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On the attribution of externalities

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Abstract

Do people blame or praise others for producing negative or positive externalities? The experimental philosopher Knobe conducted a questionnaire study that revealed that people blame others for foreseen negative externalities but do not praise them for foreseen positive ones. We find that the major determinant of the Knobe effect is the relative distribution of economic power among the agents. We confirm the Knobe effect only in situations where the producer of the externality holds the higher economic status and the positive externalities are small. Switching economic power makes the Knobe effect vanish. The Knobe effect is even reversed in settings with large positive externalities. Our results are in line with theoretical predictions by Levine.

JEL Classification: C91, D62, D63

Keywords: Intentions, Externalities, Experiment.

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1. Introduction

When a firm produces a negative externality, the firm is blamed for it and it often causes a storm of protest. For instance when Shell planned to sink its oil storage Brent Spar, public and political opposition resulted. There exist also many examples for positive externalities as a side effect of payoff maximization. A poetic example is the case of the honey producer, but also knowledge spillovers are abundant. In contrast to negative externalities it is however difficult to find examples that show reward in response to these positive externalities. This asymmetry has been confirmed by the experimental philosopher Joshua Knobe (2003) who conducted a questionnaire study in which subjects could attribute intentions to the producer of positive and negative externalities. He finds that people attribute intentions to producers of foreseen negative externalities but not to producers of foreseen positive ones. We are interested in the reason behind this asymmetry. Why do people blame others for negative externalities but do not reward them for positive ones?

Many studies have shown that perceived intentions play a major role for reciprocal behavior. For example intentions are important in law (Huang (2000)) where they help to determine whether somebody is sentenced for murder or manslaughter. People's ascriptions of intentions also have important consequences in economic markets. A study by Charness and Levine (2002) shows that selfish intentions are crucial for people's perceptions of fairness in consumer markets. They also affect people's reciprocal behavior in the labor market (Kahneman et al. (1986)). These results lead us to the question of whether ascription of intentions drives this asymmetric behavior with respect to externalities, and how people attribute intention in this context. The impact of intentions on reciprocal behavior has been discussed in economics for some time. The growing literature covers intentions both theoretically and experimentally. However, we are the first to analyze perceived intentions for externalities.

In theoretical economics, various models assign intentions an important behavioral role. In the models of Rabin (1993), Dufwenberg and Kirchsteiger (2004) and Falk and Fischbacher (2006) intentional kindness is inferred from which choice has been made – taking into account the available alternatives. A different approach has been taken by Levine (1998) and Charness and Rabin (2002) who measure the intention with the type of a player. Those who value other peoples' payoff positively are considered as intentionally kind while those who value it negatively are considered as intentionally unkind.

The experimental part of the literature discusses the impact of intentions on reciprocal behavior. Charness and Levine (2007) divide most studies that analyze intentions

experimentally into a two-class approach-categorization. The first class compares responses to choices made by a random draw (unintentional choices) to choices made by a counterpart (intentional choices). The second category includes studies that compare responses to choices that are made by counterpart and that differ in their set of alternatives. The same choice can be either intentionally friendly or intentionally unfriendly.

There are studies in both categories that find that negative intentions matter (Blount (1995), Brandts and Sola (2001), Nelson Jr. (2002), Charness and Rabin (2002), Falk et al. (2003), Offerman (2002), Charness (2004), Charness and Rabin (2005), Charness and Levine (2007), and Falk et al. (2008)). There is also evidence that negative intentions do not cause negative reciprocity (Bolton et al. (1998), Cox and Deck (2005), Houser et al. (2008)). With respect to positive intentions, there is evidence for reciprocity (Falk et al. (2008), Charness and Levine (2007)) and for no reciprocity (Offerman (2002), Cox and Deck (2005), Houser et al. (2008)). The studies give mixed evidence whether intentions have important consequences for reciprocal behavior. However, all of these studies define unfriendly moves as harming moves under payoff maximization and friendly moves as helping moves including a reduction of the own payoff. None of these studies includes positive externalities in the sense of positive side effects of payoff maximization. This idea was first introduced by Knobe (2003). In his questionnaire study he uses the following two vignettes.

HARM Story

The vice-president of a company went to the chairman of the board and said, 'We are thinking of starting a new program. It will help us increase profits, but it will also harm the environment.' The chairman of the board answered, 'I don't care at all about harming the environment. I just want to make as much profit as I can. Let's start the new program.' They started the new program, the company increased its profits and the environment was harmed. Question: Did the chairman of the board intentionally harm the environment?

HELP Story

The vice-president of a company went to the chairman of the board and said, 'We are thinking of starting a new program. It will help us increase profits, and it will also help the environment.' The chairman of the board answered, 'I don't care at all about helping the environment. I just want to make as much profit as I can. Let's start the new program.' They started the new program, the company increased its profits and the environment was helped. Question: Did the chairman of the board intentionally help the environment?

These two stories are almost identical; only the word *hurt* was replaced by the word *help*. 78 people in a Manhattan public park were randomly given one of the two questions. 82% of subjects who had to answer the HARM Question said the chairman harmed the environment intentionally but only 23% of subjects who had to answer the HELP Question claimed that the chairman helped the environment intentionally. Thus, the change of a single word from hurt to help leads to a complete change in peoples' intuitions. In experimental philosophy this result is known as the Knobe effect or side-effect effect. Knobe (2006) suggests that whether an action's side effect is perceived as good or bad influences people's ascriptions of intentionality to this side effect. The Knobe effect is stable with respect to framing (Adams and Steadman (2007), Machery (2008), Wright and Bangson (2009)), moral status of the outcome (Mallon (2008)), age (Leslie et al. (2006)), cultural background (Knobe and Burra (2006)), and order of presentation (Nichols and Ulatowski (2008) and Wright and Bangson (2009)).

In all these studies the use of the word intentional is critical since the concept of intentionality is individually defined. It is unclear what people exactly mean when they use the word *intentional*. In our study we measure attribution of intentions by introducing possible reward and punishment for producers of externalities. We economize the Knobe vignettes in order to test not only whether intentions matter but how people attribute intention when externalities are caused. In this manner we challenge the Knobe effect without the use of any specific language term. We investigate the stability of the Knobe effect and analyze the crucial economic determinants. The original vignettes do not indicate any details on the agents' economic status nor the extent of the externalities and therefore leave it to the participant to form a view of the situation. In order to describe several possible perceptions of the situation, we use three different settings varying the agents' economic status and the size of the positive externalities.

We find that the major determinant of the Knobe effect is the relative distribution of economic power among the players. We confirm the Knobe effect only in situations where the producer of the externality holds the higher economic status and the positive externalities are small. Switching economic power makes the Knobe effect vanish. Finally, increasing the positive externalities even reverses the Knobe effect. We compare the results with theoretical predictions and find that they are in line with a naïve version of Levine (1998).

We complete our experiment by running two questionnaire studies in order to test our experimental findings using Knobe's method. In one study we replicate the original Knobe questions. The second study modifies the Knobe questions by switching the economic status

of the agents. The questionnaire results confirm the experiment results. The Knobe effect only persists in the original Knobe questions including an active agent with high economic status.

The paper is organized as follows: In the next section we present the experimental design and procedure followed by the design of the questionnaire studies and procedure. In Section 4 we describe our hypotheses. Results are given in Section 5. Section 6 discusses and concludes.

2. Experimental Design and Procedure

In order to test Knobe's claim that people are willing to blame other people for negative foreseen externalities, but are not willing to praise them for positive ones, we use the following basic three player game as shown in Table 1. Player 1 has to choose between allocation *X* and *Y*. We frame *X* as default and give player 1 the option to change to allocation *Y*. If player 1 chooses *X*, he receives *X1* and player 2 receives *X2*. If he chooses *Y*, player 1 receives *Y1* and player 2 receives *Y2*. *X* represents the firm's and environment's situation at the time when vice-president and chairman of the board are talking in their office. *Y* represents the situation after the start of the program. Since the firm always gains by choosing the program, it is necessary that *X1*<*Y1*. In the story with negative externalities, the environment experiences some loss, so $X_2^{harm} > Y_2$. Within the story with positive externalities, we assume $X_2^{help} < Y_2$. As we are interested in whether people are influenced by the caused externalities, we control for other possible influences and use the same allocation Y for both kinds of externalities. The games differ only in allocation *X*.

Our experimental design corresponds to the story by Knobe as follows: player 1 is in the role of the firm and player 2 is the environment. Player 2 has no decision to make. Player 3 is in the role of the reader of the story and is therefore not involved in player 1's decision. He receives an endowment of 100 points independent from player 1's decision. After learning player 1's choice, player 3 is free to transfer points from player 1 to player 2 or the other way around. This transfer is costless for player 3, since we are interested in all participants' assessments of intentionality and not only in the non-selfish participants' transfer. Player 3's decision whether to redistribute points between player 1 and player 2 reflects whether he thinks that player 1 is blameworthy or praiseworthy for the caused externalities. In other words: Does player 3 attribute intentionality to player 1? Does he punish decisions including negative externalities more than he rewards decisions with positive externalities?

	default allocation X	changed allocation Y	
player 1	X_1	Y_1	with $X_1 < Y_1$
player 2	X_2	Y_2	with $X_2^{harm} > Y_2$, $X_2^{help} < Y_2$

Table 1: Basic Game

Since the Knobe questions do neither provide any information on specific losses nor gains for the firm or the environment, nor do they indicate any details on their relative endowments, the story sets leave it to the participant to form a view of the situation. Therefore, we consider three different possible perceptions of the situation. Perception I describes who most people probably understand the story. A strong firm is affecting the weak environment. Hurting really hurts and helping rarely helps. In Perception II we give another possible perception. A weak firm is affecting the strong environment. Hurting still hurts and helping still rarely helps. In Perception III we vary Perception II. Hurting still hurts, but helping now also really helps.

Every perception consist of three games: In the first game (harm) the allocation *Y* can be reached through negative externalities. The second game (help) involves positive externalities in order to reach *Y*. The third game does not include any externalities. It is simply the allocation *Y* without any alternative as control for player 3's general inequality aversion.

There are two main advantages of our design. First, many different perceptions can be easily modeled. Second, former studies treat reward and punishment differently. Many studies analyze only one kind of targeted interaction - either reward or punishment. Those studies that implement both reward and punishment (such as Offerman (2002), Bolton et al. (1998), Charness and Levine (2007), Rand et al. (2009) and Falk et al. (2008)) use costly reward and punishment. Therefore punishment is efficiency reducing, while reward is not. This means that effects cannot be directly compared and punishment and reward must be treated separately. We can perfectly compare reward and punishment. Since reward and punishment are costless for the punisher, punishment is equivalent to withhold reward and vice versa. Thus, we get a clean *direct* comparison of positive and negative reciprocity. In this way, we are able to bring experimental philosophy into the laboratory and test subjects' behavior in a controlled environment with real monetary consequences.

		X (harm)	Y	X (help)
Perception I	player 1	50	60	50
	player 2	50	30	20
Perception II	player 1	20	30	20
	player 2	80	60	50
Perception III	player 1	20	30	20
	player 2	80	60	20

Table 2: Perceptions I-III

Perception I: Firm holds higher economic status, relatively weak positive externalities

Perception I represents how we think most people perceive the Knobe questions. First, player 1 (the firm) holds the higher economic status in both allocations *X* and *Y*. That means $X_1 \geq X_2^{harm}$, $X_1 \geq X_2^{help}$ and $Y_1 \geq Y_2$. Second, the positive externalities are weaker than player 1's gain by choosing *Y*, which yields $Y_1 - X_1^{help} > Y_2 - X_2^{help}$. Third, there is no efficiency gain under *Y* in the situation with negative side effects.

In the game with negative externalities both players receive 50 points as basic endowment. Player 1 can choose to switch to allocation *Y* and increase his profits by 10 points. If he decides to do so, player 2 will lose 20 points. In the game with positive externalities player 1 receives 50 points and player 2 receives 20 points as basic endowment. player 1 has to decide whether he wants to increase his profits by 10 points, meaning that player 2 will also gain 10 additional points.

Perception II: Firm holds lower economic status, relatively weak positive externalities

Perception II represents another possible interpretation of the Knobe questions. The crucial difference is the switch of the economic status among the players. While in Perception I player 1 (the firm) holds the higher economic status, now player 2 (the environment) holds the higher economic status in both allocations *X* and *Y*, which means $X_1 \leq X_2^{harm}$, $X_1 \leq X_2^{help}$ and $Y_1 \leq Y_2$. There is still no efficiency gain under *Y* in the game with negative externalities and the positive externalities are still weak ($Y_1 - X_1^{help} > Y_2 - X_2^{help}$).

As basic endowment in the harm condition player 1 receives 20 points and player 2 receives 80 points. Player 1 can switch to allocation Y and increase his profits by 10 points and decrease player 2's profits by 20 points. As basic endowment in the game with positive externalities player 1 receives 20 points and player 2 receives 50 points. By choosing *Y*, player 1 can increase his profits by 10 points and,player 2 will also gain 10 points.

Perception III: Firm holds lower economic status, relatively strong positive externalities

In order to analyze the effect of the extent of the positive externalities on people's intuition whether foreseen externalities were intentional, we conduct Perception III. Perception II and III only differ with respect to the game with positive externalities. In Perception III, the positive externalities are stronger than player 1's gain by choosing Y ($Y_1 - X_1^{help} < Y_2 - X_2^{help}$). The players' economic status remains as in Perception II ($X_1 \leq X_2^{harm}$, $X_1 \leq X_2^{help}$ and $Y_1 \leq Y_2$). There is still no efficiency gain under Y in the game with negative externalities.

In the game with positive externalities, both players receive 20 points as basic endowment. By choosing Y, player 1 can increase his profits by 10 points. By doing so, player 2 will gain 40 points.

Procedure

We conducted 8 sessions in the time from January till June 2009. All sessions were played at the LakeLab (TWI/University of Konstanz) with a total number of 180 participants (60 players 3). None of the subjects participated in more than one session. Three sessions consisted of Perception I and II and five sessions included Perception I and III. This means all participants received Perception I, 25 of them additionally played Perception II and the remaining 35 subjects played Perception III.

	Number of players 3
Perception I	60
Perception II	25
Perception III	35

Table 3: Number of Participants

Before the game started, subjects were randomly assigned to their role as player 1, 2 or 3. Each subject sat at a randomly assigned PC terminal and was given a copy of instructions.[3] A set of control questions was provided to ensure the understanding of the game. The experiment did not start until all subjects had answered all questions correctly. We use a within subject design. In every game players were rematched and played the games in randomized order with no apparent order effects. The control games for inequality aversion were played after the other games at the end of the experiment. Subjects did not receive feedback until the end of their sixth game in order to avoid learning. For each game player 1

[3] Instructions can be found in the appendix.

and 2 received the payoff from the allocation and the points assigned by player 3. Player 3 received 100 points for every game. For player 3 we use the strategy method. That means, without actually knowing player 1's decision, player 3 redistributes points for both possible decisions.[4] One point was converted into 0.01 euros. The experiment took about 30 minutes, average income of a participant was 3.77 euros. Participants played the game after having participated in another experiment. Furthermore, there were no apparent session effects.

3. Design of the Questionnaire-Studies and Procedure

In order to close the circle and return to experimental philosophy, all 180 participants were asked to answer both Knobe questions at the end of the experiment. Participants received the questions in randomized order. The answers to the questionnaire studies had no consequences on the participants' payoff.

Additionally, we conducted a second questionnaire with two stories similar to the Knobe stories. In all so far conducted questionnaires such as Knobe (2003), Mallon (2008), Leslie et al. (2006), Machery (2008) or Wright and Bangson (2009), the producer of the externality holds the higher economic status. That is why we switched the economic status of the agents. The stories are the following:

HARM II Story

The vice-president of a small fast-food restaurant went to the chairman of the board and said, 'We are thinking of launching a new burger. It will help us increase profits, but it will also harm McDonald's next door.' The chairman of the board answered, 'I don't care at all about harming McDonald's. I just want to make as much profit as I can. Let's launch the new burger. 'So the company launched the new burger, increased profits and McDonald's next door was harmed. Question: Did the chairman of the board intentionally harm McDonald's?

HELP II Story

The vice-president of a small fast-food restaurant went to the chairman of the board and said, 'We are thinking of launching a new burger. It will help us increase profits, but it will also help McDonald's next door (for example due to higher pedestrian flow).' The chairman of the

[4] The use of the strategy method (Selten (1967)) is still controversial. The strategy method and the direct response method sometimes yield different results (Brosig et al. (2003), Güth et al. (2001),Schotter et al. (1994), Solnick (2007), Kübler and Müller (2002), Neugebauer et al. (2002)) and sometimes yield similar results (Cason and Mui (1998)), Brandts and Charness (2000), McLeish and Oxoby (2004), Falk and Kosfeld (2006), Cox and Deck (2005)), Charness and Levine (2007) state that the strategy method can be problematic in experiments where the level of the observed variable is important. Since in our experiment we consider changes in the rate of punishment and reward rather than the level of the rate the strategy method should be innocuous.

board answered, 'I don't care at all about helping McDonald's. I just want to make as much profit as I can. Let's launch the new burger.' So the company launched the new burger, increased profits and McDonald's next door was helped. Question: Did the chairman of the board intentionally help McDonald's?

We presented the latter two questions to 53 subjects at the LakeLab (TWI/University of Konstanz) and to 34 students at the University of Zurich. Participants received the questions in randomized order with no apparent order effects. The experiment and the questionnaires were programmed with z-Tree.[5] We recruited participants using the online recruiting system ORSEE.[6]

4. Hypotheses

In this section, we analyze the theoretical predictions for player 3's decisions when allocation *Y* has been chosen. In each perception, this allocation is the same for the three games. Thus, we can compare player 3's redistribution in the case when the outcome resulted from player 1 helping or hurting or when player 1 had no impact at all.

First, we note that selfish players 3 are indifferent between any transfers since their own payoff is not affected by their decision. Second, also players with linear self-centered inequity aversion as modeled in Fehr and Schmidt (1999) or Bolton and Ockenfels (2000) are indifferent in their redistribution decision. Since player 3 has the highest payoff independent of the redistribution, the (advantageous) sum of the inequality between player 3's payoff and the payoffs of player 1 and 2 is not affected by the redistribution. If player 3 cares also about equality between the other players, then he will equalize the payoff between player 1 and player 2 since there are no costs of redistribution. The same is true, if player 3 has convex disutility from inequality between his own payoff and the payoff of the other players or if player 3 has maximin preferences (Charness and Rabin (2002)), i.e. if he cares about the income of the poorest. Gächter and Riedl (2005) argue that entitlements constitute a "moral property right" that is influential independent of negotiators' legal property rights. Since the initial allocation can be interpreted as a reference point for property rights, we expect player 3 to include the initial allocation in his decision on transfer.

As we have seen above, not all types of non-selfish motives provide a unique prediction for the decision of player 3. For instance, also preferences for efficiency do not make a prediction for player 3. Nevertheless, equalizing the payoffs of player 1 and player 2 is always

[5] Fischbacher (2007)
[6] Greiner (2004)

among the optimal choices for player 3 as long as she has purely outcome-oriented and symmetric preferences. Furthermore, outcome-oriented preferences do not predict any difference between the games within one perception.[7] This leads us to the first hypothesis.

Hypothesis 1 (Outcome Hypothesis)

a) In all games player 3 redistributes from the richer to the poorer. Thus, in the games in Perception I, he redistributes points from player 1 to player 2, and in the games in Perception II and III player 3 redistributes points from player 2 to player 1.

b) Within a perception, the decision is independent of the game's externalities.

The Knobe effect describes that participants are willing to blame other people for negative foreseen externalities, but are not willing to praise them for positive ones. If the Knobe effect persists in an experimental economic framework we should expect that player 3 punishes others for negative externalities but does not reward them for positive ones. Therefore, on the one hand, the amount of transferred points to player 1 after a decision including negative externalities should be higher than in the control game with no externalities included. On the other hand the amount of transferred points to player 1 after a decision including positive externalities should not differ from the control game. In our experiment, punishment or reward of an action of player 1 can be assessed by comparing the assignment of points to player 1 when player 1 did cause the externalities with the situation with no negative externalities included. This is captured in Hypothesis 2.

Hypothesis 2 (Knobe Hypothesis)

a) Player 3 allocates fewer points to player 1 in games in which Allocation *Y* involved hurting player 2 than in the corresponding benchmark game.

b) Player 3 allocates the same amount of points to player 1 in games in which Allocation *Y* involved helping player 2 as in the corresponding benchmark game.

How do these hypotheses relate to theories of non-selfish preferences that are used in economics? The models of direct reciprocity as Rabin (1993) or Dufwenberg and Kirchsteiger (2004) are not in line with these hypotheses because in these models only direct kindness or unkindness is reciprocated. Since player 3 is not affected by the decision of player 1, these models predict neither reward nor punishment. Nevertheless, it is worthwhile to study how

[7] Of course, different behavior on the individual level can result from indifference. However, indifference cannot explain any statistical difference between the treatments.

these models assess kindness from player 1 towards player 2. An action is unkind toward a player if the action yields a lower payoff than the reference payoff; it is considered as kind if it yields a higher payoff than this reference payoff. The reference payoff is defined as the mean of the range of reasonable payoffs. In Rabin's model, the reasonable payoffs are those from Pareto optimal allocations. This means that in our games, hurting is unkind but helping is not kind because helping is only a Pareto improvement.[8] Thus, the model of Rabin provides an intuition for the Knobe effect. Helping is not considered kind because it does not involve a sacrifice. This intuition applies equally to all our games and corresponds to the Knobe hypothesis.

In the model of Levine (1998), people differ in how much they weight the other players' income. A positive weight means that they are altruistic and a negative weight means that they are spiteful. The weight of the other players is unknown but the actions of a player reveal information about it. Applied to our games, helping reveals that the player is more altruistic than average whereas hurting reveals that the player is more spiteful. This model predicts punishment after hurting but also reward after helping. As in the alternative-based reciprocity models discussed above intention depends on the expectation of how player 3 will redistribute. Since in the model of Levine reward and punishment are based on the average altruism or spite of the players who have chosen a particular action, we can make an empirical prediction. Concretely, the more people make a particular unkind decision, the less spiteful is this decision on average. The more people make a particular kind decision, the less friendly is this decision on average. Thus, we can derive a specific hypothesis how the aggregate behavior of players 1 is related to reward and punishment.

Hypothesis 3 (Levine Hypotheses)

a) Punishment in games involving hurt is negatively correlated with the share of players 1 who choose Allocation Y in this situation.

b) Reward in games involving help is negatively correlated with the share of players 1 who choose Allocation Y in this situation.

In the next section, we turn to the results.

[8]Since player 3 can freely choose how to redistribute the amount determined by player 1, the games could lose their characteristics when taking into account the terminal allocation. However, results show that this does not happen. player 3's transfer does change the initial benefits and costs of the allocations for player 2. In the hurting game, even after player 3's transfer, Y stays the unfavorable allocation for player 2 and in the helping game, Y stays the favorable allocation. For player 1 in the harming game the transfer changes Y's benefit. Choosing Y in the harming game then harms player 1 and player 2.

5. Results

We structure the results the following way: First we present the experimental results including player 3's decisions. We test the Outcome hypotheses and the Knobe hypotheses. Then we go on to the results of the questionnaire studies. At the end of section we test the Levine hypotheses.

This section gives results for player 3's decisions when allocation Y has been chosen. For each perception there are three games with different externalities: positive, negative and no externalities. Allocation Y stays the same for the three games. Thus, we can compare player 3's transfer depending on positive externalities, negative externalities or no externalities at all.

5.1 Outcome- Hypothesis

In order to analyze player 3's transfer between the other two players we look at the amount of transferred points from player 2 to player 1. Table 4 and Figure 1 give the transfer of player 3 from player 1 to player 2 for Perception I-III. If player 3 cares for equality of allocations, we should expect that he redistributes points from the richer to the poorer. In order to equalize payoffs, player 3 would have to transfer 15 points. These 15 points hold for a benchmark and are given by the variable *Equality*. *No externalities* list the transferred points for the control game without any externalities. Transferred points from player 2 to player 1 in the harm and help condition are given in *negative* and *positive externalities*, respectively.

	Equality	Externalities		
		no	negative	positive
Perception I	-15	-14.68	-19.89	-13.75
Perception II	15	14.52	14.00	13.00
Perception III	15	12.71	12.57	17.29

All numbers are different from 0, (Wilcoxon signed-rank test, p=0.000)

Table 4: Transfer to player 1 by player 3 when Y is chosen in Perceptions I-III

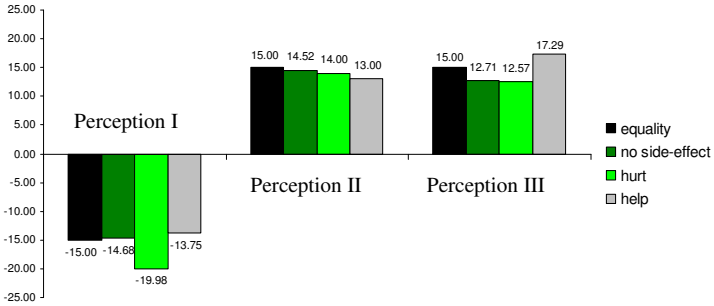

Figure 1: Transfer to player 1from player 2 by player 3

In all games with no side effects, participants' transfer from the richer to the poorer and the amount of transferred points does not differ from equality (Wilcoxon signed-rank test, Perception I: p=0.319, Perception II: p=0.338, Perception III: p=0.208). This is consistent with perfect inequality aversion and maximin. In all other games player 3 also transfers points from the richer to the poorer (Wilcoxon signed-rank test, p=0.000). These results confirm Hypotheses 1a and 1b. Participants are inequality averse and this inequality aversion is independent of the games' externalities. With no side effects included, participants transfer points in order to achieve the exactly equal split. We will see in the next section how externalities affect the participants' willingness to reciprocate.

5.2 Knobe-Hypothesis

The Knobe effect describes the effect that people blame others for negative externalities but do not praise them for positive ones. In our experiment we measure this behavior by comparing transfers for agents having caused an externality with transfers for agents having caused no externality. This allows us to control for player 3's individual inequality aversion. Table 5 and Figure 2 give the reciprocity transfer[9] of player 3 from player 1 to player 2 for Perception I-III.

[9] Reciprocity transfer gives the difference of transferred points from player 2 to player 1 after an externality to the transferred points in the control game *no externalities*. Net transfer is independent from inequality aversion.

	Externalities	
	negative	positive
Perception I	-5.30***	0.93*
Perception II	-0.52	-1.52
Perception III	-0.14	4.58**

Wilcoxon signed-rank test, different from 0, *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$.

Table 5: Reciprocity transfer to player 1 by player 3 when Y is chosen in Perceptions I-III

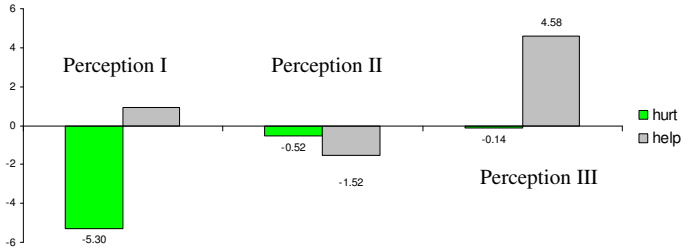

Figure 2: Reciprocity transfer to player 1 by player 3

Perception I

In the game with negative externalities, we find that apart from reasons of inequality aversion, subjects also react to the negative externalities (Wilcoxon signed-rank test, p=0.002). This confirms Hypotheses 2a. Comparing the game with positive externalities with the game without externalities, we find just a small difference in redistribution. That means that participants only slightly redistribute less than they redistribute due to inequality aversion (Wilcoxon signed-rank test, p=0.080). This confirms Hypothesis 2b. We find significant differences between the games with negative and positive side effects (Wilcoxon signed-rank test, p=0.000). That shows that subjects react more strongly to negative than to positive externalities. To summarize: The Knobe effect can be found in Perception I. Participants do not reward others for positive externalities but punish them for negative ones.[10] This confirms both parts of Hypothesis 2.

[10]There are no apparent order- or session effects. Just for completeness we mention that slightly more subjects reward others for positive externalities when they received Game 2 before Game 1 (Mann-Whitney: p=0.0419). There are also slightly more subjects punishing others for negative externalities in Perception I in the sessions that included Perception III (Mann-Whitney: p=0.069).

Perception II

We do not find that externalities matter in Perception II.[11] Subjects do not the producer of negative externalities nor do they reward the producer of positive ones. An active agent with lower economic status leads to the ignorance of all side effects. The agents' economic status affects the appearance of the Knobe effect. These results contradict Hypotheses 2a and confirm Hypotheses 2b. The Knobe effect cannot be found. When the producer of the externality holds the lower economic status, participants do neither punish him for negative externalities nor do they reward him for positive ones.

The results of Perception II also give evidence that the efficiency loss in the hurt game is not the driving force behind the Knobe effect. The efficiency loss is still present in Perception II. However, the Knobe effect has vanished.

Perception III

We used the additional treatment Perception III in order to test how people's willingness to reward foreseen externalities depends on the size of the positive externalities. Negative externalities do not affect participants willingness to redistribute (Wilcoxon signed-rank test, $p=0.242$). Subjects do not punish others for caused negative side effects in Perception III. This contradicts Hypothesis 2a. However, subjects do reward others for caused positive side effects. Positive side effects significantly increase the willingness to redistribute (Wilcoxon signed-rank test, $p=0.013$). This result contradicts Hypothesis 2b and also leads to significant differences in redistribution between the games with positive and negative side effects (Wilcoxon signed-rank test, $p=0.015$). These findings reverse the Knobe effect. When the positive externality is sufficiently strong producer of the externality holds the lower economic status, participants reward others for positive externalities but do not punish them for negative ones.

5.3 Results of the Questionnaires

The results of the last sections show that the economic status of the agent causing an externality is a crucial determinant of the Knobe effect. For the sake of completeness we verify this result by conducting two additional questionnaire-studies. The first study contains of the two original Knobe questions. In the second one we modify the original stories by switching the economic status of the agents. We present the results of the Knobe questions in

[11] Negative externalities do not vary redistribution due to inequality aversion (Wilcoxon signed-rank test, $p=0.373$). Positive externalities do not vary redistribution due to inequality aversion (Wilcoxon signed-rank test, $p=0.581$). We also do not find significant differences in redistribution comparing the game with positive with the game with negative externalities (Wilcoxon signed-rank test, $p=0.679$).

Table 6. They reflect Knobe's original results. 80% of the 180 participants state that the firm intentionally harmed the environment, but only 32% think that the firm intentionally helped the environment. This difference is significant and there are no apparent order effects (Wilcoxon signed-rank test, p=0.000). On the basis of a within-subject comparison, we find that 51% of the participants think that the firm intentionally harmed but did not intentionally help the environment. 3% of the subjects state that that firm intentionally helped but did not intentionally harm the environment. 30% and 16% say that the firm harmed and helped intentionally or did not harm and help intentionally, respectively.[12] As in our Perception I we confirm the Knobe effect.

		HELP Story		
		helped intentionally	**helped not intentionally**	total
HARM Story	**harmed intentionally**	16%	51%	67%
	harmed not intentionally	3%	30%	33%
	total	19%	81%	

Table 6: Percentage of participants who state intentionality in the Knobe questions

		HELP II Story		
		helped intentionally	**helped not intentionally**	total
HARM II Story	**harmed intentionally**	9%	18%	27%
	harmed not intentionally	6%	67%	73%
	total	15%	85%	

Table 7: Percentage of participants who state intentionality in the HARM II questions

The results of the HARM II questions are presented in Table 7.[13] 27% of the participants say that the firm intentionally harmed McDonald's and 15% think that the firm intentionally helped McDonald's. Only 18% think that the firm intentionally harmed but did not

[12] Subjects received the questions in random order with no apparent order effects.
[13] There are no apparent order nor subject- pool effects.

intentionally help McDonald's. 6% of the subjects state that that firm intentionally helped but did not intentionally harm McDonald's. 67% and 9% say that the firm harmed and helped intentionally or did not harm and help intentionally, respectively. The share of participants saying that the firm intentionally helped McDonald's (15%) does not differ from the share of participants (19%) that stated intentionality in the original Knobe helping vignette (Mann-Whitney, p=0.680). However, there is a significant decrease in the share of people thinking that the firm intentionally harmed McDonald's (27%) compared to the share in the original Knobe harming vignette (67%) (Mann-Whitney, p=0.000)). As in the experiment, the Knobe effect also vanishes in questionnaires when the producer of the externality holds the lower economic status

5.4 Levine-Hypotheses

In Section 4 we derived the predictions of theories of non-selfish preferences. The model of Levine (1998) predicts punishment after hurting but also reward after helping. Concretely, the more people make a particular unkind decision the lower is punishment for this decision. The more people make a particular kind decision the lower is reward for this decision. In this section we compare our results with the theoretical predictions by Levine. Following Levine we should expect that punishment for a negative externality and reward for a positive externality is negatively correlated with the share of players 1 producing this externality. Table 8 gives the decisions of players 1.[14] Table 9 gives the results of the regressions.

	Fraction of players 1 choosing *Y*
Perception I (help)	0.83
Perception II (help)	0.92
Perception III (help)	0.77
Perception I (hurt)	0.53
Perception II (hurt)	0.76
Perception III (hurt)	0.83

Table 8: Decisions of player 1

[14] Switching the economic status increases harming choices. (Fisher's exact test, p=0.057), whereas helping choices are not affected (Fisher's exact test, p=0.496). The size of the positives externalities does not affect harming choices (Fisher's exact test, p=0.53257) nor helping choices (Fisher's exact test, p=0.171).

	Games with negative externalities only	Games with positive externalities only
Fraction of players 1 choosing Y	-18.52 (9.14)**	-40.34 (15.15)***
Constant	15.11 (5.92)**	35.01 (13.13)***
Number of obs	120	120
F(1,59)	4.11	7.09
Prob>F	0.0472	0.0100
R-squared	0.0308	0.0430
Number of clusters	60	60

*: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$.

Table 9: Regression with robust standard errors, clustered on subject
Dependent variable reciprocity, i.e. punishment in first column and reward in second column, standard errors in parentheses

In this regression, we use the fraction of players 1 choosing Y as a predictor of reciprocity. The first regression shows that punishment is negatively correlated with the share of people who choose the unkind allocation Y. The second regression shows that reward is negatively correlated with the share of people who choose the kind allocation Y. Our findings are in line with Levine's predictions and confirm Hypotheses 3a and 3b. The more players 1 choose to harm or to help, the less they are punished or rewarded, respectively.

6. Conclusion

Why do people blame others for negative externalities but do not reward them for positive ones? This paper analyzes this asymmetric behavior (the so-called Knobe effect) and tests the stability and economic determinants of situations in which the Knobe effect arises. We find that producers of negative externalities are blamed if the externality harms an economically weaker party. If the harmed party is economically stronger, the producer is not blamed. Producers of positive externalities are rewarded if they affect an economically stronger party and if the externality is large enough.

We find the Knobe effect without the use of the word intentionally. Therefore we conclude that the Knobe effect does not depend on language but on the economic determinants of the situation such as economic power and the size of the positive externality. Since in all tested situations the negative externalities are efficiency decreasing, but the Knobe effect is only present when the producer of the externality holds the higher economic status, we conclude that the Knobe effect does not depend on efficiency considerations. Our results are in line with the theoretical predictions of a naïve version of the model by Levine (1998).

One could summarize our findings the following way. Economically strong producers of negative externalities and economically weak producers of large positive externalities experience the meaning of the saying ‘What goes around, comes around”. Positive externalities caused by agents holding a high economic status and negative externalities caused by agents holding a low economic status do not trigger reciprocal reactions. Firms have to be aware of these asymmetric ascriptions of intentions. Economically strong firms will be blamed for negative externalities, but cannot expect to be rewarded for positive ones – just like the Swabian saying ’Not nagging is praise enough’. For economically weak firms the saying does not hold though. They will not be blamed for negative externalities and if positive externalities are large enough, they can even expect reward.

7. Appendix

7.1 Instructions - player 1

There will now take place an additional experiment. In this experiment there are players 1, players 2 and players 3. This experiment is not related to the first experiment. The participants are rematched. A player A in the experiment can now be a player 1, 2 or 3. Also the players B and C are now players 1, 2 or 3. You are a player 1.

Also during this experiment we do not use euros but points. All points you receive during the experiment will be changed into euros at the end of the experiment: 100 points =1 euro. The following pages give you instructions on the course of the experiment. First, we are going to explain the basic situation. After having read the instructions you are going to find some control questions on the screen. The experiment will start as soon as all participants are familiar with the experiment. THE EXPERIMENT: There are 6 decision situations. One group contains one player 1, one player 2 and one player 3. For every decision round the groups are going to be rematched. Before the decision starts, all participants learn the initial situation. In the next step you can change this initial situation. After your decision, player 3 can transfer points from you to player 2 or from player 2 to you. Player 2 does not have to make a decision. We are going to explain the decision situation in the following example. EXAMPLE: You receive 30 points and player 2 receives 50 points. You can keep this initial allocation or change it. If you change it, you receive 10 points more, which is a total of 40 points. In this case player 2 receives 20 points more, which is a total of 70 points. Player 2 does not make a decision.

	player 1 (you)	player 2
Initial Situation	30	50
Change	+10	+20
Situation after Change	40	70

At the beginning of every round, player 3 receives 100 points. After your decision player 3 can transfer points from you to player 2 or from player 2 to you. For example he can take away points from you in order to give them to player 2. Or you can take away points from player 2 in order to give them to you. Assume, you keep the initial situation and player 3 transfers 5 points from player 2 to you. Then the allocation looks like this:

player 1 (you)	player 2
40+5=45	70-5=65

Assume, you change the initial situation and player 3 transfers 20 points from you to player 2. Then the allocation looks like this:

player 1 (you)	player 2
40-20=20	70+20=90

By now clicking on the OK Button you will receive some control questions that you can answer directly on screen.

7.2 Instructions - player 2

There will now take place an additional experiment. In this experiment there are players 1, players 2 and players 3. This experiment is not related to the first experiment. The participants are rematched. A player A in the experiment can now be a player 1, 2 or 3. Also the players B and C are now players 1, 2 or 3. You are a player 2. Also during this experiment we do not use euros but points. All points you receive during the experiment will be changed into Euros at the end of the experiment: 100 points =1 euro. The following pages give you instructions on the course of the experiment. First, we are going to explain the basic situation. After having read the instructions you are going to find some control questions on the screen. The experiment will start as soon as all participants are familiar with the experiment. THE EXPERIMENT: There are 6 decision situations. One group contains one player 1, one player 2 and one player 3. For every decision round the groups are going to be rematched. Before the decision starts, all participants learn the initial situation. In the next step player 1 can change this initial situation. After player 1's decision, player 3 can transfer points from you to player 1 or from player 1 to you. You do not have to make a decision. We are going to explain the decision situation in the following example:

EXAMPLE: player 1 receives 30 points and you receive 50 points. Player 1 can keep this initial allocation or change it. If he changes it, player 1 receives 10 points more, which is a total of 40 points. In this case you receive 20 points more, which is a total of 70 points. You do not make a decision.

	player 1	player 2 (you)
Initial Situation	30	50
Change	+10	+20
Situation after Change	40	70

At the beginning of every round player 3 receives 100 points. After player 1's decision player 3 can transfer points from you to player 1 or from player 1 to you. For example he can take away points from you in order to give them to player 1. Or you can take away points from player 1 in order to give them to you.

Assume, player 1 keeps the initial situation and player 3 transfers 5 points from you to player 1. Then the allocation looks like this:

player 1	player 2 (you)
40+5=45	70-5=65

Assume, player 1 changes the initial situation and player 3 transfers 20 points from player 1 to you. Then the allocation looks like this:

player 1	player 2 (you)
40-20=20	70+20=90

By now clicking on the OK Button you will receive some control questions that you can answer directly on screen.

7.3 Instructions - player 3

There will now take place an additional experiment. In this experiment there are players 1, player 2 and players 3. This experiment is not related to the first experiment. The participants are rematched. A player A in the experiment can now be a player 1, 2 or 3. Also the players B and C are now players 1, 2 or 3. You are a player 3. Also during this experiment we do not use euros but points. All points you receive during the experiment will be changed into euros at the end of the experiment: 100 points = 1euro. The following pages give you instructions on the course of the experiment. First, we are going to explain the basic situation. After having read the instructions you are going to find some control questions on the screen. The experiment will start as soon as all participants are familiar with the experiment. THE EXPERIMENT: There are 6 decision situations. One group contains one player 1, one player 2 and one player 3. For every decision round the groups are going to be rematched. Before the decision starts, all participants learn the initial situation. In the next step player 1 can change this initial situation. After player 1's decision, you can transfer points from player 1 to player 2 or from player 2 to player 1. Player 2 does not have to make a decision. We are going to explain the decision situation in the following example. EXAMPLE: player 1 receives 30 points and player 2 receives 50 points, player 1 can keep this initial allocation or change it. If he changes it, he receives 10 points more, which is a total of 40 points. In this case player 2 receives 20 points more, which is a total of 70 points. Player 2 does not make a decision.

	player 1	player 2
Initial Situation	30	50
Change	+10	+20
Situation after Change	40	70

At the beginning of every round, you being player 3, receive 100 points. After player 1's decision you can transfer points from player 1 to player 2 or from player 2 to player 1. For example you can take away points from player 1 in order to give them to player 2. Or you can take away points from player 2 in order to give them to player 1. You are going to make your decision before you know how player 1 decides. That means you have to indicate your decision for both decision possibilities of player 1. You therefore have to answer the following two questions:

Assume player 1 keeps the initial situation:

How many points do you want to transfer from player 1 to player 2?

How many points do you want to transfer from player 2 to player 1?

Assume player 1 changes the initial situation:

How many points do you want to transfer from player 1 to player 2?

How many points do you want to transfer from player 2 to player 1?

Please note: You can only transfer in one direction. That means, you cannot transfer points from player 1 to player 2 and transfer points from player 2 to player 1. Assume, player 1 keeps the initial situation and you transfer 5 points from player 2 to player 1. Then the allocation looks like this:

	player 1	player 2
Old	40	70
new	40+5=45	70-5=65

Assume, player 1 changes the initial situation and you transfer 20 points from player 1 to player 2. Then the allocation looks like this:

	player 1	player 2
Old	40	70
new	40-20=20	70+20=90

After your decision, you will see the new allocation for player 1 and 2 on your screen. You then have the possibility to confirm or change your decision. In every case you receive 100 points. By now clicking on the OK Button you receive some control questions that you can answer directly on screen.

8. Literature

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