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Uncertainty in social dilemmas

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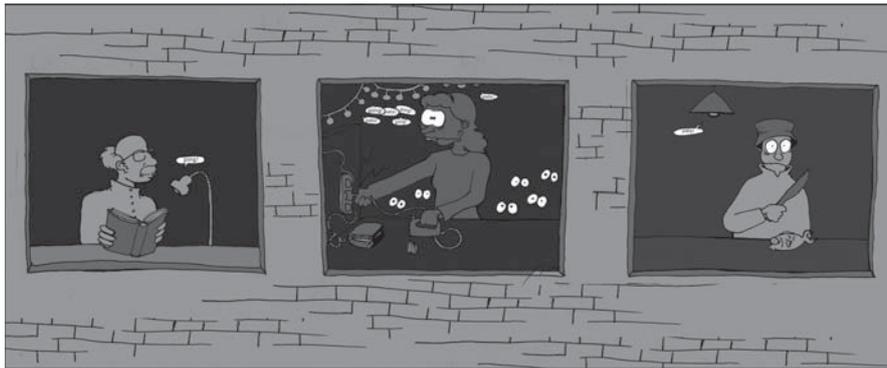
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A real-world social dilemma: the electricity blackout

Chapter 1

Introduction

In many real life situations, people experience a conflict between their own personal interest and the interest of the group to which they belong. For instance, people are often confronted with situations in which they have access to scarce or limited common resources, such as energy, fish, oil or water. Whereas people might be tempted to further their self-interest by harvesting excessively from these common resources, such resources should be consumed wisely and sparingly in order to prevent them from becoming depleted. After all, depletion of the common resource is detrimental to the whole group (Hardin, 1968). A well-known real-life example of such a situation is the environmental problem of over-fishing. In this situation, a group of fishermen have access to a natural common resource, namely the fish population. When individual fishermen choose to further their self-interest by catching as many fish as they can, the collective interest is jeopardized because excessive fishing increases the chance of the fish stock becoming depleted. So whereas individual fishermen may be tempted to overuse the common resource, the collective interest calls for moderate consumption.

Situations such as the one described above are generally referred to as *social dilemmas*. In such social dilemmas, people thus have to choose whether they want to further either their self-interest or the interest of their group. When they choose to further their self-interest this is called *defection* or *non-cooperation* and when they choose to further the collective interest this is called *cooperation*. A non-cooperative choice yields the best pay-off to individual group members (in at least one of the possible outcome configurations; Liebrand & Messick, 1996), whereas all individual group members are better off if all cooperate than if all defect (see Komorita & Parks, 1995; Kopelman, Weber, & Messick, 2002; Weber, Kopelman, & Messick, 2004, for reviews). Social dilemmas in which a group of people have access to a limited common resource are usually referred to as *common resource dilemmas*.¹ A real-life example of a common resource dilemma is the problem of electricity blackouts. Such blackouts occur when the electricity grid breaks down because the collective demand for electricity is higher than the available supply (for more real-life examples, see Ostrom, 1990; Ostrom, Gardner, & Walker, 1994).

¹ The common resource dilemma is one specific type of social dilemma. Another well-known type of social dilemma is the public good dilemma, in which a group of people can contribute endowments to realize a public good. In the present dissertation, I focus primarily on common resource dilemmas. However, in the general discussion I will also discuss the implications of our findings for public good dilemmas.

Environmental Uncertainty in Social Dilemmas

In real life, common resource dilemmas are often characterized by *environmental uncertainty* (Messick, Allison, & Samuelson, 1988). Environmental uncertainty is uncertainty regarding characteristics of the task environment of a social dilemma. In many real-life social dilemmas, it is uncertain how large the common resource is and how many people have access to the common resource. For example, electricity consumers often do not know how large the capacity of the electricity grid is. Experimental studies on single-trial common resource dilemmas are designed to capture the primary elements of the interdependence described in this blackout example. Such studies have shown that environmental uncertainty can have a substantial impact on people's decisions, often leading to over-harvesting and overestimation of the size of the common resource (e.g., Budescu, Rapoport, & Suleiman, 1990; Gustafsson, Biel, & Gärling, 1999a, 1999b, 2000; Rapoport, Budescu, Suleiman, & Weg, 1992; Suleiman & Budescu, 1999). Therefore, in earlier research it was repeatedly concluded that environmental uncertainty is detrimental to the collective interest. However, it should be noted that the bulk of earlier studies have only focused on one specific type of environmental uncertainty, namely uncertainty about the size of the common resource (also referred to as *resource size uncertainty*).

The finding that resource size uncertainty leads to over-harvesting and overestimation of the common resource can be explained in a number of different ways. Two plausible explanations are (a) the *outcome-desirability explanation* and (b) the *egoism-justification explanation* (for descriptions and tests of these two explanations, see Biel & Gärling, 1995; De Kwaadsteniet, Van Dijk, Wit, & De Cremer, 2006; Gärling, Gustafsson, & Biel, 1999; Gustafsson et al., 1999a, 1999b, 2000). The outcome-desirability explanation suggests that people are overoptimistic about the size of the uncertain common resource and that they therefore overestimate the size of this resource. As a result of this over-optimism, they harvest excessively from uncertain common resources. The egoism-justification explanation, by contrast, suggests that people may use environmental uncertainty as a means to justify their own non-cooperative harvesting decisions. In other words, under uncertainty people can justify their over-harvesting by giving higher estimates of the size of the common resource. Experimental studies by Gustafsson et al. (1999a; 1999b; see also De Vries & Wilke, 1992) have yielded results that corroborate the outcome-desirability explanation.

Although these earlier studies have expanded our understanding of the underlying psychological effects of over-harvesting, it should be noted that these studies have primarily focused on the effects of environmental uncertainty on harvesting decisions and resource size estimates. However, groups are characterized by more than just harvests and estimates. After all, groups may be characterized by a broad spectrum of interpersonal processes. In the context of common resource dilemmas,

people may try to (tacitly) coordinate their decisions with their fellow group members; They may try to make decisions they can easily justify to these group members; And they may become angry at one another when they assume that their fellow group members have harvested more than they were entitled to. In order to obtain a more comprehensive picture of the consequences of environmental uncertainty in social dilemmas, such interpersonal processes deserve further investigation. Therefore, the present dissertation will not only focus on effects of environmental uncertainty on harvests and estimates, but also on the influence of uncertainty on interpersonal processes in social dilemmas. It will be argued that environmental uncertainty may have important consequences for several key aspects of these interpersonal processes

To investigate how environmental uncertainty influences interpersonal processes, a new perspective on this topic will be presented. It will be argued that environmental uncertainty can severely hamper the application of the equal division rule. In turn, the notion that the application of this rule is hampered has various different consequences for what happens within groups. More specifically, the present dissertation will show that environmental uncertainty influences three key aspects of interpersonal processes in social dilemmas, namely (a) how people tacitly coordinate their choice behavior, (b) how they justify their decisions to others, and (c) how they respond affectively to other people's choice behavior.

The Importance of the Equal Division Rule

In a typical experimental common resource dilemma, participants are collectively endowed with a resource of money or chips from which each group member can harvest. As long as the total group harvest does not exceed the resource size all individual harvests are granted. If the collective harvest, however, exceeds the amount available in the common resource, the resource becomes depleted and all group members receive zero outcomes (e.g., Budescu et al., 1990; Gustafsson et al., 1999a, 1999b; Rapoport et al., 1992), as in the case of an electricity blackout. Therefore, it is in the interest of each individual group member as well as in the interest of the group that the total group harvest does not exceed the size of the common resource.

In common resource dilemmas, it is therefore important for people to coordinate their harvesting decisions efficiently. To prevent individual and collective interests from being harmed, group members must make sure that the common resource is not overused. However, efficient coordination is often hampered by the fact that group members cannot communicate with one another. Furthermore, group members often do not know what their fellow group members will decide. In other words, in most social dilemmas people are confronted with *social uncertainty* (also referred to as *strategic uncertainty*; Messick et al., 1988). How can people coordinate under social uncertainty? The answer to this question lies in the concept of *tacit coordination* (Schelling, 1960).

The concept of tacit coordination was developed by the Nobel prize winning economist Thomas Schelling (1960). Schelling argued that even in the absence of communication people can often coordinate their decisions. To illustrate this, he gave an example of two people who want to meet each other in New York City without having a prior understanding on where and when to meet. Where would one go and at what time? Schelling asked participants this question and found that the majority of the people answered that they would go to Central Station at 12.00 noon. If people would indeed act accordingly this would mean that tacit coordination would be highly effective. Van Dijk and colleagues (e.g., Van Dijk & Wilke, 1995, 1996; Van Dijk, Wilke, Wilke, & Metman, 1999) applied this concept of tacit coordination to social dilemmas. They argued that in social dilemmas, people can successfully coordinate their choice behavior by anchoring their decisions on so-called coordination rules.

Which coordination rule is most often applied in social dilemmas? Earlier research (e.g., Allison, McQueen, & Schaerfl, 1992; Allison & Messick, 1990; De Cremer, 2003; Rutte, Wilke, & Messick, 1987; Van Dijk & Wilke, 1993, 1995; Van Dijk et al., 1999) has shown that in *symmetric* common resource dilemmas (i.e., all group members have equal access to the common resource), most people request an equal share of the common resource. For instance, if a common resource of 500 coins is owned by five group members, most group members will decide to harvest one-fifth – or 100 coins – from that common resource. In other words, most people will decide to base their harvesting decisions on the *equal division rule*. If all group members do so, the common resource is optimally used and there is a perfect balance between individual and collective interests. Thus, by anchoring their decisions on coordination rules – such as the equal division rule – people can successfully coordinate their choice behavior.

However, the equal division rule is not only useful because it facilitates efficient coordination, but also because it is a rule that generates decisions that are considered to be “fair” (e.g., Messick, 1993; Stouten, De Cremer, & Van Dijk, 2005; 2006). After all, when all group members decide to adhere to the equal division rule, all individual group members end up with an equal share of the common resource. In symmetric common resource dilemmas, an equal division is generally considered to be a fair outcome. Thus, the application of the equal division rule may not only be helpful to ensure optimal use but may also help to establish a fair division of the common resource.² Furthermore, since the equal division rule is such a fair rule it also generates decisions that can be easily justified to fellow group members. Altogether, these characteristics make the equal division rule highly appealing (Messick, 1993).

Additionally, since the equal division rule may promote group efficiency and

² It may be interesting to note that Schelling himself (1960, p.73) already hinted at the coordinating potential of fairness by writing that “the moral force of fairness is greatly reinforced by the power of a fair result to focus attention, if it fills the vacuum of indeterminacy that would otherwise exist.”

fairness – and the rule is only successful when all group members use it – people also want their fellow group members to adhere to it. Therefore, they may try to enforce the use of the equal division rule. As a consequence, when they learn that their fellow group members have violated this rule, they will react quite negatively to these group members. More specifically, when they learn that someone has harvested more than an equal share they will become angry at this person and they will try to punish this rule violator for his/her defection (e.g., Stouten, De Cremer, & Van Dijk, 2005, 2006). Thus, the equal division rule may not only influence people's own harvesting decisions, but also how they respond to their fellow group members' decisions. In several different ways, the equal division rule thus seems to be important for how people behave in social dilemma situations.

The Equal Division Rule and Environmental Uncertainty

Can people always apply the equal division rule? What happens, for instance, when there is uncertainty about the environmental characteristics of a social dilemma? In the present dissertation, I will argue that under uncertainty the application of the equal division rule is severely hampered. After all, in order to apply the equal division rule people need specific and accurate information about the task environment of the social dilemma. For instance, to calculate an equal share people need to know exactly how large the common resource is and how many group members are sharing the common resource. When they do not have such accurate environmental information they cannot easily calculate how large an equal share is and application of the rule is hampered. As a consequence, environmental uncertainty may influence several factors that are related to the application of the equal division rule, such as the interpersonal processes described above, namely: tacit coordination, justifying decisions, and emotional and retributive reactions to others.

As was mentioned earlier, environmental characteristics are often uncertain in real-life common resource dilemmas. Therefore, the importance of environmental uncertainty has been widely acknowledged by social dilemma researchers. In the past two decades, numerous experimental studies have been conducted to investigate this topic (e.g., Au & Ngai, 2003; Budescu et al., 1990; De Vries & Wilke, 1992; Gustafsson et al., 1999a, 1999b, 2000; Hine & Gifford, 1996; Rapoport et al., 1992; Roch & Samuelson, 1997; for overviews, see Biel & Gärling, 1995; Van Dijk, Wit, Wilke, & Budescu, 2004; Suleiman & Budescu, 1999). However, as I mentioned before, earlier research on environmental uncertainty has mainly focused on harvesting decisions and resource size estimates. By also focusing on how such uncertainty influences interpersonal processes in social dilemmas, the present dissertation aims to add new insights to the existing literature in order to generate a more comprehensive picture of how people deal with environmental uncertainty in social dilemmas.

Overview of the Present Dissertation

The present dissertation focuses on how environmental uncertainty in social dilemmas influences several different factors. As was mentioned earlier, the fact that environmental uncertainty hampers the application of the equal division rule has a number of different consequences. In the above, it was argued that the equal division rule influences three key aspects of interpersonal processes, namely: (a) how people tacitly coordinate their decisions, (b) how they justify their decisions to others, and (c) how they respond to the decisions of their fellow group members. Until now, it has hardly been investigated how these important issues relate to environmental uncertainty. In the present dissertation, I will therefore investigate how these factors are influenced by environmental uncertainty in social dilemmas.

The first two empirical chapters (i.e., Chapters 2 and 3) focus on how environmental uncertainty affects tacit coordination and how such uncertainty interacts with individual differences (i.e., people's social value orientations). This topic is investigated by manipulating uncertainty about the size of the common resource (referred to as *resource size uncertainty*; see Chapter 2) and by manipulating uncertainty about the size of the group (referred to as *group size uncertainty*; see Chapter 3). In these chapters, it is argued that uncertainty hampers tacit coordination. These two chapters show that whereas under certainty people base their harvesting decisions on external cues (i.e., the equal division rule), under uncertainty they base their decisions on internal cues (i.e., their own social value orientations).

In Chapter 4, it is investigated how people justify their own harvesting decisions to their fellow group members when there is uncertainty about the size of the common resource. To do so, (a) participants are asked about the justifiability of different hypothetical harvests and (b) it is investigated how justification pressures influence their own harvesting decisions under varying levels of resource size uncertainty. This chapter shows that under certainty people justify their harvesting decisions by adhering to the equal division rule, whereas under uncertainty they justify their decisions by restricting their harvests.³

In Chapter 5, it is investigated how people respond to overuse under resource size uncertainty. More specifically, in a series of three studies people's emotional and retributive reactions to overuse are investigated. Furthermore, it is argued how these reactions can be explained by their causal attributions. This chapter demonstrates that the same negative outcome (i.e., overuse) can elicit different affective and retributive reactions, depending on whether or not the social dilemma is characterized by environmental uncertainty.

³ I would like to note that Chapters 2, 3 & 4 were based on papers that have either been published or that have been submitted for publication. Consequently, these chapters can be read separately and there exists some overlap between them (especially between the introductions of these chapters).

In Chapter 6, all of the findings of this dissertation will be summarized and discussed. Additionally, the general implications of these findings will be discussed and suggestions for future research will be presented.