



Universiteit Leiden

Date: 01/07/2017

The difference in influence of individual or collective property rights in an anticommons dilemma

Master thesis Psychology

Specialization: Economic and Consumer Psychology

Institute of Psychology

Social and Behavioral Sciences at Leiden University

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Abstract

The aim of this research was to investigate two different kinds of anticommons which can be derived from earlier research on this topic. Namely the individual good anticommons situation, in which the property rights are divided between two participants versus the collective good anticommons situation, in which the property rights of a product were shared among the participants. Expected was that people in an individual anticommons transaction would have a higher willingness to ask for a resource compared to participants in the collective anticommons transaction. The dilemma was tested an experiment, similar to a real-world situation, in which individuals can exclude other individuals from effectively using their resource, leaving their otherwise useful resource unutilized. Results suggest that, in contrast to the expectations, people in a collective anticommons situation are more likely failing transactions in an anticommons dilemma than people in an individual anticommons dilemma. Several possible explanations for the findings, and directions for future research are given.

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Introduction

Humans are considered to be social beings. To consider someone to be a social being several criteria are set. For example, the one needs other individuals to satisfy his or her own needs (Argandoña, 1998). Society either gives or takes and people know what society expects from them. Society can fulfil many different needs that people cannot fulfil on their own. Thus, people are often interdependent when in need to fulfil personal goals. Think of a product which is accessible for everyone, like a water well. This well has been placed by the collective for everyone to access. Actions from different people influence the level of the water in the water well. In this and other cases, many individuals possess a good which cannot exist without others, but can cease to exist when too many individuals overuse this common good. In this case, we can speak of a tragedy of the commons (Ostrom, 2008). To be more precise, people can either cooperate or compete with each other. A conflict may arise when there is a resource, open for everyone (the common) where no-one possesses full control or property rights over the good. The control lies in the hand of the collective where every individual only 'pays' a part of the price when overusing the good and where he or she gains direct advantage when using the good. If individuals are not (over)using the good, he or she still pays the price for others who are depleting the good, and consequently gives them a disadvantage (Dionisio & Gordo, 2006). The rational choice, for short-term maximization, would thus be to exploit the common good. This will result in to resource depletion, the tragedy of the commons.

The metaphor of the tragedy of the commons explains the costs that occur, when a product is overused because too many people have access to a depletable good. In contemporary economic theory commons are described as goods which are rivalrous yet non-excludable. This means, goods which may be (economical) beneficial, but can be accessed by everyone. An example is fish in oceans, rivers and parks. No one can exclude one another from catching the fish, but it is rivalrous in a way it cannot be caught twice. Due to the consequences of the tragedy of the commons, resources like this often suffer from degradation (Feeny, Berkes, McCay & Acheson, 1990). To avoid this tragedy, Hardin and Baden (1968) stated that the tragedy of the commons could be resolved by either privatizing a common good or by

socialism. With these two solutions one or a few persons get the responsibility over a common good and can be held accountable.

However, a problem may arise when more people get to possess property rights over a single resource. More recent studies focus on the pendant of the commons construct, which is called the tragedy of the anticommons. Within this tragedy, too many owners can prevent each other from using a scarce resource. This results in underuse of this particular good while access to this good could lead to benefits for all parties involved. This situation was described by Heller and Michael (1998) for the first time. In contrast to the common good, wherein too many people have access to a good, but no one can exclude one another, the anticommons is described as follow by Heller and Michael (1998): “A resource is prone to underuse when multiple owners each have a right to exclude others from a scarce resource and no one has an effective privilege of use” (pp. 698). This phenomenon can occur in a real-life situation in for example biomedical research (Heller & Michael, 1998). This is a sector in which privatization of biomedical discoveries took place by means of patents. In this case an anticommons situation can occur in which there are too many owners who hold rights (patents) of past discoveries, which then can be used as an obstacle to prevent further research in that domain. These patents were given to attract private investigators, but could later cause this market to become more and more expensive due to a large number of patents. In this case, the tragedy of the anticommons can be seen as a problem when a user needs to gain access to different patented inputs to finally come to a single relevant product.

From the patent holders’ perspective, it obviously makes sense to not give away his or her patent for free. Rational choice theory suggests that individuals use calculative strategies in order to make decisions. (Smith, 1991). This insinuates that individuals should calculate economic advantages and disadvantages in order to incite the best outcome for the self. Models of rational choice are straightforward and clear to understand. But where these models describe people as rational beings, in practice people tend to be less calculative than these models suggest (Wang, Zhong & Murnighan, 2014).

Standard economics assumed that the willingness-to-pay (WTP) of a person is to obtain a certain good is roughly equal to the amount he/she is willing-to-accept

(WTA) to part with the same good (Willig, 1976). Different processes can account to the calculation and evaluation of products possessed by an individual, and thus create a gap between the WTP and the WTA. Many studies have shown that the WTA is often much higher than the WTP for the same good. When confronting situations or dilemma's in which individuals have to decide how much to demand to give up an object or are willing to pay for the object, the chosen option is seen as better, or at least equal compared to the other alternatives (Aumann, 1989). Hoffman and Spitzer (1993) distinguished four relevant explanations for the WTA-WTP gap: Prospect theory, endowment effect, preference uncertainty and regret avoidance.

Research conducted by Heller (1998) showed that when the one calculates his or her own possessions, objects are rated as more valuable than possessions of others. This process is called the endowment effect (Morewedge & Giblin, 2015) and is a manifestation of loss aversion property of the Prospect theory (Kahneman & Tversky, 1979; Thaler, 1980). According to the Prospect Theory, losses would have a higher negative impact than the value of a gain of equal size. The WTA is considered as the loss value of the good where the WTP is the value from gaining a good (Kahneman et al., 1990). This effect occurs not only in the area of private goods or in research setups, but also in areas such as: "time, intellectual property, public land, and environmental, health, and safety regulations" (Buccafusco & Sprigman, 2010, pp. 9). Ownership of a product gives the owner more awareness of the features of the product and gives the owner an information advantage. This can be related to the effect of 'information asymmetry', in which people consequently value their own possessions as more valuable. The potential buyer does not possess the same amount of information, making the purchase riskier. Therefore the prices that the buyer is willing to pay compared to what the seller is asking are incongruent. The endowment effect and information asymmetry have already demonstrated that current ownership of an item affects the valuation of an object (Kahneman, Knetsch & Thaler, 1991). Furthermore, the time that an object is in ones' possession may even increase the attachment to the object causing it to be valued higher (Strahilevitz & Loewenstein, 1998).

Individuals have feelings of ownership for various material and immaterial goods. This is called psychological ownership (Pierce, Tatiana, Kostova, Kurt & Dirks, 2001). It is experienced when a person has possessive tendencies towards the good

(Dyne & Pierce, 2004). When the psychological ownership expands, it creates a positive effect (Formanek, 1991). Psychological ownership on the one hand comes forward on an individual level, on the other hand, it also exists on group level (Jon, Pierce & Jussila, 2009; Gibson & Earley, 2007). Transactions in the market frequently rely on group decision processes with members that are anonymous and are not able to communicate to one another, but are interrelated. Endowment effects are visible in both groups and individuals, but groups are shown to be much less affected by endowment effects than individuals. In some situations, the endowment effect completely disappears (Glöckner, Kleber, Tontrup & Bechtold, 2009).

The theory of property rights (Demsetz, 2002) states that property rights can either be individual (possessed by one person) or collective (possessed by a group of people). A private entrepreneur is only able to function when individual property rights are given. Someone wishing to use this individual right of the owner has to pay him to do so. Take for example a land owner who can either allow or prohibit other individuals from using his land without having to justify anything. In a collective property right situation multiple people possess the same good in which all the owners have to agree on a transaction to make it happen. If not, the transaction will not continue. When taking the same example as in the collective ownership situation, in the individual ownership situation the land may be divided by numerous people, where different parties can prohibit the use of this land (Cai, 2003). Two types of anticommons dilemmas can be distinguished. On the one hand anticommons that are owned by the collective, on the other hand anticommons that are fragmented among several autonomous individuals.

Heller (1998) distinguishes different anticommons situations which can be categorized as either individual or collective.

An individual anticommons situation can express itself as follows: when there are plans of constructing new ski slopes, ground in the area can be possessed by many different farmers, who all have to give their permission to let the ski lifts being built on their land, and let people use the land for (winter)sport activities. It can be very lucrative for each individual farmer to give permission to use their land for this winter holidays, but when one farmer doesn't agree with opening up the land, the whole ski area cannot be opened. Another, more complex example of an individual situation

may arise in medical research. Privatization may have different consequences, either positive or negative. On the one hand, privatization or patents on intellectual property rights could lead to more discoveries in risky full research areas. On the other hand, when too many owners have property rights on earlier findings, these rights can manifest into an obstacle for further research. In this case, there are many individuals who possess fragments of intellectual property rights in potential future products and may deter innovation.

An example of an anticommons with collective property rights arose in post-socialist economies, like Hungary or Estonia. The following phenomenon occurred. When the transition from a socialistic market to a free market was initiated, expected was that entrepreneurs would quickly own stores that the socialist regime had left unused. In practice, it turned out that lots of stores remained closed. The reason behind this was not the lack of interest, but that the property rights were divided among different socialist-period stakeholders. When an entrepreneur wanted to open a store, it had to collect property rights from many different owners, which resulted in a long and expensive way of acquire the final right. Thus, in this situation the store wasn't divided in fragments which were possessed by different parties, but the store as a whole was owned by many different rights holders, who all have to give their permission individually.

The aim of this research is to examine the proposed difference in the two versions of an anticommons situation. On the one hand, a situation where two individuals share the same good and can decide in mutual consultation whether and for what price they will sell the product. On the other hand, in a situation where two individuals both possess a share of a product wherein both the participants have the ability to prevent potential buyers to use their own part. Corresponding to an anticommons situation, both sellers have the ability to prevent a successful transaction, leaving all resources unused. Individual resources are underutilized and not of immediate value unless all involved parties come to an agreement in its use.

The individual anticommons situation will translate itself in a situation in which two people each own a part of the same product. Both individuals will have the authority to prohibit a transaction. They both have to decide, without having the knowledge of what the counterparty will ask, how much he or she wants to receive

for his or her part of the product. In the collective anticommons situation, two people will collectively a product, as a whole. They both have to decide how much they want to receive for their share in the product, which is a collective good of the two participants. When the willingness to pay (WTP) of the buyer is lower than the cumulative willingness to accept (WTA) of the two sellers, the deal won't continue. In this situation can be spoken of a tragedy of the anticommons.

This study will examine the influence of individual versus collective property rights in the two different anticommons situations, the individual property right situation and the collective property right situation. The hypotheses are formulated as follows:

- I. As people value their owned personal assets as more valuable than others, who don't own them, the cumulative WTA from the sellers of a product will be higher than the WTP from the buyers which will result in a higher cumulative WTA from the sellers compared to the WTP from the buyers.
- II. While the endowment effect within groups is less powerful than within individuals, people in the individual anticommons situation will have a higher WTA than in the collective anticommons situation.
- III. When forming groups of two sellers and one buyers. Groups in the individual anticommons situation will have less successful transactions than groups in the collective anticommons situation. Thus, the deal will be less likely to succeed within the individual anticommons situation.

The main question that will be answered is: "How will the individual vs collective property rights be of influence in an anticommons situation?"

Method

In a lab study the influence of individual property rights versus collective property rights in an anticommons dilemma will be tested. To do so a situation was created in which three participants will participate in either a collective or an individual good anticommons dilemma where in both situations there are two sellers and one buyer of a puzzle. In both situations, the transaction may only continue when the willingness to pay (WTP) from the potential buyer is higher or equal to the combined willingness to accept (WTA) from the sellers.

Participants

The experiments were conducted in a computer lab (cubicles) in the Faculty of Social Sciences at Leiden University in January 2017. A total of 150 participants participated in the experiment (55 males, 95 females). Almost all participants were students of Leiden University, aged between 18 and 55 years ($M = 21.81$, $SD = 3.76$). The research was conducted in Dutch. All the participants were fluent Dutch speaking. Participants were recruited using an online platform where students of Leiden University could assign for the study, or by asking people around university to come to the lab. Participants were either rewarded with a monetary reward of €2, or one participant credit, which are mandatory for all first-year students as part of their effort requirement. Based on the decisions that were made during the experiment by the participant and by other participants, extra money could be earned. The test was constructed so that participants could earn an additional reward, up to €4. When applicable, the additional money would be transferred to them after the outcomes of the experiments were analysed.

Procedure

Before the participants were assigned to a cubicle, an informed consent was signed by every one of them (appendix I). In the cubicle, the computer randomly assigned the participants to a condition. When a condition was assigned, participants had no knowledge about whether there was a difference between an individual or a collective property situation. This would be revealed in the debriefing (appendix II).

In order to test the hypotheses, the two different anticommons situations had to be distinguished. Therefore, three different conditions have been composed for this experiment. The participant could have the seller role in the individual anticommons situation, the seller role in the collective anticommons situation or the third condition as the buyer. At the start of the experiment the computer randomly assigned the participants to a condition, seller individual, seller collective or buyer. After assigning the participants to a condition, the experiment started with reading information about the assigned condition and the experiment (appendix IIIa, b & c). The three conditions were formed as follows:

Condition 1, seller individual good situation: in the individual situation, the participants both possess an equal-sized share of a puzzle (either a red or a blue halve, appendix IVa) consisting out of 2 of the 4 puzzle pieces. Without knowing what the other seller will ask, but knowing what the market price is (300 – 400 eurocents), a price had to be determined how much he or she wants to receive for his/her part of the puzzle.

Condition 2, seller collective good situation: In the collective situation, the two sellers possess the puzzle together as a whole, in this situation it is not divided (also a red and blue puzzle, but joint instead of separated, appendix IVb). Both the participants/sellers have to sell the puzzle to a buyer. To do so, they have to determine a price of which they think their share of the puzzle is worth and thus what he or she wants to receive for his/her share. Also without knowing what the other seller will ask, but with the knowledge of the market price (300 – 400 eurocents).

The puzzle has no value if both the sellers' WTA combined is higher than the buyers' WTP. In that case, the deal will not continue. When the combined WTA is lower than the buyers' WTP the transaction is considered a success. The transaction will then continue. In both situations, when their WTA is higher than the WTP from the buyer, there will be no transaction and therefore nobody will gain profit. The transaction will be successful when the cumulative WTA of the sellers is lower than the buyers' WTP and therefore both parties will gain a certain amount of money, calculated after the experiment.

Condition 3, buyer condition: there was only one situation, where the buyer had to decide how much he or she wanted to spend on a complete puzzle without

being made salient that the sellers were either the individual owner of a part of the puzzle or were collective owners. It was made salient that the deal would not continue when the combined WTA of the sellers was higher than the WTP of the buyer. Also, the buyer knows what he or she can receive for the puzzle (somewhere between the 300 and 400 eurocents).

The experiment has been arranged to represent two different anticommons situations where there are two sellers and one buyer. Analogous to a real-world anticommons situations, both sellers have the ability to prevent the transaction between the sellers and the buyer, leaving the resources which otherwise would have been of value, unused. In all three conditions, this externality was made salient. To give the participants an idea of how much the puzzle was worth on the market, they were told that the market value of a complete puzzle was 300 to 400 eurocents. Knowing what the buyer could receive for a complete puzzle was necessary giving that the participants could hardly determine the market value of a puzzle virtually displayed on the computer screen.

When the control questions were filled in, the participants had the opportunity to leave their e-mail address behind in order to receive information about the experiment. Finally, they received a debriefing describing the real purpose of the experiment.

Measurements

Control

To make sure information was carefully read, three quiz questions were asked to check whether the participants understood the assignment: *“How much money does the buyer receive when he has the whole puzzle?”*, *“How many sellers are there?”* and *“How many puzzle pieces does the puzzle count?”*. After answering the questions, he or she would determine how much money he/she would want to receive for the share of the puzzle, or would want to pay for the puzzle as a whole. To make sure everyone understood the questions, after answering the right answer was displayed.

Bidding

The participants were asked to place their bids in eurocents. The buyers had to determine how much they wanted to pay for a complete puzzle, which would have a market value of 300-400 cents. Cents instead of euros were chosen because it was assumed that this would lead to more spread, where people would less likely place bids in rounded values (i.e. 155/145 cents instead of €1,50). The exact value (virtual market value) of the puzzle is randomly generated after the research. If the randomly generated value is higher than the willingness to pay (WTP) from the buyer, the difference would be paid afterwards. If the willingness to pay was lower than the market price, no money was handed over afterwards. To determine whether deals were a success, 50 random groups were formed using Excel consisting out of two sellers who were assigned to the same condition, and one buyer. The WTA of the two sellers was added up. The cumulative WTA was subtracted from the buyers' WTP. If this number was positive, the deal was a success, and the sellers would receive their asking price. If the deal was a success, the random market price between 300 and 400 cents was generated using an excel function $(= (ASELECT() * 100) + 300)$, this random virtual market value also determined the buyers' potential profit (Market price - WTP)

When the deal was a success, all the members of a formed group received an e-mail that they could reply on with their bank accounts so they could receive their additional reward.

Motive questions

After determining how much money the sellers would want to receive for their part, and the buyer was willing to pay for the puzzle as a whole, seven control questions were asked on a 7 point Likert-scale, to determine how important the puzzle pieces were, and what their motives were to determine their price. These questions were formulated as following:

[1] Experienced importance for the puzzle pieces: *"To what extent were the puzzle pieces important to you?"*,

[2] profit maximization: *"To what extent did you try to earn as much money as possible in the task?"*,

[3] relative loss aversion: *"To what extent did you try to prevent yourself from earning less than the two others?"*,

[4] relative gain maximization: *"To what extent did you try to earn more than the two others?"*,

[5] successful deal aspiration: *"To what extent did you want the sale of the to continue?"*,

[6] collective sense of ownership: *"To what extent did you see the puzzle as collective property?"*, and

[7] individual sense of ownership: *"To what extent did you see the puzzle as your personal property?"*.

Finally, two questions were asked to determine if the participant was paying attention throughout the whole test: *"To which role were you assigned?"* and *"There were two different conditions you could have been assigned to. Everyone had two puzzle pieces, the puzzle pieces were collectively possessed, or no info was given. What condition was assigned in your case?"*. The latter was only asked in the seller condition.

Materials & analyses

To set up and run the experiment, Authorware 7.0 was used, data was stored on the servers of Leiden University. Data was analysed using IBM SPSS 23 data analytics-software.

Results

One seller condition participant (#10) had to be excluded. The price he asked was 1,000 cents. We can assume that this participant did not understand that the deal could only continue when the combined WTA from the sellers was lower than the WTP from the buyer, where it was made salient that the buyer could earn a maximum of 400 cents. Four participants in the buyers' condition had to be excluded from the data pool (#8, #38, #113, #146). Where the maximum market value was 400 cents, these buyer condition participants' WTP varied between 500 and 3,000 cents. No additional money could be earned by them. In a real-world transaction, they would have suffered a loss, which is of course irrational in a situation where the one is trying to maximize its profit. Analyses will be performed over the remaining participants ($N = 145$).

Before comparing how the individual groups performed compared to the collective group in terms of successful deals, it is interesting to take into account whether there were differences between the two condition groups in the different motive questions: *experienced importance for the puzzle pieces [1]*, *profit maximization [2]*, *relative loss aversion [3]*, *relative gain maximization [4]*, *successful deal aspiration [5]* and *sense of ownership (collective property [6] / individual property [7])*.

Collective sense of ownership [6]: There was a statistically significant difference between groups in conceiving the puzzle a collective good, as determined by one-way ANOVA ($F(2,142) = 7.05, p = .001$). Tukey post hoc test revealed that the Individual sense ownership was statistically significantly lower than for the collective ownership group (1.23 pt., $SD = .35, p = .002$). There was no statistically significant difference between the individual and buyers group ($p = .731$).

The t-tests for the other motive questions showed no significance between the two seller groups. The conditions didn't differ on experienced importance for the puzzle pieces [1] profit maximization [2], relative loss aversion [3], relative gain maximization [4], successful deal aspiration [5] and Individual sense of ownership [7].

To accept hypothesis I, a sellers' WTA should be higher than the WTP from the buyer. To be able to compare the buyers with the sellers, for this hypothesis we divide the buyers' WTP by two. The average buyers' WTP, after dividing it by two, ($M =$

132.18, $SD = 42.21$) was compared to the to the WTA of the total sellers group ($M = 150.30$, $SD = 72.58$). To compare the buyers WTP with the sellers WTA an unpaired t-test was performed, $t(143) = 1.53$, $p = .032$. As expected, the sellers' WTA was significantly higher than the buyers WTP.

To test hypothesis II, the difference in WTA between the individual WTA ($M = 145.14$, $SD = 68.00$) and the collective group ($M = 155.79$, $SD = 77.49$) was examined. In contradiction to the expectations, no significant results were found between the individual conditions and the collective condition in valuation; $t(97) = -.73$, $p = .470$. Though not significant, the opposite came out. Within the collective good situation, the average asking price was higher (figure 1).

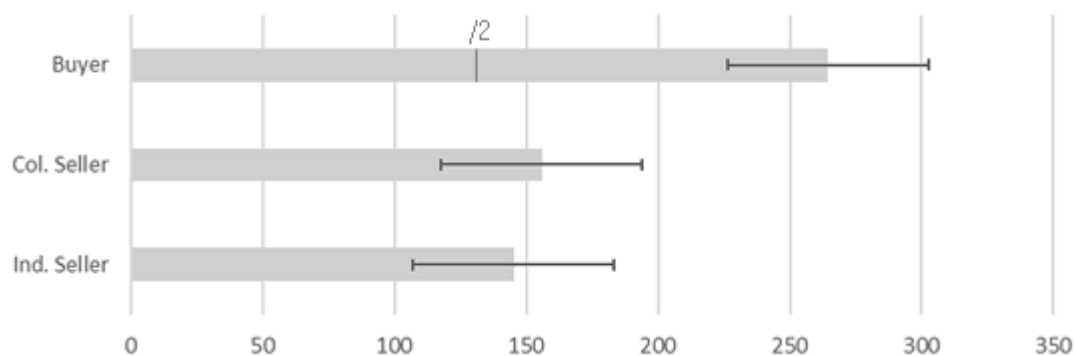


Figure 1. Averages and Standard Deviations for the two sellers- and the buyer condition

For each condition, random groups were formed between two sellers and one buyer to know how much to pay out. This was only one sample and was not representative for all the different possible group-outcomes that could occur. Therefore, a Monte Carlo simulation (Kwaadsteniet, Van Dijk, Wit, De Cremer & De Rooij, 2007), a method similar to Bootstrapping, was performed to form many different random groups. 20,000 groups were formed consisting out of one buyer, and two sellers from either the individual situation or two sellers from the collective situation, so 10,000 groups were formed in the individual condition and 10,000 in the collective condition.

For every group, the two random sellers' WTA was added. A random buyer was assigned to each couple. The WTP was subtracted from the cumulative WTA. When the outcome was positive it was a success and coded as '1'. When the outcome was

negative the transaction failed and was coded as a '0'. In Table 1 three examples displayed.

Table 1.

Examples of determining whether a formed group was successful (1, green) or unsuccessful (0, red)

WTA seller 1	WTA seller 2	Cumulative WTA	WTP buyer	Outcome	Succes (1) Fail (0)
140	150	290	350	60	1
200	150	350	200	-150	0
200	100	300	300	0	1

Within the 10,000 individual groups that were formed, a total of 4.825 (48.25%) successful transactions took place. Within the 10,000 collective groups that were formed, a total of 4.269 (42.69%) successful transactions took place.

A t-test was performed ($t(9999) = 20.34, p < .001$) to see whether the cumulative WTA of the 20,000 groups that were formed had an average, higher asking price than the WTP of the buyers. The average cumulative sellers' WTA was indeed higher ($M = 301.57, SD = 102.29$) than the WTP from the buyer ($M = 265.25, SD = 83.56$). Similar to the results stated in hypothesis I.

To test Hypothesis III the number of successes between the individual and the collective were compared. First a t-test was performed to compare the two different groups in terms of monetary outcome, $t(9,999) = 11.49, p < .001$. The outcomes of the formed individual groups ($M = -25.40, SD = 124.89$) was compared to the outcome of the collective groups ($M = -46.66, SD = 136.28$). There was a significant difference in WTA between the individual and collective group. The effect size of this difference, calculated with Cohens $d = 0.16$, showing a small effect size.

To test the two groups with each other in terms of successful (coded as 1) versus failed transactions (coded as 0) a Chi Square test was performed. In contrast to hypothesis III, the formed collective seller groups were significantly less successful than the individual seller groups, $\chi^2(1) = 62.34, p < .001$.

To look further into these unexpected findings the correlations (r) between the different conditions and the motive questions were computed, the important outcomes are displayed in table 2. There were four significant correlations between

the different conditions and the motive questions. The relevant correlations are discussed in the next chapter.

Table 2

Pearson correlations between prices within conditions and scores on motive questions

Price		Make sure don't earn less	Try to earn more than others	Successful transaction
Individual	r	.284*	0.132	-0.235
	Sig.	0.04	0.36	0.10
Collective	r	.48**	.37**	-.49***
	Sig.	0.001	0.009	0.000
Buyer	r	0.02	-0.08	0.17
	Sig.	0.904	0.600	0.274

*p<0.05, **p<0.01, ***p<0.001.

Discussion

Findings

The present study investigated whether WTA in an anticommons situation is higher for people in an individual anticommons situation compared to people in a collective anticommons situation. Lab research was performed to distinguish the two different anticommons situations by manipulating the instructions within the different conditions.

At first, expected was that the sellers would conceive the puzzle as more valuable than the buyers, because they were the actual owner of the puzzle (Morewidge et al. 2015; Kahneman et al., 1991; Glöckner et al., 2009). If so, in this experiment the sellers' combined WTA > buyers' WTP would prevent the deal from succeeding, leading to a tragedy of the anticommons. Indeed, the cumulative WTA was higher than the WTP from the buyers leading to several tragedies of the anticommons in this experiment. Deals could not continue because of a too low WTP compared to a too high cumulative WTA, creating a situation leaving the resources in possession of the sellers and buyers unused, where in a successful transaction, profit could have been acquired by all parties involved. This is typical for an anticommons situation. All resources remained unutilized (Heller et al., 1998; Dhont et al., 2012).

Secondly, current research suggests, two different anticommons can be distinguished, the individual and the collective anticommons good situation. Hypothesized was that people in the individual anticommons situation would perceive their puzzle part as more valuable (Glöckner et al., 2009). The current results however, shows no differences in valuation between the two different anticommons situations. However, the deal was more likely to continue in the individual anticommons situation compared to the collective anticommons situation. This finding was unexpected. A tragedy of the anticommons is thus more likely to occur in a collective good situation than in an individual good situation. To test hypothesis III, whether this was indeed the case, 10,000 groups were formed in each situation. Results showed that the individuals groups have indeed more successful transactions than the collective groups.

Several reasons can be given to explain these unexpected findings. At first, when comparing the two groups in terms of motive questions, the collective group participants had a higher collective sense of ownership than the individual participants. This is in contrast of our expectations, based on the endowment effect, which is less relevant for group valuation than for individual valuation. Though, other processes may account for the outcome. There was a correlation between the WTA in the collective good situation and the need to earn more than others (motive question 4; relative gain maximization), where in the individual group there was none. This could be an explanation towards more successes in the individual group.

Secondly, the collective group can be seen as more competitive. A negative correlation between WTA and the aspiration of a successful deal was shown meaning that when the WTA increased, the aspiration of a good deal decreased. This finding can be related to research by Gong, Baron and Kunreuther (2009) in which was concluded that “groups are usually less cooperative than individuals in prisoner’s dilemmas” (p. 62). Within the current research there are several parallels with a prisoner’s dilemma. Both participants have to come up, without knowing what the other will do, with a price which can be of negative influence for the other. In this experiment the participant, more or less, has a decision to either cooperate or defect by either asking a low price (and cooperate) or by asking a high price (and defect). Also, the other person suffers/benefits their decisions. There may be a parallel between these two dilemmas and could have driven participants to different prices.

Finally, for both the conditions there was a positive correlation between WTA and making sure not earning less than others. A stronger correlation was reported within the collective group. Besides the fact that the collective group had an urge to earn more than others (gain seeking behavior), they were also trying to prevent earning less than others (risk averse). Kahneman and Tversky (1979) described the principle that losses loom higher than gains. A reason for the less successes in the collective anticommons situation might be that, because participants considered the good more a collective, participants in this condition may have experienced what Gong et al. (2009) described as the process of inter-group competitiveness and the fear of being exploited. Because of this, people within the collective group may have been more risk averse.

Limitations and further research

Within the conducted research, several limitations occurred which may have been of influence on the results. Most important was the last 'check of ownership' question, asked to only the sellers. It stated: *"There were two different conditions you could have been assigned to. Everyone had two puzzle pieces, the puzzle pieces were collectively possessed, or no info was given. What condition was assigned in your case?"*. When analysing the data this question, in the collective good condition, was answered incorrectly by 29/50 participant within this group. It is not sure whether they did not understand this control question or interpreted the question. In deciding whether to keep or remove these participants in the analyses, was decided to keep them. Several reasons for this decision are listed below.

At first, the collective group without removing the wrongly answered questions participants, reported to a higher sense of collective ownership for the puzzle pieces compared to the individual group. This suggests that the collective group indeed was framed into sense of collective ownership. Secondly, the framing of the question might have been too vaguely. Purely speculative, but needs to be considered. People were indeed actual owner of the puzzle in both situations. In the collective situation, they heard that the whole puzzle was collective property with another seller. Simultaneously a puzzle with four pieces was shown. A quick calculation can be made to consider a total of 2 pieces to be his or her own, and 2 pieces being from the other, leaving in the middle what pieces are from whom. Finally, the two groups (right answers versus wrong answers) were compared to each other. No significant differences in WTA were found in asking price between them. Also, no significant differences were found in the motive questions.

Another thing that should be taken in consideration is that 10,000 groups were formed using the Monte Carlo simulation. Two notes should be made aware when using this method. At first, because the random groups were formed from the same population, it is possible that coincidentally the same participants were compared to each other, or that one individual was compared to itself. Secondly, in determining the success in the number of groups that succeeded, and thus who earned an additional monetary reward, chance played a big role for the participants. For further analysis, that chance has been taken away by performing this simulation. However,

because this drastically increased the n , a relatively small difference could give a significant effect.

A third aspect that could have contributed in price determination, is the lack of connection to a real-world situation. The current research did not include negative effects. While people perceive losses differently than gains (Seymour, Daw, Dayan, Singer & Dolan, 2007) and while losses often weigh heavier than gains (Kahneman & Tversky, 1979), people might have made different pricing decisions when the variable monetary reward could also have cost the participant money, which was not the case in this study. Moreover, another thing that could contribute to a better representation to real life, is using actual puzzle pieces instead of virtual ones. Research by Reb and Connolly (2007) showed that items are in physically owned by people create stronger endowment effects than ownership on its own.

Finally, the complexity of the anticommons situation is hard to translate into a computer lab experiment. In real-world situations, there are more factors which can be of influence in an anticommons situation. For future research, it would be interesting to see which factors can be of influence during the valuation process within an anticommons. For example, different group sizes can have impact on the group decision process, the ability to negotiate with each other or different mediators/moderators like social pressure, guilt and familiarity.

Theoretical implications and conclusion

The outcomes of a tragedy of the anticommons are negative. Where a positive result could lead to benefits for all parties involved, no one is getting any advantages over the underutilized goods. Research on what causes this phenomenon should help us understand why the situation arises, but more important, how it can be overcome.

In the valuation process, a resource has to be given up in exchange for something else, in this research a monetary reward. From earlier research (Heller, 1998) two different anticommons situations could be distinguished. This study is the first one to look in to the effect of property rights in an anticommons dilemma, namely the individual and the collective. Though our findings were not as expected, it does give an indication that there is indeed a difference in anticommons. This can be of importance when further looking into the relatively new subject of the anticommons.

Where there have been lots of studies regarding the tragedy of the commons, there is a lot to find out about the tragedy of the anticommons.

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Appendix

I. Informed Consent

S&O Psychologie – Januari/ Februari 2017

Je zult zo dadelijk meedoen aan een onderzoek over het nemen van beslissingen in groepen.

Dit duurt ongeveer 15 minuten.

Voor deelname aan dit onderzoek krijg je 2 euro.

Deelname aan dit onderzoek is geheel vrijwillig en vrijblijvend. Dit betekent dat je te allen tijde, zonder opgaaf van reden, kunt besluiten om deelname aan het onderzoek te beëindigen. Wij behouden ons het recht voor om je dan alleen het bedrag uit te betalen voor de tijd die je hebt deelgenomen aan het onderzoek, en je dus niet de totale beloning uit te keren.

Alle informatie die in het kader van dit onderzoek wordt verzameld, wordt als strikt vertrouwelijk behandeld. Alle gegevens worden in anonieme vorm verwerkt en bewaard. Er zal voor worden gezorgd dat onbevoegden er geen inzage in krijgen en ook dat de gegevens niet tot personen zijn terug te leiden.

Coördinatie: Dit onderzoek wordt gecoördineerd door Erik de Kwaadsteniet (telefoon: 071-527 4109, email: kwaadsteniet@fsw.leidenuniv.nl). Indien je vragen of klachten hebt over dit onderzoek, kun je met hem contact opnemen.

Ik heb de bovenstaande informatie gelezen en stem in met deelname aan dit onderzoek.

Naam: Handtekening:

Datum: Plaats:

II. Debriefing

Wat uitleg over dit onderzoek:

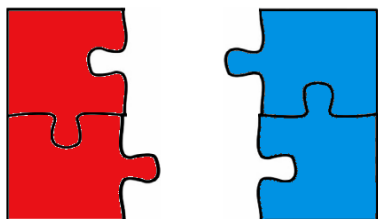
Je hebt net meegedaan aan een onderzoek naar een “anticommons dilemma”, een situatie waarin mensen anderen uit kunnen sluiten van het gebruik van een gemeenschappelijk goed. In dit onderzoek had het gemeenschappelijke goed de vorm van een puzzel. Voor alle drie de spelers van de groepstaak - zowel de verkopers als de koper - was het van belang dat de puzzel werd verkocht, omdat iedereen daar dan aan zou verdienen. Echter, als de verkopers een hogere prijs vroegen dan de koper wilde betalen, dan kon de puzzel niet gemaakt worden, en verdiende niemand iets extra's.

In dit onderzoek wilden we onderzoeken of verkopers die sterk het gevoel hadden dat hun stukje van de puzzel hen persoonlijk toebehoorde, een hogere prijs zouden vragen, en of dit een negatieve invloed zou hebben op de groepsopbrengst. We willen je vragen om eventuele andere proefpersonen niets te vertellen over de inhoud van dit onderzoek, en bedanken je voor je deelname.

Als je meer informatie wilt of als je klachten hebt over dit onderzoek, neem dan gerust contact op met de coördinator van dit onderzoek, Erik de Kwaadsteniet (071-5274109).

IIIa. Framing individual sellers condition

Als Verkoper A ben jij de eigenaar van 2 rode puzzelstukjes. Tijdens de taak heb je de mogelijkheid om jouw 2 stukjes te verkopen aan de Koper. Verkoper B heeft 2 blauwe puzzelstukjes in zijn/haar bezit. De puzzelstukjes van jou en Verkoper B vormen samen 1 complete puzzel van 4 stukjes (zie onder).



Voor de Koper is het van belang om de complete puzzel bij elkaar te verzamelen. Als het de Koper lukt om alle 4 de puzzelstukjes te kopen dan is de puzzel helemaal compleet. In dat geval kan de Koper deze complete puzzel voor geld inwisselen bij de proefleider. Voor een complete puzzel ontvangt de Koper een geldbedrag tussen de 3 en 4 euro van de proefleider. Hoeveel de Koper exact krijgt wordt bepaald door een computer. Een incomplete puzzel is echter niets waard voor de Koper.

Druk op Enter om naar het volgende scherm te gaan....

Als Verkoper A, zul je zometeen gaan aangeven hoeveel eurocent jij minimaal voor jouw 2 rode puzzelstukjes wil ontvangen. Verkoper B zal ook aangeven hoeveel hij/zij minimaal wil ontvangen voor zijn/haar blauwe stukjes.

De Koper zal aangeven hoeveel hij maximaal voor de complete puzzel wil betalen (wetende dat hij/zij 3 tot 4 euro verdient als de hele puzzel compleet is).

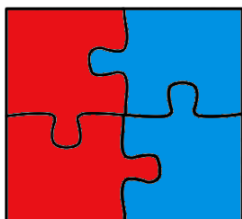
Alleen wanneer het bedrag dat de Koper maximaal voor de puzzel wil betalen hoger of gelijk is aan het bedrag dat jullie als Verkopers gezamenlijk willen ontvangen, dan gaat de koop door. In dat geval ontvangen jij en Verkoper B elk het bedrag dat jullie gevraagd hebben. Echter, als jullie als Verkopers samen meer vragen dan de Koper voor de hele puzzel wil betalen, dan gaat de koop niet door, en verdienen jullie alledrie 0 euro.

Het is hierbij van belang om te weten dat jullie tijdens de taak niet met elkaar kunnen communiceren. Jij kunt eenmalig het bedrag invullen dat jij minimaal voor jouw 2 rode puzzelstukjes wil ontvangen. Hierbij weet je niet wat Verkoper B minimaal voor zijn/haar deel wil ontvangen en hoeveel de Koper maximaal voor de gehele puzzel wil betalen.

Druk op **Enter** voor het volgende scherm.

IIIb. Framing buyers sondition

Als Verkoper A ben jij samen met Verkoper B eigenaar een puzzel van vier stukjes. Tijdens de taak hebben jullie de mogelijkheid om deze puzzel te verkopen aan de Koper. De puzzel die jij samen met Verkoper B bezit, bestaat uit 4 stukjes (zie onder). Deze puzzel is dus gezamenlijk bezit van jou en Verkoper B.



Voor de Koper is het van belang om de puzzel van jullie te kopen. Als het de Koper lukt om de puzzel van jullie te kopen, dan kan de Koper deze complete puzzel voor geld inwisselen bij de proefleider. Voor een complete puzzel ontvangt de Koper een geldbedrag tussen de 3 en 4 euro van de proefleider. Hoeveel de Koper exact voor de puzzel krijgt, wordt bepaald door een computer. Echter, als de Koper de puzzel niet weet te bemachtigen, dan ontvangt hij/zij geen geld van de proefleider.

Druk op Enter om naar het volgende scherm te gaan....

Beide Verkopers zullen aangeven hoeveel zij elk persoonlijk bij verkoop van de puzzel willen ontvangen. Als Verkoper A, zul je zometeen dus gaan aangeven hoeveel eurocent jij minimaal bij verkoop van de puzzel wil ontvangen. Verkoper B zal ook aangeven hoeveel hij/zij minimaal wil ontvangen bij verkoop van de puzzel. Hou er hierbij rekening mee dat de puzzel jullie gezamenlijk bezit is.

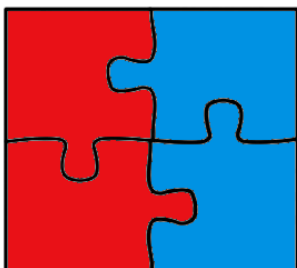
De Koper zal aangeven hoeveel hij maximaal voor de puzzel wil betalen (wetende dat hij/zij hiermee 3 tot 4 euro kan verdienen). **Alleen wanneer het bedrag dat de Koper maximaal voor de puzzel wil betalen hoger of gelijk is aan het bedrag dat jullie als Verkopers gezamenlijk willen ontvangen, dan gaat de koop door.** In dat geval ontvangen jij en Verkoper B elk het bedrag dat jullie gevraagd hebben. Echter, als jullie als Verkopers samen meer vragen dan de Koper voor de hele puzzel wil betalen, dan gaat de koop niet door, en verdienen jullie alledrie 0 euro.

Het is hierbij van belang om te weten dat jullie tijdens de taak niet met elkaar kunnen communiceren. Jij kunt eenmalig het bedrag invullen dat jij minimaal bij verkoop van de puzzel wil ontvangen. Hierbij weet je niet wat Verkoper B minimaal bij verkoop wil ontvangen en hoeveel de Koper maximaal voor de puzzel wil betalen.

Druk op **Enter** voor het volgende scherm.

IIIc. Buyer Condition

Verkoper A en Verkoper B hebben samen 1 complete puzzel van 4 stukjes in hun bezit (zie onder).



Voor jou als Koper is het van belang om deze puzzel van de 2 Verkopers te kopen. Als het jou lukt om alle 4 de puzzelstukjes te kopen dan kun je de complete puzzel inwisselen bij de proefleider. Voor een complete puzzel ontvang je tussen de 3 en 4 euro van de proefleider.

Om de volledige puzzel bij elkaar te krijgen, zul je als Koper alle 4 de puzzelstukjes van de 2 Verkopers moeten kopen. Dit gaat als volgt in zijn werk.

Druk op Enter om naar het volgende scherm te gaan....

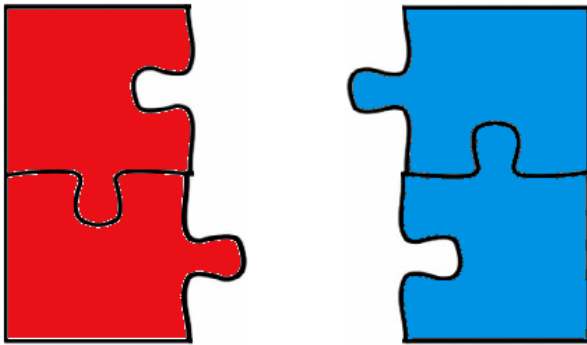
Verkoper A zal zometeen gaan aangeven hoeveel eurocent hij/zij bij de verkoop van de puzzel wil ontvangen. Verkoper B zal ook aangeven hoeveel hij/zij wil ontvangen bij verkoop de puzzel.

Als Koper zul jij op jouw beurt aangeven hoeveel je maximaal voor de complete puzzel wil betalen (onthoud hierbij dat je tussen de 3 en 4 euro van de proefleider krijgt als je de puzzel weet te kopen). **Alleen wanneer het bedrag dat jij als Koper maximaal voor de puzzel wil betalen hoger of gelijk is aan het bedrag dat de Verkopers gezamenlijk willen ontvangen, dan gaat de koop door.** In dat geval krijgen de Verkopers elk het bedrag van jou dat ze gevraagd hebben. Lukt het de Verkopers echter niet om een deal te sluiten met jou als Koper, dan gaat de koop niet door, en verdienen jullie alledrie 0 euro.

Het is hierbij van belang om te weten dat jullie tijdens de taak niet met elkaar kunnen communiceren. Jij kunt eenmalig het bedrag invullen dat jij voor de puzzel maximaal wil betalen. Hierbij weet je niet wat de Verkopers bij verkoop van puzzels minimaal willen ontvangen.

Druk op **Enter** voor het volgende scherm.

IVa. Puzzle pieces in the individual condition



IVb. Puzzle pieces in the collective condition

