2017

How to make your roommate volunteer: The influence of valence frames on maximizers and satisficers in a volunteer's dilemma

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Master thesis, specialization Economic and Consumer Psychology
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Abstract

The volunteer's dilemma is a social dilemma in which one of the players has to volunteer in order to produce the public good for the group. It is important to find out what drives people to cooperate in such volunteer's dilemmas, since it is negative for all participants when no one cooperates. Based on previous research, we expected that valence framing would influence the choice in the volunteer's dilemma. Based on prospect theory, it was hypothesized that the participants in a loss frame would defect more often than participants in a gain frame. The second factor we researched was the influence of maximization score on the probability to cooperate. We expected that maximizers would be more likely to defect. Results showed that valence framing did influence the probability of cooperating, but, perhaps due to the use of small monetary amounts as rewards, in the opposite way than expected. Maximization score was no significant predictor of the probability of cooperating.

Key words: maximizing, valence frame, volunteer's dilemma, social dilemma.

Content

Why the maximizer will not volunteer:
The influence of frames on maximizers and satisficers

People who have lived with roommates will recognize the problem: Someone needs to take the trash out, but nobody wants to do it. The trash in the can will pile up, until someone finally yields and volunteers. In the end, everybody benefits from the task done: The house is cleaner and less smelly. However, only the volunteer does the work and pays the costs needed to gain value for all roommates. This common problem is an example of the *volunteer's dilemma*. In this dilemma, you get the maximum individual payoff value when someone else does the effort, and you just benefit from the result. The somewhat less positive outcome is when you take out the trash. You have to do the effort, but also benefit from the result of having a clean house. The least favorable option is when no one does the effort, in that case no one reaches the desired result, and everyone has to live in the smell. The example of the trash is an example with minor consequences, but the volunteer's dilemma can also be a matter of life or death in case of emergency, since it is connected to the *diffusion of responsibility (*Darley, & Latané, 1968). For example, when a small child falls into the pool and someone has to jump in and save him. The effort of jumping in the water is relatively small to save a child's life, but if no one does it, the child will not survive. So who will be the first one to jump in?

In volunteer's dilemmas, the least favorable option is when no one does the effort. This is something that needs to be avoided. If we know which factors influence the chance that someone volunteers, we could use this to make sure that the least favorable option does not happen often, by addressing people in the best way. There has been some research on the volunteer's dilemma from a game-theoretic perspective (e.g. Diekman, 1985; Goeree, Holt & Smith, 2017), which explained a lot about the payoff structure of the volunteer's

dilemma and its outcomes, but did not take psychological factors into account. The present research will fill this informational gap in the literature by focusing on individual factors that influence the likelihood that someone cooperates in the volunteer's dilemma. To do this, we will first explain the overlap and distinctions between the volunteer's dilemma and other social dilemmas. Subsequently, we will give a short overview about the influence of valence frames on social decision making and we will highlight the importance of valence of the volunteer's dilemma. Finally, we will explain why we expect that the degree of maximization can influence one's choice in the volunteer's dilemma.

Defining social dilemmas

The volunteer's dilemma is a specific type of social dilemma. Social dilemmas are situations in which personal interest conflicts with the public interest (Messick et al., 1983). The pay-off schedule of the volunteer's dilemma can be seen in Table 1. In this dilemma, the best outcome for every individual is free-riding (i.e. defecting while someone else volunteers) while the best outcome for the group is that someone gives up his or her individual interest and provides the public good (Poundstone, 1992). The options of a person in a volunteer's dilemma can be described as follows. The person can choose to cooperate (C) or to defect (D). The lowest individual score is reached when

Table 1. The individual participant payoff schedule in a volunteer's dilemma

		Other group members	
		At least one player cooperates	No one cooperates
You	Cooperate	2	3
	Defect	4	1

everybody defects. In this case, all players will lose (1). If one person cooperates, and the rest defects, that person has to pay the price and has the sucker payoff (3), which can be defined as the maximum payoff minus the invested effort. If another person cooperates, but you defect, you reach the maximum score because you can free-ride on the effort of the volunteer (4). It is also possible that multiple players cooperate (2). In this case, the public good is realized, but multiple players pay the price, which makes it less preferable for the group than just one player volunteering.

This pay-off schedule is almost the same in the *chicken game*, which is often illustrated by the film 'Rebel without a cause' from 1955 (Poundstone, 1992). The difference is that the chicken game is played by two players. The pay-off schedule of the chicken game can be seen in Table 2. In the movie, two boys drive their car towards a cliff and try to jump out at the last moment. The boy who jumps out first is the so-called *chicken,* and the other boy wins. If they both keep driving, however, they will both drive off the cliff and die. Another version of the chicken game is the *highway chicken.* In this edition, two cars drive towards each other at high speed. The player who keeps driving straight the longest while the other player swerves, is the winner because he does not contribute to the public good of surviving (4) but receives the benefits from it, and the other player is the chicken and provides the public good of surviving (3). If both players swerve at the same time (2), they are both chickens, but this is still better than dying. If they both continue driving, they will both die, which is the least favorable option (1).

Table 2. The individual participant payoff schedule in a chicken game

		Other player	
		Cooperates	Defects
You	Cooperate	2	3
	Defect	4	1

When comparing the pay-off schedules in Table 1 and Table 2, one can conclude that the volunteer's dilemma is a multi-player (N-player) chicken game (Poundstone, 1992). The previous part demonstrated that there is substantial overlap between the chicken game and the volunteer's dilemma, because they have a comparable outcome-matrix. These outcomes can be described as gains or as losses. The following part will elaborate on what previous research found on how framing the outcomes as gains versus losses influences decision making, to explain why it could also be relevant for the volunteer's dilemma.

Decisions and frames

Many economic decision theories are based on the assumption that human beings are rational, and that people have stable preferences over time and situations (e.g. Von Neumann & Morgenstern, 1944). This would mean that decision makers would respond similarly to different descriptions of an objectively equivalent problem (Levin, Schneider, & Gaeth, 1998). For the decision maker, it should not matter how the problem is described, as long as the underlying payoff structure is the same. In contrast to these economic decision theories, Tversky and Kahneman (1981) found that people's decisions

depend on the valence of the problem presented to them. Just as a flat square might look like a line from a sideways perspective, one outcome can be framed from multiple perspectives and thus be perceived differently. The frame that a decision-maker uses, can be changed by the formulation of the problem. If this also applies to the volunteer's dilemma, this would mean that a change in the description of the volunteer's dilemma could increase the probability that someone cooperates. Tversky and Kahneman (1981) have demonstrated the effect of valence framing with the nowadays famous Asian disease problem. In this problem, participants heard that an Asian disease was spreading. The disease was expected to kill 600 people, and they had to decide which of the two cure programs would be activated. The participants were divided in two conditions. The participants in the positive condition had to choose between curing 200 people for sure, or a one-third chance at saving 600, with a two-thirds chance of saving no one. The participants in the negative condition had to choose between the first option which was an assured death of 400 people, or the second option which was a one-third chance of losing no lives and a two-third chance of losing all 600 people. The options of the Asian disease problem can also be seen in Table 3. For both conditions, option A offered certainty, and option B offered a risky choice because it involved chances at outcomes rather than certain outcomes. Both options were objectively equivalent, since they saved the same number of people with the same odds. The only difference between the options was the reference point.

Table 3. The options of the Asian Disease problem (Kahneman and Tversky, 1981)

	Positive frame	**Negative frame**	
Option A	100% chance at saving 200	100% chance that 400 will die	Certain
Option B	33% chance at saving all 600 67% chance at saving none	33% chance that nobody will die 67% that all 600 die	Risky

Tversky and Kahneman (1981) found that the majority of participants in the positive condition chose the certain outcome, whereas the majority in the negative condition chose for the risky option. This research shows that people are risk-avoidant in the positive domain, but risk-seeking in the negative domain. People prefer sure gains, and risky losses. Kahneman and Tversky (1983) described this phenomenon in their Prospect Theory. This research also shows that a change in reference point (gain lives or lose lives), can change the decision made by the participant. This change in preference due to valence frames is called 'choice reversal'.

Framing the volunteer

Changing the valence of the volunteer's dilemma is not hard to do, and might have a big influence on the decision of the people. The choice reversal that is caused by a change in the valence frame could be used to increase the probability that someone cooperates in the volunteer's dilemma, since options of the volunteer's dilemma differ in riskiness. For instance, when choosing to defect, you can end up with the highest outcome (free-wheeling on the effort of someone else) or the lowest outcome, when no-one decides to cooperate. This makes it a risky choice. When choosing to cooperate, you can make the public good

available for the whole group, but if multiple people volunteer, you could have a higher outcome when you would not have volunteered. The option to defect is more hazardous than the option to cooperate, because the option to defect could also lead to the outcome of not realizing the public good, which is the least beneficial outcome for the individual and the group. The option to defect thus has the highest variation in outcomes. When cooperating, you will not get the highest outcome, but at least the public good is realized and there will be some payoff. Therefore, in the volunteer's dilemma, the option to defect contains more risk than the option to cooperate. This makes it probable that there will also be a choice reversal in the volunteer's dilemma, when the valence frame of the dilemma differs. For example: When the volunteer's dilemma is about gains, all players can receive a reward, but in order to give most people a large reward, someone has to settle for the smaller reward. In this case, people will be more likely to cooperate, since this is the less risky option. When the volunteer's dilemma is about losses, all players have an amount of money, and if they want to keep it, someone has to pay for the group. In this case, people will be more likely to defect, since this is the risky option. Therefore, we could expect that there is more defection (risky option) in the loss frame than in the gain frame within the volunteer's dilemma.

The second reason we hypothesize that valence frames will influence the decision in the volunteer's dilemma, is that previous research demonstrated that valence frames can lead to choice reversal in the chicken game (De Heus, Hoogervorst and Van Dijk, 2010). According to De Heus et al. (2010), valence framing will influence choice in the social dilemma, if the participants can choose between a relative risky option and a relative safe option, which is the case in the volunteer's dilemma. This leads to Hypothesis 1.

H_1: Participants in a loss frame will volunteer less often than participants in a gain frame.

Differentiating maximizers and satisficers

As stated before, we expect that frames influence decision making in a volunteer's dilemma. Kahneman and Tversky (1981) stated that the frame a decision maker uses is partially controlled by personal characteristics of the decision maker. Schwarz et al. (2002) found that people differ in the desire to maximize their outcomes and that people have different goals for decision making. Maximizers always strive for the best possible outcome. They look through all the options and compare them thoroughly. Maximizers are not able to lower their threshold for acceptability. They only want the best outcome. Satisficers, on the other hand, determine one threshold for acceptability. If the outcome is above the threshold, the satisficer will be satisfied. A maximizer that receives the same outcome as a satisficer might be very unhappy, because the maximizer will compare it to the maximum possible outcome (Schwarz et al., 2002). Maximizers are also more likely to engage in social comparison, and are more sensitive to social comparison information than satisficers are (Schwarz et al. 2002). The concept that maximizers tend to use more social comparison, might lead them to defect more often than satisficers. Cooperating in a volunteer's dilemma will always lead to outcomes that are lower than or equal to the outcomes of the other group members, as can be seen in Figure 1. If maximizers indeed use the outcomes of their fellow group members as reference point for comparison (Hypothesis 2), it is likely that they will not volunteer. Maximizers will socially compare themselves to their group members, and see that volunteering could not bring them the

maximum outcome. People with lower maximization scores, on the other hand, might choose to cooperate more often. Cooperating still results in gains, and if this gain is above their threshold of acceptability, they will not risk receiving nothing because they are already satisfied. Therefore, we expected that people who maximize more are less likely to volunteer. This leads to hypothesis 2 and 3.

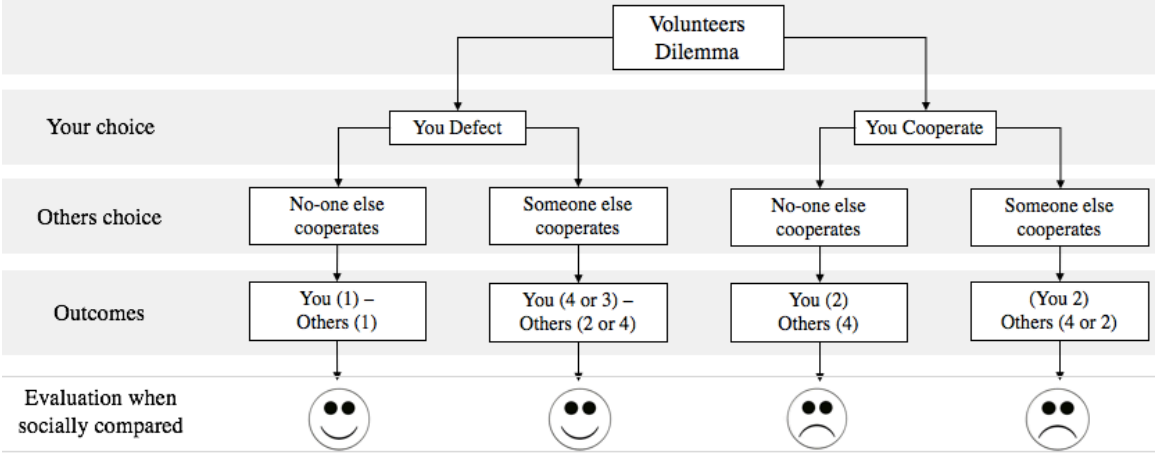

Figure 1. Systematic view of the influence of social comparison on the evaluation of the different outcomes of the volunteer's dilemma.

H_2: People with higher maximization score compare their outcomes more often with group members.

H_3: In both frames, there is a negative relationship between maximization score and the probability that someone will volunteer.

Method

To test our hypotheses, we did an online experiment with two conditions (gain frame versus loss frame) in a between-subject design. The participants were randomly assigned to the two conditions by Qualtrics, a survey design program. The dependent variable was

their choice in the volunteer's dilemma (defect or cooperate). The independent variables were the maximizing scores as measured by the questionnaire of Dalal, Diab, Zhu & Hwang (2015) and the condition (gain or loss frame).

Participants

108 Individuals participated in the experiment. The participants were Dutch speaking. The experiment was tested with an online questionnaire. Participants were contacted via social media and in the social science faculty in Leiden, The Netherlands.

We are aware that there are some difficulties with using an online survey. One of these difficulties is that participants might be less engaged to fill in the survey, and just 'want to get it over with'. Therefore, we excluded participants that did not take the survey seriously using two criteria: The duration of the survey was measured, and we excluded participants who took less than three minutes to fill in the survey. Considering the amount of text in the experiment, it is not possible to read everything in a period shorter than three minutes. We also excluded participants that answered both comprehension questions incorrectly, because we do not think they fully understood the consequences of their answers, or did not take enough time to read the description. The excluded participants were paid normally. After excluding 10 participants on the earlier named criteria, the sample consisted out of 98 participants (N = 98), of which 59 (60.2%) were female and 39 (39.8%) were male. The mean age was 24.1 years (SD = 7.41) with a minimum age of 18 and a maximum age of 62 years old.

Procedure

The participants joined the experiment via a weblink. The link led them to a Qualtrics survey. The participants read an informed consent text, that stated that they could stop the experiment at any moment, and that their answers were recorded anonymously and confidentially. The participant first answered some questions about demographics. Subsequently, the participant filled in the MTS-7 (Dalal, Diab, Zhu & Hwang, 2015) to measure maximization tendencies. A filler block with three 'find the difference' pictures was included, to weaken the association between the answers filled in at the maximization test and the decision in the volunteer's dilemma. Qualtrics randomly assigned the participants to the gain or the loss frame condition. Then the volunteer's dilemma part started. First, the participant read the instructions as shown in Appendix A1 (gain frame) and Appendix A2 (loss frame). The participant answered two questions to test whether he/she understood the instructions of the volunteer's dilemma. Second, the participant answered if he/she cooperated or defected in the volunteer's dilemma. Third, the participant answered a question to check whether the manipulation of framing worked and another one to check which information they used as reference point to make their decision. In the reference point question, the participants had to answer whether they took the outcomes of their fellow group members as a reference point, or the minimum amount that could be earned. The participant filled in the necessary information for payment. In the end, the participant was thanked for participation and told that for any questions or comments, they could contact us at a given email address.

The valence manipulation

To manipulate the valence of the volunteer's dilemma, the dilemma was framed as a gain or as a loss situation. After exclusion, 48 subjects participated in the volunteer's dilemma with a gain frame (49%) and 50 subjects in the loss frame (51%). The pay-off schedule for both frames is shown in Table 1. Each participant received €1,50 as a compensation for their time. In the *gain frame*, the participants read that they could earn a €2,50 bonus on top of the original €1,50. To realize this, however, one participant had to settle for a lower bonus of €1,-. When no one settled for the lower bonus, none of the participants would receive any extra money.

In the *loss frame*, the participants started off with €4,-. To receive this amount of money, one of the participants had to pay €1,50. That player would get €2,50 instead of €4,-. When no one payed the cost, all players received €1,50 instead of the €4,- they had in the beginning.

Both problems were stated in Dutch, since we expected that all of our respondents understood Dutch. The translated edition of the questions and answers (different for gain and loss frame) can be found in Appendices A1 and A2.

Table 1. The individual participant payoff schedule for both frames

		Other group members	
		At least one player cooperates	No one cooperates
You	Cooperate	€2,50	€2,50
	Defect	€4,00	€1,50

Measuring maximization

There are many different scales to measure maximization. The two most commonly used scales are the Maximization Scale and the Maximizing Tendency Scale. Dalal, Diab, Zhu & Hwang (2015) found that the Maximizing Tendency Scale is more valid (both psychometrical and theoretical) than the Maximization Scale. For this experiment, the Maximizing Tendency Scale was used. The MTS-7 consists of 7 items that should be answered on a 7 point Likert-scale. The MTS-7 can be found in Appendix B. The MTS-7 was translated into Dutch. During the pre-test we found that item number 5 ("I am a maximizer") raised a lot of questions. Our pre-test participants explained that they did not know the concept 'maximizer'. Therefore, the question was changed to 'I always strive for the best outcome'. The MTS-7 had a good internal consistency ($\alpha = .843$).

Results

Valence framing in the volunteer's dilemma

The first hypothesis stated that participants in a loss frame were more likely to defect than participants in a gain frame. Both the variable 'frame' (gain vs. loss) and 'choice' (cooperate vs. defect) are dichotomous variables. We first examined if the participants perceived the smaller amount of money as a gain or as a loss by performing a Chi-square test on the condition (dichotomous: gain or loss frame) and perception (dichotomous: perceived as gain or perceived as loss). The Chi-square test tested whether the distribution of outcomes is due to chance or due to the manipulation. Subsequently, we performed a Chi-square test on the condition (dichotomous: gain or loss frame) and their choice (dichotomous: cooperate or defect) in the volunteer's dilemma.

Manipulation check. The assumptions were checked to see whether performing a Chi-square would be appropriate: The two variables are on dichotomous measurement level (gain versus loss frame perceived as loss versus perceived as gain) and they consisted out of two categorical, independent groups. Therefore, performing a Chi-square was appropriate. The results of the Chi-square test on the perceived gain or loss and the gain or loss condition were not significant ($\chi^2(1) = .469$, $p = .481$), which means that the participants in a gain frame did not significantly perceive the small amount of money as a gain more often than the participants in a loss frame. Only 36.7% of the participants in a loss frame experienced the smaller amount of money as a loss. In the gain frame, only 56.3% of the participants experienced the smaller amount of money as a gain. This might be problematic for our further analysis. We will elaborate on the consequences of this outcome on further analyses in the discussion section.

Valence frames. To test whether participants in a loss frame were less likely to cooperate than participants in a gain frame, a Chi-square test was performed on the condition (gain or loss) and the choice of the participant (cooperate or defect). The Chi-square test was marginally significant ($\chi^2(1) = 3.342$, $p = .068$), which means that the choices of participants in a gain frame were significantly different from the choices of participants in a loss frame. Remarkably, the results showed that the effect of the manipulation was opposite to what the hypothesis predicted: In the gain frame, 39.6% of the participants cooperated. In the loss frame, 58.0% of the participants cooperated. A visual display of the results can be seen in Figure 2. These results mean that participants in a loss frame were more likely to cooperate, and participants in a gain frame were more likely to defect. This contradicts our theoretical framework and previous research.

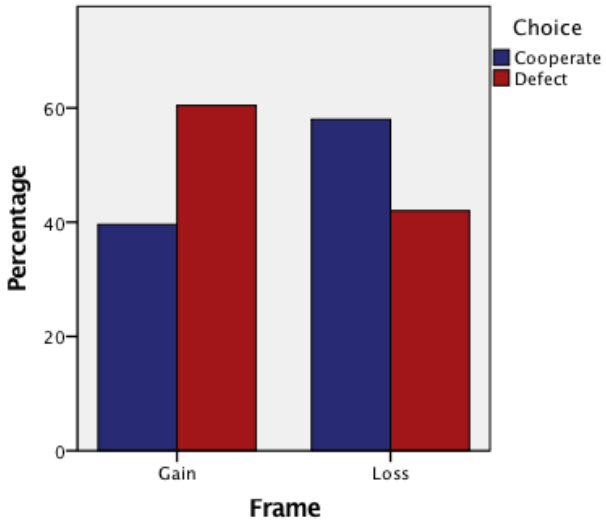

Figure 2. A bar chart showing the choices of participants in the gain frame and the loss frame.

The influence of maximization score on cooperation

The second part of the research examined the influence of maximization score on the choice in the volunteer's dilemma. The theoretical substantiation of this hypothesis is that maximizers were more likely to compare their outcomes to the outcomes of the other players (Hypothesis 2). This was tested with a logistic regression with MTS-score as independent variable and reference point as a dichotomous variable.

Subsequently, to test whether MTS-score influences the likelihood that someone cooperates (Hypothesis 3), another logistic regression was performed. In this model the dependent variable is choice (cooperate or defect) on dichotomous measurement level and the independent variable is MTS-score, measured on interval level.

Social comparison. The first logistic regression tested whether participants with higher maximization scores were more likely to compare their outcomes to their group

members instead of the total amount of money. Beforehand, the assumptions were checked: The dependent variable (reference point) is dichotomous and the options are mutually exclusive because participants said they compared their answers to their group members or to the maximum amount of money. The independent variable (MTS-score) is measured on interval level. The observations are independent because we assume that participants did not discuss their answers. The final assumption was linearity of the independent variable. To see whether this was the case, a Box Tidwell test was performed with the interaction between the MTS-score and the natural log of the MTS-score included in the logistic regression. This interaction was not significant ($p = .104$) which means we can assume linearity. The regression model was not significant ($\chi^2(1) = .300$, $p = .583$), which means that the MTS-score was not a significant predictor of the participant's reference point.

Maximization score. The second logistic regression tested whether participants with higher maximization scores were less likely to volunteer than participants with the lower maximization scores. Beforehand, the assumptions were checked: The dependent variable (choice) is dichotomous and the options are mutually exclusive because participants had to choose between cooperating or defecting. The independent variable (MTS-score) is measured on interval level. The observations are independent because we assume that participants did not discuss their answers. The final assumption was linearity of the independent variable. To see whether this was the case, a Box Tidwell test was performed with the interaction between the MTS-score and the natural log of the MTS-score included in the logistic regression. This interaction was not significant ($p = .216$) which means we can assume linearity. The final regression model was not significant

($\chi^2(1) = .233$, $p = .629$), which means that the MTS-score is not a significant predictor of the probability that someone cooperates.

Discussion

The present study was about how valence frame and maximization score influence the probability of cooperation in a volunteer's dilemma. The results of the experiment did not match the hypotheses but, nevertheless, there are interesting findings which we will discuss in the following part. First, the current method and results on valence framing are compared to the method and results of De Heus et al. (2010) to see where the differences are that can explain why valence framing influences the chicken game in their experiment significantly, but the volunteer's dilemma in our experiment only marginally significant, and opposite to what we expected. Subsequently, we will discuss the influence of maximization score on the probability of cooperation. To conclude, we will discuss implications and directions for further research.

Valence frames

The first hypothesis was that participants would be more likely to cooperate in a gain frame, than in a loss frame. The statistical results showed that the choice of the participants in the gain frame indeed differed from the choice of the participants in the loss frame, but in opposite direction than expected: Participants in a gain frame were less likely to cooperate than participants in a loss frame. This contrasts with the findings of De Heus et al. (2010), who found that in a chicken game, participants were more likely to cooperate in a gain frame than in a loss frame. The payoff structure of the chicken game is approximately equal to the structure of a volunteer's dilemma, which made it

reasonably that valence framing would have the same effect in both dilemmas. However, this was not the case. There are several reasons why the present experiment might have had different results than the research of De Heus et al. (2010).

The first reason is the difference in number of players. De Heus et al. (2010) examined the influence of valence framing in a two-player chicken game, whereas the volunteer's dilemma in this research is conducted with four players. The number of group members could make a difference in the probability of cooperating, since Archetti (2009) found that the larger the group, the smaller the probability that someone volunteers and, even though there are more possible volunteer's, the smaller the chance that the public good is realized. However, this should happen in both conditions (gain and loss frame) of the present experiment and should not reduce the influence of the valence frame on the probability to cooperate in only one of the frames.

The second explanation why current results might differ from previous research, is the payoff structure. In our experiment, participants knew they would receive at least €1,50, regardless of their choices and the choices of other players. In the experiment of De Heus et al. (2010), participants could win 0, 1, 2 or 3 tickets to a lottery game. It is possible that the chance to win nothing influences the way the participants evaluate the risk. This could be explained by curvilinear shape of the earlier named prospect theory (Kahneman & Tversky, 1983). The steepness of the value function declines as the objective value increases. This means that the participant experiences a bigger change in subjective value between 0 and 1, than between 1 and 2. It is possible that the absence of gaining nothing (or losing it all) influenced the risk judgement of the participants. This difference subjective value is displayed in Figure 3. The figure shows that the difference

subjective value between the possible outcomes is bigger in the research design of De Heus et al. (2010). The expectation was that the participants would be risk-seeking in the negative domain, and risk-aversive in the positive domain, with defecting as risky option. The risky option is defecting, because it has the biggest variance in outcomes. However, in our research there seems to be less variance in outcomes when it comes to the subjective value. This makes defecting less risky. De Heus et al. (2010) concluded that valence framing influences the outcomes in a chicken game, because the options (cooperating and defecting) differ in riskiness. The difference in outcomes between the experiments could mean that the riskiness of the options is not only depending on the objective value, but also on the subjective value of the risk. From these outcomes, we could speculate that the bigger the difference in riskiness between the options, the larger the influence of valence framing, but more research is necessary.

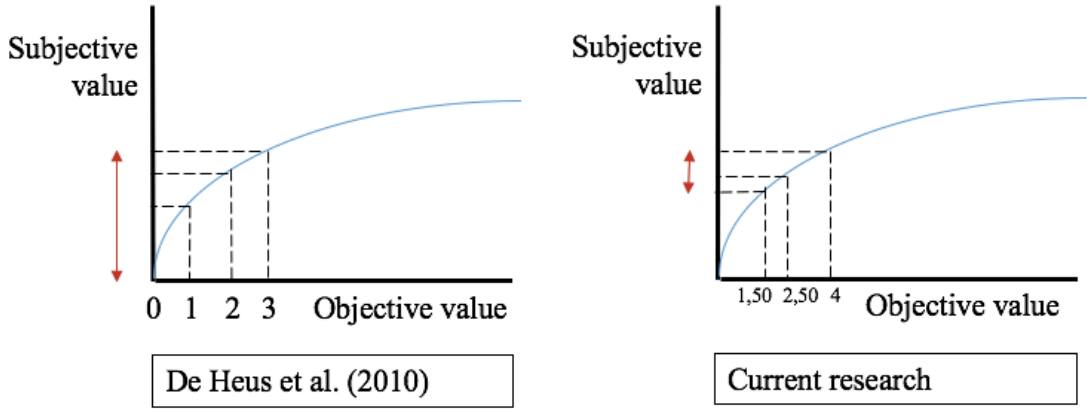

Figure 3. The difference in subjective value between the possible outcomes of the experiment of De Heus et al. (2010) and the current research.

This difference in subjective value could explain a reduction in influence of the valence frame on the probability to cooperate in the volunteer's dilemma, but it does not

yet explain why the experiment had marginally significant results contradicting the hypothesis. To explain this, more information is needed on the characteristics on how people deal with small amounts of money, since the present experiment used small amounts of money, whereas De Heus et al. (2010) used lottery tickets. Harinck, Van Dijk, Van Beest and Mersmann (2007) found that for small amounts of money, gains loom larger than losses. This happens because of two reasons. The first reason is the hedonic principle: people can make small negative outcomes appear unimportant by telling themselves that the negative outcome will not hurt them badly. The second reason is that people experience a lot of small losses and, thus, learned that they can overcome small losses. These effects make people diminish the importance of small negative outcomes, and this makes small positive outcomes seem relatively more important. People are less loss aversive when it comes to small amounts of money. This results in a different-looking value function, which can be seen in Figure 4. The adjusted value function is concave for small amounts and convex for larger amounts in the negative domain.

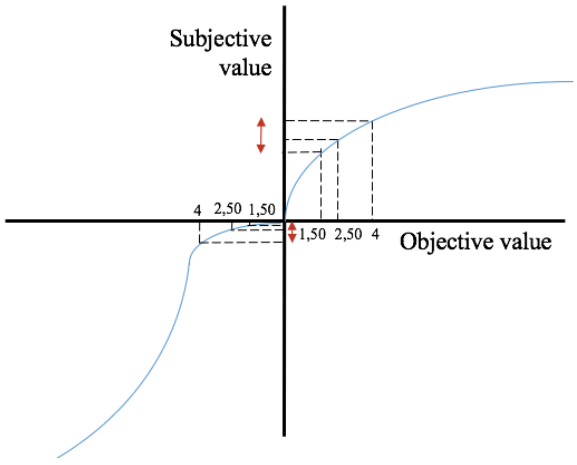

Figure 4. The relationship between subjective value and objected value, adapted for the findings about small amounts of money by Harinck et al. (2007).

When connecting these findings to our research, it is possible that the participants in the loss condition diminish the subjective value of the small loss. Figure 4 shows that in the loss frame, the subjective value difference between losing 0, 1,50 or 2,50 is relatively smaller than the objectively equivalent difference in the gain frame. Participants are not willing to take a risk (defect) for a chance at avoiding a small loss, because they know they can diminish the importance of a small loss. Since the gains loom larger, the subjective value difference between the options is bigger in the positive domain than in the negative domain, and people are more willing to take a risk in the positive domain, relatively to the negative domain. These insights could explain the high proportion of cooperation in the negative domain, but do not fully explain why the participants in the gain frame defected more than expected. To confirm this explanation, and to find out how people deal with small gains, more research is necessary. We can conclude that valence framing does have influence in the volunteer's dilemma, but, when played with small monetary rewards, participants in a loss frame will cooperate more often than participants in a gain frame. This conclusion is an addition to the previous research of De Heus et al. (2010) and seems to be in line with the findings of Harinck et al. (2007).

Manipulation check. The results showed that the manipulation check was not significant. The manipulation check question was whether they would experience the smaller amount (2,50) as a gain or as a loss. The Chi-square test showed that the participants in a gain frame did not differ significantly from the participants in a loss frame in their answer on this question. This might be because there was something wrong with the manipulation, but we also expect that social desirability of answers has an

influence here, because in both conditions, the majority of the participants said it felt as a gain. The social desirable answer is saying it feels as a gain, because you receive money. It could be seen as ungrateful when saying it feels as a loss. This is a limitation to this research, because we cannot determine whether the manipulation check is insignificant due to social desirability or a not-working manipulation.

Maximization score

The second and third hypotheses of this research were related. The second hypothesis was that people with higher maximization scores were more likely to compare their outcomes to the other team members, than to the minimal amount of money. This was not confirmed by results of the data analysis. The third hypothesis was that people with higher maximization scores would be more likely to defect, because they compared their outcome to the outcome of their group members, and cooperation cannot give positive outcomes when socially compared, as can be seen in Figure 1. Results showed that maximization score was not a significant predictor of the probability that someone cooperates. This could mean that maximization score has no influence on how people make decisions in the volunteer's dilemma. This seems contradictory, because the scale developed by Dalal et al. (2015) is measuring maximization as having high standards, and being unable to lower the standard. The highest outcome in our outcome is very clear: One could receive 4 euro. Therefore, people with higher maximization score would want that outcome, and only defecting can lead to the highest outcome, also when using social comparison to evaluate the outcomes. However, it might be that other factors influence this decision. The cooperate and defect options differ in amount of money and

in riskiness. It is possible that the difference in risk might have an influence as well. Lai (2010) found that maximizers are more risk aversive than satisficers. The risk-aversive option is cooperating. Maximization might lead to a higher tendency to defect, while risk aversion (that often comes with maximization) might lead to a higher tendency to cooperate. This way, the influence of maximizer score might be neutralized by the influence of risk-aversion. This might explain why maximization score is not a significant predictor of defection in our research. To conclude that a higher maximization tendency influences the probability to defect, future research should control for risk-aversion.

Future research

There are a few interesting questions that arise from our research. The first recommendation for further research is testing the influence of valence frame on the probability to cooperate in a volunteer's dilemma with lottery tickets as reward, just as De Heus et al. (2010) did, to rule out that the effect of valence frame on the probability to cooperate is determined by the number of players. We would also recommend to avoid using small monetary amounts in all further social dilemma research, because people treat small monetary amounts different than larger gains and losses (Harinck et al., 2007), and since social dilemmas in the real world are often not about small monetary amounts, this reduces external validity.

Another question that arises from our research is the applicability of the prospect theory in the Volunteer's dilemma. The prospect theory is valid when it comes to individual decision making, but the volunteer's dilemma concerns a group decision,

which might change how people experience the options. The prospect theory describes the relationship between objective and subjective value in individual situations. In group decision making, people might not only consider their own outcomes, but also the outcomes of others, which might change their evaluation of the different outcomes. More research is necessary to examine the differences between individual decisions and group decisions, and how people evaluate the outcomes.

One of the goals of this article was to find out what influences the chance that someone cooperates in a volunteer's dilemma, to make sure that the least favorable option (everyone defects) happens less often. From these outcomes, we can conclude that when the volunteer's dilemma is about small monetary rewards, framing the dilemma as a loss will increase the probability that someone cooperates.

Altogether, this research makes a small step towards the goal of closing the informational gap about factors that influence the probability of cooperation in the volunteer's dilemma, but further research is necessary to make sure the least favorable outcome (everyone defects) does not happen.

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Appendices

Appendix A1: Translation of the volunteer's dilemma in gain frame

You have been linked to three other participants. Together, you will do a group task. You are in a group of four people. In this task, everyone starts off with €1,50. This is the reward you receive for participating in this experiment. Every member of the group can earn a bonus of €2,50, which makes the maximum individual payoff €4,-. To receive the bonus, one group member should volunteer, and take the smaller bonus of €1,-. However, when none of the four members picks the smaller bonus of €1,-, no one in the group will receive any bonus.

Which option do you pick?

A) I choose the smaller bonus of €1,-

B) I choose the bigger bonus

Appendix A2: Translation of the volunteer's dilemma in loss frame

You have been linked to three other participants. Together with these three participants, you will do a group task. You are in a group of four people. Every group member starts off with €4,-. To make payout possible, one of the participants of the group should pay €1,50 of his/her own reward. The member that decides to pay €1,50, will only receive €2,50. When everyone in the group refuses to pay €1,50, all players have to pay €2,50.

Which option do you pick?

A) I will pay €1,50 for the group

B) I will not pay €1,50 for the group

Appendix B: Maximizing Tendency Scale (Dalal, Diab, Zhu & Hwang, 2015)

1. No matter what I do, I have the highest standards for myself.

2. I never settle for second best.

3. No matter what it takes, I always try to choose the best thing.

4. I don't like having to settle for 'good enough'.

5. I always strive for the best outcome. (Originally: I am a maximizer)

6. I will wait for the best option, no matter how long it takes.

7. I never settle.