Conditional Cooperation in the Field: Cross-Country Skiers' Behavior in Sweden*

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Abstract

In a laboratory one-shot public good game, Fischbacher, Gächter and Fehr (2001) classify 50 percent of the subjects as conditional cooperators. Outside the lab, using a student sample, Frey and Meier (2005) find that people behave pro-socially, conditional on others' behavior. This paper tests for conditional cooperation and social comparisons in a natural field experiment, using decisions from a sample of cross-country skiers in Sweden on the issue of voluntary cash contributions to the preparation of ski tracks. Two test procedures are used. First, testing for correlation between beliefs about the contribution of others and own behavior and second, experimentally varying the beliefs about others' behavior. Using the latter approach, I find the share of subjects giving a contribution to be significantly greater in the group receiving information about others' behavior than in the group that does not. Regression analysis cannot reject that subjects are affected by social comparisons and express a behavior classified as conditional cooperation.
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"Conditional cooperation is intuitive"
(Armin Falk, University of Zürich, 2004)

"…we might all of us be willing to contribute to the relief of poverty, provided everyone else did. We might not be willing to contribute the same amount without such assurance."
(Milton Friedman (1962) *Capitalism and Freedom*, p. 191)

1. Introduction

Today, experimental evidence as well as real world empirical evidence firmly establishes that the self-interest prediction of zero contribution in a one-shot public good situation can be rejected (e.g. Ostrom 1990, Ledyard 1995). It is suggested that the existence of "conditional cooperators" is the source of initially high contribution rates in such public good games (Ostrom 2000). A theory of conditional cooperation states that higher cooperation or contribution rates are expected when information is provided that many others cooperate (Frey and Meier 2005). The theory suggests that people compare themselves with the behavior of a reference agent, i.e. they make social comparisons. That people would be willing to contribute to a public good conditional on other people's cooperative behavior, was found in Fischbacher, Gächter and Fehr (2001). In their one-shot public good game, 50 percent of the subjects were classified as conditional cooperators. Several laboratory experiments have identified behavior that has been categorized as conditional cooperation (e.g. Keser and van Winden 2000), but only Fischbacher et al. (2001) explicitly test for conditional cooperation.

Evidence of conditional cooperation has also been found outside the laboratory. In a field experiment on charitable giving, using a student sample, Frey and Meier (2005) find that contributions increase, on average, if people know that many others also contribute. They test conditional cooperation in two ways. The first is by varying the beliefs about the behavior of the group in an experimentally controlled way, the second is to test whether expectations about the behavior of the group varies positively with one's own behavior. In this paper, I apply both ways of testing conditional cooperation in a natural field experiment, using decisions from a non-student sample.

The context of the experiment is a Swedish ski resort where a sample of cross-country skiers (hereafter 'skiers') face a decision to voluntarily contribute to funding the grooming of ski tracks. Ski tracks in Sweden are public goods, since for undeveloped land, including trail infrastructures such as a ski track, it is not legal to exclude skiers. Moreover, it is not legal to charge for access to such facilities.

In this study, one part of the skier population is defined as tourists, making a one-shot (one week) visit to a destination. The rest are local residents using the tracks for more or less regular training or recreational purposes. Consequently, I study a real life situation where voluntary contributions constitute a direct way of funding a public good, with a sub sample of the population playing a one-shot game.

I get results that cannot reject the existence of social comparison and conditional cooperation among the group of subjects defined as tourist skiers. When experimentally varying the beliefs of others' behavior, I find the share of subjects giving a contribution to be significantly greater ($p<0.10$ level) in a group receiving information about others' behavior than in a group not receiving any such information. A series of regressions support the result.

Testing conditional cooperation in a natural field experiment has at least two clear advantages as compared to previous studies. First, while it is still unclear how results from laboratory research can be generalized outside a laboratory situation, this field experiment adds to narrowing this gap. Second, as compared to studies using a student sample, for example Frey and Meier (2005), this field experiment can control for variability in socio-demographic characteristics. This is relevant since, for example, age has been shown to positively correlate with social preferences in general and contributions in a fundraising drive in particular (List 2004). Moreover, the Frey and Meier (2005) field experiment used a context of altruistic donations to charity, while the present field experiment is, to my knowledge, the first to test conditional cooperation in a context where subjects actually get to use the public good to which they contribute.

Finally, the study can be categorized as a natural field experiment following the definitions of Harrison and List (2004).

The remainder of the paper is organized as follows. Section 2 presents the field experiment context and the data gathering process. Section 3 reviews related literature and presents hypotheses to be tested. Results and analyses are found in section 4. Section five concludes.

2. Field experiment context and collection of data

The field experiment uses data of individual human behavior at Säfsen, a Swedish ski resort. Data were collected during eight weeks in January and February 2004. Arriving in the area with prepared tracks, each skier was given the opportunity to voluntarily contribute to ski-track funding. However, depending on their degree of attachment to the area, skiers might perceive the field situation differently. Three categories of skiers were expected; *locals* living close to the area and using the ski facilities regularly, *semi-locals* living rather close and making a few day trips to the area during a season for training purposes and *tourists*, visiting the area possibly only one week or weekend during a season. To motivate the different types of behavior, the first part of this section begins with a description of the field context and the expected behavior of different categories of skiers. The second part describes the experimental design.

Cross-country skiing in a tourist area in Sweden is an example of the general problem of tourism that uses natural and cultural environments with limited possibilities of excluding visitors. In Sweden, public access to undeveloped landscapes is open under Allemansrätten, a centuries-old right of common access. It is not explicitly codified in law, but is rather a set of customary rules and judicial interpretations regarding activities, such as camping, berry picking, and cross-country skiing, not listed among state obligations to defend landowner claims. Facilities and infrastructure on land, for example snowmobile trails, mountain bike trails, canoeing waterways or cross-country trails then

get the features of public goods.[1] The free-rider problem stemming from open access is at the root of the problem of developing tourism that uses natural and cultural environments, mainly because it is difficult or impossible to price the actual use of the products or services. Investing in quality enhancing activities or facilities would give a product attracting more tourists, although it may be infeasible to recoup the costs invested.

High-quality ski tracks are dependent on regular investments in track grooming in wintertime and some preparatory work in summertime. Rational self-interested people have little incentives to contribute to these investments. However, numerous case studies have shown that successful local governance of open access resources is possible (Ostrom 1990). Two criteria found to encourage cooperative behavior and result in successful governance are (i) a small number of members in the group and (ii) strong mutual obligations and ties among members (Grafton 2000 p.506). Tourists visiting a destination are typically not likely to meet any of the two criteria, while regular local and semi-local users (the sweat-shop bugs) are much closer.

I assume that being a tourist[2] implies making a "one-shot visit" to a destination. It is well known that in a one-shot public good game, people have incentives to free ride. However, it is not unusual that tourist destinations have a high percentage of return visitors. But it is uncertain whether tourist visitation rates at a destination of once a year or once every second year change this incentive. Considering that tourists have many other possibilities to contribute to a destination's economy, for example by buying food, lodging etc., it seems reasonable to make the assumption that a tourist has the incentive to free ride when confronted with an option to voluntary contribute to a recreational public good in a tourist area.

[1] Recreational land has been defined as an impure public good due to the aspect of rivalry in land use. Viewed as a common pool resource, recreational land is subject to reciprocal externalities in the form of short-term congestion and long-term depletion (Vail and Hultkrantz 2000).

[2] A tourist is defined by the UN as a visitor who has traveled to and visits a destination different from her home environment. The length of the stay must not exceed one year and the purpose of the trip should be something else than to act as paid labor (World Tourism Organization 1994).

2.1 Experimental design, field conditions and data

The experimental design has its origins in the unique feature of one Swedish ski resort where the norm of skiers' contribution to fund ski-track grooming has been established. Heldt (2005) reports that 70 percent of the skiers at this particular ski resort contribute to track preparations. Since a previous study (Heldt and Nerhagen 2001) showed the limitations of eliciting varying degrees of group behavior using only one ski area, I use the information on 70 percent voluntary contribution from the unique area and post it as "treatment information" in my field experiment ski area. This was not a deception since that study and the one described in this paper ran in parallel.

An important practical part of the field experiment was to present skiers with information about the group behavior before they decided to contribute. The field experiment included two periods: one control and one treatment period. In the control period, subjects received no explicit information about group behavior. In the treatment period, subjects were provided with information about the share of voluntary contributions within the group of skiers (the "group contribution"), i.e. 70 percent. General information on the motivations for fundraising was present during both control and treatment periods.[3]

To reduce the risk of data contamination, the control period had to come first and the treatment period second. Moreover, it was not possible to include a second explicit treatment with a variation in average group contributions. The reason is typical for a natural field experiment and is related to the credibility of the field context. Any rumor of manipulations or unseriousness would have discredited the study and would have had implications on subject behavior.

In the control group, subjects' beliefs about the share of voluntary contributions within the group were elicited. It is obvious that this information could not be gathered during the treatment period.

[3] See Appendix 2 for the exact wording of general information and treatment information.

Field conditions

The ski resort had no history of skiers' contributing to fund ski-track preparations. Rather, the tourist resort finances ski-track preparations out of its general revenue. From this season, there was an option of voluntary contributions. When entering the track, skiers were informed about the motivations for the new voluntary contribution system. The information included an explicit request for a voluntary contribution of 20 SEK ($3[4]) to fund track preparations. There were no explicit statements that the total amount contributed was in any way connected to the quality of present or future tracks. Cash contributions were to be made in a locked box, close to the information sign.

Since both the subjects' decision of whether to contribute as well as subject category were of interest, a questionnaire was used to gather relevant information. This also made it possible to collect other individual-specific data.

Using a questionnaire, the potential problem of sample selection must be considered. There may be several reasons why a person is not responding to a questionnaire survey and some characteristics or behavior of the respondents may differ from those of the non-respondents. Selection bias might be a problem in this study, if the subjects who did not contribute did not answer the questionnaire. To minimize the risk for selection bias, it was specifically pointed out that participation was voluntary and answers were anonymous. To promote a high participation and response rate, subjects were given a lottery ticket together with the questionnaire. Moreover, the stated purpose of the questionnaire being part of a research project in nature tourism at a university, has previously been shown to promote a high response rate as compared to marketing surveys with business purposes.

All skiers at a specific location were sampled at randomly chosen time intervals. Subjects were asked to complete the questionnaire on site and return it in a box at a discrete location. The normal procedure was that a skier arrived by car, entered the ski track, passing closely by the information signs, took a ski trip, returned to the parking lot and

[4] $ 3 is an approximate value at an exchange rate of 7 SEK/$.

was sampled for the survey. Reluctant participants could be provided with a pre-stamped envelope and be offered the alternative of completing the questionnaire at home and returning it by mail.

To screen subjects that had been sampled multiple times and still keep the anonymity, the questionnaire asked subjects to state the last three digits of their car's license plate number. Quite often skiers go in groups. To enable the use of only independent observations in the analysis, questions of party size and age were included. To increase the participation rates, the questionnaire was deliberately made short. After several pre-tests, the final version had an average answering time of about five minutes.

To capture subjects' behavior, the question "Before leaving this place, have you made a voluntary contribution of 20 SEK for track preparations?" was used. To cross-validate reported with actual behavior, information from the ski resort on the total amount of money contributed in the box during each sampling period was used. The actual average contribution in seven out of fourteen sessions based on all sampled subjects was lower that the corresponding sum of reported individual contributions. However, by looking at the amount of money, it seems likely that a few subjects placed a lower contribution instead of the suggested 20 SEK. It could also be the case that a few subjects have reported a contribution but did not actually give one within the time of the sampling period. The contribution box was open to skier contributions 24 hours a day. The analysis in section 4 is based on reported behavior. A sensitivity analysis based on sessions with a perfect match between reported behavior and the corresponding sum of money in the box does not change the main results presented in section 4.

During the treatment period of the field experiment, information stating that 70 percent of the skiers had been contributing was provided. To ensure that all subjects got the information, it appeared as a separate note on the information board as well as a separate note in the questionnaire. A total of 89 subjects were sampled for the treatment period, 38 of which entered the effective sample. Table 1 provides further details.

In the control period, no information was given on the group contribution. Instead, we included a separate question to elicit subjects' own perception of the share of voluntary contributors within the population of skiers in the area. A total of 233 subjects were sampled in the control period, 89 of which entered the effective sample. The difference in sample size as well as the composition of skier categories between control and treatment is due to exceptionally good skiing conditions in the study area, which attracted an unusually large number of semi-local skiers.[5]

Table 1: Effective sample sizes

	Control	Treatment	Total
Responses [a)]	177	67	244
Previously sampled – excluded	46	16	62
More than one in a party – excluded	42	13	55
Effective sample	89	38	127

a) Response rate Control 76 percent, Treatment 75 percent.

3. Related literature and behavioral hypotheses

Conditional cooperation is based on the notion that people are affected by, and compare themselves to, references groups, i.e. they make social comparisons. Conditional cooperators are "people who are willing to contribute more to a public good the more others contribute" (Fischbacher, Gächter and Fehr 2001 p. 397). A theory of conditional cooperation states that higher cooperation or contribution rates are expected when information is provided that many others cooperate (Frey and Meier 2005). Moreover, it has been suggested that a conditional cooperator does not only conditionally cooperate, but also initially cooperates when no cooperation norm has been established (Ostrom 2000). Ostrom's conditional cooperators are individuals willing to initiate cooperative actions when they believe that others will reciprocate. They are also willing to repeat

[5] In the estimated models of section 4, I have also controlled for the potential influence of the Swedish "sports break", without any significant effect. Treatment periods included three out of four sports break weeks.

these actions, as long as a relatively high proportion of other people involved in the situation reciprocate.

Evidence of conditional cooperation can be found in several laboratory studies (Keser and Van Winden 2000, Fischbacher et al. 2001, Croson et al. 2004). However, not all people are expected to be conditional cooperators. Fischbacher et al. (2001) classified 50 percent of the subjects as conditional cooperators, while 30 percent were classified as free riders or "purely selfish". Furthermore, Frey and Meier (2003) find that only certain 'types' of people change their behavior due to the cooperative behavior of others. Especially people who are uncertain about what decision to make are found to behave like conditional cooperators (Frey and Meier 2003). The status of *conditional cooperation* has evolved from a concept (Keser and Van Winden 2000) to an assumption on individual behavior (Fischbacher et al. 2001) to a wider interpretation of this as a social norm fundamental for human cooperation (Fehr and Fischbacher 2004). Later in this paper, I introduce and test a conditional cooperation hypothesis.

Conditional cooperation rests on the assumption that very few people like being the only ones to contribute to a good cause or a public good. But if knowing that many others or a large fraction of a given group contribute, they would also be ready to contribute. The prediction is therefore that an individual i's probability of contributing increases when the percentage of all other individuals, j $\left(j = 1,...n; j \neq i\right)$ who contribute increases or is high within a group (Frey and Meier, 2003). This contrasts with predictions from a theory of altruism, which would predict a decrease in an individual's contribution when faced with information that others are already contributing, since the need for further contributions is reduced (Sugden 1984).

Conditional cooperative behavior is consistent with at least three theoretical approaches. First, people may want to act appropriately so as to conform to a social norm, based on a perception of the appropriate action to take in a particular situation (Messick 1999). Second, people may have fairness preferences, like reciprocity or inequity aversion

(Rabin 1993, Fehr and Schmidt 1999), and third, contributions by others may signal a quality of the public good or for the organization providing the good (Vesterlund 2003).

The three theoretical approaches somewhat overlap but, in principle, give three different views on how conditional cooperation can be explained. Conformity is an imitative behavior motivated either by a fear of being sanctioned for norm deviation or as a way of taking advantage of information acquired by others. It has been defined as "the tendency to copy the most prevalent behavior in a population" (Carpenter 2004 p.395). As a motivation for conditional cooperation, conformity differs from reciprocity, where behavior is supposed to be triggered by the perceived kindness of other people (Rabin 1993). A model formalizing the intuitive meaning of reciprocity, sequential reciprocity, predicts that a person is willing to contribute if others also contribute (Dufwenberg and Kirchsteiger 2004). The inequity aversion prediction is the same as for reciprocity (Keser and Van Winden 2000). Furthermore, a theory of reciprocity predicts that there is a correlation between contributions by a particular person and contributions by others (Sugden 1984). The third explanation to conditionally cooperative behavior originates in the field of contributions to charities and fundraising. Viewing the fundraising drive as a sequential game, it has been shown that an announcement strategy, i.e. announcing previous contributions, helps organizations be recognized as high-quality (Vesterlund 2003). Even though the "signaling of quality-motivation" implies that individuals are affected by social comparisons, it is mainly directed to explain fundraisers' choice of strategy and gives less of a motivation for individuals' contributing behavior. However, it resembles conformity as individuals may view the signaling as a way of taking advantage of information acquired by others.

Two ways of explicitly testing conditional cooperation have been used. The first is to test whether expectations about the behavior of the group vary positively with one's own behavior. The second means varying the beliefs about the behavior of the group in an experimentally controlled way. In a field experiment in a charitable giving context, Frey and Meier (2005) investigate how the expectations about others' behavior correlate with one's own behavior. University students' perception of the share of fellow students

donating to a Social fund is compared to students' own decision to donate. They find a correlation of 0.34 between expressed expectations about others' contributing behavior and the own behavior. This way of testing has a causality problem. A 'false consensus' effect (Ross et al. 1977) may be present, i.e. people may form expectations about others so as to justify the own behavior. If so, it is not expectations about others that trigger behavior, it is behavior that influences expectations.

In a traditional laboratory public good game[6], Fischbacher et al. (2001) use the strategy method to address the causality problem. A contribution table is used to get subjects to consider individual contribution rates at varying degree of average contribution rates of the group. Subjects had to decide how much to give to the public good, given the contribution by others. The contribution table included 21 possible average contribution levels of others. Subjects were classified as different types depending on their reported contribution functions in the contribution table.

The second way of testing conditional cooperation is also used in the Frey and Meier (2005) field experiment. They experimentally vary the beliefs of group contributions between two levels. Their two treatments consist of information that a relatively high(/low) percentage (64 %(/46%)) of the student population contributed to the social fund. The results of the study confirm that individuals' willingness to contribute increased when they have information that a high share is already contributing.

A testable hypothesis from the theory of conditional cooperation in our setting is:

> *Conditional cooperation hypothesis*: People make social comparisons and contribute to the public good conditional on the behavior of others. Individual behavior varies positively with beliefs about the average behavior in the group. Consequently, the probability that a subject contributes to ski track preparations will increase when faced with the treatment.

[6] Where each subject was given 20 experimental tokens to be divided between a private and a public account

4. Analysis and results

In a first step, I present descriptive results for the total sample. This is followed by results from testing the conditional cooperation hypothesis on the sub-sample defined as tourists. Then, I present results on the relationship between beliefs about others' behavior and one's own behavior. The section ends by discussing the contribution decision for different categorizations and groupings of the data.

The purpose of the paper is to test the theory of conditional cooperation in a group of one-shot players. As outlined in section 2, the sample of skiers is expected to include three categories of visitors, depending on their connection to the area; *locals*, semi-*locals* and *tourists*. To be a tourist in an area often means making a one-shot visit to a destination. When studying a one-shot game, no inter-temporal considerations have to be made. In contrast, the local and semi-local skiers who live close to the tourist area and use it regularly may very well view the situation as a repeated game. For example, if you are a frequent skier in an area, you might want to make the decision that is best for improving the skiing conditions in the future. It transforms the choice to contribute into a repeated game and it is not clear what is the best strategy to choose. The a priori expectation is therefore that tourist skiers are less likely to unconditionally contribute to ski-track grooming.

4.1 The total sample

Table 2 shows the contributing behavior of subjects in the treatment and control samples, respectively. There is a difference in the share of subjects contributing between the two samples in the expected way, but the difference is not significant at conventional levels.[7]

[7] Using the information that data was collected during a number of weeks and partitioning the treatment and control samples into sub samples, a rank is used to test for differences in group-share contributions between the two samples. A Mann- Whitney test rejects the hypothesis of equality between the treatment and the control at a p-level of 0.061 (see table A6 in the Appendix for details).

Table 2: Share of skiers in total sample contributing: Effective sample

	No. of subjects	No. of subjects contributing	Percentage contributing
	n	*c*	*c/n*
Control	89	31	35 %
Treatment	38	15	40 %
Total	127	46	36 %

In the treatment group, the information on the group share contribution, i.e. that 70 percent are contributing, is the same for all subjects. In the control group, subjects have based their decision of whether to contribute on their own perception or beliefs about the group-share contribution. If control-group subjects, on average, hold beliefs that 70 percent are contributing, then the expectation would be no difference between the treatment and the control samples.

4.2 The control sample

Figure 4.1 presents the distribution of beliefs about others' behavior. Subjects are categorized into four groups depending on their beliefs about the group contribution. The y-axis indicates the share of real contributions in a group. For example, the figure demonstrates that the group of subjects which holds beliefs that between 51-70 percent of the others are contributing, has a real contribution share close to 50 percent. The average belief of group share contribution in the control sample is 41.6 (std. 23) percent and the median is 30 percent.

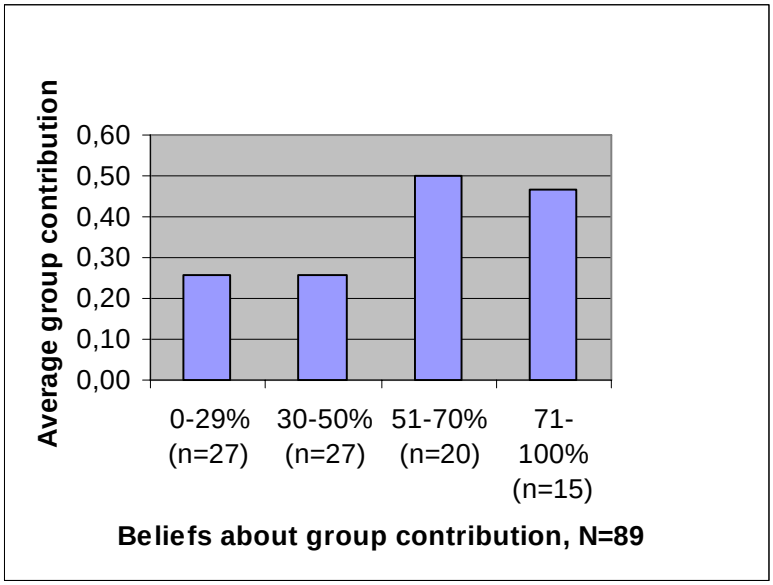

Figure 4.1: Share of real contributions for groups with different beliefs about average contribution

From these descriptive statistics, a difference between the control sample and the treatment sample would be expected if three conditions hold; 1) people in the treatment sample, on average, have the same prior beliefs about the group contribution as people in the control sample, before they received the treatment with information on the 'correct' average contribution[8], 2) people do, in fact, make social comparisons and a fraction of skiers are conditionally contributing i.e. 'conditional cooperators' and 3) the conditional cooperators have a threshold for contributing of a group share contribution below 70 percent. There is no reason to believe that condition 1 does not hold. Comparing background characteristics for the two samples (see table 3 in the Appendix), no unexplained differences are found. If there is a behavioral difference between the two samples, it is likely that either one or both of conditions 2 and 3 hold. Condition 3 is necessary to make the treatment, stating a 70 percent group contribution, consistent with

[8] The field context did not allow the collection of prior beliefs about the group contribution before they received the treatment. This information is necessary to explicitly control for beliefs when testing the conditional cooperation hypothesis. Trying to predict the beliefs of the treatment group on the basis of the beliefs of the control group, individual beliefs could not be explained by more than one significant variable at ten percent level.

the hypothesis. People may be conditionally cooperative, but at a threshold above 70 percent group contributions.

In addition to the above conditions, as explained, I assume skiers of different categories to react differently to information about others' behavior.

4.3 The tourist sample

From answers in the questionnaire, we categorized our total sample into locals (17%), semi-locals (34%) and tourists (48%). Assuming that subjects categorized as tourists are one-shot players, they are not expected to unconditionally contribute to the same degree as the two other types. Moreover, by only looking at the tourist sub-sample, I expect more subjects to contribute when faced with the treatment, if a fraction of people are conditional cooperators. Table 3 presents the first test of the conditional cooperation hypothesis. It reveals that the fraction of subjects contributing in the treatment group is 44 percent, while only 22 percent contributed in the control group. The difference is significant at the ten-percent level using a chi-square test.

Table 3: Real contributions in treatment and control: Tourist sample

	No. of subjects *n*	No. of subjects contributing *c*	Percentage contributing *c/n*
Control	36	8	22
Treatment	25	11	44
Total	61	19	*

* indicate significance at 10 %. Chi-squared = 3.23835, p-value= 0.07193

However, I do not expect subjects who already believe that a large fraction of others are contributing to react to the treatment. I have information about control group subjects' beliefs about the average contribution of others. Using the groupings of individual beliefs from figure 1, I select those subjects who stated a belief in others' average contribution being below or equal to 50 percent, and define this sub group as *low beliefs*.

Table 4 shows that 19 subjects in the tourist sample can be classified as 'low beliefs', and that only three of these had actually made a contribution. Comparing the 'low beliefs'-group with our treatment group, we see that the share of subjects making a real contribution is significantly greater in the treatment than in the 'low beliefs' group. However, I cannot reject the possibility that a false consensus effect might have been working behind the behavior in the 'low beliefs'.

Table 4: Conditional cooperation adjusted for beliefs: Tourist sample

	No. of subjects *n*	No. of subjects contributing *c*	Percent contributing *c/n*
Treatment (70 % contributing)	25	11	44
Low Beliefs (< = 50 % contributing)	28	5	18
Total	53	16	**

** indicate significance at 5 %. Chi-squared = 4.283, p-value= 0.0385.

The general pattern from the raw data analysis seems not to reject the conditional cooperation hypothesis. But there could be other factors of the field setting that affect the choice of contributing. In the next subsection, the effect of our explicit treatment is further investigated by estimating two models on the choice of contributing or not, controlling for demographic and field relevant variables. First, the models are used to test whether beliefs about others' behavior affect one's own behavior.

4.4 Further testing of the conditional cooperation hypothesis

The hypothesis of section 3 states that if people are making social comparisons, the individual behavior will vary positively with beliefs about the average behavior in the group. This implies that the perception of others' contribution and one's own behavior

should correlate. In our control sample, the coefficient of correlation between the behavior of contributing and the beliefs about others' contribution is 0.18. This is similar to the 0.34 relationship obtained by Frey and Meier (2003) in their study.

The total sample can be used to estimate the probability of contributing, contingent on a number of explanatory variables. Due to the limited sample size (127 observations), table 5 presents estimates both from a linear probability model and a probit model. Estimates from the two models at large give a unified picture of the driving forces behind the behavior to contribute. The variable *Belief* captures the effect of subjects' stated beliefs on the probability of contributing for those subjects not exposed to the treatment. As can be seen, the probability of contributing is increasing in others' contribution and is significant at the ten-percent level. This result is consistent with the conditional cooperation hypothesis. However, a "false consensus"-effect might have affected the stated beliefs.

The analysis of the tourist sample showed skiers to be conditionally cooperating. Results from our probit model with relevant covariates included support this finding. The interaction variable *Treatment*Tourist* captures the effect of a tourist exposed to the treatment. Being a tourist exposed to the treatment increases the probability of contributing. The marginal effect is 0.37. In the linear model, the coefficient implies that the probability of contributing increases by 40 percentage points when being a tourist exposed to the treatment. This finding seems robust considering the marginal effect from the probit model. On the other hand, simply being categorized as a *Tourist* decreases the probability of contributing. This supports our initial hypothesis of tourists being less likely to make unconditional contributions. Consequently, the regression analysis cannot reject that skiers make social comparisons and express a behavior of conditional cooperation.

Table 5: Models to explain the choice to contribute or not: Total sample

(Dependent variable =1 if contributing, 0 if not)

Variable	Probit estimates		Linear probability estimates [a)]
	Coefficient	Marginal effects	Coefficient (Std. dev.)
Age	0.020* (0.010)	0.726E-02	0.009** (0.004)
Belief [b)]	0.011* (0.006)	0.396E-02	0.004* (0.002)
Experience	-0.101* (0.056)	-0.372E-01	-0.046** (0.018)
Tourist	-0.455 (0.308)	-0.168	-0.166* (0.102)
Treatment	-0.010 (0.481)	-0.362E-02	-0.032 (0.165)
Constant	-1.244** (0.620)	-0.460	0.013 (0.212)
Interaction Treatment*Tourist	1.008* (0.544)	0.373	0.400** (0.185)
	N=127, Log L. -75.7501, Restricted log L. -83.1439		N=123, R^2=0.109,Model significance with F-test=2.35,p-value 0.035.

a) The linear probability model estimates are corrected for heteroscedasticity using WLS following Goldberger (1964), (four observations had to be dropped due to negative estimated probabilities of donation). b) Modeled as *Interaction* Belief*Control, i.e. only valid for the control sample. *, ** and *** indicate significance at ten, five and one percent levels, respectively. Descriptive statistics and variable descriptions are found in Appendix table A3.

Studies have shown that only a fraction of subjects are classified as conditional cooperators (Fischbacher et al. 2001), i.e. not all tourists can be expected to react to the treatment. Considering this, and the fact that the dependent variable is a dichotomous one (yes/no), the result is even stronger. The study took place in a natural field context, and table 5 reveals that other variables than the treatment influence the decision to contribute. Other significant variables are in line with the expectations. Experienced skiers, in terms of ski trips per week, seem less likely to give a contribution. Since the idea of giving voluntary contributions is rather new, it does not seem farfetched that a change of habit is not immediately accepted. The significant positive relationship between contributing and age is consistent with the behavior in public good games from other field experiments in a public good context (List 2004).

5. Conclusions

This paper presents results from a natural field experiment on conditional cooperation. To my knowledge, this is the first field experiment testing conditional cooperation in the field on a non-student population and the first to test conditional cooperation in a public good context. It is also one of the few field experiments testing social interaction. The field context involves cross-country skiers in a Swedish ski resort facing a decision to contribute to ski-track funding or not.

The conditional cooperation hypothesis is tested in two ways for a sample of skiers assumed to make a one-shot visit to the ski resort, i.e. tourists. When experimentally varying the beliefs of others' behavior, I find the share of subjects giving a contribution to be significantly greater ($p<0.10$ level) in the group receiving information about others' behavior than in the group that does not. Complementary regression analysis cannot reject that subjects make social comparisons and express a behavior of conditional cooperation. The results support the findings of Frey and Meier (2005).

When testing whether beliefs about other peoples' behavior affect the own behavior, I find a positive correlation. In a model for explaining the choice of contributing, the probability of contributing is increasing when the beliefs of others' contribution is increasing. This is consistent with the conditional cooperation hypothesis.

Finally, I find a significant positive relationship between giving a contribution and age. This result is consistent with the behavior in other field experiments in a public good context (List 2004).

References

Carpenter J. P. (2004). When in Rome: Conformity and the Provision of Public Goods. *Journal of Socio-Economics*, 33: 395-408.

Croson R., E. Fatas and T. Neugebauer (2004). Reciprocity, Matching and Conditional Cooperation in Two Public Goods Games. Working Paper, IESA 09-04.

Dufwenberg M. and G. Kirchsteiger (2004). A Theory of Sequential Reciprocity. *Games and Economic Behavior*, 47: 268-298.

Falk A. (2004) Lecture notes: Behavioral Economics, Institute for Empirical Research in Economics, University of Zürich.

Fehr E. and K. Schmidt (1999). A Theory of Fairness, Competition and Cooperation. *Quarterly Journal of Economics*, 114: 817-868.

Fehr E. and U. Fischbacher (2004). Social Norms and Human Cooperation. *Trends in Cognitive Sciences*, 8(4): 185-190.

Fischbacher U., S. Gächter and E. Fehr (2001). Are People Conditionally Cooperative? Evidence from a Public Goods Experiment. *Economic Letters*, 71: 397- 404.

Frey B.S. and S. Meier (2003). Social Comparisons and Pro-social Behavior: Testing Conditional Cooperation in a Field Experiment, Working Paper no. 162. Institute for Empirical Research in Economics, University of Zurich.

Frey B.S. and S. Meier (2005). Social Comparisons and Pro-social Behavior: Testing Conditional Cooperation in a Field Experiment. Forthcoming in *American Economic Review.*

Friedman M. (1962). *Capitalism and Freedom*. Chicago: University of Chicago Press.

Goldberger A.S. (1964). *Econometric Theory*, New York: Wiley & Sons. In Gujarati D.N. (1995) *Basic Econometrics*, 3rd ed., New York: McGraw-Hill.

Grafton R. (2000). Governance of the Commons: A Role for the State? *Land Economics*, 76 (4): 504-517.

Harrison G. W. and J. A. List (2004). Field Experiments. *Journal of Economic Literature*, 42(4): 1009-1055.

Heldt T. (2005). Informal Sanctions and Conditional Cooperation: A Natural Experiment on Voluntary Contributions to a Public Good. In Heldt T. (2005). *Sustainable Nature Tourism and the Nature of Tourists' Cooperative Behavior: Recreation Conflicts, Conditional Cooperation and the Public Good Problem*, Uppsala University.

Heldt T. and L. Nerhagen (2001). Turskid-och skoteråkning i Sälenfjällen: Är "På rätt led i Sälenfjällen" ur led?. Working paper 2001:3 in Transportation and Tourism. Dalarna University, Borlänge.

Keser C. and F. van Winden (2000). Conditional Cooperation and Voluntary Contributions to Public Goods. *Scandinavian Journal of Economics*, 102(1): 23-39.

List J.A. (2004). Young, Selfish and Male: Field Evidence of Social Preferences. *The Economic Journal*, 114: 121-149.

Ledyard J. O. (1995). Public Goods: A Survey of Experimental Research, in A.E.Roth and J. Kagel (eds.), *The Handbook of Experimental Economics*. Princeton: Princeton University Press.

Messick D. (1999). Alternative Logics for Decision Making in Social Settings. *Journal of Economic Behavior and Organization*, 39: 11-28.

Ross L., D. Green and P. House (1977) 'The False Consensus Effect': An Egocentric Bias in Social Perception and Attribution Processes. *Journal of Experimental Social Psychology*, 13: 279-301.

Rabin M. (1993). Incorporating Fairness into Game Theory and Economics. *American Economic Review*, 83: 1281-1302.

Ostrom E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge university press.

Ostrom E. (2000). Collective Action and the Evolution of Social Norms. *Journal of Economic Perspectives*, 14: 137-158.

Sugden R. (1984). Reciprocity: The Supply of Public Goods through Voluntary Contributions. *The Economic Journal*, 94: 772-787.

Vail, D. and L. Hultkrantz (2000). Property Rights and Sustainable Nature Tourism: Institutional Adaptation and Mal-adaptation in Dalarna and Maine. *Ecological Economics*, 35 (2): 223 - 242.

Vesterlund L. (2003). The Informational Value of Sequential Fundraising. *Journal of Public Economics*, 87 (3-4): 627-657.

World Tourism Organization (1994). *Recommendations on Tourism Statistics*. World Tourism Organization, Madrid.

Appendix 1

A1. Sample and Descriptive statistics for the study area

Table A1: Response rates

Main sample	333
Real sample	322
Returned blank	2
Responses	244
Response rate (%)	76

Table A2: Effective sample size

Responses	244
Excl. previously sampled	62
Excl. group members	55
Effective sample	127

Table A3: Descriptive Statistics treatment and control sample
(Effective sample) Means (μ), Standard Deviations (σ) and Number of Observations (N).

Variable	Treatment sample			Control sample		
	μ	σ	N	μ	σ	N
Age (years)	48.55	11.08	38	45.21	12.95	89
Beliefs of others (percent)	70.00	0.00	38	41.60	23.53	89
Belief	0.00	0.00	38	41.60	23.53	89
Children (no. in family)	0.18	0.61	38	0.17	0.55	89
Company (yes=1, no=0)	0.55	0.50	38	0.57	0.50	89
Contributing (yes=1, no=0)	0.39	0.50	38	0.35	0.48	89
Education (four steps)	3.22	0.83	36	3.15	0.92	85
Experience (weakly ski tours/year)	3.61	2.76	38	3.29	2.10	89
First time visit to study area (yes=1, no=0)	0.29	0.46	38	0.22	0.42	89
Gender (Woman=0)	0.63	0.49	38	0.69	0.47	89
Kilometers skied	13.61	10.82	38	17.15	10.67	88
Local inhabitant (yes=1, no=0)	0.05	0.23	38	0.22	0.42	89
Return visitor (yes=1, no=0)	0.74	0.45	38	0.71	0.46	87
Semi locals	0.29	0.46	38	0.36	0.48	89
Treatment (yes=1, no=0)	1.00	0.00	38	0.00	0.00	89
Tourist (yes=1, no=0)	0.66	0.48	38	0.40	0.49	89
Interaction Tourist*Treatment	0.66	0.48	38	0.00	0.00	89

Table A4: Summary field sessions (Effective sample)

Field session	Effective sample *n*	No. of subjects contributing *c*	Share contributing *c/n*	Combined sessions	Rank
1	35	13	0.37	0.37 (n=35)	4
2*	13	4	0.31	0.31 (n=13)	3
3*	19	8	0.42	0.42 (n=19)	5
4	3	3	1.0	0.45 (n=11)	6
5*	5	2	0.40		
6	3	0	0.00		
7*	11	1	0.09	0.09 (n=11)	1
8^T	12	3	0.25	0.23 (n=17)	2
9^T	5	1	0.20		
10^T*	7	4	0.57	0.50 (n=10)	7
11^T*	3	1	0.33		
12^T	2	1	0.50	0.55 (n=11)	8
13^T	3	2	0.67		
14^T*	6	3	0.50		
Total	127	46	0.36		

^{T} denotes session with treatment. * Denotes session with perfect match of reported contribution and money in box, i.e. "pure sessions".

Table A5: Share of skiers contributing

	Adjusted Real sample[a)] *N*	Effective sample *n*	No. of subjects contributing *c*	Percent contributing *c/N*	*c/n*
Treatment	60	38	15	25	39
Control	145	89	31	21	35
Total	205	127	46	22	36

a) Effective sample plus non-respondents which is equal to real sample minus previously sampled minus more than one in a party.

Appendix 2

A2. Information posted at ski resort - Säfsen

The below information in Swedish was posted at the entrance of the ski-track area in Säfsen (English translations in brackets)

Bidragssystem för längdåkning i SÄFSEN

ett forskningsprojekt inom naturturismområdet i **Högskolan Dalarnas** regi i samarbete med **Säfsen Resort**.

(Voluntary contributions to fund ski tracks in SÄFSEN constitute part of a nature tourism research project in cooperation with Dalarna University College and Uppsala University.)

Ett bra skidspår kräver daglig preparering av pistmaskin. Innan snön kommer sker röjning och markarbeten för att ge bästa underlag för spårdragning. Säfsen Resort satsar årligen dryga 800.000 kr på underarbete och preparering av längdskidspåren i området. På andra skidorter i Sverige ges besökande och lokalt boende möjligheten att bidra till denna kostsamma verksamhet.

(A good ski track requires daily grooming. Before the winter season, land is cleared to give the best conditions for ski-track grooming. SÄFSEN Resort yearly spends 800 000 SEK on grooming and prepatory work on the tracks in the area. In other ski resorts in Sweden, visitors and locals get the opportunity to contribute to this costly business.)

Hjälp oss att hålla fortsatt hög kvalité på längdspåren i Säfsen. Ge gärna ett frivilligt bidrag om 20 kr – en tjuga - för bra skidspår!

("Help us keep the high quality of the ski tracks in Säfsen – Please give a voluntary contribution of 20 SEK - "a twenty" (i.e. a twenty kronor bill) for track preparations!") – for good ski tracks!

A3. Treatment information

The information below was posted in connection with the general information about the voluntary contribution system during treatment sessions. The Swedish text in bold states: " Within this study 7 out of 10 cross-country skiers (70 %), contribute 20 SEK to ski track grooming." This information also appeared as a separate note in the questionnaire during the treatment period. Below the main text appears the contact information to the one responsible for the questionnaire survey.

Inom denna undersökning betalar 7 av 10 längdåkare (70%), 20 kr för preparering av spåren.

Längdskidåkning vid Säfsen Resort
ett forskningsprojekt inom naturturismområdet i samarbete med Högskolan Dalarna och Uppsala universitet. Har Du frågor om undersökningen kontakta Tobias Heldt Högskolan Dalarna, tel.070 – 525 68 57, e-post: the@du.se.