

The background of the cover is a watercolor illustration of several human figures in profile, facing right. The figures are rendered in a soft, painterly style with a palette of muted colors including blues, greys, yellows, and pinks. The figures are layered, with some appearing more prominent than others, creating a sense of depth and social interaction. The overall composition is abstract and evocative, suggesting themes of human connection and social behavior.

Paul A. M. Van Lange  
Daniel Balliet  
Craig D. Parks  
Mark Van Vugt

# SOCIAL DILEMMAS

The Psychology of Human Cooperation

OXFORD

## ■ Social Dilemmas



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*The Psychology of Human*

*Cooperation*

Paul A. M. Van Lange

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## ■ P R E F A C E

Social dilemmas are a pervasive feature of human society. They are a basic fabric of social life, and challenge dyads, groups, and societies. They did so in the past, they do so now, and they will do so in the future: Social dilemmas cross the borders of time: our ancestors must have faced many social dilemmas in their small groups and societies. Even the literary figure, Robinson Crusoe, must have quickly learned about social dilemmas after Friday entered his life. Similarly, we often face social dilemmas at home, at work, or many other places where we are interdependent with other people. Newspapers are filled with articles about societal problems that frequently are rooted in conflicts between self-interest and collective interest, such as littering in parks, free-riding on public transportation, evading taxes, pursuing bonuses in the financial world, or exploiting natural resources. And social dilemmas may involve many people who do not know one other, may include different countries, and for some issues, such as global change, may concern the entire world. In many respects, social dilemmas also cross “the borders of space.”

As the title indicates, this book is about social dilemmas, which are broadly defined as conflicts between (often short-term) self-interest and (often longer-term) collective interest. This book is also about the psychology of human cooperation. In the course of this book, it will become clear that social dilemmas and human cooperation are two sides of the same coin. Social dilemmas challenge our capacity and motivation to cooperate with each other. Life without social dilemmas would be relatively straightforward and pain-free: People would just behave as they liked as if guided by Adam Smith’s invisible hand—at least as long as they were able to coordinate actions with others. But life without social dilemmas is utopian. In our interactions with friends and partners, work colleagues, or members of clubs and communities and societies at large, there are frequent conflicts between our narrow self-interests and the collective interest.

This book provides many different examples of social dilemmas, and we will see that they challenge the maintenance of our close relationships, our friendships, our work, and leisure life, our politics, security, health, and the natural environment in which we live. One could make the claim that the primary purpose of government and management is to resolve social dilemmas. We would not be surprised that a careful analysis would reveal that the majority of all challenges (80 percent is a wild guess) that governments and management face are rooted in situations that are, or closely resemble, social dilemmas. How can we promote spontaneous help from bystanders, how can we activate citizenship and mutual help among employees in our work organizations? How can we restrain overfishing? How can we promote commuting by public transportation? How can we reduce greed and excessive bonus cultures in the financial world? How can we maintain trust and cooperation among nations, and promote national security? Social dilemmas can

be easily over-recognized, but it *is* a challenge to entertain the thought exercise of finding social issues at the level of relationships, organizations, or governments that do not share elements of social dilemmas. They exist—but not so easy to find.

Social dilemmas are important and ubiquitous. Because social dilemmas capture so many situations that matter to all of us, they are of great scientific interest. They touch upon basic questions about human nature, such as: are people naturally selfish, altruistic, or perhaps both? While cooperation is a big theme in the scientific literature, studying the psychology of human cooperation raises various questions about constructs that are intimately linked to it, such as trust, prosociality, reciprocity, fairness, culture, norm violation, emotions, reputation, social learning, adaptation, reward and punishment, and many other important theoretical concepts. For example, specific issues such as forgiveness, morality, tolerance (of exploitation), generosity, retaliation, deceit, and competition (or spite) are all relevant to the study of social dilemmas, and some of these phenomena can be easily placed under its rubric.

It is a real treat to write about social dilemmas. And it is an even greater treat to do so with true friends. We have worked very well—both together *and* alone, in that order. We had a number of meetings at various places around the world, we had a few dinners, and while we did most of the writing individually, after we agreed about the basic structure of the book, we worked as a virtual team. While thinking about the contents of this book, we reached the following conclusions. There should be a chapter about the history and methods of social dilemmas because it is an established field of research and there have been many developments in the analyses of different experimental games since the first empirical articles on the prisoner's dilemma game emerged. Part 1 of the book offers an introduction to social dilemmas. Chapter 1 focuses on definitions and assumptions underlying social dilemmas. Chapter 2 provides an historical account of social dilemma research with a special focus on methods and experimental paradigms.

We did not have to think long about including a chapter on the psychological perspective on social dilemmas, because that is the perspective we take as social psychologists studying social dilemmas. Although our overall perspective on social dilemmas is colored by our own discipline, we also agreed about including a chapter on evolutionary approaches to social dilemmas because this theoretical perspective has guided the field from the start. We also felt that we needed to include a cultural approach to social dilemmas because of the importance of cultural differences in cooperation. The importance of culture is illustrated by some older studies on social dilemmas, as well as more recent studies which have compared the same games in many different countries, societies, and cultures. Part 2 addresses these perspectives, the evolutionary perspective (Chapter 3), the psychological perspective (Chapter 4), and the cultural perspective (Chapter 5).

Without much hesitation we also decided that we needed chapters on societal applications of social dilemma research. Each of us has worked on applications of social dilemmas. Some of us have conducted field research on environmental dilemmas, others on management and organizational dilemmas, and still others on social dilemmas in politics and security. Chapter 6 summarizes research on social dilemmas in management and organizations. Chapter 7 reviews applications of

social dilemma research in the domains of environmental sustainability, politics, security, and public health. We decided to add these latter themes because of their urgency, and because we strongly believe in the utility of a social dilemma approach for studying and resolving these dilemmas. Yet we acknowledge that more research is needed, especially on important societal dilemmas. The concluding chapter, Chapter 8, outlines the prospects for the future of social dilemmas and human cooperation, addressing major new trends in research, theory and application.

We hope to reach a broad audience of scientists in various fields and disciplines, as well as the interested reader or practitioner who is committed to resolving social dilemmas in various domains of social life. As we note in the various chapters, and as suggested by the title, our primary approach has been psychological: we address the psychology of human cooperation. We felt it would be premature, and too ambitious, to write a textbook on social dilemmas that includes anthropological, biological, economical, mathematical, or philosophical perspectives as well. It would be unrealistic to convey the impression that we actively pursue the dream of interdisciplinary coverage of the social dilemma literature. In other words, we do not really capture all perspectives on human cooperation in social dilemmas. We hope to do so in the future some time, as we all think this is a very important service to the field. But for now, we think that our coverage of the psychology of human cooperation is comprehensive and reasonably exhaustive, at least when focusing on the past two decades of research on social dilemmas. We also recognized the importance of discussing some basic issues—the bigger theoretical or societal issues—that are inspired by social dilemma research. Obviously, science is not complete if there are no remaining issues left to be addressed.

Clearly, a book that involves four authors, even four true friends, is a challenge. The way we worked was that each chapter was assigned to one of the four authors of this book. Chapters 1, 4, and 8 were prepared by Paul Van Lange, Chapters 2 and 6 by Craig Parks, Chapters 3 and 7 by Mark Van Vugt, and Chapter 5 by Daniel Balliet. Each of the chapters was read by other authors and discussed in detail, both face-to-face and via e-mail. This led to many important additions and revisions. All along, we knew that our shared goal was to write a comprehensive state-of-the-art book on the psychology of social dilemmas. We are not in the position to judge whether we have succeeded, and we reserve judgment on this to our readers—academics, students, practitioners, and the broader public.

We would like to extend our gratitude to a number of people for making valuable contributions to the completion of the book. Social psychologist Jeff Joireman has made significant inputs to Chapters 1 and 4. Evolutionary biologist Pat Barclay has made important intellectual contributions to Chapter 3. Several people have been supportive of this book project from the start whom we would like to thank for their help. Margaret Foddy has shown continuous support throughout the book project, and has contributed to our thinking about the outline and structure of the book. We are grateful to David Schroeder, Norbert Kerr and Mike Kuhlman, whose genuine interest in this project strengthened our conviction and motivation to initiate and complete this project. We also want to thank Abby Cross who has expressed her enthusiasm from the very beginning at a meeting of *Society and Personality and Social Psychology*, and throughout the three years after that

meeting while we wrote the book. We want to thank Niels van Doesum for comments on the final writings, and Lisanne Pauw who has organized, checked, and rechecked, the long list of references. Finally, we would like to thank all members of the broad international social dilemma community that comes together at the bi-annual meetings at some exotic location in the world. We are proud members of this community and without the intellectual inputs of each of the members of this social dilemma network, this book could simply not have been written.

Finally, we hope that you will enjoy reading this book—as a student, a fellow academic, teacher, practitioner, or member of the general public—and that it makes a meaningful difference, even if only a small difference, in how you think about cooperation and how to promote cooperation in our everyday lives and society at large.

The authors, December 2012

## ■ Social Dilemmas





PART ONE

## Introduction to Social Dilemmas



# 1 Introduction to Social Dilemmas

## ■ INTRODUCTION

What determines how well an organization will do in business? What determines how well a national soccer team will do in World Cup? What determines whether a marriage or relationship will thrive and survive rather than end? What determines the quality of the environment that the world seeks to protect? Of course, skill and talents are crucial. A business might benefit from skill and foresight in strategic planning, or coming up with the right product at the right time. Having an exceptionally skillful player on the team might make a big difference. Perhaps the ability to communicate clearly, along with the ability to listen and provide support, might promote well-functioning relationships. And the society's ability to provide technological solutions to environmental issues (e.g., development of cleaner cars) do help.

But above and beyond differences in ability (talent and skill), the health and vitality of relationships, groups, and the society at large is strongly challenged by social dilemmas, or conflicts between short-term self-interest and long-term collective interest. Organizations fare better if their employees are willing to go the extra mile; teams perform better if individuals are willing to share success rather than primarily pursue their own success; acts of sacrifice help partners in a relationship and marriage; and exercising restraint on consumption, such as eating particular fish that risk depletion, helps to maintain a healthy environment. Pollution and depletion of natural resources are among the most urgent social dilemmas. And even various forms of intergroup conflict, as in the Middle East, share features with social dilemmas. After all, members of groups typically prefer peace over hostility since peace meets a basic desire for security (and peace is less costly). Thus, a good deal of what we see on headline news, what we read in newspapers and news sites on the Internet, and what we experience at work or at home resembles aspects of social dilemma.

Many social dilemmas are challenging because acting in one's immediate self-interest is tempting to everyone involved, even though everybody benefits from acting in the longer-term collective interest. For example, relationships are healthier if partners do not neglect each another's preferences, organizations are more productive if employees spontaneously exchange expertise, and nations fare better when they show respect for one another's values, norms, and traditions. Similarly, in the long run everyone would benefit from a cleaner environment,

Paul van Lange had primary responsibility for preparation of this chapter.

yet how many are prepared to voluntarily reduce their carbon footprint by saving more energy or driving or flying less frequently?

### ■ THE HUIZINGE CASE

One real world social dilemma occurred during the winter of 1979 in Huizinge, a small village in the north of the Netherlands. Due to an unusually heavy snow, Huizinge was completely cut off from the rest of country so that there was no electricity for lighting, heat, television, and so on (Liebrand, 1983). However, one of the 150 inhabitants owned a generator that could provide sufficient electricity to all the people of this small community, if and only if they exercised substantial restraint in their energy use. For example, they could use only one light, they could not use heated water, heat had to be limited to about 18 degrees Celsius (64 degrees Fahrenheit), and the curtains had to be closed. As it turned out, the generator collapsed because most people were in fact using heated water, and were living comfortably at 21 degrees Celsius (70 degrees Fahrenheit), watching television, and burning several lights simultaneously. After being without electricity for a while, the citizens were able to repair the generator, and this time, they appointed inspectors to check whether people were using more electricity than agreed upon. But even then, the generator eventually collapsed due to overuse of energy. And again, all inhabitants suffered from the cold and lack of light, and of course, could not watch television. Indeed, there is little doubt that they all had preferred a situation in which they could use at least some electricity (a result of massive cooperation) rather than no electricity at all (a result of massive noncooperation).

Social dilemmas can be quite intense, as the Huizinge case illustrates. They are also quite ubiquitous. In fact, many of the world's most pressing problems represent social dilemmas, broadly defined as situations in which short-term self-interest is at odds with longer-term collective interests. Some of the most widely-recognized social dilemmas challenge society's well-being in the environmental domain, including overharvesting of fish, overgrazing of common property, overpopulation, destruction of the Brazilian rainforest, and buildup of greenhouse gasses due to overreliance on cars. The lure of short-term self-interest can also discourage people from contributing time, money, or effort toward the provision of collectively beneficial goods. For example, people may listen to National Public Radio without contributing toward its operations; community members may enjoy a public fireworks display without helping to fund it; employees may elect to never go above and beyond the call of duty, choosing instead to engage solely in activities prescribed by their formally defined job description; and citizens may decide to not exert the effort to vote, leaving the functioning of their democracy to their compatriots.

Social dilemmas apply to a wide range of real-world problems; they exist within dyads, small groups, and society at large; and they deal with issues relevant to a large number of disciplines, including psychology, sociology, political science and economics, to name but a few. Given their scope, implications, and interdisciplinary nature, social dilemmas have motivated huge literatures in each of these

disciplines (see also Fehr & Gintis, 2007). Also, disciplines have tended to focus on only one type of the social dilemma. For example, the two-person prisoner's dilemma was very popular in social psychology during the 1970s; this was followed by greater appreciation for other social dilemmas, including social dilemmas involving a greater number of people. In some social dilemmas, the act of cooperation involves "giving" to a public good, in other social dilemmas, it is "not taking too much" from a shared resource. We will now take a closer look at the various types of social dilemmas, and the different names that various scientists have used to capture a specific social dilemma. Once we have illustrated a family of social dilemmas, we will also be able to provide a more formal definition of a social dilemma.

### ■ SOCIAL DILEMMAS: A FAMILY OF GAMES

Social dilemmas come in many flavors. Sometimes cooperation means giving or contributing to the collective, sometimes it means not taking or consuming from a resource shared by a collective. Sometimes the time horizon is short, even as short as a single interaction, sometimes it is long-lasting, almost without an end as in ongoing relationships. There are social dilemmas involving two persons, and social dilemmas involving all people living in a country, continent, or even the world. Not surprisingly, the diversity in social dilemma settings has led researchers to offer a range of different definitions for the concept. In his *Annual Review of Psychology* article, Robyn Dawes (1980) was one of the first who formally coined the term *social dilemma*, which he defined as a situation in which (a) each decision maker has a dominating strategy dictating non-cooperation (i.e., an option that produces the highest outcome, regardless of others' choices), and (b) if all choose this dominating strategy, all end up worse off than if all had cooperated (i.e., a deficient equilibrium).

But as we will see, while focusing on the crux of the dilemma, this definition does not do justice to some other outcome structures (or more precisely, interdependence structures) that also capture the conflict between self-interest and collective interest. These include not only the Prisoner's Dilemma, but also the Chicken Dilemma, and the Assurance Dilemma (or trust dilemma). This definition also does not include the temporal or time dimension (e.g., Messick & Brewer, 1983; Van Lange, Joireman, Parks, & Van Dijk, 2013), because consequences can be immediate (short-term) or delayed (long-term). A more inclusive conceptualization allows us to include social traps, social fences, public good dilemmas, and resource dilemmas (see Table 1.1). We briefly discuss both features in turn.

*Prisoner's, Chicken, and Assurance Dilemmas.* The well-known Prisoner's Dilemma has often been used as the basis for defining social dilemmas, which is also evident in Dawes' definition. We suggest that two other outcome interdependence structures can also be viewed as social dilemmas, if one relaxes the requirements for a dominating strategy and a single equilibrium. These structures include the Chicken and the Assurance (or Trust) Dilemma. In both dilemmas, the individual versus collective conflict essential to social dilemmas is retained: there is a non-cooperative course of action that is (at times) tempting for each individual,

TABLE 1.1. *Classification of Social Dilemmas (after Messick and Brewer, 1983)*

	Collective Consequences	
	Immediate	Delayed
Social Traps		
<ul style="list-style-type: none"> <li>• Take Some Dilemmas</li> <li>• Commons/Resource Dilemmas</li> </ul>	Commuting by car (vs. public transportation, or carpooling) leads to daily traffic congestion and stress	Harvesting as many fish as one can from a common resource eventually leads to the collapse of the resource
Social Fences		
<ul style="list-style-type: none"> <li>• Give Some Dilemmas</li> <li>• Public Goods Dilemmas</li> </ul>	Electing to not contribute to a community-funded fireworks show results in cancellation of the show	Choosing to not engage in extra-role behaviors that benefit one's company eventually leads to a deterioration of the company's positive culture

and if all pursue this non-cooperative course of action, all end up worse off than if all had cooperated (see Figure 1.1)

In the *Chicken Dilemma* (also termed the Hawk-Dove game or the Snow Drift game), each person is tempted to behave non-cooperatively (by driving straight toward one's "opponent" in an effort to win the game), but if neither player cooperates (swerves), both parties experience the worst outcome possible (death). Clearly, Chicken does not involve a dominating strategy, as the best decision for an individual rational decision maker depends on what he or she believes the other will do; if one believes the other will cooperate (swerve), the best course of action is to behave non-cooperatively (and continue driving ahead); however, if one is convinced that the other will not cooperate (will not swerve), one's best course of action is to cooperate (swerve), because it is better to lose the game than to die. There are interesting parallels between Chicken and situations in which people are faced with the dilemma whether to maintain honor or status when they are closely at risk (see Kelley, Holmes, Kerr, Reis, Rusbult, & Van Lange, 2003). For example, Chicken is a situation in which you should exhibit toughness (by being a hawk) by not cooperating, and clearly outperform the other if the other does not cooperate (who is the dove). Intimidation may play a role by communicating toughness, or a "no surrender" attitude. These are also risky strategies: if both participants express such toughness, then the result may be that one needs to change to cooperation (and lose face), or persist in noncooperation and maintain honor, but seriously risk death. Over time, this may result in a snow drift, especially if

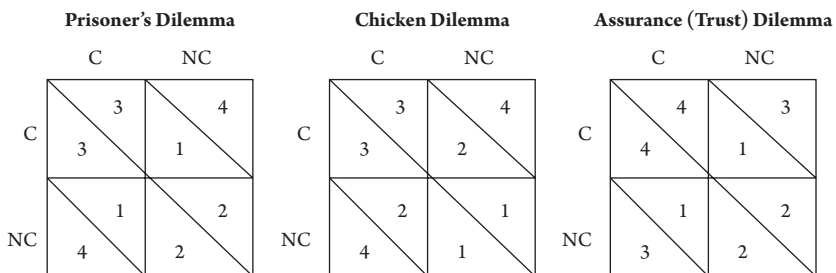


Figure 1.1 Three Social Dilemmas.

people are committed not to lose face. In everyday life, such situations may arise when two companies are involved in an intense competition to lower the price of their product to a point that is “killing” for both, or to guarantee treatment (early delivery of the product) than can never be implemented.

The *Assurance (Trust) Dilemma* also lacks a dominating strategy, and is unique in that the highest collective *and* individual outcomes occur when both partners choose to cooperate. This correspondence of joint and self outcomes might suggest that the solution is simple, and there is no dilemma. However, if one party considers beating the other party to be more important than obtaining high outcomes for the self and others, or is convinced the other will behave competitively, the best course of action is to not cooperate. The Assurance Dilemma is sometimes described as resembling features of the relationship between the USA and Soviet Union during the cold war, in which disarming represented the cooperative choice and arming the noncooperative choice (e.g., Hamburger, 1979). To jointly disarm was clearly the best solution for both countries, yet being the only one to disarm would have made one nation terribly vulnerable, because it may have yielded the worst possible solution. Thus, the two countries armed for a long time because they failed to trust one another, believing that the other party was seeking relative advantage, and therefore was to be considered very threatening. As another example, two athletes want to be involved in a fair contest, in that neither takes drugs to promote their performances. However, if one athlete suspects that the other might take drugs, it is perhaps best to take drugs as well to minimize the odds of losing due to unfair disadvantages (Liebrand, Wilke, Vogel, & Wolters, 1986).

The similarity between the Prisoner’s, Chicken, and Assurance Dilemmas is that all three situations involve *collective rationality*: Cooperative behavior by both individuals yields greater outcomes than does noncooperative behavior by both individuals. Specifically, the best (Assurance) or second best (Chicken, Prisoner’s Dilemma) possible outcome is obtained if both make a cooperative choice, whereas the third best (Assurance, Prisoner’s Dilemma) or worst (Chicken) possible outcome is obtained if both make a noncooperative choice. In the Prisoner’s dilemma, tendencies toward cooperation are challenged by both greed (i.e., the appetitive pressure of obtaining the best possible outcome by making a noncooperative choice) and fear (i.e., the aversive pressure of avoiding the worst possible outcome by making a noncooperative choice; Coombs, 1973). In Chicken, cooperation is challenged by greed, whereas in Trust, cooperation is challenged by fear. Thus, in a sense, the Prisoner’s Dilemma “combines Chicken and Assurance, representing a stronger conflict of interest, involving both fear and greed. Consistent with this analysis, research has revealed that individuals exhibit greater levels of cooperation in Assurance and Chicken than in the Prisoner’s Dilemma (Liebrand et al., 1986).

*The temporal dimension.* We often see that the consequences for the self can be immediate or delayed, just as the consequences for the collective can be immediate or delayed. This temporal dimension is exemplified in *social traps*, or situations in which a course of action that offers positive outcomes for the self leads to negative outcomes for the collective (Messick & McClelland, 1983; Platt, 1973). Examples of delayed social traps include the buildup of pollution due to over-reliance on

cars, and the eventual collapse of a common fishing ground as a result of sustained overharvesting. Given their emphasis on “consuming” or “taking” a positive outcome for the self, social traps are often called *take some dilemmas*, a classic example of which is the *commons (or resource) dilemma*. This is the kind of social dilemma that attracted environmental scientists to examine the variables that help people to exercise restraint in their consumption of shared resources.

These social trap situations may be contrasted with *social fences*, or situations in which an action that results in negative consequences for the self would, if performed by enough people, lead to positive consequences for the collective. Examples of delayed social fences include the eventual deterioration of a company’s positive culture due to employees’ unwillingness to engage in extra-role (or organizational citizenship) behaviors, such as being a good sport and helping new employees adjust, and the gradual deterioration of an education system due to taxpayers’ unwillingness to fund school levies. Given their emphasis on “giving” something of the self (such as time, money, or effort), social fences are often called *give some dilemmas*, a classic example of which is the *Public Goods Dilemma*. This is the kind of social dilemma that attracted experimental economists in particular to examine the variables that help people to contribute to public goods, and resist the temptation to free-ride on the contributions of other members.

## ■ A DEFINITION OF SOCIAL DILEMMAS

We define social dilemmas as situations in which a non-cooperative course of action is (at times) tempting for each individual in that it yields superior (often short-term) outcomes for self, and if all pursue this non-cooperative course of action, all are (often in the longer-term) worse off than if all had cooperated (see also Van Lange, Joireman, Parks, & Van Dijk, 2013). This definition is inclusive of the well-known Prisoner’s Dilemma, as well as the Chicken Dilemma and the Assurance Dilemma, and it includes the correlation with time, such that consequences for self are often immediate or short-term, while the consequences for the collective often unfold over longer periods of time.

Although the above definition of social dilemmas is fairly comprehensive, we acknowledge that other important distinctions are not included. One such distinction is the difference between *first order dilemma*, which represents the initial dilemma, and a *second order dilemma*, which represents the dilemma that one might face when deciding whether to contribute to a costly system that might promote cooperation in the first order dilemma (e.g., a system that sanctions free-riders, Yamagishi, 1986a). Cooperation in the first order dilemma is known as *elementary cooperation*, while cooperation in the second order dilemma is known as *instrumental cooperation*. As the reader will see in this book, a good deal of contemporary research on social dilemmas has also been devoted to instrumental cooperation in second order dilemmas, providing strong evidence that many (but not all) people are quite willing to engage in costly behavior to reward other group members who have cooperated and punish those who have not cooperated (e.g., Fehr & Gächter, 2002). And as has been common in social dilemma research (e.g., Bornstein, 1992; Pruitt & Kimmel, 1977), several scientists are