Emotions and Economic Behavior: An Experimental Investigation
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Chapter 6

Summary, evaluation, and future research

Section 6.1 starts out with a summary of all previous chapters in this thesis. In section 6.2, the experimental findings are evaluated. In particular, the question is addressed which set of ingredients would provide a better account of emotions in economic behavior. Finally, in 6.3 some suggestions for future (experimental) research are given.

6.1 Summary

In the last two decades emotions have become a major area of scientific study in psychology. It appears that emotions play an important role in many psychological processes, like learning, attention, and memory. Recent neuroscientific research even suggests that emotions are essential for rational decision-making. Economists, however, have typically neglected the role of emotions in their research. The goal of this thesis is to investigate how emotions influence economic behavior in a series of laboratory experiments. Experienced emotions are measured with the help of self-reports. In each experiment, participants are confronted with a decision problem that reflects in a simple, abstract, but fundamental way an important economic situation. Taxation, investment, bidding in auctions, and bargaining are the type of decision problems covered by this thesis. Each experiment can be seen as a real economic situation because participants are paid according to their decisions and (on average) earn their opportunity costs of time.

Chapter 2 gives a short review of relevant psychological literature. It starts with the question how emotions are defined. Emotions typically arise when one evaluates an event as relevant for one’s concerns or preferences. If concerns are promoted, positive emotions result. If concerns are damaged, negative emotions arise. Positive emotions, like joy or
relief, are experienced as pleasurable whereas negative emotions, such as anger or sadness, are experienced as painful. Emotions thus have a direct hedonic impact. An important feature of emotions is that they are “cognitively impenetrable”: one cannot choose to have or not have emotions, given certain stimuli or events that are relevant for one’s concerns (Frijda, 1986). In the emotion literature, there appear to be two ways to define emotions. First, emotions can be defined in terms of action tendency (bodily components), which is the urge to execute a particular form of action (e.g. approach or avoidance). Whether or not an action tendency results in action depends on the so-called regulation phase where the consequences of executing an action tendency are evaluated.

Second, emotions can be defined in terms of their eliciting conditions (mental components). Loosely speaking, emotions are what causes them. For example, anger is defined as the action of another person that is disapproved of and that has undesirable consequences for the individual itself.

Next, chapter 2 discusses some important aspects of emotions, such as intensity, duration, relation to mood, and effects on cognition and behavior. Finally, the issue of measurement is addressed. In principle, emotions can be measured in terms of behavior (e.g. facial expression), physiology (e.g. heart rate, galvanic skin response), or subjective experience (e.g. awareness of the situation as relevant and urgent with respect to ways of dealing with it, awareness of physiological changes). While each form of measurement has its limitations, assessment of the subjective experience with the help of self-reports is the most widely used method and generally considered to be valuable and useful. Because self-reports are also cheap, efficient, and easy to implement in economic experiments (without much loss of experimental control), this instrument has been chosen for measurement throughout this thesis.

In chapter 3, three experiments on the so-called power-to-take game are discussed. This game models in a simple but fundamental way situations where one agent can (potentially) appropriate part of the endowment of another agent. It captures important aspects of taxation, principal-agent relationships, and monopoly pricing. The game consists of two stages. First, one player (the take authority) can claim any part of the endowment of the other player (the responder). Then, the latter player can respond by destroying (part) of the own endowment. We focus on how emotions influence responder
behavior. The results show that a higher take rate increases the intensity of negative emotions, such as irritation, contempt, and envy, and decreases the intensity of positive emotions like happiness and joy. Furthermore, negative emotions drive destruction and at high emotional intensity, responders typically destroy everything. In addition, expectations of the claim to be made by the take authority turn out to be important for the probability of destruction (responders who are optimistic typically destroy). Because destruction of own resources is inefficient, *emotional hazard* is identified as a new source of efficiency costs. Finally, it appears that emotional hazard is a robust phenomenon: it also occurs when groups decide or when individuals have earned their resources.

Chapter 4 consists of two studies on decision-making under risk. In the first study, it is investigated how anticipated and experienced emotions influence investment behavior. It is find that global risk – i.e. risk independent of an agent’s investment decision (like political risk) – substantially decreases investment. Also effort to obtain the capital used for investment decreases investment substantially. These results are neither in line with expected utility theory nor with psychologically orientated theories of decision-making under risk (e.g. prospect theory or regret theory). The economic relevance of the results is discussed and an explanation is offered that takes the role of experienced emotions and anticipated emotions into account. In addition, an (alternative) emotion-based explanation is provided for related experimental findings concerning the common ratio effect. Finally, it is briefly explored how individuals react to a substantially greater global risk and whether anticipating future emotions affect emotions in the present.

In the second study of chapter 4, it is investigated whether acute emotions affect bidding behavior in a first-price sealed bid auction. Each subject bids in two auction series. To induce emotions, subjects are confronted with a random economic shock, either positive or negative, after the first series. It turns out that the economic shock has a significant effect on subjects’ experienced emotions and mood. Next, the relation between emotions (mood) and bidding behavior in the second auction series is studied. Subjects who experience negative affect, bid significantly higher given their private value, while subjects who are in good mood do not change their bidding behavior. We offer two interpretations for these results – one in terms of revealed risk preferences and one in
terms of probability weighing – and discuss them in light of some related psychological work.

Chapter 5 investigates within the context of an ultimatum bargaining experiment whether emotions and their behavioral effects are robust with respect to time. Because in many economic decision situations individuals often have the opportunity to delay their decisions (which then may be less impulsive and emotion driven), this seems an interesting issue. The first treatment of the experiment is the ultimatum game as it is commonly implemented. It allows one to study whether (‘unfair’) offers evoke emotions and whether these emotions influence rejection behavior. In the second treatment, the responder learns about the offer of the divider immediately but must make the decision whether or not to accept this offer after a one-hour break. This treatment tells one whether time softens emotions triggered by an ‘unfair’ offer and, if so, how this affects responder behavior. It turns out that negative emotions drive rejection behavior and that neither responder behavior nor experienced emotions are affected by the break. This result suggests that emotions are robust in terms of their effect on decision-making because they show up (again) when one actually has to make a decision.

6.2 Evaluation

The most central conclusion of the experiments reported in this thesis is that emotions systematically influence economic decisions in ways not accounted for by existing economic models. An important question now is which set of ingredients would provide a better account of the role of emotions in economic behavior. On the basis of the obtained experimental results, we will argue that the following five ingredients are of importance when dealing with emotions: (i) the framing of the decision situation; (ii) the specific emotion and institution; (iii) emotional intensity; (iv) anticipated versus experienced emotions; (v) hedonic consequences. Furthermore, we will argue that by explaining emotions in terms of cost-benefit models some of these ingredients are likely to get missed.
CHAPTER 6. SUMMARY, EVALUATION, AND FUTURE RESEARCH

Framing of the decision situation

In many economic models the way a decision problem is presented to agents is assumed not to play any role. Experimental research, however, has demonstrated that framing issues can be important in a variety of decision situations. For example, in the context of decision-making under risk there is evidence that individuals react differently to losses compared to gains, and that the particular framing of the decision situation may determine how losses and gains are perceived (e.g. Kahneman & Tversky, 1979). And, in the sphere of ultimatum bargaining, it matters whether the game is presented as an interaction between a buyer and a seller, or as dividing a ‘pie’ between a divider and responder.¹ In the domain of emotions, we will argue that whether emotions are triggered or not (and, if so, which ones and with what intensity) is likely to depend on the particular framing of a decision situation. We offer two pieces of experimental evidence why framing might be important when dealing with emotions.

First, the results of the investment experiment in chapter 4 suggest that global risk (i.e. risk independent of an investment decision) decreases investment because it triggers acute anxiety. Whether anxiety is triggered or not is likely to depend on how global risk is presented to the subjects. We argued that if it is introduced before an investment decision has to be made but resolved after this decision, subjects are likely to perceive it as a salient threat to their concerns (monetary earnings) and, consequently, experience anxiety. In that case, anxiety motivates to reduce risks. However, if global risk is reduced to a single stage – this entails that all probabilities are multiplied with the global risk factor –, there is no threat to lose the return on investments anymore. Consequently, emotions are not very important in this situation and other (more) cognitive motivations are likely to guide behavior.

Second, the results of the power-to-take game in chapter 3 and the ultimatum game in chapter 5 show that expectations can be important for economic decisions. We argued that expectations are related to norms (standards) that either operate as a concern to the individual and influence the intensity of experienced emotions, or as an argument in the regulation phase and affect behavior in a more cognitive way. What individuals expect of others is likely to depend on the particular framing of the decision situation. For

¹ See e.g. Davis & Holt (1993, p. 265) and references therein.
example, the results of the power-to-take game show that if endowments are earned, responders become more pessimistic (expect a higher take rate). In addition, it matters whether players are presented as groups or as individual players because responders become more optimistic when they play against groups.

*The specific emotion and institution*

Given that an emotion is triggered, the behavioral consequences appear to be emotion and institution specific. The evidence that supports this claim comes from the experiments on risk taking reported in chapter 4. First, there is evidence that different emotions affect risk taking behavior in different ways. As already discussed in the context of framing, we argued that global risk in the investment experiment is likely to trigger acute anxiety which motivates to reduce risk. This is in line with our finding that investment decreases when subjects are confronted with global risk. When global risk is increased substantially, it turns out that subjects become significantly more angry but (on average) do not change their investment behavior compared to the situation where there is no global risk. One of the explanations that we offered for this surprising result is that subjects evaluate the high global risk they are subjected to as inappropriate and blame the experimenter. In that case, anger may operate as counter force against anxiety, which is in line with psychological evidence suggesting that anger promotes risk seeking.

More evidence for our claim that different emotions effect risk taking in different ways comes from the auction experiment. In that experiment it was found that bidders who are in a good mood do not change their bidding behavior, whereas bidders who are in a bad mood bid significantly higher. This result shows that positive and negative emotions (mood) can have asymmetric effects on behavior.

Second, it appears that the behavioral effects of emotions can be institution dependent. In the auction experiment, we found that bidders who are in a good mood do not change their bidding behavior, which can be interpreted as their revealed risk preferences not being affected by their mood. This result is not line with psychological evidence suggesting that positive feelings typically reduce risk seeking in the domain of binary lottery choice in order to maintain one’s (good) mood. We have explained this discrepancy by referring to an important difference between the private value auction and
the binary lottery task: in the private value auction the negative consequences of risk taking are much less transparent compared to the lottery choice where all probabilities and outcomes are explicitly stated. In the latter institution, subjects can easily avoid (salient) negative outcomes and maintain their mood by choosing the safe option. The effects of (positive) emotions on risk taking thus appear to depend on the specific institution under which decisions are taken.

**Emotional intensity**

In chapter 2, we discussed that emotions can be defined as action tendencies which have the character of urges or impulses. An important feature of action tendencies – and thus emotions – is that they are programs that have precedence in the control of action and information processing. In particular when the intensity of an emotion is strong, it may surpass what Frijda (1986) calls "regulation thresholds" or "points of no return". In other words, if the intensity of an emotion becomes high, the emotional reaction is more likely to disturb or even override other considerations in the decision-making process.

We have found experimental evidence that is consistent with this picture of emotions. In the power-to-take experiments of chapter 3, it turned out that negative emotions drive the destruction of own (earned) economic resources. In particular, we found that responders who destroyed everything experienced more irritation than responders who destroyed nothing or an intermediate amount. Apparently, when the intensity of emotion is high, responder behavior becomes more extreme. This kind of behavior could be interpreted as responders having surpassed a point of no return. In that case, one may say that the emotional reaction has to some extent hijacked other (more rational) considerations.

Skeptics nevertheless may say that responders who choose extreme actions do so because they simply prefer them (and make them better off). Emotions, they may argue, only operate as an underlying mechanism of preferences. Responders are rational in the sense that they consider their options and choose the one that maximizes utility. While this argument may appear appealing, we think it leaves out some important aspects of emotions. First, if emotions are indeed an underlying mechanism of preferences, then factors that influence the intensity of emotions, such as concern strength, unexpectedness,
arousal, and effort are likely to affect preferences. In that case, preferences are not stable anymore. Second, our interpretation that emotions disturb other (more rational) considerations is supported by psychological evidence. For example, Leith & Baumeister (1996) argue that a negative emotion in combination with high arousal (e.g. anger) leads to less careful rational thought and through this way affects risk-taking behavior. Other evidence, discussed by Caplin & Leahy (2001), shows that anxious individual avoid potentially relevant information. To conclude, emotions do not only shape preferences but are likely to affect the process of decision-making as well, in particular when their intensity is high.

Anticipated versus experienced emotions

When economists deal with emotions, they generally do not distinguish between anticipated and experienced emotions. For example, when an individual chooses to behave honestly in situations where dishonesty would yield a larger payoff (e.g. situations in which detection is impossible or highly unlikely), this behavior can be rationalized by referring to the disutility of guilt that is associated with dishonesty (e.g. Becker, 1976; Frank, 1988). This approach only considers the emotional consequences of actions. Because it is assumed that rational individuals perfectly anticipate these emotional consequences, emotions need not be experienced when a decision is being made. Furthermore, it is assumed that individuals not only consider emotional consequences for themselves but also for others.

In the investment experiment of chapter 4, we argued that a distinction between anticipated and experienced emotions is useful. Anticipating emotions is a cognitive operation, which is not likely to disturb other cognitive evaluations or bias motivations. On the other hand, experienced emotions may systematically bias motivations and/or cognitions. For example, in the investment experiment we argued that global risk decreases investment because it is likely to trigger acute anxiety, which motivates to

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2 Hermalin & Isen (1999) incorporate the effects of positive and negative affect on (strategic) decision-making, without assuming fixed preferences. In their intertemporal model, preferences in a particular period are determined, in part, by affect at the beginning of that period. In this approach emotions shape preferences but do not affect the way decisions are made. Furthermore, their model assumes that agents are able to predict the changes in preferences of other agents, which is not supported by our experimental findings as we will discuss below.
reduce risk. Furthermore, by making a distinction between anticipated and experienced emotions we were able to explain a variety of related experimental results on the common ratio effect (see 4.1.5).

According to Loewenstein (2000) people typically underestimate the impact of future emotions or the impact of emotions experienced by others. The results of the investment experiment suggest that investors do anticipate the greater psychic costs of investment failure when the capital used for investment has been produced by own effort. In other words, we found evidence that individuals anticipate their own future emotions. Whether this anticipation of emotion is still an underestimation cannot be established on the basis of the obtained experimental data.

With regard to the emotions of other agents, we found evidence that these emotions are in some situations completely neglected. In particular, it seems that decision-makers neglect the degree of effort done by others, which, we argued in chapters 3 and 4, is an important determinant of the intensity of negative emotions. In the power-to-take experiments (chapter 3), the take authorities do not anticipate the effect of effort on responder behavior when selecting a take rate since the take rates in the effort and no-effort experiment are similar. Yet responder behavior turned out to be affected by effort, with more destruction in the no-effort experiment.

Hedonic consequences

Because emotions are experienced as either painful or pleasant they have direct consequences for well being. The experiments reported in this thesis provide ample evidence for this claim. For example, in the power-to-take experiments (chapter 3) the take rate has a direct hedonic impact because the intensity of negative (positive) emotions is positively (negatively) related to this rate. And, in the auction experiment (chapter 4), the random economic shock turns out to have a significant effect on bidders’ experienced emotions and mood. Furthermore, it appears that the hedonic impact of an emotion is not limited to those subjects whose behavior is ultimately influenced by it but also affects other subjects. For example, responders in the power-to-take experiment who did not destroy own resources also reported to have experienced negative emotions. These findings suggest that the welfare effects due to the direct hedonic impact of emotions can
be quite substantial (in addition to the welfare effects caused by the behavioral impact of emotions (cf. emotional hazard in chapter 3)).

When economists deal with emotions, they usually try to explain some pattern of behavior that is inconsistent with pursuing own material self-interest. Basically, they refer to the emotional consequences of actions that decision-makers may anticipate when making a decision. For example, when someone cooperates in a one-shot prisoner’s dilemma game, it is explained by referring to the emotional costs of guilt that would be triggered by defection (e.g. Frank, 1988). However, if behavior is consistent with pursuing narrow self-interest, for example when a responder in an ultimatum game accepts an ‘unfair’ offer, the resulting outcome is assumed not to have any emotional consequences. In many instances this need not be the case (as our results of chapter 5 show) and the cost-benefit approach is therefore likely to neglect a potentially important welfare effect.

6.3 Future research

In the individual chapters we have already given several suggestions for future experimental research. Among other things, we mentioned: manipulating expectations, delegation and optimal contracting, risk behavior under different degrees of global risk or other (market) institutions, investigating different types of emotions in auctions, framing issues (keep the economic context the same but manipulate emotional factors), and gathering additional data on experienced emotions (i.e. exploring physiological measurements).

Another interesting topic for future research would be to learn more about how emotions affect the use of information in different decision problems. For example, one could design a market experiment where subjects are not given any information (concerning bids, offers, quantities, etc) but where they have the opportunity to gather information themselves, which is recorded by the experimenter. By manipulating the emotional states of subjects (e.g. via economic shocks), such an experiment may reveal whether different emotional states are related to a different use of information. More
generally, such an experiment may shed more light on the relationship between affective factors and the strategies (decision rules) people use when interacting in markets.

Examining the behavioral effects of emotions under high intensity would also constitute an interesting avenue for future research. As we noted before, when the intensity of an emotion becomes high, it may surpass what Frijda (1986) calls "regulation thresholds" or "points of no return". In other words, emotions are more likely to affect behavior when they are intense. To get a good picture of the economic significance of emotions, we need to study them under a wide range of intensities. Whether it is possible to induce strong emotions in the laboratory is as yet unclear. Because the financial stakes subjects are dealing with are usually of modest size emotions are not likely to be very intense, except may be for negative emotions such as anger and contempt that depend strongly on ego-involvement. A possible way to induce strong emotions is to increase the stakes substantially. While some researchers have already investigated economic behavior in situations where the financial incentives were of considerable size (e.g. Slonim & Roth, 1998), there has not been any study with such incentives on emotions.

Given that emotions have direct hedonic consequences (as we established above), another challenging question for economists would be how to deal with the welfare effects of emotions. One may think that because emotions have a relatively brief duration these welfare effects are expected to be rather minimal. However, the results of chapter 5 suggest that emotions can be triggered again when one thinks about the event that has originally generated them. Given the possibility that past emotions are again experienced, the welfare effects of emotions could be larger than one may suspect at first sight.

Finally, it would be interesting to develop new theoretical models that are able to explain the observed experimental findings and that could be further tested empirically. Although we argued in the previous section that cost-benefit models are likely to neglect many important features of emotions, it is as yet not clear how these new theoretical models would look like. Some researchers have already done some work in this direction either by extending the traditional model (Caplin & Leahy, 2001; Hermelin & Isen, 1999; Wu, 1999) or by suggesting an alternative approach (Elster, 1998; Loewenstein, 2000; Loewenstein et al., forthcoming; van Winden, 2001).³

³ Another approach is to explain emotions in an evolutionary context (Romer, 2000).
The emotion process is clearly a complex one. Many issues are still unresolved. Nevertheless, the experiments reported in this thesis show that emotions can be fruitfully studied in the laboratory. They appear to play an important role as a determining factor of economic behavior. Economist should therefore be interested to learn more about emotions. By doing so, we may get a better picture of the determinants of economic behavior, the welfare consequences thereof, and the ways to deal with it.