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ECONOMIC PAPERS

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Does Truth Win When Teams Reason Strategically?

UNIVERSITÄT DUISBURG ESSEN

#396

Imprint

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstr. 150, 44801 Bochum, Germany

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Ruhr Economic Papers #396

Responsible Editor: Volker Clausen

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ISSN 1864-4872 (online) – ISBN 978-3-86788-451-8

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Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über: *http://dnb.d-nb.de* abrufbar.

http://dx.doi.org/10.4419/86788451
ISSN 1864-4872 (online)
ISBN 978-3-86788-451-8

Jeannette Brosig-Koch, Timo Heinrich, and Christoph Helbach[1]

Does Truth Win When Teams Reason Strategically?

Abstract

This study tests experimentally whether teams can create synergies in strategic interactions. For our comparison between team and individual behavior we employ the race game. This game has the advantage that the optimal strategy does neither depend on beliefs about other players nor on distributional or efficiency concerns. Our results reveal that teams do not only outperform individuals but that they can also beat the "truth-wins" benchmark. In particular, varying the length of the race game we find that the team advantage increases with the complexity of the game. The latter finding supports the conjectures made by Charness et al. (2010) and Cooper and Kagel (2005), who suggest a relation between task complexity and the size of synergies created by teams.

JEL Classification: C72, C91, C92

Keywords: Race game; strategic sophistication; team decision making

January 2013

1 All University of Duisburg-Essen. *– We thank René Fahr and Bernd Irlenbusch for sharing their data. Financial support by the Fritz Thyssen Foundation is gratefully acknowledged.* *– All correspondence to Jeannette Brosig-Koch, University of Duisburg-Essen, Faculty of Economics and Business Administration, Universitätsstr. 12, 45117 Essen, Germany; E-Mail: jeannette.brosig-koch@ibes.uni-due.de.*

1 Introduction

When people plan for the future or make long-term commitments, such as choosing a college or a retirement plan, they not only seek expert advice. Many also consult with others who are in the same situation and have to make the same decision. But does this improve their judgment? Of course, anyone can benefit from someone else's superior knowledge or skills. But does it also make sense to team up with someone, who is less knowledgeable or skillful?

In studies on strategic reasoning, teams have been found to adhere closer to standard game-theoretic predictions than individual players. In two seminal papers on the guessing game, Kocher and Sutter observe decisions by teams to approach the Nash-equilibrium quicker than those by individuals (Kocher and Sutter, 2005, Sutter, 2005). Also, teams play the Nash-equilibrium strategy more often in one-shot normal-form games studied by Sutter et al. (2010) and behave more rationally in information cascade situations as Fahr and Irlenbusch (2011) observe. Yet, so far the nature of these differences in behavior remains unclear. Maybe teams are just as smart as their smartest member? Or, do people reasoning together create synergies?

The idea that teams perform as well as their best member has been discussed in the psychology literature since the 1950s. It is known as the "truth-wins" hypothesis which was proposed by Lorge and Solomon (1955) and by Marquart (1955). If teams beat this benchmark, we can conclude that they are more than the sum of their parts and are able to generate insights none of its members would have had alone. Focusing mainly on non-interactive tasks, results from the psychology literature on small groups suggest that teams usually do not reach the truth-wins benchmark, let alone beating it, as Kerr and Tindale (2004) summarize.[1] The evidence from economics is less clear cut.

On the one hand, findings from experiments run by Charness et al. (2007), Charness et al. (2010) and Casari et al. (2011) point into the same direction as the psychology literature. Charness et al. (2007) study decisions in an urn experiment with respect to Bayesian updating and (first-order stochastic) dominance. They find that error rates drop with the number of decision makers. However, when comparing two-person and three-person team performance with individual perfor-

[1] See also the textbooks by Larson (2010) and Laughlin (2011) for an overview. Teams sometimes reach the benchmark in tasks that have a demonstrably correct solution, for example in mathematical problems (Laughlin and Ellis, 1986) or in the game of Mastermind (Bonner et al. 2002). They beat it on Letters-to-Numbers problems (Laughlin et al. 2002). Charness and Sutter (2012) and Kugler et al. (2012) provide overviews on the economics literature.

mance, most teams apparently do not reach the truth-wins benchmark. Charness et al. (2010) study the conjunction fallacy, i.e. the tendency of decision-makers to violate the rule that the probability of the intersection of two events cannot exceed the probability that one of the two events occurs. In their experiment teams of two and three violate this rule less often than individuals, but also fall short of the truth-wins benchmark. Similar findings are reported by Casari et al. (2011). The authors study bids in a company takeover game and find that teams of three place better bids than individuals, i.e. less bids that yield an expected loss or less bids that are dominated by others. Yet, teams underperform with respect to the truth-wins benchmark. However, similar to the psychological studies, these three experiments require no, or only little, strategic reasoning: In the first two, subjects face a non-interactive decision task; in the third, subjects play against a buyer who simply accepts all offers yielding a positive profit.

Analyzing strategic interaction, Cooper and Kagel (2005), on the other hand, observe that teams of two are able to beat the truth-wins norm. They focus on behavior in signaling games with numerous equilibria which are based on the entry limit pricing model by Milgrom and Roberts (1982). Cooper and Kagel identify a subset of moves as "strategic" and show that teams behave more strategically and thereby beat the truth-wins norm in some variants of the game. Interpreting the individuals' speed of learning as a measure of difficulty, Cooper and Kagel conjecture that the team advantage is positively related to the difficulty of learning to play strategically. In light of the experimental evidence Charness et al. (2010) speculate that "the additional layer of complexity may lead to a greater degree of synergy" in strategic games (p. 555). Unfortunately, in strategic interactions it is often difficult to judge what constitutes "better" performance (and, accordingly, a greater degree of synergy) *a priori*. Does it mean increasing payoffs? Or, adhering closer to the predictions derived from game-theoretic models under the assumption of strictly selfish preferences and common knowledge of rationality?

This study provides a clean test of the conjecture made by Charness et al (2010). To overcome the aforementioned interpretation problems, we employ the race game, which has recently come into focus of economists (see, e.g., Burks et al., 2009, Dufwenberg et al., 2010, Gneezy et al., 2010, and Levitt et al., 2011). The race game is a two-player constant-sum game with complete and perfect information that has a dominant strategy, which can be found by backward induction. Optimal behavior in this game does not depend on beliefs and is the same for all potential preferences that value one's own payoff higher than the opponent's. The only way to increase payoffs is to adhere closer to the game-theoretic prediction. Therefore this game allows a clean comparison of team performance with the truth-wins benchmark and the identification of synergies. Moreover, by varying the length of the game we can check whether a relationship between the complexity of the strategic interaction and the differences between individual and team performance exists, as suggested by Charness et al. (2010). To our knowledge this is also the first study that allows comparing the ability to apply the fundamental game-theoretic concept of backward induction (in isolation) between teams and individuals.

Our results support the supposition that the team-advantage is related to task complexity: Teams beat the truth-wins norm in medium and long race games, but not in less complex short race games.

2 Experimental Design

In a race game $G(m, k)$, two players alternate in choosing integers between 1 and k. All chosen values are summed up and the player who can choose a number that makes the sum equal to m wins. The race game is a combinatorial game that can be solved by backward induction.[2] If player 1 wants to win and reach m on her last move, she needs to secure the winning position m-(k+1) in the preceding move. This way, limited to a choice between 1 and k, player 2 will not be able to reach m on his turn. In order to secure this winning position, however, player 1 also needs to secure m-2(k+1) on the move before, or, generally, m-n(k+1) on her n-th to last move.[3] Applying this strategy, the first mover can win all race games except those where m is divisible by (k+1).

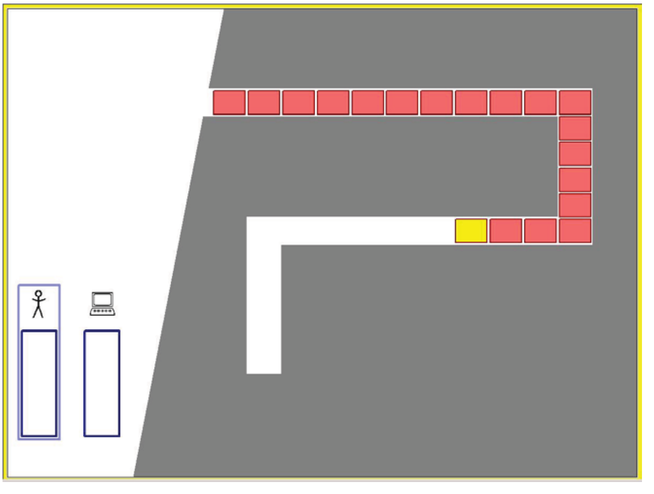
In our experiment we aimed to compare the performance of teams and individuals in race games of different lengths. Subjects played twelve race games $G(m, k=4)$ consisting of two identical series of games with m taking the values 19, 3, 29, 8, 11 and 21. The games varied from zero to five steps of reasoning that are necessary to find the first winning position. In the following we refer to the two series as part 1 and part 2. To increase comparability between individuals and teams, subjects played against a computer programmed to play the winning strategy outlined

[2] As it ends after a finite number of moves, contains no random moves and both players alternate moving, it belongs to the class of combinatorial games (like e.g. chess). More precisely, it is an impartial combinatorial game because at each position that can be reached in the game, the strategy set is the same for both players (unlike chess but similar e.g. to Nim). Conway (2001) and Albert et al. (2007) provide an overview on combinatorial games.

[3] As Dufwenberg et al. (2010) and Levitt et al. (2011) point out, this procedure is not backward induction in the *strict* sense as a player does not need to solve for his opponent's optimal choice.

above – if possible. Subjects moved first in all games and could reach a winning position in the first move of all games. If the computer could not reach a winning position, it resorted to random play. Subjects were unaware of the total number of games but knew that the computer "tries to win" each game.

Figure 1: Graphical display of the game $G(m=19, k=4)$



Our implementation of the race game and the experimental procedures were based on the study by Brosig-Koch et al. (2012). We used their novel graphical interface displayed in Figure 1 and framed the players' goal as securing a treasure (the yellow square). This treasure is hidden in a cave and can be reached by removing stones that are blocking the way (the red squares). Depending on the game, the number of stones in the way (m-1) varied. Subjects learned that, same as the computer, they can remove between 1 and 4 (k) stones on their turn by dragging them in to their "box". After each move the stones in the box disappear. The player who is able to secure the treasure by placing it in his box wins the game.[4] The instructions were read out aloud and were accompanied by a presentation and a video. They were followed by five control questions. After

[4] Before the first move in each game, the value of m is hidden to the subjects but can be uncovered by costless clicks. That is, subjects were informed that their view on the cave is blocked by bushes that can be removed by clicking on a pair of scissors. On each click, starting from the cave's entrance, two adjacent bushes disappear. At their turn subjects can remove as many bushes as they like. But in order to take a stone, the bushes covering it need to be removed. Note that all teams and 15 of 21 individuals uncovered the treasure before their first move in every game. After the third game, all individuals except one uncovered the treasure before the first move.

the two series of race games the experiment concluded with a short questionnaire. The complete instructions and the control questions are included in the Appendix A. The video is available upon request.

In the *Individuals* treatment 21 subjects participated, 12 of them women. Subjects made the decision individually at a computer and were paid 5 Euros for each game they won. In the *Teams* treatment 24 subjects participated in 12 same-gender teams, half of them female. In this treatment both team members also used an individual computer, but each member had two computer screens available. One screen showed the game, the other a chat interface that connected both team members and allowed them to exchange text messages during the course of the 12 games. Only one subject in each team could enter the team's decisions. The other subject saw a copy of the decision-maker's game screen.[5] Each subject received 5 Euros for each game the team won. All subjects were students and 20 years old at the time of the experiment. They were recruited with ORSEE (Greiner, 2004). Experiments were conducted at the Essen Laboratory for Experimental Economics (elfe) using z-Tree (Fischbacher, 2007). On average subjects earned 30.0 Euro and were paid using a double-blind procedure.

3 Results

A first view on the results confirms the common finding: Teams adhere closer to standard game-theoretic predictions and outperform individual players. On average they win almost two more of the 12 games. Individuals only win 41.3 percent of the games while teams win 57.6 percent. The difference in performance is significant ($p = 0.003$, exact two-tailed Mann-Whitney-U test) and it persists when considering the first and the second part of the experiment separately ($p \leq 0.015$, exact two-tailed Mann-Whitney-U tests). The number of games teams or individuals win does not differ between both parts ($p \geq 0.183$, exact two-tailed Wilcoxon tests). Also, comparing the two instances of each game individually yields no significant differences ($p \geq 0.250$, exact McNemar tests). That is, we do not observe any learning for teams and individuals. Table 1 displays the share of games won in each of the 12 games.

[5] All data at the individual level are included in Appendix B.

Table 1 – Share of games won (in percent)

Game	1	2	3	4	5	6	7	8	9	10	11	12
m	19	3	29	8	11	21	19	3	29	8	11	21
Individuals	14.3	100.0	0.0	71.4	47.6	0.0	0.0	100.0	0.0	81.0	66.7	14.3
Teams	25.0	100.0	8.3	100.0	75.0	16.7	25.0	100.0	16.7	100.0	91.7	33.3

In the spirit of Cooper and Kagel (2005), we also check whether teams create synergies and are able to beat the truth-wins benchmark. For this purpose we compare the performance of our real teams to the performance of simulated teams that aggregate individual performance according to the truth-wins hypothesis. More precisely, we randomly draw (with replacement) 12 observations of women and 12 of men playing alone. We then match them into two-person same-gender teams and record the average performance of all 12 simulated teams – assuming that each simulated team performs as well as its best member. We repeat this process 100,000 times. Following Cooper and Kagel (2005), we consider teams to beat the truth-wins benchmark when they win more games than 95 percent of the simulated teams or, in other words, when their average performance lies above the 90-percent confidence interval (CI) of simulated team performance.[6]

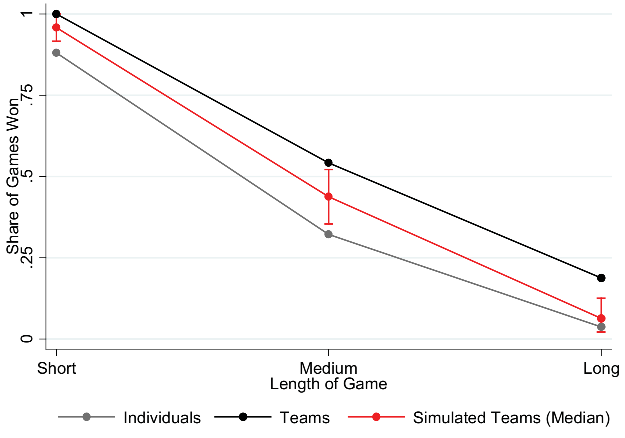
Over all games, the simulated teams win 47.9 percent of the games on average (median 47.9, 90-percent CI [43.8; 51.4]), suggesting that real teams (with their success-rate of 57.6 percent) beat the truth-wins benchmark.[7] Considering part 1 and part 2 separately presents a similar picture: In the first run-through of the six games, real teams win 54.2 percent of the games while simulated teams win 45.6 percent on average (median 45.8, 90-percent CI [41.7; 48.6]); in the second run-

[6] We chose 90-percent CIs for comparability with the study by Cooper and Kagel (2005). Choosing a stricter 95-percent confidence interval would not alter any of the results. Also, it can be desirable to use individual decisions that were made by team members before they decide jointly for a within-subject comparison (see, e.g., Casari et al., 2011). However, same as Cooper and Kagel (2005), we were also interested whether learning differs between individuals and teams. We opted for the current between-subject design as we feared that eliciting individual play by team members might confound this comparison.

[7] In this analysis we calculate the mean performance at the level of an independent observation *before* determining the simulated team performance. We chose this approach to be consistent with previous work in social psychology. There the best member of a nominal group is usually determined by the mean performance over several trials (Larson, 2010, p.145). Of course, the level of aggregation can be crucial for this comparison as $(max[a_i,b_i]+max[a_j,b_j])/2 \geq max[(a_i+a_j)/2, (b_i+b_j)/2]$ if a_i (or b_i) is the performance of player *a* (or player *b*) in game *i*. The higher the level of aggregation, the worse simulated teams will fare compared to real teams. However, even if we calculate simulated team performance on the game level and determine the mean performance *afterwards*, real teams still beat the 50.4 percent success rate of simulated teams (median 50.7, 90-percent CI [45.8; 54.9]).

through, real teams win 61.1 percent while simulated teams win 51.5 percent on average (median 51.4, 90-percent CI [45.8; 56.9]).

Figure 2 – Share of games won and length of game



When considering individual games, real teams outperform simulated teams in all games that were won by none of the individual players but by at least one team. This is the case for both instances of the longest game (m = 29), the second longest game (m = 21) in part 1 and the third longest game (m = 19) in part 2. Re-running the simulations after grouping the games according to their length into short (m = 3 and m = 8), medium (m = 11 and m = 19) and long (m = 21 and m = 29), reveals that the team advantage appears to be modulated by the complexity of the game. Figure 1 plots the share of games won for individuals and real teams as well as the median performance of the simulated teams together with 90-percent confidence intervals over the three groups. The advantage of real teams increases with game length. Only in medium and long games do they outperform the simulated teams.[8]

[8] Interestingly, the data on behavior in information cascades by Fahr and Irlenbusch (2011) yields a somewhat similar pattern. Fahr and Irlenbusch distinguish dilemma situations in which decision-makers should "follow the herd" instead of their private signal from non-dilemma situations. They observe that only 55.5 percent of individual decisions in dilemma situations are rational compared to 97.4 percent of the remaining individual decisions. Re-analyzing their data with respect to the truth-wins norm, we find that teams fall short of simulated teams in non-dilemma situations. Yet, in the more demanding dilemma situations the difference in performances is not significant

4 Conclusion

The experimental results of this study suggest that teams of two people outperform individuals in a combinatorial game known as the race game. In the experiment subjects played six different race games of varying length that required between zero and fives steps of backward induction to be solved optimally. The results are in line with observations made by Cooper and Kagel (2005), Kocher and Sutter (2005), Sutter (2005), Sutter et al. (2010) and Fahr and Irlenbusch (2011) who find teams to follow standard game-theoretic predictions more closely than individual players in a variety of strategic interactions.

Our contribution to the literature is twofold: First, we introduce the race game to the study of team performance and show that teams outperform individuals in a game that can be solved by backward induction. The employed race game is especially suitable for identifying synergies in team performance as optimal play does not depend on beliefs and is the same for a wide range of preferences. Second, we show that in this game teams are only able to create synergies if a sufficient degree of complexity is prevalent. This observation is broadly in line with conjectures by Charness et al. (2010) and Cooper and Kagel (2005), who suggest a relation between task complexity and the advantages teams have over individuals. Of course, one has to be careful in drawing general conclusions from this observation but it might explain some of the mixed results on the truth-wins benchmark.

At least in the race game, there appears to be no harm in pairing up with someone who is less successful in making strategic decisions. Our simulations suggest that in strategic interactions the performance of a two-person team is not always limited to the performance of its most skillful member. In contrast, both members can benefit from teaming up if the task is sufficiently complex.

anymore. Note, however, that the behavior in information cascades crucially depends on the players' beliefs and not only on the ability to reason strategically.

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Appendix A: Instructions (translated from German)

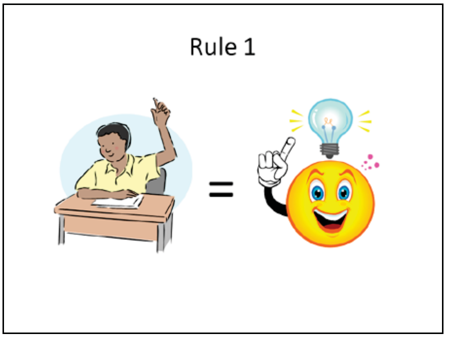
The first part of the following instructions was read aloud by the experimenter. It was accompanied by slides and a short video that were shown on a central screen in the laboratory. In case of the *Team* treatment, subjects subsequently had to read the second part of the instructions in their respective sound-proof cubicle.

Part 1

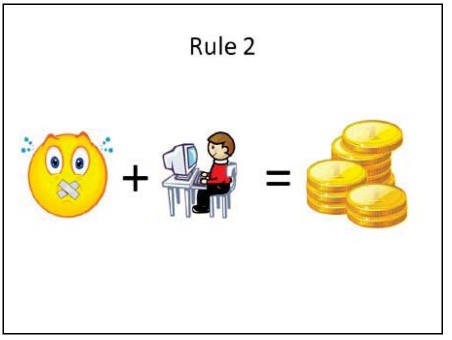
Hello and welcome! Today you are taking part in an experiment in which you will be able to earn money. How much money you will earn depends on your decisions.

[*Team* treatment only: The instructions of today's experiment consist of two parts. I will read part one now. You will find the second part later inside the cubicles. Please enter your respective cubicle after the first part of the instructions. You can find the number of your cubicle on the table tennis ball that you have found at your current desk.]

Important: All your decisions are made anonymously. Nobody will be able to link the choices you made to your name. We will tell you in a moment what the experiment is about. First of all there are two important rules:



1. Signal us, if you do not understand something. We want you to have a perfect understanding of everything!

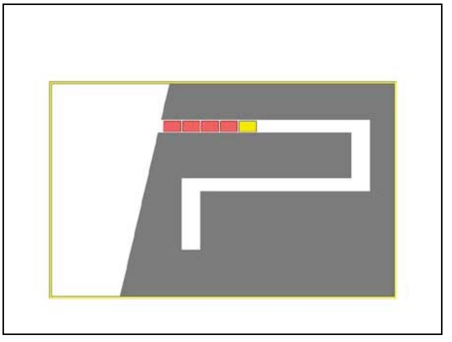


2. It is not allowed to talk to other participants. If you, however, talk to another participant you will be immediately excluded from this experiment. Consequently you will also earn no money in this case.

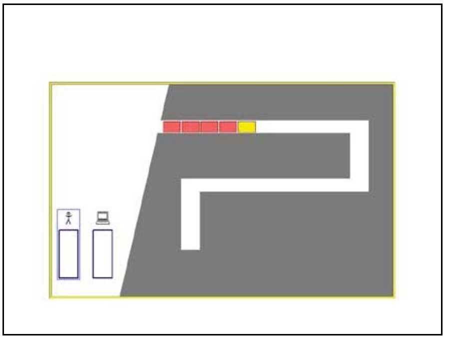
Now let's return to the rules of the game. Several times each of you will individually play a game against the computer. The more often you win against the computer, the more money you will earn. How does the game look like?

The computer challenges you. The goal of the game is to reach and collect a treasure.

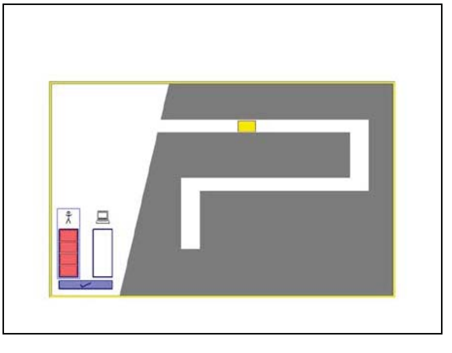
The treasure, which looks like a yellow square, has been buried by the computer in a cave, which has only one entry. You and the computer can reach the treasure only by using the entrance of the cave.



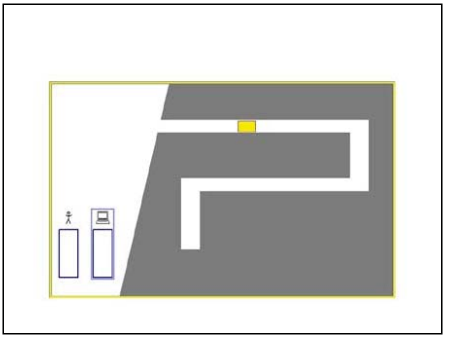
Unfortunately, the computer has blocked the passage from the entry to the treasure with one or more red stones. (This means that behind the treasure there are no more red stones but only air.) To reach the treasure you have to remove the red stones. The stones can only be removed by carrying them out through the entrance of the cave. This means that you and the computer can only move the stone, which is the closest to the entrance.



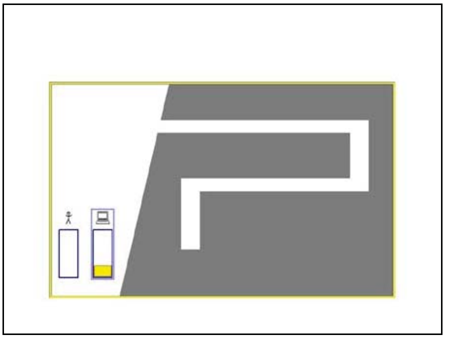
You can remove the stones by packing them into your box. This box (the blue rectangle on the left side) only fits one, two, three, or at most four stones.



By removing the stones you alternate with your rival, the computer.

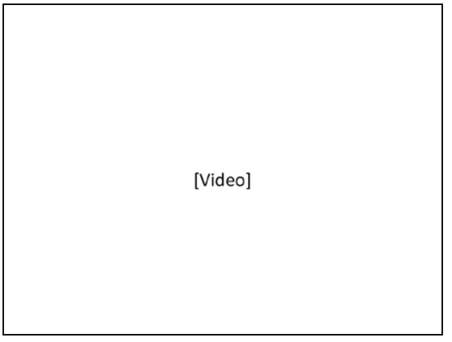


The computer can also remove stones and also has a box (the blue rectangle on the right side) that fits four stones at most.

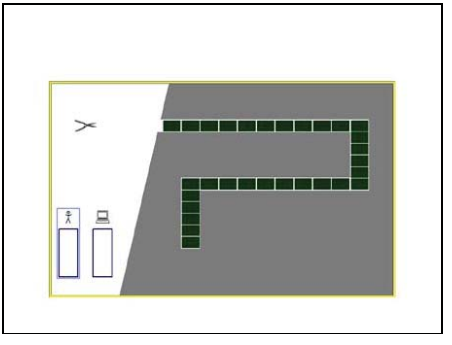


After every move the stones in your box and the computer's box disappear. The winner is the player who packs the treasure in his box first. In this game you are always the first who can pack stones into your box and remove them. Thereafter, it is the computer's turn. Same as you, the computer tries to win the game and to put the treasure into his box.

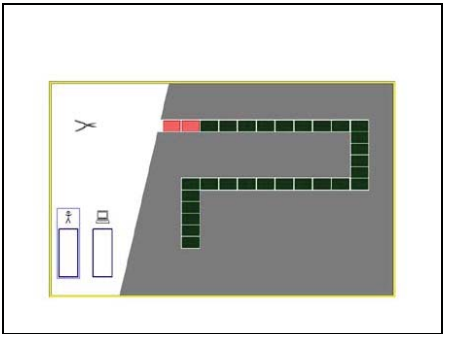
You can pick a stone by clicking on it with the mouse, holding the button and pulling the stone into your box. (If you have put more stones in your box than you wanted to, you can pull the stones back into the cave.) When there are as many stones in your box as you want to remove, you have to click on the blue checkmark button and the stones disappear. Then it is the computer's turn and you can observe how many stones the computer removes.



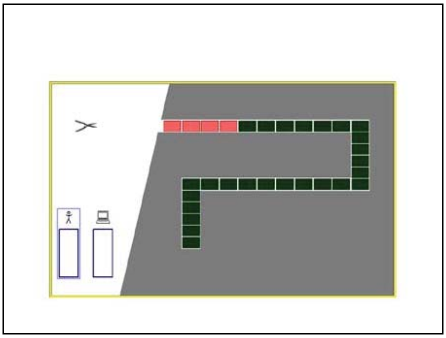
You take turns with the computer until one of you removes the treasure and wins. You can only win by packing the stone into your box and removing it. Same as you, the computer must remove at least one stone at each turn.



There is a special feature: After the computer has hidden the treasure it has blocked your view to the cave with bushes, that look like green squares. The computer knows what is hidden behind each green bush. If you want to see what is behind the green bushes as well, you just have to click on the hedge trimmer.



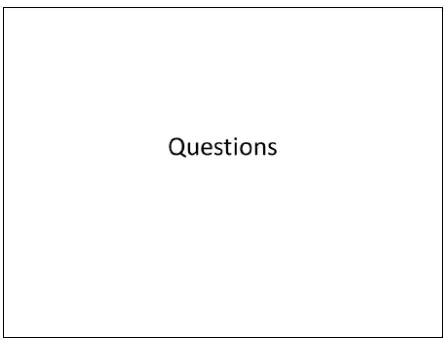
Starting from the entry of the cave you can remove two adjacent bushes by clicking on the hedge trimmer once.



In each move you can remove as many green bushes as you want. Behind every green bush there can be either a red stone, or nothing, or the treasure. As mentioned before, you play several games consecutively. These games differ from each other only in the number of red stones, blocking your way to the treasure. For each game you win you will receive five Euro.

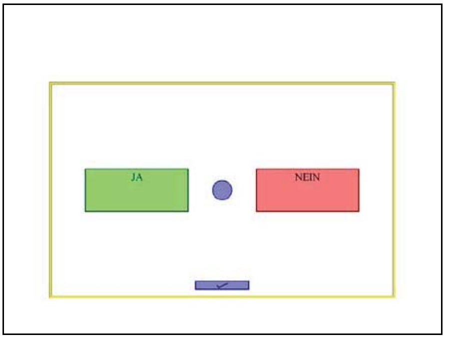
When you entered this room you received a card with your code name. Please keep it safe. At the end of the experiment you have to enter your code name in the computer. You also need your card to collect your payoff.

At the end of the experiment your respective payoffs will be calculated. After this the cash desk in the corridor outside the laboratory opens. There you can collect a closed envelope containing your payoff by showing your card. The cashier does not know what is inside these envelopes. Please collect your payoffs immediately after the experiment.

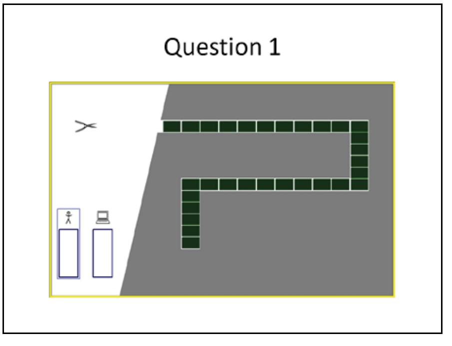


Questions

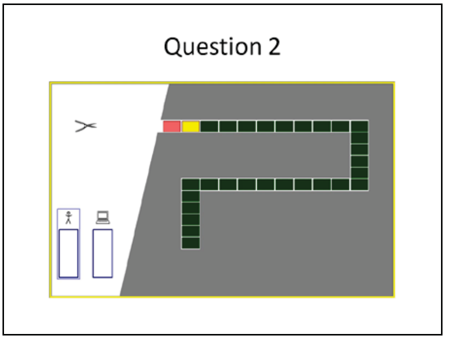
Before we start we will ask some questions so that we can help you better to understand the game.



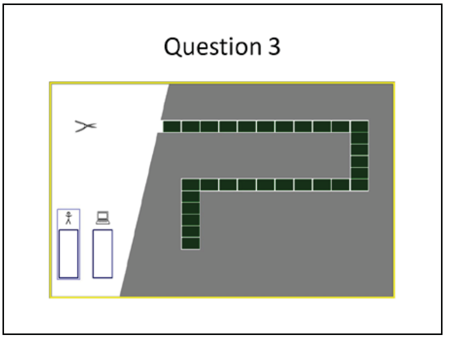
Please answer the questions with "Yes" or "No" by pulling the blue ball, which will appear in front of you on the monitor, into the green or the red area.



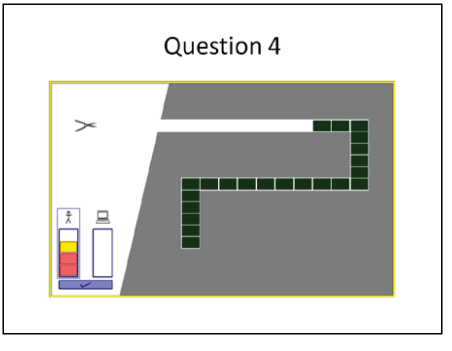
1) Please have a look at the following game. Does the computer know behind which green bush the treasure lies?



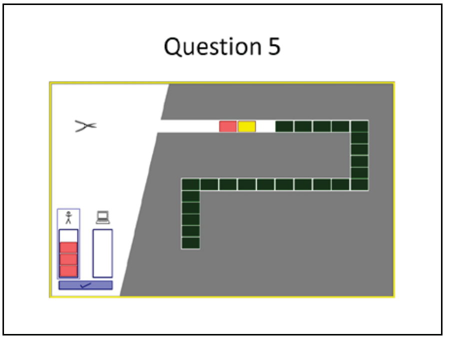
2) Please have a look at the following game. Do you see where the treasure is?



3) Please have a look at the following game. Are you allowed to remove all green bushes with the hedge trimmer now?



4) Please have a look at the following game. Is it correct, that the computer is winning the game?



5) Please have a look at the following game. You want to pack two stones into your box in order to win. Is this possible?

[*Team* treatment only:

Part 2

Playing in teams: During the experiment you will play the game that was just presented. You will play against the computer jointly with another participant. The decisions will only be entered by one of the team members (player A). The other team member (player B) can observe the course of the game on the screen. Which player you are, will be shown on your screen.

Chat: During the experiment each team can communicate via chat messages. You can decide freely about the content of the chat. But you are not allowed to reveal personal information about yourself like name, age, address, field of study (including lecturers, lectures or lecture contents, that would allow identification of the field of study) or similar. Anyone who violates these communication rules will be excluded from the experiment and will not receive any money.]

Appendix B: Data

						Win in game								*Age*		
ID	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*Female*	*(months)*	*Team*	*Observer*
1	0	1	0	1	0	0	0	1	0	1	1	0	1	247	0	-
2	0	1	0	1	0	0	0	1	0	1	1	0	1	240	0	-
3	0	1	0	1	0	0	0	1	0	0	1	0	0	250	0	-
4	0	1	0	1	1	0	0	1	0	1	1	0	1	249	0	-
5	0	1	0	1	1	0	0	1	0	1	1	0	0	249	0	-
6	0	1	0	1	1	0	0	1	0	1	1	0	1	246	0	-
7	0	1	0	1	0	0	0	1	0	1	1	1	1	241	0	-
8	0	1	0	0	0	0	0	1	0	1	0	0	0	240	0	-
9	0	1	0	1	1	0	0	1	0	1	1	0	1	243	0	-
10	1	1	0	0	1	0	0	1	0	1	0	0	1	242	0	-
11	0	1	0	1	1	0	0	1	0	1	1	0	0	246	0	-
12	0	1	0	0	0	0	0	1	0	0	1	0	1	246	0	-
13	0	1	0	1	1	0	0	1	0	1	1	0	0	243	0	-
14	0	1	0	1	0	0	0	1	0	1	0	0	1	240	0	-
15	0	1	0	0	0	0	0	1	0	1	0	0	1	242	0	-
16	1	1	0	1	0	0	0	1	0	1	1	1	0	240	0	-
17	0	1	0	1	1	0	0	1	0	1	1	0	0	244	0	-
18	0	1	0	0	0	0	0	1	0	0	0	0	0	245	0	-
19	0	1	0	1	0	0	0	1	0	0	0	0	1	241	0	-
20	1	1	0	0	1	0	0	1	0	1	1	1	0	248	0	-
21	0	1	0	1	1	0	0	1	0	1	0	0	1	242	0	-
22	0	1	0	1	1	0	0	1	0	1	0	0	0	248	1	0
23	0	1	0	1	1	0	0	1	0	1	0	0	0	248	1	1
24	0	1	0	1	1	0	0	1	0	1	1	0	1	240	1	0
25	0	1	0	1	1	0	0	1	0	1	1	0	1	246	1	1
26	0	1	0	1	1	0	1	1	1	1	1	1	0	248	1	0
27	0	1	0	1	1	0	1	1	1	1	1	1	0	241	1	1
28	1	1	0	1	0	0	1	1	0	1	1	0	1	239	1	0
29	1	1	0	1	0	0	1	1	0	1	1	0	1	250	1	1
30	1	1	0	1	0	0	0	1	0	1	1	0	0	248	1	0
31	1	1	0	1	0	0	0	1	0	1	1	0	0	241	1	1
32	0	1	0	1	1	0	0	1	0	1	1	0	1	248	1	0
33	0	1	0	1	1	0	0	1	0	1	1	0	1	239	1	1
34	0	1	0	1	1	0	0	1	0	1	1	0	1	246	1	0
35	0	1	0	1	1	0	0	1	0	1	1	0	1	250	1	1
36	0	1	0	1	1	0	0	1	0	1	1	1	0	245	1	0
37	0	1	0	1	1	0	0	1	0	1	1	1	0	247	1	1
38	0	1	0	1	0	1	0	1	0	1	1	0	1	241	1	0
39	0	1	0	1	0	1	0	1	0	1	1	0	1	246	1	1
40	0	1	0	1	1	0	0	1	0	1	1	1	0	243	1	0
41	0	1	0	1	1	0	0	1	0	1	1	1	0	242	1	1
42	0	1	0	1	1	0	0	1	0	1	1	0	1	249	1	0
43	0	1	0	1	1	0	0	1	0	1	1	0	1	245	1	1
44	1	1	1	1	1	1	1	1	1	1	1	1	0	244	1	0
45	1	1	1	1	1	1	1	1	1	1	1	1	0	239	1	1