

FRAMING AND SOCIAL INTERACTION

An Experimental Study of Associative Framing

Associative framing is said to be present when two or more contexts differ in normative charge and this results in decision makers changing their behavior between the contexts. Since norms are thought to matter in social dilemmas, associative framing could affect the cooperation rate in such situations. This experimental study investigates the features of associative framing in social dilemmas. As earlier studies exhibit imperfections in their experimental design we start by confirming that an associative framing effect in social dilemmas does exist. Second, we show that social interaction between human actors is a necessary prerequisite for this effect to occur. We do this by using a unique design that eliminates social interaction from one of the two parts of the experiment. Third, we find a clear gender difference in sensitivity to associative framing, with women being much more sensitive than men. This is in congruence with prior studies indicating that women are more responsive to social norms than men. Moreover, we use a post-experimental questionnaire in order to get a clearer picture of the underlying processes behind associative framing. The answers from the questionnaire indicate that this process is to a large extent unconscious to the subject.

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1 INTRODUCTION

An underlying assumption in neoclassical economic theory is that people, when making decisions, behave according to a stable set of preferences. These preferences are thought to be built upon the actor being egoistic and rational. In most rational choice models this implies that the preferences should not change between different situations. (See e.g. Becker, 1971.)

Nonetheless, when observing reality it becomes clear that the assumption about stable preferences does not hold. Rather, the real world is inhabited by people who appear to change preferences from day to day and behave unselfishly in some occasions and selfishly in others. This discrepancy between model and real world is a potential problem, since it is not clear whether the predictions of the model will hold for the real world. (See e.g. Kahneman, 2003.)

The phenomenon that behavior is context-dependent is called *framing* and the different contexts are, accordingly, called *frames*. The concept of framing was first introduced by Tversky and Kahneman (1981) and the main idea is that depending on how a decision problem, for example in the form of a game like the ultimatum game or the prisoner's dilemma game, is posed, people will respond differently to it and make different decisions. According to Cookson (2000) the framing effect

...is said to be present when different ways of describing the same choice problem change the choices that people make, even though the underlying information and choice options remain essentially the same. (p. 55)

McCaffery and Baron (2004) depart from what they mean by a frame and deduct a definition of framing effects from there:

A "frame" refers to a purely rhetorical characterization of an underlying constant factual reality. That the purely formal framing of a situation has effects on individual choice of evaluation violates a principle fundamental to rational choice, that of preference invariance. (p. 681)

These two citations might seem very similar but there are, as we shall see below, significant dissimilarities in how the concept of framing is used in different academic disciplines and even between how it is used by various researchers within economics.¹

In this paper we study a type of framing that is called *associative framing*. Associative framing is said to be present when different framings of the same problem give the decision makers mental access to such different norms that they make different decisions in the two frames. Thus, an underlying idea behind associative framing is that norms matter for decision making. (See e.g. Selten, 1998; and Rege and Telle, 2004.) More specifically, we

¹ The various definitions of framing are discussed at length in section 2.1.

study associative framing in social dilemma situations. The reason for this is that norms are thought to matter greatly for the behavior in such settings. (See e.g. Schroeder, 1995; and Ostrom, 2000.)

Associative framing applied on social dilemmas has only recently been studied by economists, for example by Rege and Telle (2004) who found some evidence for the hypothesis that people cooperate more in a public good game (PG-game) when it is framed as a Community game than when it is neutrally framed. There is, however, also relevant psychological research on associative framing. The psychologists Ross and Samuels (1993) conducted an experiment where they found a significantly higher rate of cooperation in the prisoner's dilemma game (PD-game) when the game was framed as a Community game compared to when it was framed as a Wall Street game. Batson and Moran (1999) found similar evidence when the PD-game was framed as either a social exchange study or a business exchange study.²

Despite the existence of these studies, there is still no certainty whether an associative framing effect in social dilemmas exists. There are, to our knowledge, no unproblematic studies where an associative framing effect has been shown. For example, the associative framing effect that Rege and Telle (2004) found almost disappeared when they introduced the concept of social approval into their model. When it comes to the psychological studies, the implementation of the experiment is often problematic. Ross and Samuels (1993) had very low real payoffs and a questionable selection of experimental subjects. Moreover, their subjects played face to face, possibly giving rise to a number of uncontrollable effects. Batson and Moran (1999) deceived their subjects, had no real payoffs and also mixed different areas of interest (associative framing and empathy-induced altruism), making it difficult to evaluate the conclusions in either field.³

Another feature of the research on associative framing is the lack of studies that investigate the mechanisms behind the effect. Although there have been some mechanism studies on other types of framing there is, as far as we know, no such research when it comes to associative framing. When commenting Ross and Samuels (1993), Ross and Ward (1996) explicitly ask for that kind of research. Even though it has not been tested, some researchers have as a hypothesis that social interaction, since it is believed to be of importance for norms, could be of importance for associative framing as well. (See e.g. Bicchieri, 2002; and Kay and Ross, 2003.)

Not only is there uncertainty about whether associative framing, if it exists, is tied to social interaction or not. The current research also says very little about how such an associative framing effect differs between groups of experimental subjects, for example be-

² In section 2.4 below these and other relevant studies of associative framing in social dilemmas are discussed further.

³ There are several reasons why these various features complicate the interpretation of the results. See section 3.1 for a discussion about methodological issues in experimental economics.

tween women and men. This could potentially be an area of interest, since it is sometimes claimed that women and men differ in their behavior in for example the dictator game, the ultimatum game and the PD-game (see e.g. Camerer, 2003).

Furthermore, the associative framing research does hitherto not make it clear to what extent associative framing is a conscious or an unconscious process to the subject. One way of expanding the knowledge about this is by investigating whether conscious motives and associations differ between frames and by examining if the subjects remember the features of the frame after the experiment is completed. This could be important since framing effects are sometimes seen as a problem; for example disturbing the results of economic experiments or other research. It should be easier to mitigate this problem with better knowledge about the origin of the framing effect. (See e.g. Harrison et al, 2004 for examples of situations where framing effects are problematic for the researcher.)

In order to expand the knowledge about framing effects, most researchers conduct some sort of experiment in a controlled environment. The main reason is that this method enables an investigation of the influence of one specific variable, holding other influencing factors constant (see e.g. Friedman and Cassar, 2004). We follow this methodological tradition in the sense that we also conduct an economic experiment in order to answer our research questions.

Building on the discussion above we want to accomplish four things in this paper. First, we want to investigate whether there is an associative framing effect in social dilemma games. If such an effect is found we want to continue by studying if the existence of associative framing is dependent on social interaction. Third, we will examine whether there is a gender difference in the associative framing effect. Fourth, we will try to extend the knowledge about to what extent the process behind the associative framing effect is conscious to the subject. This leads us to formulate the following four research questions:

1. *Is there an associative framing effect in social dilemma games?*
2. *Is social interaction necessary to generate associative framing?*
3. *Is there a gender difference in the sensitivity to associative framing?*
4. *To what extent is the process behind associative framing conscious?*

The practical relevance for this study can be found in many different areas; a greater understanding of associative framing should, for example, make it possible to improve communication in areas such as marketing and politics. Since social dilemma situations often are present in reality (for example in environmental and welfare issues, see Schroeder, 1995), our research could provide a piece of the puzzle of how to solve social dilemma problems. Furthermore, the importance of a better knowledge about associative framing for future research can hardly be overstated since it could help adjust the neo-

classical economic models to reality and thus contribute to better and more reliable economic predictions.

The paper is arranged as follows. In section two, we outline relevant prior research and theory needed for our study. This comprises not only framing theories, but also theories about social dilemmas and PD-games. Thereafter, in section three, we go through the experimental method which is used in the study and also present the design of our experiment. In section four, the results of our study are presented and analyzed. Section five concludes.

2 THEORETICAL BACKGROUND AND PRIOR RESEARCH

This section covers the theoretical background and the prior research. We begin by describing the phenomenon of framing and its various definitions and forms. Next, we go through the most common theoretical approaches used to explain the existence of framing effects. Thereafter, an introduction to the concept of social dilemmas is given. In the concluding part, these different areas are tied together in a section that presents the prior research on associative framing in social dilemmas.

2.1 Framing as a Phenomenon

The mere observation that human behavior often is context-dependent is the foundation for all framing research. The agreement among researchers does not go much further, however. Most studies on framing have their own definitions of framing and hence this field of research is not very well structured. (See e.g. Nelson and Oxley, 1999; and Druckman, 2001, for examples of different definitions of framing.) Druckman (2001) expresses this:

What is needed is a unifying theory or framework to organize the wide variety of framing effect results. This is particularly important because of the fragmented nature of the literature; indeed, as should be apparent, much research on framing effects proceeds with little attempt to connect itself to other related work. (p. 246)

The task of structuring prior research on framing is not made easier by the vast amount of studies. In his survey, Kühberger (1998) found that a total of 248 framing papers had been published by 1997 and there are no indications that the pace with which new framing articles are written has declined. Kühberger also concluded that framing is a topic in many different fields of research, ranging from sociology and applied medicine to psychology and economics. The multitude of research and the fact that it has its origin in many different research areas makes it virtually impossible to cover all aspects of framing in this paper. Thus we focus, first, on papers that are of great influence across the research areas, second, on relevant research from psychology and third, on research made within economics or in closely related fields of research.

Another important distinction between different types of framing research is if the researcher sees framing effects as something that causes problems for research or as something that is interesting in its own right. An example of the former view of framing is found in DeShazo (2002), where framing effects are seen as a disturbance in conducting experiments. This view is also held by Harrison et al (2004) who, rather unsuccessfully, try to develop a model to mitigate framing effects. However, most researchers, including ourselves, are of the opinion that framing is fascinating in itself because it can tell us something about how people behave and how departures from traditional rational choice theory can be modeled.

To bring some order into the definitions of and views on framing we have chosen to structure the field into three main categories. First, we have *risky choice framing*, which is the original type of framing in the sense that it was the type first introduced. Second, there is *procedural framing* which is a type of value neutral framing. Our third framing category is *associative framing*, which is the type of framing studied in this paper.⁴ With these groups, we cover the vast majority of research in the framing field. However, because of the existence of research that is best characterized as outliers, we cannot claim to cover all possible variants of framing.⁵

Risky choice framing was first described by Tversky and Kahneman (1981) although they simply called the effect framing (since there were no other types of framing to relate to). Their main example, the Asian disease problem, is still probably the best known example of framing. The subjects were presented with two different programs and asked to decide between them. The two programs were, however, described in different ways to different subjects, namely with a survival frame and a mortality frame. The survival frame was formulated as follows:

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are [sic] as follows: If Program A is adopted, 200 people will be saved. If program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved. Which of the programs would you favor? (Tversky and Kahneman, 1981, p. 453)

The mortality frame was identically described except for the last part (where program A corresponds to program C and program B to program D):

If Program C is adopted 400 people will die. If program D is adopted there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die. (Tversky and Kahneman, 1981, p. 453)

It is easy to see that the problems are effectively identical and that the only difference is that the outcomes are described as 'lives saved' in the survival frame and as 'lives lost' in the mortality frame. Tversky and Kahneman (1981) found, however, that this change gave rise to an obvious shift in preferences with a vast majority in the survival frame preferring program A and a corresponding majority in the mortality frame preferring program D.

This type of framing, where risky choices are presented in a positive and a negative frame, has later been applied in various fields, by both Kahneman and Tversky (e.g. 1984;

⁴ In this categorization we were inspired by Levin et al (1998), Levin et al (2002), Blount and Larrick (2000), and Rege and Telle (2004) who all use classifications that are in one way or the other similar to our.

⁵ For example, Carpenter et al (2004) play the ultimatum and the dictator game with students and with workers and claim that this difference in subjects is a *social framing*. Elliott et al (1998) have a very wide definition of framing and state that *institutions* (as described e.g. in North (1990)) and frames are more or less the same thing.

and Tversky and Kahneman, 1986) and others. The conclusion is often, but not always, that a positive frame induces risk aversion and that a negative frame stimulates risk taking. (See e.g. Kühberger, 1998; and Levin et al, 1998.)

Procedural framing is different from risky choice framing in the sense that the two frames do not differ in value charge. Instead of a positive and a negative frame, there is some difference in the procedure between two frames. One example is provided by Pruitt (1967 and 1970) who, without explicitly calling it framing, examined the behavior that different decompositions of PD-games induced. He found that different motives, and hence different behavior, were stimulated by the various decompositions. For example, when the decomposition emphasized the cooperative action in the PD-game as an action of “being nice”, the rate of cooperation increased compared with a decomposition where this aspect of the action was not highlighted. The results led him to conclude that

...although the DPD [decomposed PD-game] reduces algebraically to the standard PD, it does not necessarily reduce behaviorally to that game. (Pruitt, 1967, p. 26)

Another example of procedural framing comes from Croson (1996). She conducted experiments where the subjects played an ultimatum game with either an absolute frame (where the subjects were informed about the total amount of the resources and the offer in US-dollars) or a percentage frame (where the subjects were informed only about the percentage offer). She found some support for the hypothesis that fairness as a motive became more important when the relative distribution was highlighted in the percentage frame, thus strengthening Pruitt’s (1970) idea about different motives being induced by different procedural frames. A similar idea was suggested, and not rejected, in the context of a beauty contest game by Duffy and Nagel (1997).

Procedural framing has also been investigated by van Dijk and Wilke (2000) who studied a PG-game by structuring the game as either a give-some or a keep-some situation. The way of describing the choice at hand affected the levels of contributions significantly. They proposed that this framing effect was due to different norms being activated depending on whether focus was put on what you contribute or keep.⁶ (See also e.g. Andreoni, 1995; Sonnemans et al, 1998; Willinger and Ziegelmeyer, 1999; Park, 2000; and Cookson, 2000.)

Associative framing is different from risky choice framing in that the decisions made not necessarily have to involve risk in the sense that Tversky and Kahneman (1981) used it. It differs from procedural framing in that it is not value neutral. Instead, associative framing is about introducing norms into the decision, for example by giving the frames different names or describing the situations differently.

⁶ Since various, value charged, motives are induced by the procedural framing, it can be questioned whether the procedural framing is as value neutral as sometimes thought.

Although the concept of associative framing was not introduced until fairly recently, the idea that the normative charge of a context matters for decision making is not new. For example, Eiser and Bhavnani (1974) conducted an experiment where they let subjects play a PD-game in four different frames.⁷ Even though they found that the rate of cooperation was higher in non-economic conditions, their conclusions can hardly be seen as more than indicative because of the many flaws in the way that the experiment was conducted.⁸

Since the purpose of this paper is to study associative framing in social dilemma games, we dedicate part 2.4 to previous research in this field. Hence, the above passage on associative framing should only serve as an introduction to the concept of associative framing, comparing it to risky choice framing and procedural framing.

Before this part is concluded, there are two other research topics that need to be introduced. First, there is the question of whether people that are “experts” in some sense are immune to framing. Second, there is some research concerning differences between women and men in sensitivity to framing.

Among the advocates of rational choice theory who claim that behavioral phenomena are of little importance to economic theory it is common to object that experimentally studied behavioral “anomalies” will disappear if the experiments are done on experts instead on, for example, students. The idea is that people who are trained in handling probabilities or making decision within a specific area of expertise become “immune” to behavioral fallacies. This issue has been raised also within the framing research field. The hypothesis that experts are less prone to framing has, however, been rejected almost every time it has been tested. (See e.g. Rabin, 1996; and Kühberger, 1998.)

Women and men are sometimes found to show different behavioral deviations from what rational choice models predict. It has been hypothesized that this could apply to framing as well. The experimental results have been inconclusive however. Most studies, among them Elliot et al (1998) and Levin et al (2002), have shown no gender difference in sensitivity to framing whereas a few, for example Cullis et al (2006), have found that men are more sensitive to framing than women.⁹

2.2 Explanations for the Occurrence of Framing

There is still much research needed in order to explain the occurrence of framing effects. As with the definitions of framing, the theories trying to explain framing effects are het-

⁷ Eiser and Bahvnani (1974) used the word condition instead of frame, as the concepts of frame and framing were not introduced before 1981.

⁸ We return to these flaws and other aspects of this study in section 2.4.

⁹ The gender based results are, however, most often a side effect and not the primary purpose of the study. Therefore, no great effort has been made in order to explain the results.

erogeneous. The theories that exist are, in general, developed to explain a certain type of framing effect rather than the phenomenon as a whole. (See e.g. Weber et al, 2004.)

In the following, different explanations for the existence of framing are presented. This is done in three steps. First, the most formalized theory, *prospect theory*, is presented. Thereafter, we focus on social norms as an explanatory approach. After that, the explanatory power of individual factors such as personality traits and gender are discussed.

The most consistent theory for explaining framing effects is prospect theory. It is often said to have been the starting point for behavioral economics and was first presented in Kahneman and Tversky (1979). However, prospect theory was not primarily developed with framing effects in mind but rather to explain how people make decisions under risk. The central thesis in this theory is the S-shaped value function, as shown to the left in figure 2.1 below, which has three distinguishing features:

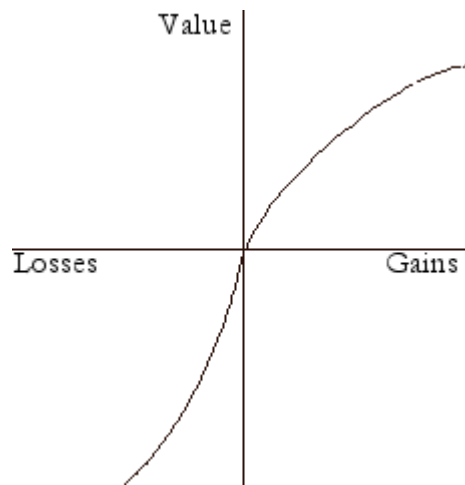
The value function is (i) defined on deviations from the reference point; (ii) generally concave for gains and commonly convex for losses; (iii) steeper for losses than for gains. (Kahneman and Tversky, 1979, p. 279)

The rationale behind this reasoning is that human perception is focused on changes rather than on absolute values and that we perceive a change from ten to 20 as larger than one from 50 to 60. Hence, in explaining deviations from the notion of actors having stable preferences, prospect theory emphasizes the functioning and boundaries of human perception and cognition.

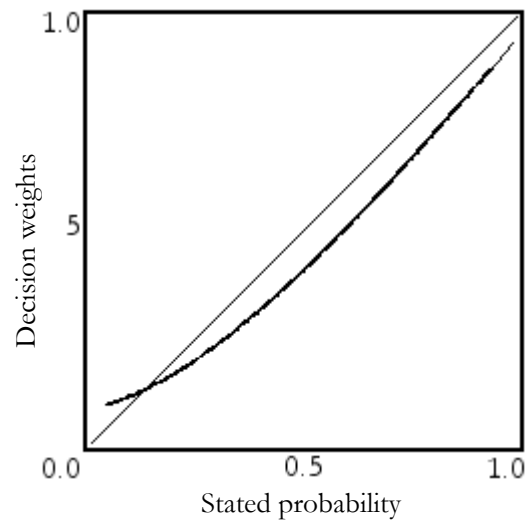
Another important feature of prospect theory is the idea of decision weights. These measure the impact of events on the attractiveness of prospects. Generally, small probabilities are over-weighted and large probabilities are ascribed too little weight. This idea is illustrated in the right-hand figure below.

Figure 2.1: Prospect theory (Source: Kahneman and Tversky, 1979)

The S-curve



Decision weights



Prospect theory divides the decision making into two phases. The first phase is one of editing where a preliminary analysis and a simplification of the choice at hand are made. In this phase, framing effects may play an important role in the perception of the different options by affecting what is perceived as the reference point or in how the decision is simplified. In the second phase the prospects are evaluated and the prospect with the highest value is chosen. (See Kahneman and Tversky, 1979; and Tversky and Kahneman, 1986.)

Although prospect theory explains the occurrence of risky choice framing effects rather well, it is difficult to apply this theory to procedural and associative framing. One problem is that in more complex situations, with, for example, social interaction, it is unclear what prospect theory would predict. In such a situation there is no longer a certain reference point from which to depart thus depriving prospect theory of much of its explanatory power. (See Sonnemans et al, 1998; and Cookson, 2000.)

To compensate for the shortcomings of prospect theory when it comes to other areas than risky choice framing, new explanatory approaches must be found. A path to follow is that of social norms. Many researchers have concluded that these are important and govern much of the behavior and interaction in society. (See e.g. Kerr, 1995; Pillutla and Chen, 1999; Ostrom, 2000; and Weber et al, 2004.)

The importance of norms has been thought to apply also to framing, with researchers proposing that what we view as appropriate behavior depends on which behavioral norms that are activated in a certain situation. When the individual has to make a decision under uncertainty she turns to norms for the provision of a behavioral basis. The associative frame is thus thought to influence the perception of the situation and hence what is seen as the “correct” behavior. (See e.g. Montgomery 1998; Selten, 1998; Pillutla and Chen, 1999; Eek and Biel, 2003; and Rege and Telle, 2004.)

Theories emphasizing social norms are closely related to role theory. This theory argues that each individual contains many different roles. Which role is most prominent depends on the characteristics of this situation. Thus “role theorists might presume that self-classification (‘Who am I?’) is a constantly recurring problem of pattern recognition” (Montgomery, 1998, p. 98). In concurrence with role theory, researchers have suggested that the frame highlights particular preferences held by the individual rather than affecting the actual preferences held. (Nelson and Oxley, 1999; Camerer et al, 2003; and Kay and Ross, 2003.)

One can distinguish between two different ways of looking at how norms affect behavior; one centering on the individual’s image of self and one that focuses on reputation and prestige. (See e.g. Kerr, 1995; and Kiesler et al, 1996.) Kerr (1995) argues that despite some norms possibly being related to both self-image and prestige

...such distinctions may still be useful for identifying the conditions under which various norms may affect cooperation [...]. For example, cooperation induced by social norms would require different conditions (e.g., opportunity for surveillance by the group; concern with acceptance by the group) than cooperation induced by personal norms. (p. 33)

Explanations focusing on the ‘image of self’-aspect of adherence to norms build on the idea that norms are internalized. The obedience to a norm makes us feel good and consequently we follow the norm irrespectively of being observed by others when doing so. (See e.g. Kiesler et al, 1996; and Rege and Telle, 2004.) In accordance with this reasoning, Kiesler et al (1996) study how people interact with computers through pre-game communication and promises. They conclude that their work

...suggests that commitments can be elicited fairly easily, even by a machine. If keeping their word is important to people’s self-identity and feelings of self-worth, and if they gain personal and social benefits from sticking to social contracts, then they might value even commitments to a computer. (p. 63)

Following this reasoning, interaction with other human beings should not be an important factor for the occurrence of associative framing.

However, norms could also affect behavior through concerns for one’s reputation. The individual obeys the rules because she wants to be perceived as a “good” person and thereby increase her prestige. Since reputation and prestige depend on the judgment and hence presence of others, this approach centers on the importance of social interaction for the adherence to norms. (See e.g. Bicchieri, 2002; and Rege and Telle, 2004.) Rege and Telle (2004) state that since people want others to approve of them

[s]imply the suspicion that someone dislikes ones behavior may constitute a significant social cost for someone disobeying a social norm. (p. 1626)

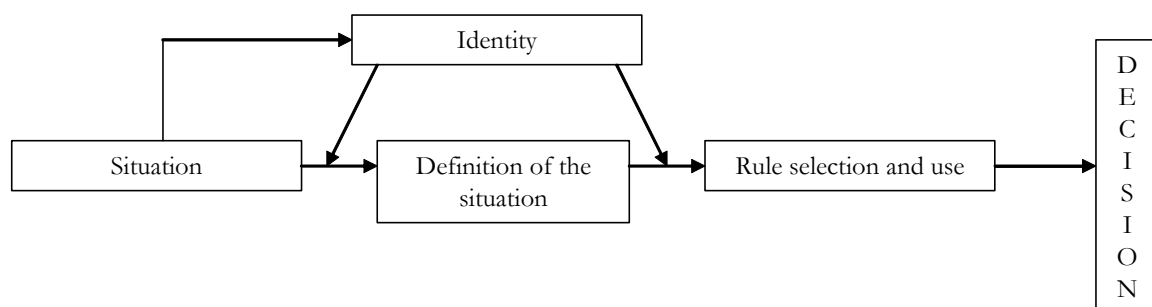
In accordance with this way of reasoning, we should expect an associative framing effect only in situations with social interaction.

Even though norms can provide an explanation as to why certain frames generate higher aggregate levels of cooperation than others, there are still large differences in individual behavior within each frame. Some people, or groups of people, seem to be more responsive to framing.

Several researchers have proposed that this variation could be explained by differences in personality. Levin et al (2002) and Park (2000) studied whether various personality traits, such as an individualistic or cooperative value orientation, affect the sensibility to framing. In concurrence to their hypotheses, their results showed that different personalities do react differently to framing. This held for both magnitude and kind of framing. However, these results were contradicted by Sonnemans et al (1998) who found no support that specific personality traits affect the responsiveness to framing.

Weber et al (2004) have developed a theory that combines the personality dimension with the social norm explanation. In what they call the *logic of appropriateness* framework (presented in figure 2.2 below) they identify three considerations that guide the individual when making a choice. These are the classification of the situation with respect to the normative context, the identity and personality traits of the individual and the selection of what behavioral rules to use in the situation.

Figure 2.2: The logic of appropriateness framework (Source: Weber et al, 2004)



Among explanations emphasizing group characteristics, theories about gender are the most prominent. Many studies have reached the conclusion that women are more socially orientated and men more individually orientated. (See Camerer, 2003; and Croson and Gneezy, 2004 for an overview of the field.)

However, experimental economics research on social interaction games has arrived at mixed conclusions concerning gender differences in behavior. In some studies women have been found to be more cooperative and generous while in others men seemed to be more giving. (See Eckel and Grossman, 1998.) Eckel and Grossman (1998) proposed

that one possible explanation for this ambiguity is differences in the sensitivity to the judgment of others.

This idea is consistent with the conclusion in Croson and Gneezy (2004), that women are more responsive to the social context than men. The findings in Andreoni and Vesterlund (2001) that men's altruism diminished more rapidly with increased cost than did women's, further point to women being more sensitive to social norms than men. This was also indicated by the results in Mellström and Johannesson (2006) where women adhered stronger to the individualistic norms induced by a market setting.¹⁰ If women are more sensitive to social context than men, we can expect the framing effect to be larger for women.

2.3 Social Dilemmas

The origins of social dilemma research can be traced back to the mid-1960s and especially to Olson's (1965) *The Logic of Collective Action* and Hardin's (1968) "The tragedy of the commons". The idea behind a social dilemma is that there is a conflict between a person's self-interest and the common good. Thus, there are three conditions that have to be fulfilled in order for a game to qualify as a social dilemma:

- (1) [A] noncooperative choice is always more profitable to the individual than a cooperative choice, regardless of the choices made by others; (2) a noncooperative choice is always harmful to others compared to a cooperative choice; and (3) the aggregate amount of harm done to others by a non-cooperative choice is greater than the profit to the individual. (Kopelman, 2002, pp. 113-114)

The applications of social dilemma research are many. Schroeder (1995) mentions a few and concludes that there are real life examples of social dilemmas in resource management and social traps as well as in issues about provision of public goods. In its simplest form, a social dilemma can be described as the well known PD-game:

Figure 2.3: Payoff-matrix of the PD-game

		Subject 1	
		A	B
Subject 2	A	R R	T S
	B	T S	P P

In the PD-game, two subjects choose simultaneously between A and B as shown in figure 2.3. The payoffs of subject 1 are shown in the upper right corner and the payoffs of

¹⁰ These articles are inconclusive when it comes to *why* women are more sensitive to social norms than men. One potential explanation, however, can be found in feminist theory. Gemzöe (2002) refers to Hirdman, who claims that since men constitute the norm in a gender structured society, women learn to a higher degree to adjust their behavior to what is "right".

subject 2 are stated in the lower left corner. Further, the payoffs are such that the following conditions are fulfilled:

$$T > R > P > S \text{ and } R > \frac{S+T}{2}. \quad (2.1)$$

This payoff structure implies two things. First, according to conventional rational choice theory, the PD-game has a unique equilibrium in both parties playing B. This is based on the assumption that subjects maximize their own payoff. Second, the collective payoff if both subjects choose A is larger than the collective payoff in the case where one or both players choose B. Hence, the conflict between self-interest and common good is created. Most often, the action A is seen as the *cooperative action* and the action B is seen as the *defective action*. (See Poundstone, 1992; and Camerer and Thaler, 2003.)

Since the payoff structure potentially can influence how the players choose to act, indexes have been developed in order to simplify comparison of PD-games with different payoff matrixes. The most well known is called *Rapoport's K-index* and is calculated as follows (Schroeder, 1995, p. 18):

$$r_1 = \frac{R-P}{T-S}. \quad (2.2)$$

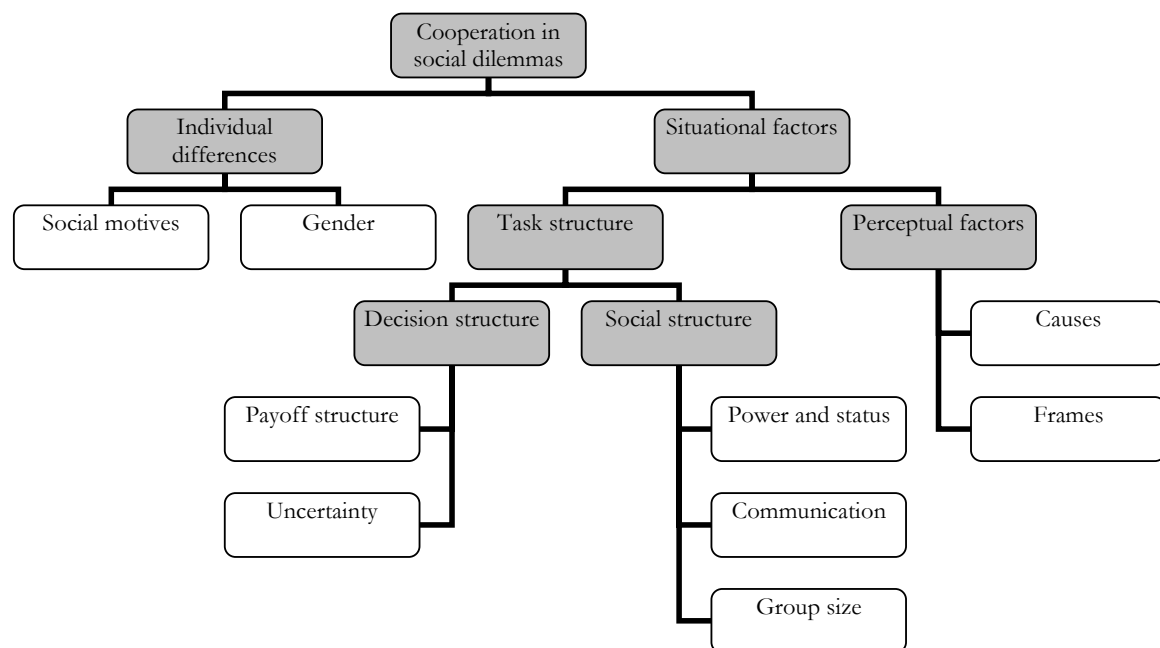
The social dilemma can also be set up as an n-people PG-game. A PG-game is organized so that each subject has some resources which they can either keep for themselves or contribute to a common pool. The amount that is contributed is multiplied by some factor and distributed evenly between all subjects, thus making the total payoff higher when more is contributed. However, the multiplying factor is set so that it is always a dominant strategy for each subject not to contribute anything but hope that the others will contribute. (See e.g. Andreoni, 1995; Pilutla and Chen, 1999; and Rege and Telle, 2004.)

Despite the prediction that everyone should defect in the PD-game and contribute nothing in the PG-game, the rate of cooperation in reality is somewhere around 50 percent on average (see e.g. Bicchieri, 2002; and Ostrom, 2000). The question then becomes: Why do people cooperate in one-shot social dilemma games? The short answer is that people cooperate because they do not only care about monetary payoff, but also about other things such as fairness and reputation. For example, Rabin (1993) has developed a fairness-adjusted PD-model to make clear why it is sometimes in the individual's best interest to cooperate, given certain fairness preferences.

A more exhaustive answer to the question about why people cooperate is given by Koppelman et al (2002) who have identified nine classes of variables that influence coopera-

tion in social dilemmas.¹¹ How these nine classes are organized is illustrated below. (The following figure and text is based on Sally, 1995; and Kopelman et al, 2002.)

Figure 2.4: Elements influencing cooperation in social dilemmas (Source: Kopelman et al, 2002)



Social motives and *gender* are both categorized under individual differences. Here, the idea is captured that people have certain stable characteristics, such as gender or a stable motivational orientation, which make them prone to behave in a certain way in social dilemmas. The findings about gender are mixed, with some studies suggesting that there is no stable difference in behavior in social dilemmas and others claiming that women are more cooperative than men. When it comes to motivational differences there is some evidence that people with different motivational orientations behave differently in social dilemmas.¹²

In addition to individual differences, situational factors can influence the behavior in social dilemmas. There is, for example, the structure of the task, which can be analyzed in terms of the *decision structure* and the *social structure*. Concerning the decision structure, different *payoff structures* have been shown to give different incentives for various actions and so has the degree of *uncertainty* in a situation; there could, for example, be an uncertainty about the knowledge of the other parties or about the total size of the common pool.

¹¹ These nine classes should not, however, be treated as totally independent of each other. As we discuss below, there is also a possibility that various variables interact.

¹² Kopelmans et al (2002) division of motivational types is representative but far from the only one. For further divisions and discussion about motivational characteristics see e.g. Ostrom (2000), Sonnemans et al (1998) and DeDreu and McCusker (1997).

The social structure has, for example, to do with the *power and status* of various players. It has been shown that the behavior of subjects can be influenced by the appointment of one of the subjects as ‘first mover’ or ‘leader’ and that such an appointment also influences how the subjects perceive each others actions. Another part of the social structure is the *group size*. Early research established the thereafter much-replicated tendency of smaller groups to achieve more cooperative outcomes than larger groups. *Communication* is also widely thought to yield cooperative effects, first because communication enhances group identity and second because it elicits commitments to cooperate.

Last, but not least, Kopelman et al (2002) claim that perceptual factors influence cooperation. Under perceptual factors they include *causes*. The conclusion is that the reason given for a person’s position regarding access to a shared resource makes a difference in the choice whether to cooperate or not, or how much to contribute to a common pool. When people feel that they have “earned the right” to make the first move, for example by answering a set of questions correctly, they are often less prone to cooperate.

Frames are also regarded as a perceptual factor that influences the rate of cooperation in social dilemma games. However, neither Sally (1995) nor Kopelman et al (2002) think that enough research has been done to enable the presentation of any uncontestable stylized facts (other than that various types of framing effects have been found) or to speculate about the mechanisms behind the framing effects. In the next part, we further go through the previous research on associative framing in social dilemma games.

2.4 Associative Framing in Social Dilemmas

Experiments about framing in social dilemmas have been conducted for all three of the different framing types we identified above. For risky choice framing the applications on social dilemmas have given rise to such contradictory effects that some researchers have been led to conclude that neither risky choice framing nor prospect theory are applicable to social dilemmas.¹³ (See e.g. Schwartz-Shea and Simmons, 1995; Sonnemans et al, 1998; and Cookson, 2000.) For procedural framing, the conclusions are that different compositions of a social dilemma game give access to different norms, thus influencing the behavior. In this sense the research on procedural framing in social dilemmas resembles the associative framing research. (See e.g. van Dijk and Wilke, 2000.)

An early example of research on associative framing in social dilemmas is Eiser and Bhavnani (1974) who, without explicitly referring to the term framing, studied cooperation in four different treatments of a PD-game. In addition to a neutral control frame they had three distinct frames: economic bargaining, international negotiation, and interpersonal interaction. They found that cooperation was more common in the two latter ones. However, the study was problematic in that the participants did not receive

¹³ The reason is that the structure of the decision problem of a social dilemma makes it difficult to say what the predictions of prospect theory would be, thus significantly weakening the predictive power of prospect theory.

any monetary payoffs and were led to believe that they were playing against a real counterpart.¹⁴

To our knowledge there are four studies that have investigated associative framing and social dilemmas which had a design similar to ours. Pillutla and Chen (1999) constructed one economic and one non-economic frame in a PG-game. They expected people to contribute less in the economic context, when subjects can be anticipated to associate to competitive norms, than in the non-economic context where associations to cooperation should be activated. In the economic frame the participants were asked to make a decision regarding an investment for a hypothetical factory playing the role of an investment manager. In the non-economic frame the subjects were posing as representatives of the factory and asked to decide on a contribution for a social event. In accordance with their hypothesis, Pillutla and Chen found that people contribute more in a non-economic context than in an economic one.

However, the study had a number of shortcomings. First, the participants were given incorrect information on the behavior of other participants. Second, all subjects made decisions in both frames thus making it impossible to control what information actually influenced the decision at hand. Furthermore, the decisions to be made were hypothetical and it is unclear what implications the decisions had for the participants' monetary payoffs.

A different method was applied by Rege and Telle (2004). They also investigated a PG-game, but looked at how social approval and associative frames influence the level of contributions through the activation of adherence to different social norms. The role of social approval was tested by either concealing or disclosing the participants' choice and identity. To activate norms for cooperation through associative framing the subjects were referred to as a 'community', the envelope with their contributions was marked with 'the community' and was to be put in 'the community box' while the envelope containing what they kept had 'mine' written on it. The responding terms used in the other frame were 'participants in the experiment', 'the box', 'back in the box' and 'mine'. Rege and Telle found a strong social approval effect but only a weak framing effect. They suggested that these results could be due to the social approval crowding out the framing effect.

Batson and Moran (1999) conducted a one trial decomposed PD-game. In order to construct their different frames the participants got an introductory text to read that was either titled 'Social Exchange Study' or 'Business Transaction Study' and with text emphasizing a social context and a business context, respectively. Throughout the experiment these frames were reinforced by using the terms 'social exchange' and 'participant' or 'business transaction' and 'party'. Their results supported the hypothesis that framing af-

¹⁴ See section 3.1 for a discussion about why these and other features of conducting an experiment can be problematic for the interpretation of the results.

affected the level of cooperation, with subjects cooperating more in the social exchange frame. The study had some problematic features, though. For example, the participants were not playing with monetary payoffs and all participants were women. Moreover, the participants were deceived and two of the subjects had to be excluded for having expressed doubt regarding the information given.

The experiment most closely resembling ours was conducted by Ross and Samuels (1993, described in Ross and Ward, 1996, and Liberman et al, 2004). They let the subjects play a seven-trial PD-game and the associative framing was to call the games ‘Wall Street Game’ and ‘Community Game’ respectively. The former was expected to yield lower levels of cooperation than the latter since Wall Street was thought to activate competitive behavioral norms whereas Community was expected to evoke cooperative norms and thus more cooperative choices. Their results showed that the cooperation rate in the first round was 32 percent in the Wall Street frame while 66 percent cooperated in the Community frame. Since this effect was induced by merely changing the name of the game, their experiment provided support for the existence of associative framing effects.

Nevertheless, their results should be treated with caution. First, the participants were not randomly selected but nominated. This was due to the fact that the main reason for conducting the experiment was to investigate whether it was possible to predict who would cooperate. Also, all participants were men. Second, the participants were seated facing each other and the subjects were told at the outset that the game would continue for seven rounds. These features introduced a number of uncontrollable factors (such as strategic thinking in the repeated game) which could have influenced the results.

From the above we conclude that although much research has been conducted on associative framing effects and social dilemmas many question marks remain; both regarding the robustness of associative framing effects and explanations as to why they occur. Or as it is put in Ross and Ward (1996):

Further research will be required to determine exactly why the particular label attached to the game exerted so large an effect – that is, to what extent the label influenced subjects directly (i.e., determined the way subjects felt they ought to play) and to what extent it influenced them indirectly (i.e. by changing their expectations about how the other player would choose to play or even by altering their beliefs about how the other player would expect them to play). (p. 108)

3 METHOD, DESIGN AND HYPOTHESES GENERATION

This section comprises five parts. The first part is an introduction to experimental economics, its history and features. Thereafter, we describe our experimental design and generate testable hypotheses. The third part portrays the realization of the experiment. After that, we introduce the concept of follow-up questions and explain how we used this method. We conclude by explaining our use of statistics to test the hypotheses.

3.1 Introduction to Experimental Economics

The natural sciences have a long history of using experiments as a method of research. Physics developed the first experimental tradition around 1600 and chemistry emerged as an experimental science two centuries later. In other sciences, experiments are a more recent invention and by the beginning of the twentieth century, laboratory techniques developed in psychology. (See Friedman and Cassar, 2004.)

Economics was one of the latest disciplines to go experimental. In the 1950s new theories such as game theory emerged. As these theories produced easily testable predictions, a natural next step was to test the predictions in a laboratory environment. Since then, the discipline of economic experiments has steadily gone forward. (See Kopelman et al, 2002; Friedman and Cassar, 2004; and Schmid, 2004.)

In the beginning, economic experimenters were highly influenced by the methodology of the psychological experiments. Since then, however, the techniques of experimental economics have diverged from those of psychology. Hertwig and Ortman (2001) identify the two main methodological differences. The first regards payment and they conclude that economists almost always pay the participants cash based on performance. In psychology this is not standard procedure and when the subjects get paid in cash at all, it is often a flat amount unrelated to performance. The reason that it is important to pay the subjects based on performance is that it is otherwise unclear which incentives that are created and thus what is tested. The second main methodological difference is about deception. Misleading the subjects is common in psychology but among experimental economists deception of any kind is unthinkable. The rationale behind the economic approach is that it is important that the subjects know that they can trust the information given. If they do not, it is difficult for the researcher to interpret their behavior.

A discussion about the advantages and disadvantages of experimental economics as a method will be closely tied to the distinction between internal and external validity. This is due to the fact that economic experiments in general easily generate the former but do not guarantee the latter. When a study is characterized by high internal validity it is easily replicable by another investigator. A good laboratory technique ensures this in that it enables the experimenter to test alternative theories in a controlled environment. It has also been argued that this possibility to isolate the interesting variables leads to better theory specification, since the variables must be explicit in the experimental design.

External validity, that is the extent to which the results of a study can be generalized to the outside world, cannot be guaranteed solely through a well-considered experimental design and a good laboratory procedure. Instead, it is central that the laboratory setting provides as real incentives as possible. It is also of importance that the hypotheses are built on relevant and reliable theory. In addition to that, laboratory robustness tests play a crucial role.¹⁵ (See Friedman and Cassar, 2004 and Schmid 2004.)

3.2 Design and Hypotheses Generation

As discussed above, there are four aims with this paper. First, we wanted to test if there is an associative framing effect in social dilemmas. In doing this, we were inspired by the study made by Ross and Samuels (1993). We therefore replicated their experiment and conducted a PD-game with two frames, one Wall Street frame where the game was labeled ‘Wall Street Game’ and one Community frame where the corresponding name was ‘Community Game’.¹⁶ However, we tried to avoid the possible distortions of their results in the sense that we let the subjects play the game one shot, had both female and male participants and did not let the subjects play face to face. We conducted a PD-game with the following payoff-matrix (the payoffs are in SEK¹⁷):

Figure 3.1: Payoff-matrix

		PLAYER 1	
		A	B
PLAYER 2	A	50 50	80 5
	B	5 80	20 20

The payoffs were chosen with two considerations in mind. First, it was necessary to ensure that the payoffs were high enough to give incentives for the participants to consider the decision carefully. Also, the payoffs should not be negative, as in the study by Ross and Samuels (1993), since this potentially could lead to distortions as the participants know that they cannot credibly be forced to pay money to take part in the experiment. Therefore they might consider the negative payoff as a zero payoff. Second, in replicating a study it is important to make certain that the payoff matrixes are as similar as possible regarding the internal relation between the payoffs. One way of comparing PD-games in this way is to compare the K-index as stated in equation (2.2). With this payoff matrix both Ross and Samuels (1993) and our study had a K-index of 0.4.¹⁸

¹⁵ See part 5.5 for a discussion about how we tried to minimize these problems in our experimental design.

¹⁶ The Swedish names of the game in the two frames were ‘Börsspelet’ and ‘Gemenskapsspelet’ respectively. In the translations we were guided by Liberman et al (2004) and Rege and Telle (2004). Our focus was to keep the connotations and associations of the words ‘Wall Street’ and ‘Community’ rather than using an exact translation.

¹⁷ Exchange rate SEK/USD: 7.64 (2006-04-04).

¹⁸ In addition to that, Batson and Moran (1999) also had a K-index of 0.4.

Our second aim with the paper is to investigate whether the existence of associative framing is dependent on social interaction. In doing this we were inspired by researchers, for example Blount (1995) and Kiesler et al (1996), who let human subjects play PD-games against computers. In the first part of our experiment, the subjects played against other human players thus creating a situation with social interaction. In order to test if this interaction is necessary for the framing effect, we wanted to eliminate the interaction part. We thus held the design constant in the second part, with the exception that the counterpart now was a computer instead of a human player.

To imitate a human player, and thus only eliminate the social interaction, the computer played A and B with a frequency equal to how the human players played in the first part of the experiment, with separate probabilities calculated for the two frames. In order to further ensure that the two parts were as similar as possible, we matched each participant in the second part with a ‘receiver’. The receivers were people seated in a separate room who received the payoffs that the computer generated, but who were uninformed about which game the active participants played and how they acted. Through this design we could remove the effects of social interaction from the second part of the experiment while holding all other aspects constant.

Schematically, the different parts of the experiment can be illustrated as below, where the first row is part one and the second row is part two:

Figure 3.2: The treatments of the experiment

		FRAME	
		Wall Street	Community
COUNTER-PART	Human player	Treatment 1	Treatment 2
	Computer	Treatment 3	Treatment 4

We are now ready to generate testable hypotheses for the first and second research question. Since most prior research has shown an associative framing effect, our first hypothesis is that there is such an effect. This would imply that subjects in the Wall Street frame, where competitive norms are thought to be made salient, cooperate less than in the Community frame, which we expect to evoke cooperative norms. Let μ_1 and μ_2 denote the fraction of subjects choosing the cooperative choice (i.e. A) in treatments 1 and 2 respectively.

Hypothesis 1: The fraction that cooperates is lower in treatment 1 than in treatment 2, i.e. $\mu_1 < \mu_2$.

If hypothesis 1 is verified, we want to test if social interaction is necessary to generate the associative framing effect. Building on the literature that establishes the importance of externally functioning norms in social dilemmas, our second hypothesis is that social interaction is needed to generate associative framing effects. Let μ_3 and μ_4 denote the fraction of subjects choosing the cooperative choice in treatments 3 and 4 respectively.

Hypothesis 2: The fraction that cooperates in treatment 3 is equal to the fraction that cooperates in treatment 4, i.e. $\mu_3 = \mu_4$.

The third aim of this paper is to examine whether there are gender differences in the sensitivity to associative framing. This was done by dividing the observations by gender and testing if the female and male subjects reacted differently to the framing. Since there is very little prior research on gender differences in sensitivity to associative framing we chose not to state an explicit hypothesis regarding the third research question. The fourth research question was not investigated in the main experiment but with a post experimental questionnaire, which is described separately in part 3.4.

3.3 Conducting the Experiment

The experiment was conducted on April 4 2006 on Södertörn University College. The total number of participants was 188 and they all volunteered to take part. The decision-making participants were 127 students of economics, enrolled in a basic microeconomic course. Out of them 58 percent were women. The 61 receivers in the second part of the experiment were drawn from a slightly different population namely business students. The reason behind this arrangement was to make certain that the receivers would not know anything about which game that was played and how the decision-making participants acted.

In treatments 1 and 2 there were 32 and 34 participants respectively. In treatment 1 75 percent of the participants were women and in treatment 2 the corresponding number was 44 percent. They were seated in four different rooms, two rooms with Wall Street frame and two rooms with Community frame. The participants were, anonymously and randomly, paired with a person in another room and both players in a pair had the same frame. All the participants received the same oral and written instructions, with the exception of the name of the game.¹⁹

In treatments 3 and 4 there were 31 and 30 decision-making participants respectively and an equal number of receivers. In the two treatments there were 61 and 53 percent women respectively. The decision-making participants were seated in two rooms, one room with Wall Street frame and one room with Community frame. As described above, each decision-making participant was matched with a receiver that was seated in a separate room. The decision-makers were given oral and written instructions that differed

¹⁹ See also Appendix A where the instructions for treatments 1 and 2 are attached.

from the ones given in treatments 1 and 2 only in that the counterpart was explained as being a computer and a receiver instead of another person. They were also informed of how the computer would make the choice between A and B. The instructions for treatments 3 and 4 were identical except for the name of the game.²⁰ The receivers were given written information that they were taking part in an economic experiment, but they received no information about why they received a specific payoff.

All treatments were conducted simultaneously during a lecture. Directly after the lecture the participants received information about how their counterpart (human or not) had chosen and were given payment in accordance with the result.

3.4 Follow-up Questions

We now return to the fourth aim of this paper, namely to examine to what extent the process behind associative framing is conscious to the subject. Since this is difficult to achieve by the above experiment, we decided to complement the experiment with post experimental follow-up questions. Because of the lack of theories and prior research on this topic and since this data is of a qualitative nature, we refrain from formulating a hypothesis about this research question.

In experimental psychology there is a tradition of asking the participants follow-up questions after the experiment. This can be done orally, as a debriefing discussion, as well as through written questionnaires. There are two reasons for doing this. First, it makes it possible to control that the experiment isolated the intended effects. Second, the follow-up questions enable a more profound understanding of the motives behind the behavior of the participants. (See e.g. Hodgkinson et al, 1999; and Blount and Larrick, 2000.)

Despite these advantages, researchers in experimental economics have traditionally not used follow-up questions to any great extent. The reason is probably that economists are slightly more positivistic in their approach and thus see explicit follow-up questions as giving rise to biases in the behavior of the participants and to problematic subjective interpretations. (See Friedman and Cassar, 2004.)

Although the economic criticism is partly valid, we find that the positive aspects of follow-up questions outweigh the negative ones. To guarantee that we did not induce a behavioral bias, we made sure not to introduce the fact that follow-up questions would be asked until the main experiment was completed.

The questionnaire was divided into two parts. The first part contained questions about the motives behind the decision made by the participant. The alternatives given covered different motives believed to be important in PD-games: individualism, effectiveness, altruism, competition and aggression (inspired by DeDreu and McCusker, 1997; Sonne-

²⁰ See also Appendix B where the instructions for treatments 3 and 4 are attached.

mans et al, 1998; and Kopelman et al, 2002).²¹ The first part also contained a question about the expectations about how the counterpart would play as this is thought to be important in determining how a person acts in a PD-game. By asking these questions, we wanted to see whether the different treatments gave rise to different motives and expectations.

When the participants had completed the first part of the questionnaire, it was collected and the second part was distributed. The reason for this was the fear that the process of answering the questions in the second part (where we among other things asked about the name of the game just played) would influence the answers in the first part.

The second part began with a question about the sex of the participant. After that the participants were asked to state which associations the game had given rise to. The alternatives given were tied to either the Wall Street frame (for example profit and opposite interests) or the Community frame (for example friendship and cooperation). The idea behind this question was to check whether the different treatments gave rise to different associations. Finally, the participants were asked if they remembered what the game they just had played was called. The purpose was mainly to test if the participants had paid explicit attention to the name of the game.

The questionnaires were identical for treatments 1 and 2. In the questionnaire for treatments 3 and 4, there was a slight change to take into account that the counterpart no longer was a human person but a computer and a receiver.²²

3.5 Statistics

To analyze the experimental data we used a non-parametric contingency Pearson chi-square test as recommended by D'Agostino et al (1998). In addition to that, we used a non-linear binary logistic regression analysis as described in Gujarati (2003). This enabled us to control for various variables such as gender.²³ For most tests we present the results not only for the entire sample but also divided by gender. All reported p-values are two sided.

²¹ For the exact formulation of the motives, see Appendix C.

²² For a full overview of the questionnaires in general and the associations in particular, see Appendix C.

²³ A binary logistic regression is used when the dependent variable is binary. Logistic regression has much in common with OLS regression, e.g. is the interpretation of the coefficients similar. Unlike OLS regression, however, logistic regression does not assume a linear relationship between the independent and the dependent variables. It does, however, require that the observations are independent, a requirement that our observations fulfill. See e.g. Menard (2002).

4 RESULTS AND ANALYSIS

In this section the results from the experiment and the questionnaire are presented and analyzed. This is done in two steps. In the first part, we concentrate on the results from the experiment, thus analyzing mainly the first three research questions. In part two, we turn to the results of the follow-up questions and take a closer look at the fourth research question.

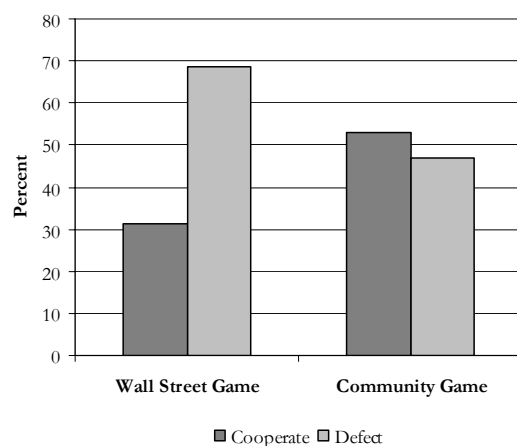
4.1 The Experiment

The first research question and its corresponding hypothesis were about whether there is a significant difference in the rate of cooperation between the Wall Street frame and the Community frame. Theory and former experiments indicate that there is a difference such that more people choose to cooperate in a frame that gives the subject associations to cooperative norms and vice versa in a frame that evokes defective norms. We tested this by analyzing data from treatments 1 and 2. The data are presented in the table and the figure below.

Table 4.1: Crosstab results, treatments 1 and 2, person to person. Rate of cooperation.

	RATE OF COOPERATION		
	Women	Men	Total
Wall Street Game (treatment 1)	N=7 (Tot.=24) 29%	N=3 (Tot.=8) 38%	N=10 (Tot.=32) 31%
Community Game (treatment 2)	N=11 (Tot.=15) 73%	N=7 (Tot.=19) 37%	N=18 (Tot.=34) 53%
Total	N=18 (Tot.=39) 46%	N=10 (Tot.=27) 37%	N=28 (Tot.=66) 42%
Pearson Chi-Square	7.245 ($p=0.007$)	0.001 ($p=0.974$)	3.175 ($p=0.075$)

Figure 4.1: Diagram, treatments 1 and 2, person to person



The data shows a clear framing effect. Whereas only 31 percent in the Wall Street frame chose to cooperate, there was a cooperation rate of more than 50 percent in the Com-

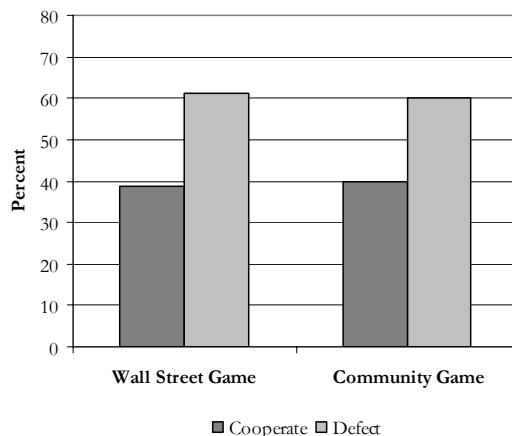
munity frame. This difference is statistically significant at the ten percent level ($p=0.075$) and thus we conclude that our first hypothesis is verified and that there is an associative framing effect.

With the second research question and the second hypothesis, we wanted to investigate whether this associative framing effect persists when the counterpart no longer is a human player with the same information as oneself but a computer with a non-informed receiver connected to it. The underlying idea is that the existence of a counterpart is necessary for the mechanism of the associative framing effect to work in the sense that there has to be another person present that the subject can tie the relevant norms to. We tested this by comparing data from treatments 1 and 2 with data from treatments 3 and 4. The latter are presented below.

Table 4.2: Crosstab results, treatments 3 and 4, person to computer. Rate of cooperation.

	RATE OF COOPERATION		
	Women	Men	Total
Wall Street Game (treatment 3)	N=6 (Tot.=19) 32%	N=6 (Tot.=12) 50%	N=12 (Tot.=31) 39%
Community Game (treatment 4)	N=5 (Tot.=16) 31%	N=7 (Tot.=14) 50%	N=12 (Tot.=30) 40%
Total	N=11 (Tot.=35) 31%	N=13 (Tot.=26) 50%	N=24 (Tot.=61) 39%
Pearson Chi-Square	0.000 ($p=0.983$)	0.000 ($p=1.000$)	0.011 ($p=0.918$)

Figure 4.2: Diagram, treatments 3 and 4, person to computer



As can be seen, there was no framing effect present when the subject played the game against a computer. 39 percent chose to cooperate in the Wall Street frame and the corresponding rate for the Community frame was almost identical, 40 percent. Thus there was no significant difference between the frames ($p=0.918$). When comparing these results with the results from treatments 1 and 2, we note that the framing effect that existed

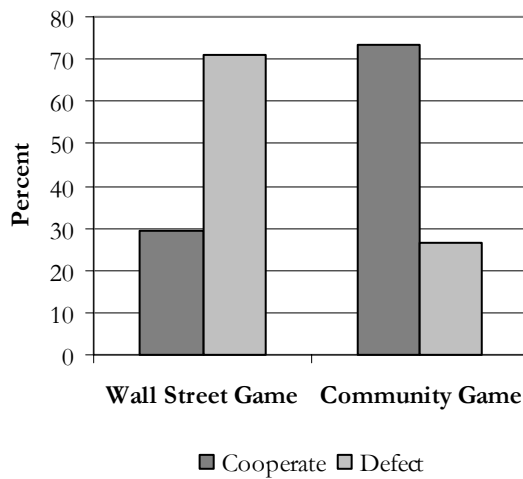
when subjects played against each other disappeared when the counterpart was a computer. Hence, it seems to be important to have an informed counterpart to interact with for the associative framing effect to arise. We can thus also verify our second hypothesis.

Furthermore, it is interesting to note that the rate of cooperation moved in different directions from treatments 1 and 2 to treatments 3 and 4. In the Wall Street frame 31 percent cooperated when playing against another person whereas 39 percent cooperated when playing against a computer. The existence of the other person in combination with the Wall Street frame thus seems to make norms available that tell the subject not to cooperate. In the Community frame the change went in the opposite direction. 53 percent chose to cooperate when playing against another person but only 40 percent cooperated against the computer. The fact that there is a human, informed counterpart in combination with the Community frame thus seems to give the subjects easy access to cooperative norms.

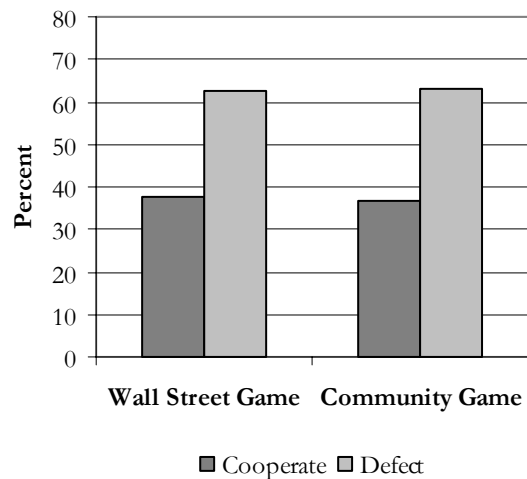
In order to investigate research question three, we divided the data by gender. The gender divided data are presented in table 4.1 and 4.2 above. This data is also illustrated in the figures below.

Figure 4.3: Diagram, treatments 1 and 2, person to person, divided by gender

Women:



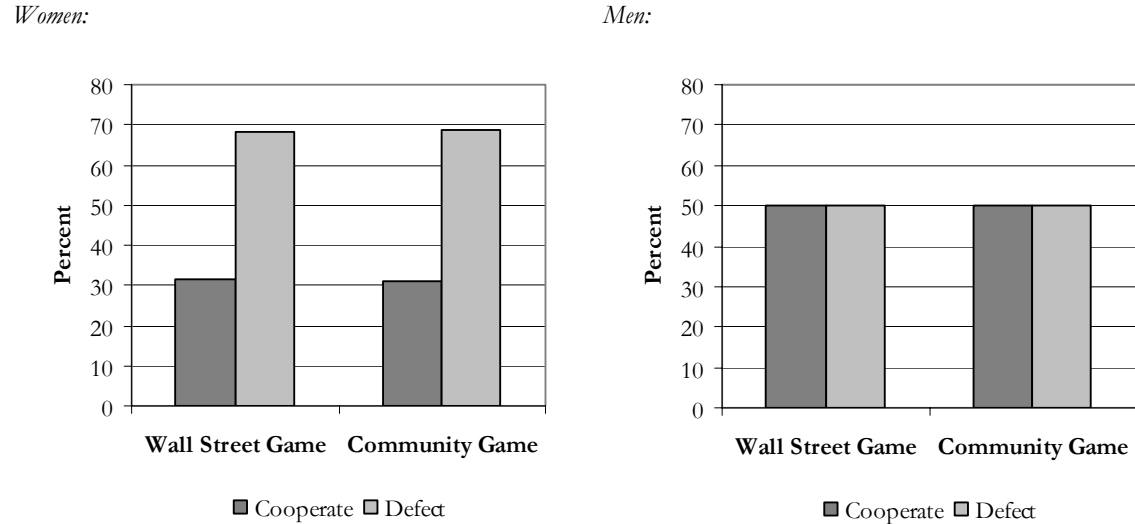
Men:



From the tables and diagrams can be concluded that the associative framing effect was fully accounted for by women. Among the female subject, only 29 percent cooperated in the Wall Street frame, a rate that rose to 73 percent in the Community frame. Since this difference was highly statistically significant ($p=0.007$), we can conclude that there is a strong framing effect among the women. For men, however, the results were different. Among them, 38 percent cooperated in the Wall Street frame versus 37 percent in the Community frame. Hence, no difference between the two frames was to be found for

men ($p=0.974$). We can thus conclude that there is a difference in the sensitivity to framing effects, with women accounting for the whole effect.

Figure 4.4: Diagram, treatments 3 and 4, person to computer, divided by gender



From the above we can see that the framing effect that we found among the women in the first part of the experiment disappeared in the second part. Instead 31 percent of the female subjects cooperated in both frames. Among the men, there was a 50 percent cooperation rate in both frames.²⁴

In order to further test the hypotheses, we also ran binary logistic regressions. In the first regression, the decision to cooperate or not was the dependent variable (dummy variable, 1=cooperate, 0=defect). The independent variables were a framing dummy (1=Community frame, 0=Wall Street frame) and a gender dummy (1=female, 0=male).

$$Decision = \beta_1 + \beta_2 (Frame) + \beta_3 (Gender) + \varepsilon. \quad (4.1)$$

We ran the regression for both treatments 1 and 2 and treatments 3 and 4. The results of the regressions are shown in the table below.

Table 4.3: Coefficients from binary logistic regression, equation (4.1)

	Treatments 1 and 2	Treatments 3 and 4
Frame	1.181 ($p=0.037$)	-0.008 ($p=0.988$)
Gender	0.794 ($p=0.168$)	-0.781 ($p=0.146$)

As can be seen in the table, the conclusions that were drawn above are confirmed. The framing coefficient had the correct positive sign and was significant at the five percent level ($p=0.037$) in treatments 1 and 2, showing that there was a framing effect when peo-

²⁴ Although it is beside the scope of this paper, it is interesting to note that our results does not support the idea that women are more socially oriented, and thus cooperate to a higher extent, than men.

ple played against a human counterpart. The framing coefficient became insignificant (and of the wrong sign) in treatments 3 and 4, telling us that the framing effect did not exist when the subjects played against the computer.

We also ran the above regression with the difference that we added a variable for the interaction between frame and gender:

$$Decision = \beta_1 + \beta_2(Frame) + \beta_3(Gender) + \beta_4(Frame)(Gender) + \varepsilon. \quad (4.2)$$

The results of this regression for the respective parts of the experiment are shown in the table below.

Table 4.4: Coefficients from binary logistic regression, equation (4.2)

	Treatments 1 and 2	Treatments 3 and 4
Frame	-0.028 (p=0.974)	0.000 (p=1.000)
Gender	-0.376 (p=0.661)	-0.773 (p=0.309)
Frame-Gender	1.927 (p=0.091)	-0.015 (p=0.989)

From these results, we see that the framing effect was accounted for by the female subjects since the coefficient for the variable that captures the interaction between frame and gender was statistically significant in treatment 1 and 2 (p=0.091), whereas no other coefficient was significant. The above conclusion about women being the main driver of the framing effect was thus confirmed.

With the purpose of confirming the above results further, we also conducted some other robustness tests. For example, we excluded the subjects (N=5) whose commentaries in the follow-up questions led us to believe that they might have misunderstood the game. None of the above conclusions were affected by this omission.

4.2 The Follow-up Questions

In order to address our fourth research question, the one about to what extent the process behind associative framing is conscious to the subject, we analyzed the follow-up questions that the subjects were asked after the conduction of the main experiment. Below, these results are presented and discussed.

First we looked at the motives that the subjects stated for their choice of cooperation or defection. That is presented in the table below and in figure D.1 in Appendix D. It should be noted that the subjects could choose more than one option.

Table 4.5: Crosstab results with Pearson Chi-Square values, motives

	Treatments 1 and 2	Treatments 3 and 4
Individualism	0.229 (p=0.632)	8.795 (p=0.003)
Efficiency	0.518 (p=0.472)	0.027 (p=0.869)
To be nice	1.243 (p=0.265)	1.344 (p=0.246)
Altruism	0.956 (p=0.328)	0.984 (p=0.321)
Competition	0.008 (p=0.927)	0.560 (p=0.454)
Aggression	3.339 (p=0.068)	0.255 (p=0.614)

The motives that were most frequently given were individualism and efficiency. That was true for all treatments. In treatments 1 and 2 there were no significant differences in which motives were stated between the frames; except for aggression that was mentioned as a motive significantly more often in the Wall Street frame than in the Community frame. In treatments 3 and 4 the only significant difference was that the motive individualism was more frequently mentioned in the Wall Street frame than in the Community frame. We thus draw the conclusion that the conscious motives, as stated after the decision was made, did not differ to any noteworthy extent between the frames. This implies that framing does not give rise to any strong alterations of explicit and conscious motives. We also carried out the above tests for women and men separately and found nothing that alters the above conclusion.

Next, we examined whether the expectations about how the other person would play differed between the treatments. 17 percent of the participants stated that they had not considered how the counterpart would act. Among the remaining subjects, the expectations were concentrated around the 50/50 option in all four treatments. In treatment 1, 49 percent expected the other person to cooperate and in treatment 2 this figure was 53 percent, a difference that was not significant. In treatments 3 and 4 the corresponding expectation rates were 55 and 51 percent respectively, a difference that was not significant either. An illustration of these data can be found in figure D.2 in Appendix D.

The conclusion with respect to expectations is thus that the framing of a choice does not appear to matter for the explicit expectations that are generated. However, this conclusion is rather weak since we believe that the 50/50 option was a strong anchoring point. This is due partly to the formulation of the question and partly to the fact that most people are not very used to think in terms of probabilities.²⁵ Therefore there is a risk that we by this question did not entirely capture potential real differences in expectations between the treatments.

We went on by analyzing the associations the subjects stated that they got to the game. These data are presented in the table below and in figure D.3 in Appendix D. Again, the subjects could choose more than one option.

²⁵ See the first page of the questionnaire in appendix C.

Table 4.6: Crosstab results with Pearson Chi-Square values, associations

	Treatments 1 and 2	Treatments 3 and 4
Affinity	0.440 (p=0.507)	0.155 (p=0.694)
Opposite interests	2.569 (p=0.109)	1.761 (p=0.185)
Cooperation	1.585 (p=0.208)	0.394 (p=0.530)
Friendship	0.002 (p=0.965)	2.070 (p=0.150)
Contest	2.124 (p=0.145)	0.138 (p=0.710)
Common Interests	1.160 (p=0.281)	0.794 (p=0.373)
Profit	2.878 (p=0.090)	0.395 (p=0.530)
Competition	1.160 (p=0.281)	0.131 (p=0.717)

The most commonly stated associations were profit and cooperation in treatment 1 and 2 and profit and common interests in treatments 3 and 4. However, there were almost no significant differences in which associations people stated between the frames. The only significant difference was in treatments 1 and 2 where people who played the Wall Street game more often associated to profit than did the subjects in the Community frame.

In order to get an overview of the associations, we divided them into two groups, pro-social and pro-self. The pro-social category contained affinity, cooperation, friendship and common interests and the pro-self category included opposite interests, contest, profit and competition. We then tested if there was a significant difference between how many people that had chosen associations in the two categories between the frames. As the table below show, such a difference was only found in treatment 3 and 4 where significantly more subjects chose pro-self associations in the Wall Street frame than in the Community frame. See also table D.4 for a visual overview.

Table 4.7: Crosstab results with Pearson Chi-Square values, associations in overview

	Treatment 1 and 2	Treatment 3 and 4
Pro-social	0.009 (p=0.923)	0.942 (p=0.332)
Pro-self	1.243 (p=0.265)	2.977 (p=0.084)

We thus conclude that the framing effect does not seem to lead to a noteworthy difference in the associations that are made. Actually, the name of the game seems to give rise to more differences in associations when no framing effects arise. This is exemplified by the fact that there were more pro-self associations in the Wall Street frame when the subjects played against a computer (p=0.084). A gender divided test further showed that men in treatments 1 and 2 were significantly more likely to associate the Community game with cooperation (p=0.038) and the Wall Street game with contest (p=0.038) and opposite interest (p=0.064) although no framing effect existed for men.

The last follow-up question checked whether the subjects remembered the name of the game or not. The results are shown in figure D.5 in Appendix D. We note that the name Wall Street game was easier to remember than the name Community game. 94 percent remembered the name in treatment 1 and 87 percent in treatment 3. The corresponding

numbers for treatments 2 and 4 were 74 and 80 percent respectively. This can possibly be explained by the fact that, in Swedish, the name 'Wall Street game' is much shorter than the name 'Community game'. In general, however, most subjects remembered the name of the game. Regressions and crosstab analysis indicated however that it does not seem to matter for the framing effect if a subject remembers the name or not.²⁶ This confirms our supposition from above that the framing effect mainly is an unconscious process that neither influences explicit motives, expectations or associations.

²⁶ In this regression we had a dummy variable that denoted if the subject remembered the name or not. The coefficient for this variable was not significant. Crosstab analyses were done separately on the subjects that remembered and on the subjects that did not remember the name of the game and indicated that it did not matter if the subjects remembered the name or not. The conclusion from the crosstab analyses was however weakened because of the small number of subjects that did not remember the name of the game.

5 CONCLUSIONS

In this concluding section we will first revisit the research questions and answer them. Thereafter follows a general discussion about the implications of these results and suggestions for further research. We close with some final words and a short summary.

5.1 Is there an Associative Framing Effect in Social Dilemma Games?

As presented in section two above, there are several prior studies that have found an associative framing effect in social dilemma games. The underlying idea is that different framings give the subject access to diverse norms that, in turn, make her or him behave differently in the respective frames. However, because of flaws and inconsistencies in the prior research, we saw a need to test the robustness of these results. Thus, we conducted an experiment where we let the subjects play a PD-game in two distinct frames: a Wall Street frame that was thought to give access to competitive norms and a Community frame which should activate cooperative norms.

Since the results showed that there was a significantly higher cooperation rate in the Community frame than in the Wall Street frame, we could verify our first hypothesis. The answer to the first research question is thus yes, there is an associative framing effect in social dilemma games.

5.2 Is Social Interaction Necessary to Generate Associative Framing?

The theoretical base makes a distinction between the internal and the external functioning of norms. The former highlights the self-image and the sense of “feeling good” when adhering to social norms, regardless of being observed or not. The latter focuses on the reputation and signaling effect of norms and the fact that one might want to obey to social norms in order for the interacting person to get a certain impression of one’s actions.

If norms function mainly internally and an associative framing effect exists, this effect should be there regardless of whether the relevant subject is interacting with, and is observed by, someone or not. On the other hand, if the norms function mainly externally, the framing effects should only exist when there is an interacting and observing counterpart present. Building on the extensive literature on the importance of externally functioning norms in social dilemmas, we concluded that it is more probable that the externally working norms are important for the associative framing effect. We thus formulated our second hypothesis accordingly.

To our knowledge there are no framing studies where it has been investigated whether social interaction is necessary for associative framing. In comparison with the mere testing of the existence of an associative framing effect, where we had several studies to build upon, we had to design the test of the second hypothesis from scratch. We decided to conduct the same experiment as for the first hypothesis, with the difference that we replaced the human counterpart with a computer that made the decision and a receiver

who got the money allotted to the computer. Hence, we compared two framing settings with the only difference that the social interaction was removed from one of them.

The results showed that our second hypothesis was correct; the framing effect that we found in the first part of the experiment was no longer there in the second part when the social interaction was removed. We thus conclude that the answer to the second research question is affirmative. Social interaction is a necessary component for the associative framing effect to occur.

Another observation was that the change in cooperation rate, when moving from the part where the subjects played against each other to the part where the counterpart was a computer, was positive in the Wall Street frame and negative in the Community frame. This supports the idea that competitive norms are made salient in the Wall Street frame, thus inducing a defecting behavior whereas the same is true for cooperative norms in the Community frame.

5.3 Is there a Gender Difference in the Sensitivity to Associative Framing?

There is no clear-cut theory predicting if gender matters for the sensitivity to associative framing. The results from prior framing studies are also mixed, with most researchers finding that no gender difference exists. There are also some researchers who claim that women are more sensitive to norms than men, which would imply a stronger associative framing effect for women. Since theory and prior research thus is contradictory on this issue, we chose not to state an explicit hypothesis about gender differences in responsiveness to associative framing.

We tested this by dividing the data from both parts of the experiment according to gender. The results showed a very strong associative framing effect for women whereas for men no such effect existed. The answer to the third research question is thus a clear yes; women are more sensitive to associative framing effects than men.

5.4 To what Extent is the Process behind Associative Framing Conscious?

The theoretical background to framing research tells us very little about the consciousness of the process behind associative framing. The studies that discuss this issue at all, most often assume that framing effects are unconscious and that a higher degree of consciousness would weaken the framing effect. We found this topic interesting to investigate, since it could possibly tell us something further about the mechanisms behind associative framing. Because of the lack of both theories and prior research we chose, however, not to state any hypothesis regarding the fourth research question.

When examining this, we used a post-experimental questionnaire asking the participants to indicate, among other things, motives for their choice, expectations about the behavior of their counterpart and associations they got to the game. This made it possible for us to analyze whether these features were influenced by the frame. The results indicate

that the frame only to a very limited extent affects which motives, expectations and associations that a subject states ex-post.

The questionnaire also tested whether or not the subject remembered the name of the game. As a vast majority of them did so, the material for analyzing the effects of a subject not remembering the name was limited. Nonetheless, it did not seem to matter for the framing effect if the name of the game was remembered or not.

Our overall conclusion from the analysis of the follow-up questions, and thus the answer to research question four, is that the process behind the associative framing effect seems to be mostly unconscious. However, this result should be treated with caution for mainly two reasons. First, there is always a danger in asking ex-post questions since this carries with it a risk of post rationalization. Second, our analysis of this material is to a higher extent qualitative, which implies more subjectivity and lower internal validity.

5.5 Discussion

There are two distinct features of the results that need to be discussed in greater detail. First, the method used in this paper implies both advantages and disadvantages and has certain consequences for the possibilities to generalize the results. Second, we want to discuss which implications for theory and practice our results give rise to.

As pointed out in section three, economic experiments have an advantage in that they enable the researcher to control the laboratory environment, thus making it possible to isolate certain factors that might influence the experimental subjects. This means that the internal validity in general is high in economic experiments. Since nothing unforeseen occurred in the conduction of our experiment, this can be said to hold also for the present study. In addition to that, the follow-up questions provided a possibility to control whether the participants had understood the instructions or not. Since only a few subjects gave indication of not having understood, it should be fairly easy to replicate our study.

Higher internal validity often implies lower external validity and this is true for economic experiments as well. Since the laboratory environment is artificially created, it can sometimes be hard to know to what extent the behavioral patterns found in an experiment holds also for the “real world”. This can potentially be a weakness with the present results as well. However, being aware of the difficulty to generate high external validity in experimental studies we designed the study in order to minimize these problems.

By using only decision-related payoffs (the subjects did not receive any flat amount for participating), the decision made in the experiment to a greater extent influenced the subjects’ monetary payoff, thus creating a stronger connection between the artificial laboratory environment and the real world. Furthermore, we took care to base our experimental design and our hypotheses on relevant theory. This should have enhanced the external

validity in the sense that others have reasoned along similar lines and posed comparable hypotheses. The external validity should have been further increased by the fact that there are other researchers who have conducted experiments and got results similar to ours. Since contextual factors will not be exactly alike in the various studies, similar results in many studies indicate some robustness and thus better generalizability.

With this said, we now turn to the implications of the results for economic theory and practice. In doing this, we consider one research question at the time. The finding with respect to the first research question was that there is an associative framing effect in social dilemmas. The main consequence of this is that the assumptions behind traditional rational choice theory, and especially the assumption about clearly defined and stable preferences, do not hold. Even very subtle alterations of a situation, such as a name or a label, can lead to changes in associations that have a large effect on behavior. Thus, it is important to take contextual and normative factors into account when building models of human behavior. Since economic decisions often have a normative dimension, this is particularly important in economic models. We look forward to future research which finds ways to incorporate these aspects into standard economic theory or develop new behavioral models. This would certainly improve the predictive power, and thus in some sense the usefulness, of economics.

Another implication of the answer to the first research question concerns the possibilities of finding solutions to social dilemma problems. Since associative framing affects the level of cooperation, it can be used to achieve a higher total payoff in social dilemma games. Possibly, this could be applied also on real life social dilemmas, such as environmental issues or provision of public goods.

The answer to the second research question tells us that social interaction is a necessary component in order to generate associative framing. Since this is not needed for risky choice framing, as can be understood from prior experiments conducted with non-interacting participants, this is an obvious difference between associative and risky choice framing. As a consequence, it will be difficult or even impossible to create a general theory that can explain all types of framing. This lack of homogeneity could be an explanation to the diversity of definitions and theoretical approaches within the framing research field. It could also help explain why the applications of risky choice framing on social dilemmas have been so problematic. It is further evident that a formal theory that is developed in order to explain the existence and functioning of associative framing must contain some aspect of social interaction. If there is an associative framing effect in non-interactive situations, the mechanisms behind it probably look different from associative framing in interactive contexts. Hopefully, future research can shed more light on the importance of interaction for various types of framing, and maybe also for other behavioral phenomena.

The third research question asked whether there is a gender difference in sensitivity to associative framing. Such a difference was found and women were shown to be much more responsive to associative framing than men. In fact, the female participants accounted for the whole framing effect. This result is contradictory to the results that have shown no gender difference in sensitivity to framing but is in accordance with the theories that claim that women are more sensitive to social norms than men. This implies that it will be difficult to develop a unified model, at least with the same values for the parameters, that explains associative framing for both men and women.

However, we do not believe that there is no associative framing effect at all for men. In the study that most closely resembles our, Ross and Samuels (1993) found a large associative framing effect with only male subjects. The difference between their results and ours could possibly be due to the fact that their experimental design, with the subjects seated face to face, gave rise to a stronger and more direct social interaction than did our design. We have seen that social interaction is an important component in order to generate the associative framing effect and it could be that the elements of social interaction must be even stronger (as in Ross and Samuels, 1993) to create the associative framing effect for men. We look forward to research examining this hypothesis.

Since norms do not matter only in framing, and it seems as women and men differ in their norm sensitivity, more gender divided research is needed not only in the framing field but also in other areas. It could also be of interest to divide experimental data along other dimensions than gender. There could for example be important cultural variations that cause differences in sensitivity to framing or to other behavioral phenomena.

With the fourth research question we wanted to investigate to what extent the process behind associative framing is conscious to the subject. The results indicated that the degree of consciousness is low. There was also a tendency that the subjects with more conscious associations to the frames did not behave in accordance with them. That implies that a higher level of consciousness might actually mitigate the framing from affecting the behavior. Because of the lack of prior research on this topic, we would welcome a study that has as its main focus to explore how conscious associations and behavior interact in framed situations.

In summary, the present study has provided evidence for the existence of an associative framing effect in social dilemmas. In addition to that, it has been shown that social interaction is a crucial factor for the occurrence of associative framing. Further, the results demonstrated a gender difference in the sensitivity to framing, with women being much more sensitive than men. Moreover, even though subjects act in accordance with the frame, their conscious associations and motives seem to be rather stable between the frames. However, more research is needed in order to understand all the complex aspects of framing in general and associative framing in particular.

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APPENDIX A: INSTRUCTIONS FOR TREATMENTS 1 AND 2

Wall Street Game [Community Game]²⁷, instructions

Hi and welcome. You are going to take part in the **Wall Street Game [Community Game]**. For your participation you will get compensation. This compensation is dependent on the choice you make.

Please read the instructions carefully. If you have any questions, please raise your hand and the experimenter will come and help you. Do not ask questions without raising your hand first. It is also important that you do not speak to the other participants while the experiment is taking place.

In the Wall Street Game [Community Game] you are paired up with a person in another room. You will not get any information about who that person is, neither before nor after the experiment. The other person will not get information about your identity either.

All people in this room and all people in the other room get the same instructions and compensation for taking part in the experiment.

The Wall Street Game [Community Game] looks like this:

		You	
		A	B
The other person	A	50 50	80 5
	B	5 80	20 20

You and the other person choose simultaneously between A and B. Depending on your respective choices, you end up in one of the four squares in the matrix above. The bold numbers in the upper right corner represents, in [Swedish] crowns, what you get and the numbers in the lower left corner represents what the other person gets.

Examples:

- If both you and the other person choose A you both get 50 crowns.
- If both you and the other person choose B you both get 20 crowns.
- If you choose A and the other person chooses B you get 5 crowns and the other person gets 80 crowns.
- If you choose B and the other person chooses A you get 80 crowns and the other person gets 5 crowns.

Please note that you will not know anything about the decision of the other person when you make your decision.

²⁷ The name 'Wall Street Game' was used in treatment 1 and the name 'Community Game' was used in treatment 2.

Write your decision on the page marked “answering form”. Then turn the booklet upside-down and put it in front of you.

When the Wall Street Game [Community Game] is finished, the experimenter will compile the results and prepare an envelope for each participant. These envelopes will be distributed after the lecture. The envelope will contain information about what the other person decided and what the result of the game was. The sum you are allotted will also be in the envelope.

Thank you for your participation!

APPENDIX B: INSTRUCTIONS FOR TREATMENTS 3 AND 4

Wall Street Game [Community Game]²⁸, instructions

Hi and welcome. You are going to take part in the **Wall Street Game [Community Game]**. For your participation you will get compensation. This compensation is dependent on the choice you make.

Please read the instructions carefully. If you have any questions, please raise your hand and the experimenter will come and help you. Do not ask questions without raising your hand first. It is also important that you do not speak to the other participants while the experiment is taking place.

In the Wall Street Game [Community Game] you are paired up with a computer. To the computer a receiver is connected. The receiver is a person sitting in another room. You will not get any information about who the receiver is, neither before nor after the experiment. The receiver will not get information about your identity either.

The receiver makes no decision during the experiment but get the compensation that the computer is allotted. This person knows only that the money that she or he gets is the result of an experiment. The person does not know which game that has been played and thus not how you or the computer acted.

All people in this room get the same instructions and compensation for taking part in the experiment.

The Wall Street Game [Community Game] looks like this:

		You	
		A	B
The computer / the receiver	A	50 50	5 80
	B	80 5	20 20

You and the computer choose simultaneously between A and B. Depending on your respective choices, you end up in one of the four squares in the matrix above. The bold numbers in the upper right corner represents, in [Swedish] crowns, what you get and the numbers in the lower left corner represents what the receiver gets.

Examples:

- If both you and the computer choose A you get 50 crowns and the receiver gets 50 crowns.
- If both you and the computer choose B you get 20 crowns and the receiver gets 20 crowns.

²⁸ The name 'Wall Street Game' was used in treatment 3 and the name 'Community Game' was used in treatment 4.

- If you choose A and the computer chooses B you get 5 crowns and the receiver gets 80 crowns.
- If you choose B and the computer chooses A you get 80 crowns and the receiver gets 5 crowns.

When the computer chooses between A and B it is done in the following way: we also conduct this experiment with people playing against each other. Depending on how the players act in that game we calculate with which probability the computer must choose A and B respectively to “imitate” the behavior of a human player.

Please note that you will not know anything about the decision of the computer when you make your decision.

Write your decision on the page marked “answering form”. Then turn the booklet upside-down and put it in front of you.

When the Wall Street Game [Community Game] is finished, the experimenter will compile the results and prepare an envelope for each participant in this room. These envelopes will be distributed after the lecture. The envelope will contain information about what the computer decided and what the result of the game was. The sum you are allotted will also be in the envelope. The receivers in the other room will also get an envelope with the money that the computer was allotted, but no further information.

Thank you for your participation!

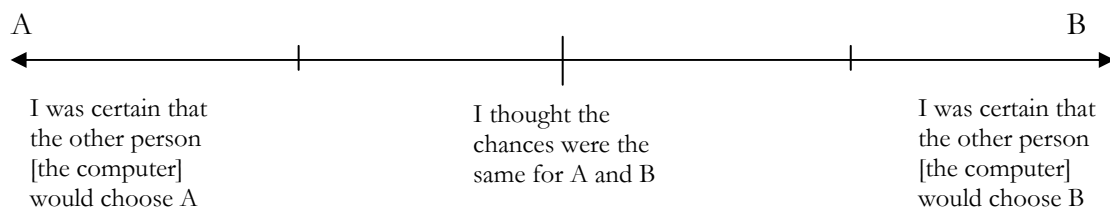
APPENDIX C: QUESTIONNAIRES

Thank you for participating in the experiment! Now we would be very grateful if you would answer some follow-up questions. It will only take a few minutes.

What motives were of importance when you made your decision? Indicate the ones that fit the best. Feel free to indicate multiple alternatives. You are welcome to complement with other motives.

- ☐ That I should get as much money as possible
- ☐ That together me and the other person [the receiver]²⁹ would get as much money as possible
- ☐ To be nice
- ☐ That the other person [the receiver] would get as much money as possible
- ☐ That I would get more money than the other person [the receiver]
- ☐ To prevent that the other person [the receiver] would get a lot of money.
- ☐ Other: _____

How did you expect the other person [the computer] to act? Indicate on the scale.



- ☐ I did not think about what the computer would choose.

Here you can further explain why your decision looked like it did:

Tell the experimenter when you have finished answering the questions. You will then get another page to complete.

²⁹ In the questionnaires for treatments 1 and 2 the term 'the other person' was used. In treatments 3 and 4 this was replaced with 'the receiver' or 'the computer'.

Sex:

☐ Female

☐ Male

What are your associations to the game? Indicate the ones that fit the best. You are welcome to indicate multiple alternatives. Feel free to complement with other motives.

☐ Affinity

☐ Opposite interests

☐ Cooperation

☐ Friendship

☐ Contest

☐ Common interests

☐ Profit

☐ Competition

☐ Other: _____

☐ Other: _____

Do you remember what the game you just played was called?

☐ No

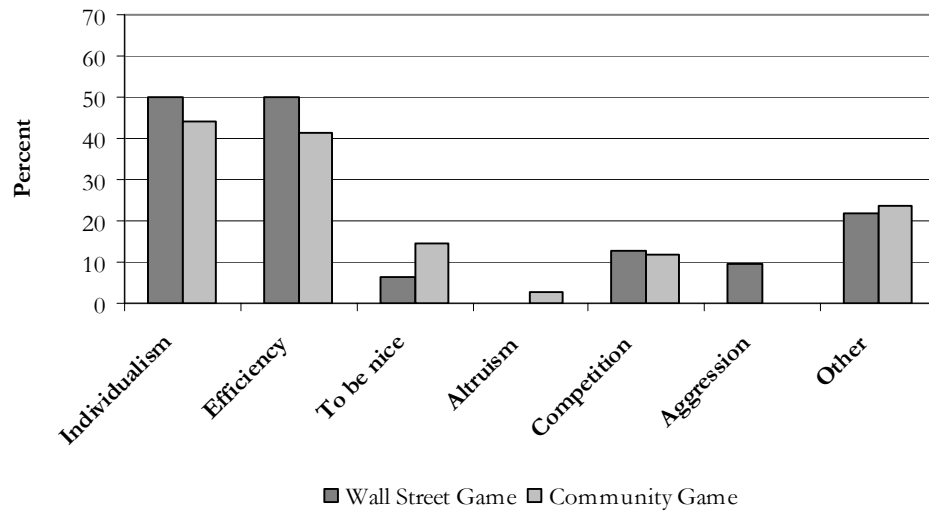
☐ Yes, it was called: _____

Tell the experimenter when you have finished answering the form. Now this part is also completed. Thank you very much for your participation.

APPENDIX D: FIGURES

Figure D.1: Motives

Person to person



Person to computer

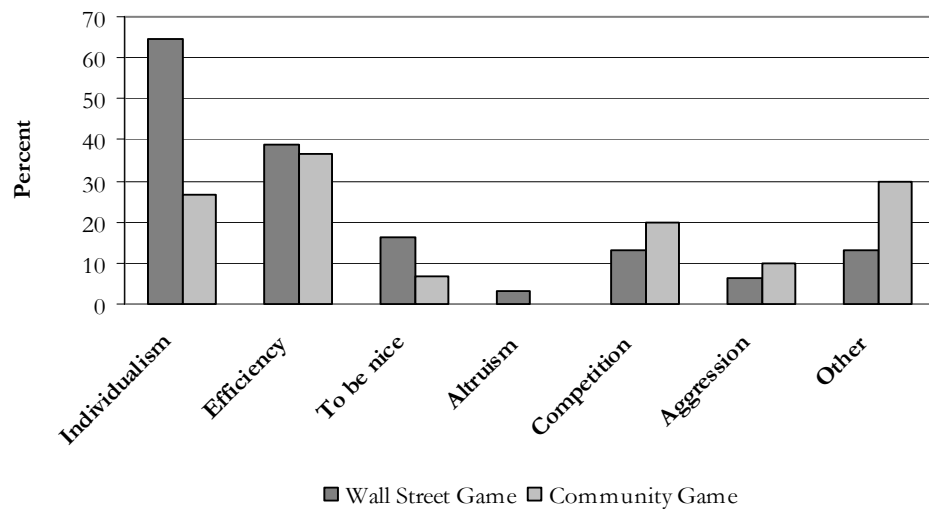


Figure D.2: Expectations

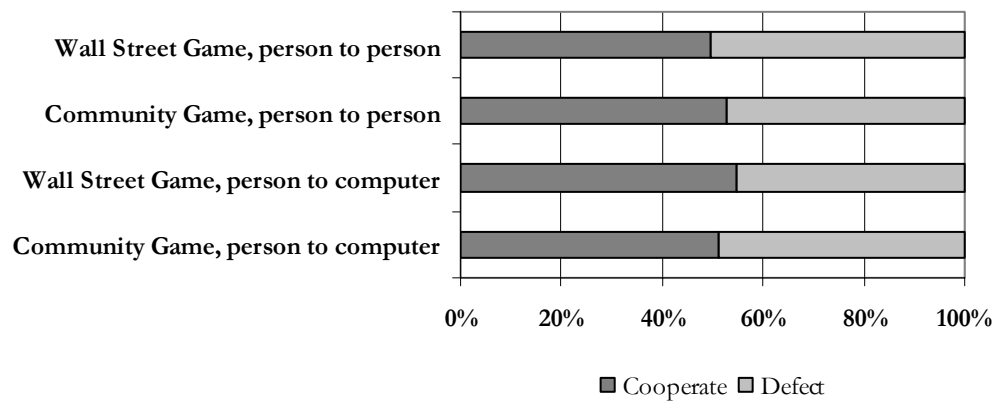
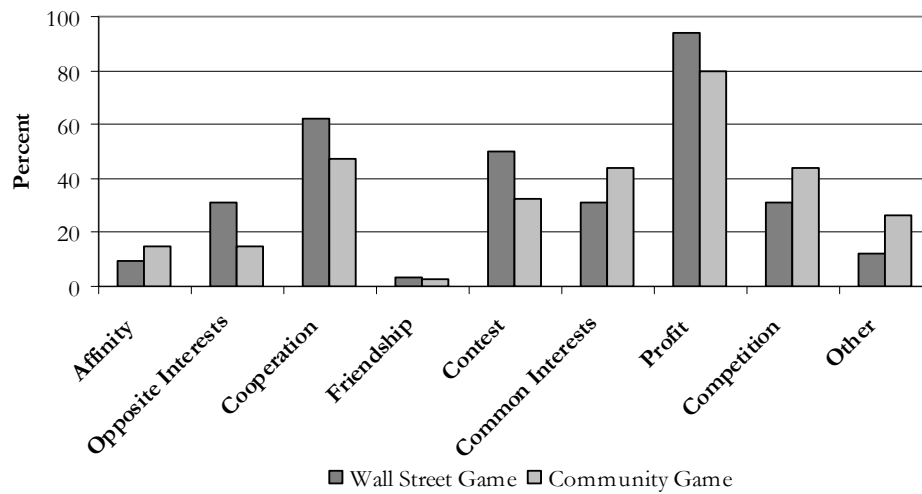


Figure D.3: Associations

Person to person



Person to computer

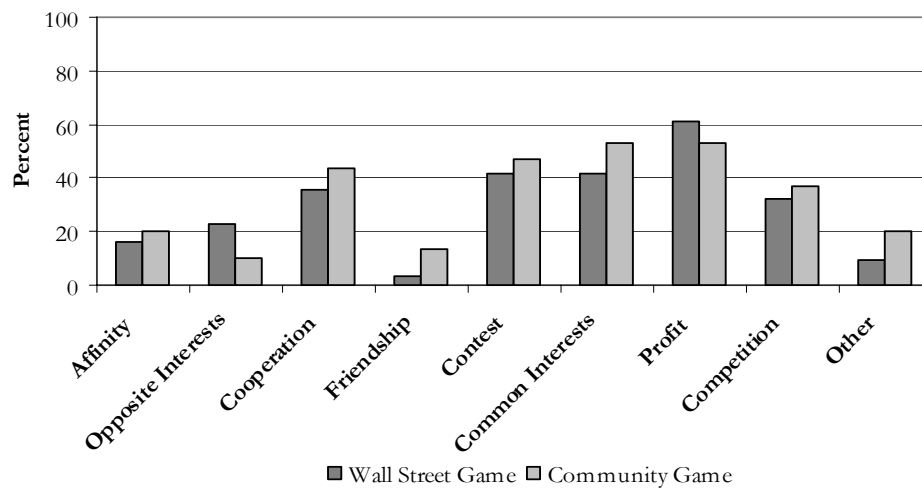
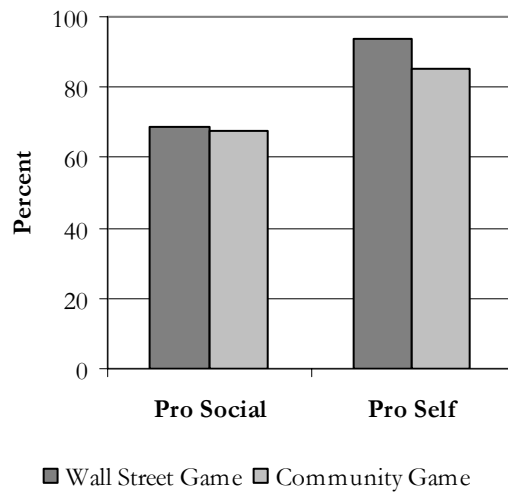


Figure D.4: Associations, an overview.

Person to person:



Person to computer:

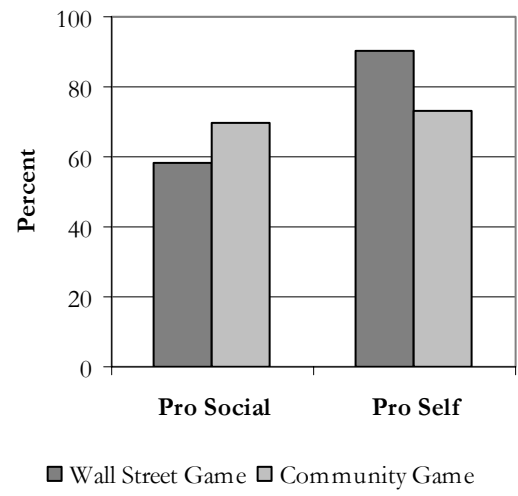


Figure D.5: Remembrance of the name of the game

