



# Individual Differences in Social Value Orientation on Aggressive VS Non-Aggressive Investments of Resources in Asymmetric Conflict

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Milena Delidou

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Institute of Psychology  
Faculty of Social and Behavioural Sciences – Leiden University  
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Supervisor: Dr. Ruthie Pliskin

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### Abstract

Humans, like any other animals, have a strong instinct to promote their own survival. The present study aimed in investigating if individual differences in social value orientation (SVO) can influence attacker behavior, and investment to innovation. I predicted that individuals with a randomly assigned attacker role that have a prosocial SVO will attack less than individuals with an attacker role and a proself (individualistic and competitive) SVO. I also predicted that individuals with a prosocial SVO would invest more in innovative means to earn resources, than those with a proself SVO. A total of 115 participants performed a computer based economic decision making game, where the roles of attacker/defender were randomly assigned. During the game, participants were provided with monetary units and could attack (attackers) or defend (defenders), or choose to invest in innovation, which had the potential of earning them more monetary resources. The results were contradicting to my predictions. There was no difference found in attack behavior between participants that had an attacker role and a prosocial SVO compared to participants with an attacker role and a proself SVO. Also, attackers and defenders with a prosocial SVO did not invest in innovation more than attackers and defenders with a proself SVO.

## Introduction

We live in an increasingly populated world where everyone strives for what is generally considered highly valuable. Our evolutionary need for survival can promote extreme actions, that can later on be acknowledged as unnecessary and unethical. Aims of surviving, and gaining limited resources to promote survival, can lead individuals to behaviors that can be catastrophic. Wars do not usually arise simply because two nations dislike each other, but because of one nation's desire to take control over valuable resources belonging to the other nation. Similarly, conflict can arise between individuals because of one party's desire to gain valuable resources the other party owns (e.g. burglary, white collar crimes). This need to gain valuable resources can lead individuals to invest time, energy, and resources in order to increase the chances of successfully defeating the other party, and taking control over their resources. Investment of time, energy, and resources can also be the case when individuals aim to protect their resources from potential attackers.

Nonetheless, even in times of despair over lack of resources, humans have proven to have the capabilities of creating innovative means (e.g. technological innovations) to achieve goals, and gain goods to promote survival without causing harm to others. This being said, some individuals still choose to employ more aggressive means to achieve their goal of gaining what is they desire, while others choose to either simply adhere to their resources, or use innovative means to increase resources. Social value orientation (SVO), that is, how important individuals consider others' welfare, might play a role in how individuals choose to attack in order to gain resources or defend their own resources. Investigating this can help us discover potential differences (i.e. SVO orientations) amongst people that can lead to certain attack and defense behaviors. A question that arises here, is whether individual differences in SVO can lead individuals to aggressively aim for gaining others' resources, or maintaining own resources. More specifically, investigating individuals' social value orientation (SVO),

can help us discover whether individual differences in SVO can lead to aggressive attacking. A question that follows the previous one is, whether individual differences in SVO are related to individuals' choice of implementing innovative means to multiply resources, instead of implementing an attack to gain others' resources, or defense to keep own resources. In the present paper, I will aim to study the aforementioned points and try to answer these questions.

### Conflict and Conflict Asymmetry

Conflict has been persistently present in human interactions. It can be considered a competition between parties, with the aim to "win" (Schelling, 1980). Conflict can vary from situations regarding two competing parties aiming for an ultimate position or status (e.g. a managerial position), but also parties aiming for means of promoting survival and well-being (e.g. food, shelter). Classical empirical research on conflict indicates that the main prerequisite for conflict is a (perceived) scarcity in resources (Sherif, 1954, 1958, 1961). This implies that scarcity can set a high value on resources, making them important gains that individuals strive for in order to survive. This in turn, can promote individuals' employment of high (aggressive) efforts to achieve obtaining them, or maintaining them. Resource scarcity can lead individuals experiencing a need to obtain control over the resources of others by attacking them, but also a need to protect own resources from potential attackers (De Dreu, Kret & Sligte, 2016).

Conflict asymmetry can arise when individuals have differing perceptions over the intensity of the conflict, with one individual experiencing more conflict than the other (van Dijk, Giebels, & Zebel, 2016). Asymmetric conflict can also take place when an individual can (and also wants) to attack, while another individual can only defend. This leaves the defender with only one choice (defense) and creates an asymmetry in conflict. Asymmetric

conflict can lead to a variability in investment behavior, distinguishing two kinds of behaviors: investment in attack (attacking others in order to obtain their resources), or, investment in defense (defending own resources in order to prevent others from obtaining them) (De Dreu et al., 2016).

It is interesting to study what happens when some individuals can gain more goods (resources) by challenging the status quo, while other individuals can only maintain it to keep their existing resources safe. In the animal kingdom, in situations of survival, a predator can gain goods by attacking a prey, while the prey can only choose to survive by defending itself. Human existence is also full of situations where the stronger predator is more likely to win (and not lose) by attacking the weaker prey, while the prey can only go as far as protecting itself and eliminating the loss of its goods. In the temptation of gaining more resources, predators (attackers) have a tendency to attack, disregarding the other party (Bohm, Rusch, & Gureck, 2016; De Dreu, Scholte, Van Winden & Ridderinkhof, 2015; De Dreu, Kret & Sligte, 2016). The outcomes usually show a tendency for defenders to be more successful than attackers in maintaining their resources. The potential reason for this, is considered to be a difference in the intensity of competing between attackers and defenders (De Dreu, et al., 2018). Attackers attack less intensely, while defenders defend more intensely, since defending one's resources is more crucial for survival than attacking to gain more resources. Also, a general preference to seek gain and eliminate loss (Kahneman, Knetsch, & Thaler, 1991), can explain the need to attack, and the need to defend, with the difference that for some, the only available option is to defend. In addition, while self-defense is an evolutionary and automatic reaction in aims of survival, attack (aggression) needs more control and planning in order to result in the desired outcome (De Dreu et al., 2016). Defending oneself is a reactive response that comes about naturally, while a highly accurate coordination is necessary to create a successful attack.

### Asymmetric Conflict, Innovation, and Social Value Orientation

Studying different roles in an asymmetric conflict situation, where one individual is an attacker, and the other individual is the defender, can help us understand individual differences in the behavior of attackers and defenders. More specifically, I am interested in investigating the relationship between Social Value Orientation (SVO) and investment behavior in situations where one of the individuals is an attacker and the other the defender.

SVO, which is the degree to which an individual attaches more value to the profit of others versus oneself, is interesting to study in the context of attack/defense behaviors. The different scores of individuals in SVO are related to different orientations, that in turn are related with how much someone would maximize their own earnings, in the expense of another individual's earnings. For example, the prosocial orientation is characterized by maximizing one's payoff while maximizing the other's payoff, while the individualistic orientation is characterized by maximizing one's payoff while disregarding the other's payoff. (Murphy & Ackermann, 2013).

Previous research found that individuals who are more concerned about others' welfare, and are more empathetic (qualities related to the prosocial category in SVO), are found to attack less frequently (De Dreu, et al., 2018). Although there is some integration of SVO in explaining conflict, present studies have focused on only some characteristics of SVO (e.g. empathy in prosocial orientation), but not a general picture of SVO, and the influence of the different kinds of SVO in conflict intensity in attacker/defender situations. Studying the influence of SVO on the intensity of investment in situations of conflict between attackers and defenders, can help us understand how individual differences in considering others' welfare, can lead individuals in implementing aggression in asymmetric conflict.

De Dreu et al (2018) found that prosocial SVO leads to less investments in attack. Thielmann and Bohm (2016) also found evidence which suggest that prosocial SVO can actually prevent individuals from wanting to harm others. Based on this line of thinking, we can assume that those with a prosocial SVO will choose to invest in alternative means to maximize their resources instead of attacking, while those with a proself (individualistic, and competitive) SVO will choose to attack.

Innovation is another construct I am aiming in implementing in the study of attacker/defender behavior and SVO. De Dreu & van Dijk (2018) investigated the association of innovation with climatic shocks. Their findings show that when in times of threat and pressure, humans have a tendency to seek innovative ways to promote survival. This way, we can assume that individuals will seek to find or come up with innovative means more to maximize their gains when they need to divide limited recourses. In addition, since prosocial SVO is related to intentions of not harming other, we can assume that those with a prosocial SVO, will choose alternative means like innovation more in order to gain resources than those with a proself SVO.

Based on the aforementioned finding, and the connection I assume they have to SVO, I formulated the following hypotheses: H1: Attackers with a prosocial SVO will attack less than attackers with a proself SVO. H2: Attackers and defenders with a prosocial SVO will invest in innovation more, than attackers and defenders with a proself SVO.

## **Method**

### **Participants**

We recruited 240 participants from which six were excluded due to incomplete data (e.g. caused by software errors), resulting in 234 participants divided into an experimental



group (n = 115) and a control group (n = 119). Participants in the control group had the options to either keep their resources, or invest to attack or defend respective to their randomly assigned roles as attackers or defenders. Participants that were assigned to the experimental group (age range: 17-42 yr.;  $M_{\text{age}} = 21.8$ ; 22 males) performed a version of the test that had the additional option to invest in innovation. Since innovation is investigated in the present study, only participants of the experimental group were included in my analysis. A majority of the participants were students of the Leiden University Faculty of Social and Behavioral Sciences, and were recruited through an online database (SONA), which Leiden University researchers use for research participation.

### **Procedure**

To prevent any carryover effects, participants were asked to complete an online questionnaire at least 48 hours prior to the attacker/defender game. The online questionnaire included questions on participants' demographic information, and measures of different constructs, one of which, the Triple Dominance Measure for Social Value Orientation (Van Lange et al, 1997) is related to, and implemented in the present study. The remaining measures are related to research relevant to other studies in the umbrella theme of individual differences in the context of asymmetric conflict. These measures are unrelated to the constructs I am studying so they will not be discussed in this paper.

In the Triple Dominance Measure for Social Value Orientation (Van Lange, Otten, De Bruin, & Joireman, 1997), participants are asked to imagine a situation in which they are randomly paired with a stranger they will never meet in person. They are then asked to choose options related to the allocation of points, and they are instructed to assume that the higher the points they collect, the better the outcome for themselves. Participants are also

informed that their choices can affect not only their own, but also the other's outcome (i.e. points each of the individuals collect). The measure includes nine items, and each item has three choices (A, B, C). Participants are classified in the three categories of SVO (i.e. prosocial, individualistic, competitive) if they have six or more consistent choices. Through the Triple Dominance Measure we can distinguish the tendency of participants to act prosocial, individualistically, or competitively. In this study I am interested in differences between those with a prosocial SVO, and those with a proself SVO (individualistic, and competitive). Due to the Triple Dominance measure's classification rule, eleven participants had to be dropped off the analysis, since they did not have six consistent choices, and thus could not be classified in any of the three SVO categories. The remaining 104 participants consisted of 73 prosocials, and 31 proselfs (of which 28 were classified as individualistic, and 3 were classified as competitive).

#### Attacker-defender paradigm

The experiment was conducted based on the attacker-defender paradigm (Ibidunmoye, Alese, & Ogundele, 2013; Guan et al., 2017; De Dreu, & Gross, 2018). Before starting the experiment participants were asked to sign a consent form, and were informed that they can terminate their participation in the experiment at any desired moment. In the experiment, two participants were assigned in separate cubicles. The attacker or defender status was randomly assigned to each participant. The game consisted of 60 rounds, and in each round participants were provided with 20 monetary units (euros), which they could use for investment. In each round, participants had the choice to invest a desired amount of monetary units to one of the following options:

Option 1: Keeping the monetary units without any action.

Option 2: Attacking the other participant, or, defending against the other participant.

Option 3 (only available to the experimental group): Investing in innovation.

The present study focuses on participants that were assigned to the experimental group, and thus had option 3 available. In this option (also in option 2) a participant's inadequate investment in defense could result in loss of resources, if the other participant invests more in attack. For example, if the participant (defender) invested an amount (e.g. eight monetary units) in defense, while the other participant (attacker) invested a higher amount in attack (e.g. ten monetary units), the defender was defeated, and lost the resources that were not used for defense. In addition, resources invested for either attack or defense, were not eligible for further use. They could either be used to gain resources that were not used by the other party (option for attackers), or help protect resources that the individual did not use (option for defenders).

Innovation was available for both attackers and defenders in the experimental group. For these participants, if the investment in innovation met a certain randomly generated threshold, participants could get returns on their investment (30 extra monetary units). In case a defender chose to invest less in defense than the attacker invested in attack although, the defender would lose all his/her resources, including any gains from the innovation. This would also mean that the attacker would gain a much higher amount of resources.

The experiment lasted approximately an hour. Once the experiment was over, participants were compensated. An initial monetary compensation was granted to participants (6.5 euros, or 2 participation credits), but participants also acquired additional monetary units that they earned through the attacker/defender game (up to 16 euros in addition to the initial

6.5 euros), based on their success in the game. The experimental procedures were approved by the Leiden University Psychology Research Ethics Committee.

### **Statistical Analyses**

To investigate the effects of SVO in asymmetric conflict and how it differs among attackers and defenders, I conducted two two-way analyses of variance. The relative variables I used to test my hypotheses were: Role (Attacker or Defender) and SVO (which may be a potential moderator; assigns individuals to the prosocial or proself categories) as independent variables. The dependent variables were Conflict (indicating the choice to attack/defend) in one analysis, and Innovation as the dependent variable in the second analysis. All analyses were conducted on SPSS (Version 24).

### **Results**

Individual differences in SVO might moderate the attack behavior of attackers, where attackers with a prosocial SVO may choose to attack less than attackers with a proself SVO. A two-way analysis of variance was conducted, with the randomly assigned role of the participants (attacker or defender), the investment behavior of the participants (attack or defend respective to their role), and the SVO category participants belong to (prosocial or proself) as variables, to test whether prosocial attackers' attack behavior differed from proselfs' attack behavior. The interaction effect between the role of the participants (attacker/defender) and the social value orientation category they belong to (prosocial/proself) yielded an F ratio of  $F(1,100) = .03, p = .857$ , indicating a non-significant difference in attack behavior between attackers with a prosocial SVO ( $M = 4.25, SD = 2.78$ ), and attackers with a proself SVO ( $M =$

5.10,  $SD = 2.45$ ) (Table 1). The main effect for SVO ( $F(1,100) = 2.85, p = .095$ ), indicated a non-significant effect of SVO in attack or defend behavior of attackers and defenders with a prosocial SVO ( $M = 4.56, SD = 2.72$ ), and attackers and defenders with a proself SVO ( $M = 5.57, SD = 2.38$ ). The main effect for the role of the individuals was also non-significant with  $F(1,100) = 1.74, p = .190$ , showing a non-significant difference between attackers and defenders in investment to attack ( $M = 4.48, SD = 2.70$ ) or defense ( $M = 5.25, SD = 2.57$ ) respectively (see Figure 1 for an illustration of the results).

Individual differences in SVO might also moderate individuals' investment in innovation, where both attackers and defenders with a prosocial SVO may choose to invest more in innovation than attackers and defenders with a proself SVO. A two-way analysis of variance was conducted, with the role of the participants, the investment of participants to innovation, and the SVO category of the participants, to test if investing in innovation differed between prosocial attackers/defenders, and proself attackers/defenders. The analysis resulted in a non-significant main effect for SVO ( $F(1,100) = 1.70, p = .196$ ) (Table 1), indicating no significant difference in investment to innovation between attackers/defenders with a prosocial ( $M = 12.46, SD = 2.71$ ) or proself ( $M = 11.61, SD = 3.14$ ) SVO. The interaction effect between the role of the participants and the SVO category they belong to was non-significant ( $F(1,100) = .01, p = .907$ ), with investment to innovation being not significantly different between attackers with a prosocial SVO ( $M = 12.80, SD = 2.77$ ), compared to attackers with a proself SVO ( $M = 11.93, SD = 3.33$ ), and defenders with a prosocial SVO ( $M = 12.07, SD = 2.63$ ), compared to defenders with a proself ( $M = 11.35, SD = 3.06$ ) SVO. The main effect of the role of the participants was also non-significant with  $F(1,100) = 1.13, p = .291$ , meaning that participants' investment to innovation was not significantly influenced by whether they were assigned an attacker ( $M = 12.57, SD = 2.92$ ), or a defender role ( $M = 11.83, SD = 2.77$ ) (see Figure 2 for an illustration of the results).

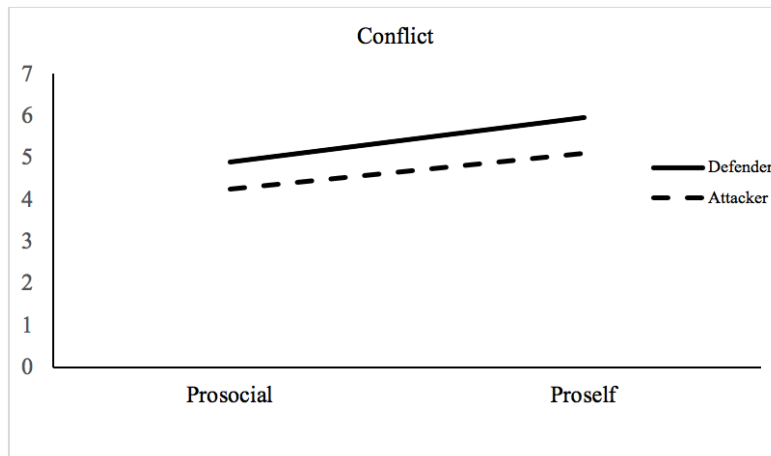


Figure 1. Mean investments of attackers/defenders from the two SVO categories to attack/defend (conflict).

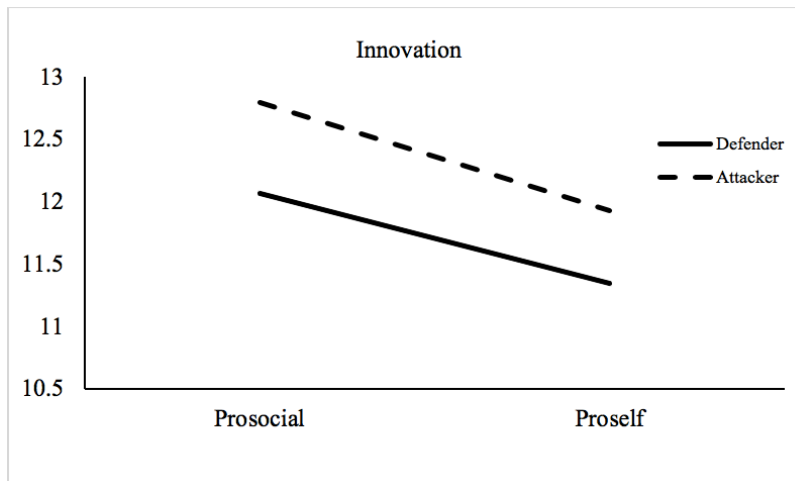


Figure 2. Mean investments of attackers/defenders from the two SVO categories to innovation.

Table 1.

*ANOVA Summary Table for Conflict and Innovation*

Source	Conflict					Innovation				
	<i>df</i>	MS	<i>F</i>	<i>p</i>	Effect Size	<i>df</i>	MS	<i>F</i>	<i>p</i>	Effect Size
Role	1	12.01	1.74	.190	.017	1	9.18	1.13	.291	.011
SVO	1	19.62	2.85	.095	.028	1	13.79	1.70	.196	.017
Role * SVO	1	.23	.03	.857	.00033	1	.11	.01	.907	.00014
Within groups	100	6.89				100	8.13			
Total	104									

*Note:* MS = Mean squares, effect size = partial  $\eta^2$ .

## Discussion

Economic behavior, and the aim to implement survival and well-being through owing or gaining valuable resources is a big part of the human life. The present study aimed in investigating whether individual differences in social value orientation (SVO) can moderate the choices of individuals to attack or innovate. Using an attacker/defender paradigm, I investigated whether a participant's choice to invest monetary units to attack another participant, or invest monetary units to innovate and increase gains in an alternative way, are influenced by the category of SVO the individual belongs to (prosocial or proself).

I hypothesized that attackers with a prosocial SVO would choose to attack others less than attackers with a proself SVO. To test this, dyad groups of participants were asked to play a computer based economic decision making game with each other at the same time, where the role of the attacker or defender was assigned randomly. Having knowledge about the SVO category the participants belong to (through the relevant SVO measure assigned earlier) I could compare the behavior of participants from the two SVO categories. The results did not show an influence of SVO in attack behavior. Participants that had the attacker status and belonged to the prosocial SVO category did not invest less to attack than did participants that had the attacker status and belonged to the proself SVO category.

Furthermore, the findings showed that investment behavior of attackers and defenders did not differ much from each other, meaning that having any status did not predict more or less investment. This is in line with previous theory that humans have a general need to seek gain and eliminate loss (Kahneman, Knetsch, & Thaler, 1991), thus explaining the similar results in the attack and defense behavior of my participant.

My second hypothesis was related to attackers' and defenders' investment to innovation. I hypothesized that both attackers and defenders with a prosocial SVO will choose to implement the innovation option more than attackers and defenders with a proself



SVO. The findings did not show an influence of SVO in attackers' and defenders' choices to implement innovation. More specifically, prosocial attackers and defenders did not invest more to innovation than did proself attackers and defenders.

The findings also showed that there is no interaction between the status of individuals and their SVO when it comes to investing in innovation. Having either an attacker or a defender status, and being either prosocial or proself did not predict more or less investment in innovation. Additionally, no difference was found between attackers and defenders in general when investing in innovation. Both groups had similar investments in innovation.

These findings are contradicting with the findings of previous studies that found prosocial SVO to be connected with intentions to prevent attack, and harm to others (De Dreu et al., 2018; Thielmann & Bohm, 2016). The findings also contradict with the findings of De Dreu & van Dijk (2018) about the increased implementation of innovation in times of environmental (climatic) pressure that can lead individuals to search for alternative means to promote survival. The assumption that prosocial SVO could increase the need to find alternative means to survival to prevent harm to others was also not supported. How much individuals chose to invest to innovation, was unrelated to the category of SVO they belong to.

The findings of this study present that the choice to attack, or invest is not influenced by how important individuals consider other people's gains or well-being. A potential explanation for this might be the intensity of the need for survival humans have in them. The need to survive, or gain more may be so intense that in situations where individuals are given the chance to attack and gain, they will do so. The findings might have potential limitations although. One potential limitation might be related to the design of the study. The sample size was relatively small, and most importantly, there was a difference in the number of participants belonging to the prosocial and proself SVO categories. The proself category

included less than half the participants of the prosocial category, leading to potentially less variability in the sample. The sample also consisted predominantly by females. Even though I did not study gender differences in SVO, attack/defend behavior, and investment behavior, in case there are pre-existing gender differences, they might have influenced the course of our findings.

Finally, the present study attempted to explain potential differences between individuals of two different statuses, explained by a social value perspective. The economic decisions of the individuals in instances where they have a privileged (attacker) status was interesting to investigate, since it can be applied to multiple societal situation (e.g. behavior of managers, national leaders, family dynamics). The findings that SVO does not influence attack and innovation behavior can set a new perspective in human behavior and open doors to search for other potential reasons why there might be differences in attack and innovation behavior between individuals. SVO might not be a construct that explains these differences, but other constructs (e.g. empathy, power, social dominance orientation) might give a different perspective and explanation to differences in economic behavior.

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## Appendix

*The Triple Dominance Measure:***An Instrument to Measure Interpersonal Orientation**

In this task we ask you to imagine that you have been randomly paired with another person, whom we will refer to simply as the "Other." This other person is someone you do not know and that you will not knowingly meet in the future. Both you and the "Other" person will be making choices by circling either the letter A, B, or C. Your own choices will produce points for both yourself and the "Other" person. Likewise, the other's choice will produce points for him/her and for you. Every point has value: the more points you receive, the better for you, and the more points the "Other" receives, the better for him/her.

Here's an example of how this task works:

	A	B	C
You get	500	500	550
Other gets	100	500	300

In this example, if you choose A you would receive 500 points and the other would receive 100 points; if you chose B, you would receive 500 points and the other 500; and if you chose C, you would receive 550 points and the other 300. So, you see that your choice influences both the number of points you receive and the number of points the other receives. Before you begin making choices, please keep in mind that there are no right or wrong answers -- choose the option that you, for whatever reason, prefer most. Also, remember that the points have value: the more of them you accumulate the better for you. Likewise, from the "other's" point of view, the more points s/he accumulates, the better for him/her.

For each of the nine choice situations, circle A, B, or C, depending on which column you prefer most:

	A	B	C
(1) You get	480	540	480
Other gets	80	280	480

	A	B	C
(6) You get	500	500	570
Other gets	500	100	300

	A	B	C
(2) You get	560	500	500
Other gets	300	500	100

	A	B	C
(7) You get	510	560	510
Other gets	510	300	110

	A	B	C
(3) You get	520	520	580
Other gets	520	120	320

	A	B	C
(8) You get	550	500	500
Other gets	300	100	500

	A	B	C
(4) You get	500	560	490
Other gets	100	300	490

	A	B	C
(9) You get	480	490	540
Other gets	100	490	300

	A	B	C
(5) You get	560	500	490
Other gets	300	500	90