emotions are responsible for punishment?; What is the relationship between the intensity of experienced emotions and the take rate, on the one hand, and the destruction of income, on the other?; What effect does the responder's expectation of the take rate have on his or her behavior?

3.2.2 Experimental design

In total 78 subjects, almost all undergraduate students from the University of Amsterdam, participated in the experiment. About half of the subjects (55%) were students of economics. The other half were students from various fields such as chemistry, mathematics, law, planning, and psychology. About 40% of the subjects had participated in an economic experiment, different from this one, before. We framed the take game as neutral as possible, avoiding any suggestive terms like take authority (a translation of the instructions is provided in Appendix 3A). Subjects received a show-up fee of 15 guilders (approximately $7.5), independent of their earnings in the experiment. On average, subjects received 28.50 guilders in total. The whole experiment took about one hour and 45 minutes.

Before subjects played the one-shot take game, they first had to participate in an individual two-variable optimization task on the computer for 30 minutes. This task consists of 10 periods, where in each period subjects have 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 maximum of 1 guilder and 50 cent. The task was set up such that most

the take rate. If, for example, the take rate is 50%, then taking a dollar away from the take authority will cost the responder exactly one dollar in which case the price ratio is equal to one.

7 Emotion theory seems to support the second system where the 'winner' takes it all (Frijda, personal communication; Tesser & Achee, 1994).

8 See van Dijk et al. (2001).
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

Subjects were able to find the maximum value within the time limit of three minutes. A pilot experiment suggested that subjects indeed perceive this task as a form of work.9

After subjects had completed the computer task, 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). Then the instructions for the take game were read, followed by two individual exercises on the computer to check subjects' understanding of the procedures. After these exercises, random pairs of a responder and take authority were formed by letting take authorities draw a coded envelope from a box. The envelope contained a form on which the earnings of a responder from the real effort task were stated (see Appendix 3B). The take authorities then had to fill in their own earnings as well as the take rate, and put the form back in the envelope again. Subsequently, the envelopes were brought to the matched responders who filled in the part of their earnings to be destroyed. The envelopes containing the forms were then returned to the take authorities for their information. Then, we asked subjects to fill out a questionnaire with questions concerning expectations, motivations, and emotions.10

When subjects completed the 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.11

9 Subjects indicated that they experienced the task as rather neutral, in the sense that it was neither very exciting nor very boring, neither very difficult nor very easy, and neither very pleasant nor very unpleasant.
10 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.
11 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
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

We now briefly discuss how we measured emotions. To assess the emotions responders experienced when they learned about the decision of the take authority, we gave them a list of eleven emotion names and ask them to report the 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 relevant in our setting. Both positive and negative emotions are included, in order to avoid that subjects are ‘pushed’ in a particular direction.

3.2.3 Results

The individual data are presented in table 3.1. Concerning the amount responders and take authorities earned in the real effort task that preceded the take game, it turns out that most of the time paired subjects had exactly the same earnings at the start of the take game, and in any case the income of the take authorities was at least as high as that of the responders. As can be observed from this table, take authorities chose considerable take rates. The mean take rate is 58.5, the median 66.7, and the mode 70.0. Furthermore, it appears that eight (21%) of the 39 responders destroyed income. The extent to which they chose to do so leads to our first substantive result.

RESULT 1: The behavior of responders is discontinuous, they typically destroy nothing or everything

Support. As table 3.1 shows, seven out of eight responders destroying income chose an extreme rate of (almost) 100%.

Intensity score measures concerning the emotions experienced by the responders are presented in table 3.2 (the asterisks in the table will be referred to below). The data show that responders who destroyed as well as those who destroyed nothing experienced a

the distortion is filtered out” (p. 113-14). On the other hand, Hoffman et al. (1994) found that in a dictator game double blindness does matter, leading to more greedy behavior of the dictator.
variety of emotions. Especially, negative emotions, such as irritation, contempt, anger, and envy obtain a relatively high score. In addition, it is noted that anger is strongly positively correlated to irritation, with a correlation coefficient of 0.71 (p<0.01), which suggests that anger and irritation refer to a similar underlying emotion. The same holds for happiness and joy (correlation coefficient of 0.94, p<0.01), and, although less strongly, for envy and jealousy (correlation coefficient of 0.5, p<0.01).

<table>
<thead>
<tr>
<th>Case (#)</th>
<th>Y_take</th>
<th>Y_resp</th>
<th>t (%)</th>
<th>d (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>15</td>
<td>13.5</td>
<td>25</td>
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<tr>
<td></td>
<td>5</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>15</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>15</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>15</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>15</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>15</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>15</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>15</td>
<td>15</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>15</td>
<td>15</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>15</td>
<td>15</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>15</td>
<td>15</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>66.7</td>
</tr>
</tbody>
</table>

Note: Y_take denotes the effort-task income of the take authority, Y_resp the effort task income of the responder, t the take rate and d the part of Y_resp destroyed by the responder. Cases are ordered by the take rate.

RESULT 2: The intensity of negative (positive) emotions experienced by the responder is positively (negatively) related to the take rate.

Support. We have estimated an ordered logit model for each emotion separately. The results are given in table 3.3.

With regard to the negative emotions irritation, envy, and contempt, the estimated coefficients are all significantly positive. For anger, the coefficient is also positive but only significant at p=0.13. An increase in the take rate is thus related to a higher intensity
of these negative emotions. With regard to the positive emotions happiness and joy, the estimated coefficients are significantly negative, which means that an increase in the take rate is related to a lower intensity of these emotions.

**Table 3.2.** Intensity scores of experienced emotions in the effort experiment

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

Note: *The intensity scale ranges from 1 (no emotion) to 7 (high intensity); standard deviations in parentheses. **p<0.01, two-tailed Mann-Whitney test of no significant difference in means.*

RESULT 3: The probability of destroying income is positively related to the intensity of experienced negative emotions.

**Support.** We have estimated a binary logit model for each emotion separately. The dependent variable “Destroy” equals 1 if a responder destroyed income, and 0 otherwise. The results are given in table 3.4. It turns out that only for irritation and contempt significant results are obtained. An increase in the intensity of these emotions significantly increases the probability that a responder will destroy income. Note that the effects for envy, happiness, and joy are not significant. Although the intensity of envy, happiness, and joy are related to the take rate, these emotions ultimately do not affect behavior. It is irritation and contempt that appear to influence behavior. A Mann-Whitney test gives further support for this finding: responders who destroyed income experienced...
Table 3.3. Relationship between intensity of emotion and the take rate in the effort experiment

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Explanatory Variable</th>
<th>Coefficient</th>
<th>P-value</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irritation</td>
<td>Take rate</td>
<td>0.058</td>
<td>0.000</td>
<td>17.50**</td>
</tr>
<tr>
<td>Happiness</td>
<td>Take rate</td>
<td>-0.048</td>
<td>0.001</td>
<td>12.41**</td>
</tr>
<tr>
<td>Joy</td>
<td>Take rate</td>
<td>-0.047</td>
<td>0.001</td>
<td>12.12**</td>
</tr>
<tr>
<td>Envy</td>
<td>Take rate</td>
<td>0.026</td>
<td>0.039</td>
<td>4.35*</td>
</tr>
<tr>
<td>Contempt</td>
<td>Take rate</td>
<td>0.031</td>
<td>0.062</td>
<td>4.11*</td>
</tr>
<tr>
<td>Anger</td>
<td>Take rate</td>
<td>0.020</td>
<td>0.126</td>
<td>2.33</td>
</tr>
<tr>
<td>Sadness</td>
<td>Take rate</td>
<td>0.015</td>
<td>0.227</td>
<td>1.50</td>
</tr>
<tr>
<td>Surprise</td>
<td>Take rate</td>
<td>-0.017</td>
<td>0.181</td>
<td>1.81</td>
</tr>
<tr>
<td>Shame</td>
<td>Take rate</td>
<td>-0.012</td>
<td>0.471</td>
<td>0.50</td>
</tr>
<tr>
<td>Fear</td>
<td>Take rate</td>
<td>-0.006</td>
<td>0.680</td>
<td>0.17</td>
</tr>
<tr>
<td>Jealousy</td>
<td>Take rate</td>
<td>0.002</td>
<td>0.887</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Note: Ordered logit estimates for each emotion; n=39; *p<0.05; **p<0.01

Table 3.4. Relationship between destroying income and intensity of emotion in the effort experiment

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Explanatory Variable</th>
<th>Coefficient</th>
<th>Constant</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destroy (0 or 1)</td>
<td>Contempt</td>
<td>0.880**</td>
<td>-4.830**</td>
<td>13.12**</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Irritation</td>
<td>0.953*</td>
<td>-6.075**</td>
<td>10.64**</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Surprise</td>
<td>0.251</td>
<td>-2.273</td>
<td>1.88</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Jealousy</td>
<td>-0.244</td>
<td>-0.563</td>
<td>1.54</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Joy</td>
<td>-0.303</td>
<td>-0.786</td>
<td>1.01</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Anger</td>
<td>0.186</td>
<td>-2.038</td>
<td>0.80</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Happiness</td>
<td>-0.197</td>
<td>-0.966</td>
<td>0.56</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Fear</td>
<td>-0.213</td>
<td>-0.978</td>
<td>0.40</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Envy</td>
<td>0.111</td>
<td>-1.776</td>
<td>0.29</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Sadness</td>
<td>0.042</td>
<td>-1.477</td>
<td>0.03</td>
</tr>
<tr>
<td>Destroy (0 or 1)</td>
<td>Jealousy</td>
<td>-0.011</td>
<td>-1.336</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Note: Binary logit estimates for each emotion. The logit function is f(x)=1/[1 + exp(-a +bx)]; n=39; *p<0.05; **p<0.01

on average significantly more irritation and contempt than those who destroyed nothing (see the means in table 3.2). With regard to the other emotions, differences in experienced emotion show no statistically significant effect on behavior.

RESULT 4: The probability of destroying income is positively related to the take rate
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

Support. To test the corollary of the previous two results, we used another binary logit model where the dependent variable is "Destroy" (0 or 1) and the explanatory variable the take rate. The estimated coefficient (0.14) and constant (-11.29) are both significant at the 5% level.

We have also investigated whether behavior or experienced emotion is influenced by gender, education (economics or not), or experience in economic experiments. It turns out that none of these factors have an effect on behavior or experienced emotions

The role of expectations

Figure 3.1 provides some information about responders’ expectations of the take rate and the actual rates chosen by the take authorities. A proportion of the responders explicitly reported not to have any expectation. Consequently, the analysis of expectations that follows is based on a smaller number of observations (n=22). From figure 3.1 we see that for most responders expectations were not consistent with the actual take rate. Responders above the 45° line were too optimistic: they expected a lower take rate than the actual rate. Responders under the 45° line were too pessimistic: they expected a higher take rate than the actual rate. The figure also shows which responders destroyed income (squares). Interestingly, only responders who were too optimistic destroyed income.

Because expectations were assessed after the take game, it is possible that responders who were too optimistic found it hard to admit that they were wrong. These responders may have been inclined to present themselves as realistic or perhaps even as pessimistic. Therefore, we checked whether responder’s expectations of the take rate are correlated to the take rate. It turns out that the correlation between the take rate and expected take rate is very low (correlation coefficient of 0.12) and not significant (p=0.60). We conclude that there is no systematic bias in responders’ reported expectations of the take rate.

13 The significance level is 0.004 for irritation and 0.001 for contempt, using a two-tailed test.
RESULT 5: Responder’s expectation of the take rate has a significant effect on the probability of destroying income but not on the intensity of experienced emotion.

Support. To investigate whether expectations influence the intensity of experienced emotion, we compared each model in table 3.3 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 the (negative or positive) emotions. Further, we analyzed whether behavior is related to expectations. To that purpose, two logit models were estimated with "Destroy" again as the dependent variable (equal to 1 if a responder destroyed income, and zero otherwise). For both models 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, given in
Table 3.5. Comparison of logit models with and without the expected take rate in the effort experiment

<table>
<thead>
<tr>
<th>Model</th>
<th>Dependent Variable</th>
<th>Explanatory Variables</th>
<th>Coefficient</th>
<th>P-value</th>
<th>Log Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1 (n=22)</td>
<td>Destroy (0 or 1)</td>
<td>Constant, Take rate</td>
<td>-5.7518, 0.0639</td>
<td>0.1666, 0.2701</td>
<td>18.322, 11.000</td>
</tr>
<tr>
<td>Model 2 (n=22)</td>
<td>Destroy (0 or 1)</td>
<td>Constant, Take rate – expected take rate</td>
<td>-3.3714, 0.1677</td>
<td>0.0600, 0.0665</td>
<td></td>
</tr>
</tbody>
</table>

Note: The logit function is \( f(x) = \frac{1}{1 + \exp(-a + bx)} \)

Why do expectations influence behavior but not emotions? We offer the following explanation. Expectations can influence a decision in two ways. First, expectations may influence the intensity of emotion because of a ‘surprise’ effect (Ortony et al., 1988, p. 60). In our case, this effect does not seem to play an (important) role next to the effect of the actual take rate, since we have not found any significant relation between expectations and experienced emotion. Second, expectations can be related to norms (standards) that influence behavior in a more cognitive way (cf. Pruitt, 1968). If the take authority violates the responder’s norms, then the responder will judge this behavior as inappropriate. The responder may therefore believe (s)he should punish the take authority. Evidence from an empirical study on fairness in the market place by

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13 Using the estimated model 2 it is easy to calculate that for the probability of destroying income to exceed 50% the difference between the actual and the expected take rate should be larger than 20 percentage points. We have also estimated the coefficients of the take rate and expected take rate separately for model 2. The coefficient of the take rate is then equal to 0.17 (p=0.11) and the coefficient of the expected take rate -0.17 (p=0.08).

14 The bimodal distribution of the expectations suggests that two standards apply to the power-to-take game. First, a split-the-difference rule (27% expected a take rate of 50%), and, second, something like a split-the-difference ‘squared’ rule (23% expected a take rate of 80%). The latter may have been activated
Kahneman et al. (1986) supports the claim 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). Furthermore, they note that people agree on general principles of fairness but can have disagreement about specific cases. This may explain the variation in the reported expectations of responders (see figure 3.1).

3.3 The no-effort experiment

3.3.1 Research questions

The main question to be addressed in this section is whether behavior in the power-to-take game changes if endowments are simply provided to the players like manna from heaven, instead of being based on own earned income. From an economic viewpoint, this is an interesting issue since in large private and public organizations surpluses are often generated via the entitlement of managers to the use of a budget that does not necessarily bear a strong direct relationship with the manager's own past effort, in contrast with for example the owner-entrepreneur of a small business. Although standard economic theory says 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.

Before subjects played the power-to-take game in the effort experiment (and received instructions about it), they first had to earn their endowment $E$, by doing an individual real effort task on the computer. This task was set up such that (almost) all earned an equally sized endowment. In the no-effort experiment both the take authority and responder are simply given this endowment, without having to do any effort for it. The first research question is whether the behavior of responders and take authorities is influenced by (sunk) effort. A second research question, which becomes particularly

by the following reasoning: Since a take rate of at least 50% should be feasible, the real issue is the appropriate take rate in the interval [50, 100]. Interestingly, only one subject expected a rate of 0%, at which both subjects would leave the experiment with the same earnings.

15 It is possible that subjects are confused about which norm applies to the power-to-take game because of its rather abstract nature. This may explain why a substantial proportion of the subjects reported not to have any expectations.

16 This section is based on Bosman et al. (2000).

17 See 3.2.2 for a description of the effort task.
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 cost 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.

Because of the novelty of the power-to-take game, there exist no economic 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 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 study focuses on the way in which endowments – rather than entitlements to a specific role – are obtained. Subjects either do not have to work for their endowment or have to do the same amount of real effort to obtain their endowment, prior to the power-to-take game. Furthermore, the roles of take authority and responder in the game are assigned by chance. Consequently, in our set-up, equity theory predicts the same outcome under both conditions.

3.3.2 Experimental design
The no-effort experiment was set up exactly as the effort experiment, 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 Appendix 3A). 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
chapter, mathematics, law, and psychology. The game was framed exactly in the same way as in the effort experiment (again avoiding any suggestive terms like take authority, etc). 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, and the same amount as endowment. On average, subjects were paid out 28 guilders in total. The whole experiment took about one hour and 15 minutes.

Emotions were measured in the same way as in the effort experiment. The same list of eleven emotion names was used and subjects were asked 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”.

3.3.3 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 3.2. Furthermore, in the analysis that follows, the Amsterdam and Innsbruck data are pooled, since we found no significant differences in behavior.

Behavior
A summary of individual data is given in table 3.6. Our first result deals with the behavior of the take authorities.

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%.

18 This show-up fee is the same as in the effort experiment (see 3.3).
19 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
Table 3.6. Summary of individual data in the no-effort experiment

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

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

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 3.7, 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).

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).
Table 3.7. Proportion of responders who destroyed everything, nothing, or part in the effort and no-effort experiment

<table>
<thead>
<tr>
<th></th>
<th>Effort</th>
<th>No-effort</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destroy everything</td>
<td>7</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Destroy part</td>
<td>1</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Destroy nothing</td>
<td>31</td>
<td>25</td>
<td>56</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>40</td>
<td>79</td>
</tr>
</tbody>
</table>

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 3.8. 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). 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. 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.

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. 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.

37
### Table 3.8. Intensity scores of experienced emotions of responders in the no-effort experiment

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

Note: The intensity scale ranges from 1 (no emotion) to 7 (high intensity); standard deviations in parentheses.

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 in the effort experiment 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.

RESULT 4: With 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, 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 3.2. 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 3.6, 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 3.2. logit estimates of the probability to destroy as a function of the take rate in the effort and no-effort experiment

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

Figure 3.3 provide information about responders’ expectations of the take rate and the actual rates chosen by the take authorities. Before we investigate the role of

22 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
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

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.\(^{23}\)

From figure 3.3 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, figures 3.1 (see 3.2.3) and 3.3 suggest that expectations are not the same in the effort and no-effort experiment. The following result bears this out.

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

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).

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.

\(^{23}\) 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).
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

Figure 3.3. Scatter diagram of actual and expected take rates in the no-effort experiment

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 the discussion in 3.5, 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).

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24 In figure 3.3, 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).
Support. Using the same ordered logit models as in the effort experiment (see result 2 in 3.2.3), it turns out that the expected take rate is negatively related to anger and contempt and positively to joy. Recall that expectations have no predictive value for the intensity of experienced (negative or positive) emotions in the effort experiment. In section 3.5 we offer an explanation for these results. To analyze whether expectations influence behavior, we estimated 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 the 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’ 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.
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

3.4 The group experiment

3.4.1 Research questions

The object of the group experiment is to investigate how groups, rather than individuals, play the power-to-take game. Again, we focus on responder behavior. Since many economic decisions are taken by groups – and groups are often modeled as a single agent – this is an important issue. An important and new feature of this experiment is that groups are being videotaped while making their group decision. The videotapes are used to make transcripts of the group discussions. With the help of these transcripts, it is possible to learn more about individual motivations and the way these (sometimes conflicting) motivations interact in a group. Since gathering data in this way is expensive and time consuming, the number of observations is relatively small. Nevertheless, the data appear to be informative and support some tentative conclusions. Because of the small number of observations, we have decided to include results that are significant at the 10% level.

Although social psychologists have studied group dynamics quite extensively, there has not been much experimental work on group decision-making in economic settings. Moreover, the evidence gathered by economists is inconclusive. For example, Bornstein & Yaniv (1998) find that groups who play an ultimatum game behave more in accordance with standard economic theory than individuals. In the power-to-take game, which bears similarity to the ultimatum game, this should then show up in higher takes rates and lower destruction rates for groups. However, other studies show that groups behave in a more other-regarding way (Cason & Mui, 1997, investigating the dictator game) or that they behave in the same way as individuals (Bone et al., 1999, focusing on lottery choice). There is also evidence that groups do not behave differently per se but

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25 This section is based on Bosman et al. (2001a).
26 According to Loomes (1999), the use of audio or video records makes up one of the real challenges of experimental economics in the future. For a more elaborate discussion on this research method, see Hennig-Schmidt (1999). Other experimental studies where video records are used, include Jacobsen & Sadr (1996) and Sadrieh & Hennig-Schmidt (1999).
27 A major finding by social psychologists is the so-called group polarization hypothesis: groups behave towards more extreme points in the same direction as the initial individual tendencies. See Cason & Mui (1997) for a short discussion on this hypothesis.
learn faster and reason with more depth compared to individuals (Kocher & Sutter, 2000, studying beauty contests).

3.4.2 Experimental design
The group experiment was run in the Laboratory of Experimental Economics at the University of Bonn. In total, 70 subjects, almost all undergraduate students from the University of Bonn, participated in the experiment. The show-up fee was 20 German marks (approximately 10 U.S. dollars), independent of subjects’ earnings in the experiment. On average subjects earned approximately 38 marks. The whole experiment took about 2 hours.

Each subject first had to earn her or his endowment by doing the same effort task as in the effort experiment. Almost all subjects earned the maximum amount of 20 German marks. Subsequently, a take authority and responder group, each consisting of three members, was randomly formed. The income of the group equals the aggregate income of its members. The power-to-take game was played in the same way as in the effort and no-effort experiment (except that groups were being videotaped while making their group decision). The responders’ expectations of the take rate were assessed directly after the effort task but before responder groups were formed. This means that each responder reported an expectation before (s)he learned about the take rate and before any group discussion took place. Finally, responders’ experienced emotions were measured after they learned about the take rate but before any group discussion took place.

3.4.3 Results
Group behavior
A summary of group behavior is given in the first three columns of table 3.9. It appears that groups behave in much the same way as individuals. The take rates in the group experiment are similar to the take rates in the effort experiment, with an average rate of

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28 See 3.3.2 for a description of the effort task.
29 There were 12 take authority and 12 responder groups. In one case, both the take authority and responder group consisted of two members.
30 The same questionnaire was used as in the effort and no-effort experiment (see 3.2.2 for more details).
31 Although take rates are similar in the effort and group experiment, there is some indication that the variance is marginally lower in the group experiment (Mann-Whitney test, p=0.094, one-tailed).
60%. Two out of twelve groups destroyed their whole group income, while one destroyed 50%. These numbers are in line with individual responder behavior in the effort experiment. The efficiency costs due to emotional hazard thus appear to be robust and not limited to individual decision-making.

Table 3.9. Summary of behavior in the group experiment

<table>
<thead>
<tr>
<th>Case (#)</th>
<th>t (%)</th>
<th>d (%)</th>
<th>Intended individual d (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>resp 1</td>
<td>resp 2</td>
<td>resp 3</td>
</tr>
<tr>
<td>1</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>0</td>
<td>0 /</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>0</td>
<td>0 / 100</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>0</td>
<td>0 / 100</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>0</td>
<td>0 / &gt;0</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
<td>100</td>
<td>100 / 100 / 100</td>
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<tr>
<td>7</td>
<td>60</td>
<td>0</td>
<td>0 / 0</td>
</tr>
<tr>
<td>8</td>
<td>60</td>
<td>0</td>
<td>0 / 0</td>
</tr>
<tr>
<td>9</td>
<td>72</td>
<td>0</td>
<td>40 / 0</td>
</tr>
<tr>
<td>10</td>
<td>73</td>
<td>0</td>
<td>0 / 0</td>
</tr>
<tr>
<td>11</td>
<td>75</td>
<td>50</td>
<td>0 / 100</td>
</tr>
<tr>
<td>12</td>
<td>85</td>
<td>100</td>
<td>100 / 100 / 100</td>
</tr>
</tbody>
</table>

Note: t denotes the take rate and d the part of the group income that is destroyed. The last three columns give the intended destruction rate for each individual responder i=1, 2, 3; case 2 consists of two responders; case 9 has one missing observation. Cases are ordered by the take rate.

RESULT 1: Behavior in the group experiment is in line with individual behavior in the effort experiment.

Support: Using a Man-Whitney test, the hypothesis that the take rates are drawn from the same distribution cannot be rejected (p=0.77). Using a fisher exact test, the hypothesis

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32 Like in the effort and no-effort experiment, the probability of destruction is positively related to the take rate (Spearman rank-order coefficient for correlation=0.057, p=0.0508). However, in contrast with the effort and no-effort experiment, there is no evidence that the expected take rate of the group (i.e. the average expected rate of all responders in the group) is important for the decision to destroy. This last finding suggests that it may be problematic to consider a group as a single agent because important features of the decision to destroy are missed.
that the proportion of responders who destroyed are the same in the effort and group experiment cannot be rejected (p=0.71).

**Emotions at the group level**

Although we asked responders to report their individually experienced emotions, we cannot establish the relationship between emotions and behavior in the same way as in the effort and no-effort experiment because decisions are made at the group level. However, we can analyze whether there is a relation between, on the one hand, emotions at the group level and, on the other hand, the take and group destruction rate. As an index of emotion at the group level, the average reported intensity of each emotion is used. It turns out that there is no significant correlation between the take rate and any average emotion (Spearman rank-order coefficient for correlation, p>0.10). Furthermore, we cannot reject that the hypothesis that the average emotion scores of groups that destroy and groups that do not destroy are drawn from the same distribution (Mann-Whitney test, p>0.10, two-sided). Although the number of observations at the group level is small (which may explain why the null hypotheses cannot be rejected), these results are not in line with the results of the effort and no-effort experiment. It may therefore be problematic to consider a group as a single agent. In particular, when individual motivations are emotion driven, averaging the individual intensity scores may not be very useful. We therefore will explore how individual motivations interact in a group.

**Individual motivations and group behavior**

To investigate the relation between individual motivations and group behavior, we need some measure of an individual’s willingness to destroy based on the transcripts. To that purpose we define a new variable called the ‘intended individual destruction rate’ which is either (1) the first destruction rate that is mentioned and can be identified as an intention or proposal, or (2) approval or confirmation of some destruction rate mentioned by another individual. It turns out that for one subject only it was not possible to determine her or his intended destruction rate. The intended destruction rates are

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33 To score the intended individual destruction rates two raters went through the transcripts independently. In 4 out of 35 cases, there was a discrepancy in scores. Subsequently, these four cases were again
depicted in the last three columns of table 3.9. The next result, which is in line with the effort experiment, deals with these intended destruction rates.

RESULT 2: Individual responders typically want to destroy 0 or 100% of the earned group income.

Support. In total, 32 out of the 35 subjects showed a preference for a destruction rate of either 0 or 100%, while 2 wanted to destroy an intermediate amount, and one member did not reveal a preference.

For example, in one group a member said: "OK, I believe there are only two extremes since the rest is foolish", while in another group a member said: "So, in my view the question can only be, do we destroy everything or do we destroy nothing (...) in between is playing". In the responder group where 50% of the group income was destroyed, the group outcome was clearly an interpersonal rather than intrapersonal compromise, since individual members indicated to prefer a destruction rate of either 0 % or 100%.

Responders’ individual expectations of the take rate appear to play a qualitatively similar role in the group experiment as in the effort and no-effort experiment. Recall that the individual responder’s expectation of the take rate was assessed before group members came together to decide on destruction and before they learned about the take rate. It turns out that responders who were too optimistic typically show a preference for destruction in the group discussion.

RESULT 3: Responders who are optimistic show a preference for destruction in the group discussion.

Support. It turns out that 15 out of 29 responders who reported an expectation were optimistic (actual take rate is higher than expected) and 8 out of these 15 optimists preferred to destroy, while of the 14 pessimists/realists only 3 preferred to destroy. Using

considered by two other raters, followed by a final discussion with all raters. Ultimately, the discrepancies were solved and supported by all raters.

48
a Fisher exact test, the hypothesis that the proportion of optimistic responders who preferred to destroy is the same as the proportion of pessimistic/realistic responders who preferred to destroy is rejected at the 10% level (p=0.082, one-sided). A binary logit model, with as dependent variable intended destruction (equal to 1 if the intended destruction rate is greater than zero; 0 otherwise) and as explanatory variable the expected take rate, gives further support that expectations are important for the intended decision to destroy (the estimated model, with a coefficient of -0.037, is significant at the 5% level, n=29). The logit model that also includes the take rate is marginally significantly better (likelihood ratio test, p=0.07; coefficient for the take rate is 0.07 and for the expected take rate -0.04).

RESULT 4: Responders in the group experiment expect lower take rates than responders in the effort experiment.

Support. Using a Man-Whitney test, the hypothesis that the expected take rates are drawn from the same distribution is rejected at the 10% level (p=0.0564, two-tailed).

The average expected take rate in the group experiment is 51% and in the effort experiment 66%. Since the actual mean take rate in the group and effort experiment is 60%, responders in the group experiment are (on average) too optimistic. In the discussion in 3.5 we will come back to this result.

Another interesting observation is that responders typically stuck to their intended decisions in the group discussion, even in case of conflicting preferences. Those who wanted to destroy neither seemed to cool off nor got persuaded by more ‘rational’ members during the 10 minutes discussion. Although no formal decision rule was imposed, groups appeared to use a simple majority decision rule to arrive at a group decision. The next result bears this out.

RESULT 5: Although no formal decision rule is imposed, groups appear to use a simple majority decision rule.
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

Support. In seven groups all individual responders had the same intended destruction rate which also turned out to be the group destruction rate. In four groups there was a conflict of intended destruction: two out of three responders in each group showed a preference for no destruction, while the others intended to destroy either something or everything. In three out of those four groups, the destruction rate was equal to the destruction rate preferred by the majority, while in one group a compromise was made at 50%. Finally, in one group we can not conclude whether majority rule was used because the intended destruction rate of one responder could not be determined.

Result 5 suggests that the composition of the group, in terms of individuals’ intended decisions, determines whether the group behavior is more or less ‘rational’ than that of its members.

Emotions at the individual level
The transcripts show that emotions play a role in the group discussion because responders refer to emotions – in particular anger, envy, greed, and revenge – or use emotion loaded words such as “outrageous”, “audacious”, or “exploitation”. There is, however, no evidence that responder groups that destroy use such emotion or emotion loaded words more frequently. Furthermore, it appears that responders use emotions as arguments to convince other responders in their group. For example, in one group a responder replies to another responder who stresses the importance of maximizing group earnings: “that is a logical argument, but, as said, I find that emotions do at least play a role”. Again, there is no evidence that groups that destroy use such arguments more often than groups that do not destroy.

Finally, it is investigated whether individual reported emotions are related to the take and intended individual destruction rate. First, it turns out that there is no significant correlation between the take rate and any of the eleven emotions that we measured (Spearman rank-order coefficient for correlation, p>0.10). However, if the responder’s expectation of the take rate is included in the analysis, there is a significant positive correlation between (take rate – expected rate) and fear (coefficient=0.42,

There is no evidence of any gender difference with respect to reported emotions.
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

A marginally significant positive correlation is found for irritation (coefficient=0.32, p=0.09). Second, if we look at the relation between emotions and intended destruction, the correlation is not significant for any of the eleven emotions that we measured. A marginally significant negative correlation (coefficient=-0.33) is found for jealousy only (p=0.06). In the next section, we will come back to these findings when the power-to-take experiments are discussed.

3.5 Discussion

3.5.1 Effort versus no-effort

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 3.3.1 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 section 3.3.1), which makes it psychologically more costly to destroy. This ambiguity may help explain why the behavior of the take authorities is similar in the

35 Note that there is a significant positive correlation between fear and irritation (Spearman rank-order coefficient=0.36, p=0.03), and between surprise and irritation (coefficient=0.65, p<0.01). Further, note that
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

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. 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 3.1 and 3.3).

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

irritation is positively correlated to contempt (coefficient=0.41, p=0.02).

36 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.

52
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 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.

3.5.2 Group versus individuals

The group experiment has shown that the take rates selected by groups are similar to the rates selected by individuals in the effort experiment and that the destruction of earned income is not limited to individual decision-making only. Furthermore, it appears, at least qualitatively, that expectations drive the intended individual destruction rate in much the same as they drive the decision to destroy in the effort and no-effort experiment. Nevertheless, there are some differences between, on the one hand, emotion and destruction in the effort experiment and, on the other hand, emotion and intended
destruction in the group experiment. Furthermore, there is a difference in the expected take rates, with the responders in the group experiment being more optimistic than responders in the effort experiment. We now try to explain these differences.

A first difference concerns the relation between the (expected) take rate and emotion. While in the effort experiment the take rate is positively related to the intensity of negative emotions, there appears to be no relation between the take rate and emotions in the group experiment. On the other hand, when we look at the effect of the expected take rate on emotion, it turns out that it is negative in the group experiment (fear, surprise, and irritation) but unimportant in the effort experiment. Before we explain this result, first note that there is a significant positive correlation between fear and contempt, fear and irritation, and surprise and irritation. It thus appears that the same type of negative emotions is related to the (expected) take rate in the effort and group experiment. To explain why in the group experiment the expected take rate has an impact on experienced emotions but not the take rate itself, note that there is less variation in the take rates compared to the expected rates. The reason is that responders in each group face the same take rate while their expectations of the take rate differ. Given this difference in variation, the effect of the take rate on emotion is more difficult to measure than the effect of the expected rate. Moreover, the range of take rates in the group experiment is smaller than in the effort experiment, which also makes the effect of the take rate on emotion more difficult to measure. Given that it may be difficult in the group experiment to detect an effect of the take rate on emotion, why do we find an effect of the expected rate on emotion in the group experiment but not in the effort experiment? As argued before in this section (see effort versus no-effort), one reason may be that the expected take rate has an asymmetric effect on emotional intensity because responders turned out to be too pessimistic (on average) in the effort experiment and too optimistic in the group experiment. Given the relatively few responders that appeared to be too optimistic in the effort experiment, its negative effect is then difficult to measure. As argued before, 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.
A second difference between the group and effort experiment concerns the relation between (intended) destruction and emotions. In the effort experiment, negative emotions (irritation and contempt) drive actual destruction. In the group experiment there is no relation between emotion and the intended individual destruction rate. Why would that be? A first reason may that the revealed intended destruction rate in the group discussion deviates from what the responder would do as an individual player (like in the effort experiment). It is possible that responders were influenced by the arguments of other responders when they revealed their preferred destruction rate (often the preferred destruction rates were revealed after some discussion had taken place). For example, if a responder believes her or his preferred destruction rate deviates from what the others prefer, (s)he may adjust it in the direction of the preferred rate of others (conformation). The transcripts, however, show responders typically stuck to their preferred destruction rate in the group discussion (even in case of conflicting preferences). This casts some doubt on the idea that responders areinclined to conform to others when they reveal their preferences. A second reason why there is no relation between emotion and intended destruction in the group experiment may be that destruction is norm driven. In section 3.2.3, we argued that expectations can be related to norms that influence behavior in a more cognitive way. In the group experiment there is evidence that responders’ expectations of the take rate are important for their intended destruction rate. It is possible that the group discussion, which often took place before any preferred destruction rates were revealed, makes responders more aware of social norms. There is evidence from the transcripts that norms about reciprocity do seem to play a role. For example, in one group the decision whether or not to destroy is referred to as a “moral case”, while in another group a responder notes that if you take 75%, “you must live with the consequences”.

A third difference between the group and effort experiment concerns the expectations of responders. Recall that in the group experiment responders were, on average, too optimistic (the take rate is higher than expected) whereas in the effort experiment they were too pessimistic. A first reason for this difference may be that responders expect groups to behave in a more other regarding way. A second reason may be that responders assume that groups destroy more easily than individuals and that take
CHAPTE RR  3.  TH E  POWER-TO-TAKE EXPERIMENTS

authoritie ss  tak e  thi s  into  accoun t  whe n  choosin g  a  tak e  rate.  Obviously,  this  type  of
reasoning  is  more  advanced  because  a  responder  must  know  the  motivations  of  other
responders  in  the  group  and  have  some  model  of  how  these  motivations  interact  in  the
discussion.  Moreover,  the  responder  must  assume  that  take  authorities  use  the  same
model  when  deciding  on  the  take  rate.  Because  expectations  were  assessed  before
responders  came  together  to  make  the  group  decision,  there  was  not  any  discussion  on
this  issue.  With  regard  to  the  take  authorities,  there  is  no  indication  that  they  take  the
interaction  of  responders'  individual  motivations  into  account  when  selecting  a  take  rate.
They  seem  to  consider  the  responder  group  as  a  single  agent.  Although  this  observation  is
not  in  line  with  the  second,  more  advanced,  explanation,  clearly  more  research  is
necessary  to  understand  how  expectations  are  formed  in  group  settings.  This  can  be  done,
for  example,  by  letting  responders  collectively  form  (and  discuss)  their  beliefs  about  the
behavior  of  the  take  authority  group.  Finally,  the  observed  difference  in  the  responder's
expectation  of  the  take  rate  between  the  group  and  effort  experiment  could  be  due  to  a
difference  in  timing  of  the  assessment  of  expectations.  Recall  that  in  the  effort
experiment  expectations  were  assessed  after  responders  learned  about  the  take  rate,
whereas  in  the  group  experiment  they  were  assessed  before  individual  responders  knew
the  take  rate.  Although  we  ascertained  that  in  the  effort  experiment  expectations  are  not
correlated  to  the  take  rate,  it  is  nevertheless  possible  that  they  are  shifted  upwards  when
being  assessed  ex  post.

3.5.3 Other theories

We  now  investigate  to  what  extent  existing  economic  models  can  explain  the  results  of
the  power-to-take  experiments.  A  first  candidate  is  the  standard  game-theoretic  approach,
assuming  rational  self-interested  behavior.  This  model  predicts  that  the  responder  will  not
destroy  any  income  if  the  take  rate  is  less  than  100%  and  is  indifferent  between  all
percentages  of  destruction  if  the  rate  is  100%.  The  data  (see  table  3.1)  of  the  effort
experiment  show  that  18%  of  the  responders  destroyed  income  at  take  rates
(considerably)  lower  than  100%.  In  fact,  27%  of  the  responders  who  faced  a  take  rate  of
70%  already  destroyed  income.  In  the  no-effort  and  group  experiment  some  responders
already  destroyed  everything  at  take  rates  as  low  as  60%.  These  results  clearly  cannot  be
reconciled with the standard model. Moreover, we have found evidence in all three experiments that behavior in the power-to-take game is inconsistent with the standard model. According to our estimated logit model (see result 8 in 3.3.3) the difference between the actual take rate and the expected take rate determines the probability of destruction. In case of effort, this model suggests that responders would even destroy income at rates lower than 70%. For example, when the take rate is 50% and the expected take rate 20%, the probability of destruction is 84%. In the standard model responders’ expectations of the take rate play no role at all.

We next turn to economic models where it is assumed that individuals are not only motivated by their own payoffs. Some recent models assume that people may be motivated by considerations of fairness or equity. In one approach it is assumed that players are not only motivated by their own payoff but also by a ‘relative’ payoff, measuring how their own payoff compares to that of the other player(s). Another approach assumes that players’ concern with the distribution of payoffs depends on the intentions of the other player(s).

The equity or inequality aversion model of Fehr & Schmidt (1999) falls in the first category. It is assumed that people exhibit inequality aversion and are willing to give up money in order to have less inequality. Applied to our power-to-take game, this model does not predict the behavior of take authorities very well. We observe much higher take rates in all experiments, than predicted by this model. With regard to the responders, Fehr & Schmidt predict that responders will never destroy when the take rate is below 50%, and (generally) they will either choose a destruction rate of 0% or 100%. This prediction is in line with the results of our effort experiment and with the group experiment but not with the no-effort experiment where the majority of responders destroyed an intermediate amount of their endowment. Although the probability of punishment according to the

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37 The cooperative game model of taxation of Aumann & Kurz (1977), which is referred to in the introduction, is not very successful either, because it predicts a split-the-difference outcome (that is, a take rate of 50%) with no destruction of income.

38 Another potentially relevant motive that is mentioned in the literature is envy (see, e.g., Feldman & Kirman, 1974). Although we indeed find a positive relationship between the take rate and envy (cf. table 3.3), there appears to be no effect of envy on the behavior of responders in both the effort and no-effort experiment (cf. table 3.4).

39 In addition to these approaches, Levine (1995) developed a model that incorporates both distributional and intentional concerns.

40 A similar model in this category is that of Bolton and Ockenfels (2000).
Fehr & Schmidt model is roughly in line with our (logit) estimates in the effort experiment, our finding that expectations have a significant impact on the probability of punishment is not captured by the Fehr & Schmidt model, since expectations do not play a role in their model.

Another potentially relevant model is that of Rabin (1993). An important feature of this model is that intentions play a crucial role. It is assumed that people are willing to sacrifice their own material well-being to help those who are believed to be intentionally kind and to hurt those who are intentionally unkind. Applying Duwfenberg & Kirchsteiger's (1998) adaptation of this model for sequential games it turns out that, for a certain range of take rates (above 50%), there can be multiple equilibria where responders destroy nothing, some part, or everything of their income. Since in this model it is also possible that responders choose an intermediate amount of punishment, it is in this respect consistent with our results of the effort experiment – though responders in the effort experiment (almost) never choose this option – as well as the results of the no-effort and group experiment. The model, however, does not capture our finding in all experiments that (particularly) if expectations deviate from reality, they have a significant effect on the probability of punishment. Furthermore, Rabin assumes that if the material payoffs become very large, players are no longer willing to sacrifice their own material well-being any more in order to punish (reward) unkind (kind) behavior. Although we have not tested what happens in the power-to-take game when the stakes are increased, this assumption is questionable when taking emotional urges into account. In any case, experimental research on the ultimatum game by Slonim & Roth (1998) shows that even when the financial stakes are very high (62.5 times the hourly wage) subjects still behave reciprocally and reject unfair (but still substantial) offers. From an emotional point view this makes sense. After all, emotions arise when one’s interests are affected. Higher stakes are likely to increase the intensity of emotions, which may cause emotions to progressively seize command over behavior (see chapter 2), even though the cost of giving in to one’s emotional urges becomes higher as well.

41 Hoffman et al. (1996) find that ultimatum game behavior does not significantly change when the pie is increased from $10 to $100.
3.6 Conclusion

The goal of this chapter is to investigate the influence of emotions in a simple two-player power-to-take game that captures some important aspects of economic reality, as discussed in 3.1. Focussing on the (emotional) behavior of the responder, we have identified a new source of efficiency cost: emotional hazard. It appears that emotional hazard is a robust phenomenon that also occurs when groups decide or when endowments are given to subjects like manna from heaven. In the latter case the degree of emotional hazard becomes even greater since responders destroyed more on aggregate when endowments were unearned.

It now becomes an interesting research issue to establish the precise consequences of emotional hazard in institutionally richer economic environments. For example, the effort and group experiments show that if emotions influence behavior, the impact can be quite substantial because subjects make rather ‘extreme’ choices. Even if the number of agents whose behavior is influenced by emotions is not very large, the effect on aggregate can be quite substantial because of these agents’ extreme choices. An important question is to what extent this type of behavior and the efficiency costs that go with it are present outside the economic laboratory. Note that the degree of emotional hazard in our experiment is likely to represent a lower bound. Remember that subjects played the power-to-take game anonymously and were not able to identify one another. When people deal with each other face to face or are able to communicate, emotions are likely to play a greater role because the situation is less abstract. Moreover, people can easily reinforce each other’s emotions and get trapped in a downward spiral. A simple difference in opinion, for example, can easily turn into a heated debate. Processes like these that enhance emotions appear to be particularly relevant for economic situations where agents deal with each other in person, such as principal-agent relationships or monopoly pricing where the buyer deals directly with the seller.

Another interesting issue for future research concerns the strategic manipulation of expectations. Our results show that expectations, in particular the difference between the actual and expected take rate, play an important role in the responder’s decision to destroy income. Is it possible to influence the probability of destruction, and in this way economic efficiency, by manipulating these expectations (e.g. give responders
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

information about selected take rates: cf. Roth & Schoumaker, 1983)? Since the relevant expectations may be determined by relatively stable moral standards of behavior, as discussed in 3.2.3, the answer is not clear at this stage. Furthermore, the behavioral sensitivity to deviations from these expectations may change with more experience or information. Finally, there is even the possibility that agents become more emotional when they find out that they are being manipulated.
Appendix 3A: Instructions power-to-take game

(translated from Dutch)

Two phases
This part of 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 which says how much participant B earned in part I of the experiment. Participant A must choose a percentage and fill this in on the form, together with A’s own income from part I of the experiment. This percentage determines how much of participant B’s income 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 income from part I of the experiment 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 income of participant B that is left. Note that the transfer equals the percentage chosen by participant A of the income 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. Suppose that in part I of the experiment participant A earned 15 guilders and participant B 12 guilders. In phase 1 of part II of the experiment, participant A decides that 60% of the income 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 income from part I of the experiment. Suppose participant B decides to destroy zero percent of his or her income. The transfer from B to A is then equal to 7 guilders and 20 cent (60% of 12 guilders). The total payoff for B at
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

the end of the experiment is equal to 19 guilders and 80 cent (namely, the show-up fee of 15 guilders plus the 12 guilders of part I minus 7 guilders and 20 cent of part II). The total payoff for A at the end of the experiment is equal to 37 guilders and 20 cent (namely, the show-up fee of 15 guilders plus 15 guilders of part I plus 7 guilders and 20 cent of part II)

Now suppose that in this example participant B had decided to destroy 50% of his or her income. In this case the transfer from B to A is only 3 guilders and 60 cent (namely, 60% of the remaining income of participant B after phase II, which is 60% of 6 guilders). The total payoff for A at the end of the experiment is equal to 33 guilders and 60 cent (namely, the show-up fee of 15 guilders plus 15 guilders of part I plus 3 guilders and 60 cent of part II) and for participant B 17 guilders and 40 cent (namely, the show-up fee of 15 guilders plus the 12 guilders of part I minus 9 guilders and 60 cent of part II (of which 6 guilders are destroyed and 3 guilders and 60 cent transferred)

In summary

In phase 1, each participant A will be paired with a participant B by drawing an envelope. The envelope contains a Form which states the income of participant B from part I of the experiment. Participant A fills in his or her own income from part I of the experiment and the percentage that indicates how much of participant B’s income will be transferred to participant A after phase 2. 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 income from part I of the experiment 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 this block the income of participant B is stated. Participant A fills in his or her own income and the percentage. In phase 2, participant B completes the yellow block. In this block, participant B states which part of his or her own income will be destroyed. 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
CHAPTER 3. THE POWER-TO-TAKE EXPERIMENTS

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 on the computer 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, the computers will be switched off and you again have the opportunity to ask questions. After this the experiment will start.

Finally
To secure anonymity, participants A and B will be partially separated 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.
Chapter 3. The Power-to-Take Experiments

Appendix 3B: Decision form

(translated from Dutch)

FORM

Participant A fills in this block:

Income of participant A from part I: ..........  
Income of participant B from part I: xxx  
I (participant A) decide that .......... % of the income of participant B will be transferred to me.

Participant B fills in this block:

I (participant B) destroy .......... % of my income of part I of the experiment.
Appendix C: Emotion questionnaire

(Translated from Dutch)

We ask you to think back of the moment when you received the form and learned about the percentage chosen by participant A. We first ask you to go through the following list of emotion names attentively. Subsequently, we ask you to report the intensity of each emotion that you experienced.

Fear: none

Envy none

Anger none

Sadness none

Happiness none

Shame none

Irritation none

Contempt none

Joy none

Jealousy none

Surprise none

If you believe that one or several other emotion words describe your experience better than the ones mentioned above, please report them below and indicate their intensity:

........................ none

........................ none

........................ none

65