

# **Physician Behavior and Conditional Altruism: The Effects of Payment System and Uncertain Health Benefit**

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## **Theory and Decision**

**Supplementary online material (experiment instructions)**

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## Supplementary material (experiment instructions)

### Instructions for the experiment

*[Included below are the original instructions for the CAP treatment. Whenever there is a difference between the CAP and FFS treatments, this is noted in the text.]*

Welcome to the experiment and thank you for participating!

You are participating in an economic experiment on decision behavior. Please read the instructions carefully before the experiment starts. These instructions are solely for your private information. It is prohibited to communicate with others taking part in this experiment during the course of the session. Should you have any questions, please ask us by raising your hand and your questions will be answered privately. If you violate this rule, we will have to exclude you from the experiment and from all payments.

You and the other participants will be asked to make decisions for which you can earn money in addition to the 4 euros you will receive for participating in the experiment. Your payoff will depend on the decisions you make. At the end of the experiment, your payoff will be converted to euros and paid to you in cash. During the experiment, all amounts are presented in the experimental currency Taler.

1 Taler = 1 euro.

The experiment will take about 90 minutes and consists of three parts. You will receive detailed instructions prior to each part. The parts of the experiment are completely unrelated, which means that the decisions made in one part will not affect your earnings in the other parts. The sum of earnings from the different parts will constitute your total earnings from the experiment (together with the 4 euro show-up fee).

#### Part One

Please read the following instructions carefully. We will approach you in about 10 minutes to answer any questions you may have. If you have questions at any time during the experiment, please raise your hand and we will come to you. Part one of the experiment consists of 15 rounds of decision situations (and at the end of part one we will ask you to answer a few general questions related to health care and medical decision making).

#### Decision situations

In each round, you will take on the role of a physician and decide on the quantity of medical treatment for a given illness in a patient. That is, you will determine the quantity of medical services you wish to provide to the patient for a given illness.

The illnesses differ in two dimensions: (i) the relationship between the quantity of medical treatment and the resulting health benefit and (ii) the certainty in health benefit resulting from medical treatment.

- For illnesses in category 1, there is no risk or uncertainty involved in the treatment. This means that you will always know the exact health benefit resulting from the provided medical treatment. Below is a screenshot of the information provided about the quantity of the medical treatment and the patient benefit (for the time being please focus only on the white columns). For example, if you provide the patient with a quantity of 2 medical services, the resulting health benefit is 7, and if you provide the patient with a quantity of 4 medical services, the resulting health benefit is 9.

<b>Example patient</b>					
Illness in category 1 (no risk or uncertainty)					
Quantity of medical treatment	Your capitation [fee-for-service] payment (in Taler)	Your costs (in Taler)	Your profit (in Taler)	Patient benefit (in Taler)	Your selected quantity of medical treatment
0				5	Provide 0
1				6	Provide 1
2				7	Provide 2
3				8	Provide 3
4				9	Provide 4
5				10	Provide 5
6				9	Provide 6
7				8	Provide 7
8				7	Provide 8
9				6	Provide 9
10				5	Provide 10

**You are a physician.**  
Which quantity of medical treatment do you want to provide?

- For illnesses in category 2, there is risk involved in the treatment. More precisely, there is a 50% probability the medical treatment you provide will result in a good outcome, i.e., a high health benefit, but there is also a 50% probability of a bad outcome, i.e., a low health benefit. Below is a screenshot of the information provided about the quantity of medical treatment and the patient benefit (for the time being please focus only on the white columns). For example, if you provide the patient with a quantity of 2 medical services, the resulting health benefit is 8 if good outcome and 6 if bad outcome. Thus, the outcome of the treatment is risky. To characterize this, think of a bag containing 10 balls where 5 balls are white and 5 balls are black (we will call it bag A). The good outcome is realized if you guess correctly the color of a ball that will be drawn from the bag. If you guess that a white ball will be drawn randomly from the bag and this is what happens, then there is a good outcome for the patient, and consequently, if you provide the patient with a quantity of 2 medical services, the resulting health benefit will be 8. If you guess a white ball but a black ball is drawn, then there is a bad outcome for the patient, and consequently, if you provide the patient with a quantity of 2 medical services, the resulting health benefit will be 6. Similarly, if you provide the patient with a quantity of 4 medical services, the resulting health benefit will be 10 if good outcome and 8 if bad outcome.

### Example patient

Illness in category 2 (risk)

Quantity of medical treatment	Your capitation [fee-for-service] payment (in Taler)	Your costs (in Taler)	Your profit (in Taler)	Patient benefit (in Taler)		Your selected quantity of medical treatment
				Good	Bad	
0				6	4	Provide 0
1				7	5	Provide 1
2				8	6	Provide 2
3				9	7	Provide 3
4				10	8	Provide 4
5				11	9	Provide 5
6				10	8	Provide 6
7				9	7	Provide 7
8				8	6	Provide 8
9				7	5	Provide 9
10				6	4	Provide 10

### You are a physician.

Which quantity of medical treatment do you want to provide?

Confirm

-Help-

**Risk** is involved in the medical treatment.

There will be a draw from a bag (A) of 10 balls where 5 balls are white and 5 balls are black.

- There is a good outcome for the patient if you guess correctly the color of the drawn ball.

- There is a bad outcome for the patient if you guess incorrectly the color of the drawn ball.

- For illnesses in category 3, there is uncertainty involved in the treatment. More specifically, there is an unknown probability that the medical treatment you provide will result in a good outcome, i.e., a high health benefit, but there is also an unknown probability that the treatment will result in a bad outcome, i.e., a low health benefit. Below is a screenshot of the information provided about the quantity of medical treatment and the patient benefit (for the time being please focus only on the white columns). For example, if you provide the patient with a quantity of 2 medical services, the resulting health benefit is 8 if good outcome and 6 if bad outcome. Thus, the outcome of the treatment is uncertain. To characterize this, think of a bag containing 10 balls. You know there are both white and black balls in the bag, but not how many of each (we will call it bag B). The good outcome is realized if you guess correctly the color of a ball drawn from the bag. If you guess that a white ball will be drawn randomly from the bag and this is what happens, then there is a good outcome for the patient, and consequently, if you provide the patient with a quantity of 2 medical services, the resulting health benefit will be 8. If you guess a white ball but a black ball is drawn, then there is a bad outcome for the patient, and consequently, if you provide the patient with a quantity of 2 medical services, the resulting health benefit will be 6. Similarly, if you provide the patient with a quantity of 4 medical services, the resulting health benefit will be 10 if good outcome and 8 if bad outcome.

### Example patient

Illness in category 3 (uncertainty)

Quantity of medical treatment	Your capitation [fee-for-service] payment (in Taler)	Your costs (in Taler)	Your profit (in Taler)	Patient benefit (in Taler)		Your selected quantity of medical treatment
				Good	Bad	
0				6	4	Provide 0
1				7	5	Provide 1
2				8	6	Provide 2
3				9	7	Provide 3
4				10	8	Provide 4
5				11	9	Provide 5
6				10	8	Provide 6
7				9	7	Provide 7
8				8	6	Provide 8
9				7	5	Provide 9
10				6	4	Provide 10

### You are a physician.

Which quantity of medical treatment do you want to provide?

Confirm

-Help-

**Uncertainty** is involved in the medical treatment.

There will be a draw from a bag (B) of 10 balls where there are white and black balls.

You don't know the composition of the number of white and black balls in the bag.

- There is a good outcome for the patient if you guess correctly the color of the drawn ball.

- There is a bad outcome for the patient if you guess incorrectly the color of the drawn ball.

### Profit

In each round you receive a capitation [fee-for-service] remuneration for treating the patient. Your remuneration is irrespective of the quantity of medical treatment provided. [Your remuneration increases with the quantity of medical treatment provided.] You also incur costs for treating the patient and they depend on the quantity of services you provide. [You also incur costs for treating the patient, which also depend on the quantity of services provided.] Your profit for each decision is calculated by subtracting these costs from the capitation [fee-for-service] remuneration.

Every possible treatment quantity yields a benefit for the patient – contingent on illness. Hence, when deciding on medical services, you will determine not only your own profit but also the patient's benefit.

In each round, you will receive detailed information on your screen (see below) for the respective patient. The information will show your capitation [fee-for-service] remuneration, your costs and your profit, as well as the patient benefit, for each possible quantity of medical treatment. Below is a screenshot of the information provided. For example, let's say you are about to decide what quantity of medical treatment to provide for an illness with a risky outcome. If you provide the patient with a quantity of 2 [8] medical services, your profit will be 9.6 and the patient's health benefit 8 if good outcome and 6 if bad outcome. If you instead

provide the patient with a quantity of 4 [6] medical services, your profit will be 8.4 and the patient's health benefit 10 if good outcome and 8 if bad outcome.

<b>Example patient</b> Illness in category 2 (risk)						
Quantity of medical treatment	Your capitation [fee-for-service] payment (in Taler)	Your costs (in Taler)	Your profit (in Taler)	Patient benefit (in Taler)		Your selected quantity of medical treatment
				Good	Bad	
0	10 [0]	0.0	10.0 [0.0]	6	4	Provide 0
1	10 [2]	0.1	9.9 [1.9]	7	5	Provide 1
2	10 [4]	0.4	9.6 [3.6]	8	6	Provide 2
3	10 [6]	0.9	9.1 [5.1]	9	7	Provide 3
4	10 [8]	1.6	8.4 [6.4]	10	8	Provide 4
5	10 [10]	2.5	7.5 [7.5]	11	9	Provide 5
6	10 [12]	3.6	6.4 [8.4]	10	8	Provide 6
7	10 [14]	4.9	5.1 [9.1]	9	7	Provide 7
8	10 [16]	6.4	3.6 [9.6]	8	6	Provide 8
9	10 [18]	8.1	1.9 [9.9]	7	5	Provide 9
10	10 [20]	10.0	0.0 [10.0]	6	4	Provide 10

**You are a physician.**  
Which quantity of medical treatment do you want to provide?

-Help-  
**Risk** is involved in the medical treatment.  
 There will be a draw from a bag (A) of 10 balls where 5 balls are white and 5 balls are black.  
 - There is a good outcome for the patient if you guess correctly the color of the drawn ball.  
 - There is a bad outcome for the patient if you guess incorrectly the color of the drawn ball.

At the end of the experiment, one of the 15 rounds in the first part of the experiment will be chosen randomly. Your profit in this round will be paid to you in cash. If the selected round involves a risky or uncertain outcome, a draw of balls will determine whether the outcome for the patient is good or bad, as explained. In case of the risky outcome, you will select a color, either black or white, and then one randomly selected participant will draw a ball from a bag containing 5 black and 5 white balls (bag A). In case of the uncertain outcome, you will select a color, either black or white, and then one randomly selected participant will draw a ball from a bag containing 10 balls with unknown proportions of black and white balls (bag B).

In this part of the experiment, no patients will be physically present in the laboratory. Yet, the patient benefit does accrue to a real patient, since the amount resulting from your decision will be transferred to Christoffel Blindenmission Deutschland e.V., an organization funding treatment of patients with eye cataracts.

The transfer of money to Christoffel Blindenmission Deutschland e.V. will be made after the experiment by the experimenter. An official note of confirmation will be published on the experimental laboratory's blackboard on July 6. You will be able to verify that the transferred amount is exactly the same as the total patient benefit (in euro) resulting from the decisions made by all participants in the randomly chosen situation.

## Comprehension questions

Prior to the decision rounds, we kindly ask you to answer a few comprehension questions. They are intended to help familiarize you with the decision situations. If you have any questions about this, please raise your hand. Part one of the experiment will begin once all participants have answered the comprehension questions correctly.

Part Two [handed out after the completion of part one]

Please read the following instructions carefully. We will approach you in about 5 minutes to answer any questions you may have. If you have questions at any time during the experiment, please raise your hand and we will come to you. Please remember that 1 Taler = 1 euro.

## Decisions

Part 2 is composed of  $2 \times 20$  individual decision situations. In the first set of decision situation, you will choose between either receiving a certain amount of money for sure or drawing a ball from bag C with a chance to win 5 Taler. An example is shown below. As you can see, you will be asked to make repeated choices between receiving a certain amount of money for sure and drawing a ball from bag C. You can also see that the guaranteed amount you can choose increases in each row. If you choose to draw a ball from bag C, the drawing will be conducted as follows. We will fill the bag with 5 black and 5 white balls. One randomly selected person will be chosen to draw a ball from the bag. Before this person draws the ball, you will pick a color, black or white. If your chosen color matches the randomly drawn ball, you will win 5 Taler (otherwise zero). You will be asked to make 20 choices. For example, for the first choice situation, you will decide whether to draw a ball from bag C and have the possibility of winning 5 Taler or receive 0.25 Taler for sure. If you prefer to draw from the bag, then check the box on the left; if you would rather receive 0.25 Taler for sure, then check the box on the right. As you can see, the amount in Taler increases in the right column. Once you have chosen the guaranteed amount, you should repeat this decision throughout the remaining choice situations. For example, if you choose to receive 0.25 Taler for sure in the first choice situation, instead of drawing a ball from bag C, then you will obviously also choose 0.5 Taler for sure over drawing a ball from bag C in the next choice situation.

Part 2				
1	Draw from bag C	<input type="radio"/>	<input type="radio"/>	0.25 Tokens for sure
2	Draw from bag C	<input type="radio"/>	<input type="radio"/>	0.5 Tokens for sure
3	Draw from bag C	<input type="radio"/>	<input type="radio"/>	0.75 Tokens for sure
4	Draw from bag C	<input type="radio"/>	<input type="radio"/>	1 Token for sure
5	Draw from bag C	<input type="radio"/>	<input type="radio"/>	1.25 Tokens for sure
6	Draw from bag C	<input type="radio"/>	<input type="radio"/>	1.5 Tokens for sure
7	Draw from bag C	<input type="radio"/>	<input type="radio"/>	1.75 Tokens for sure
8	Draw from bag C	<input type="radio"/>	<input type="radio"/>	2 Tokens for sure
9	Draw from bag C	<input type="radio"/>	<input type="radio"/>	2.25 Tokens for sure
10	Draw from bag C	<input type="radio"/>	<input type="radio"/>	2.5 Tokens for sure
11	Draw from bag C	<input type="radio"/>	<input type="radio"/>	2.75 Tokens for sure
12	Draw from bag C	<input type="radio"/>	<input type="radio"/>	3 Tokens for sure
13	Draw from bag C	<input type="radio"/>	<input type="radio"/>	3.25 Tokens for sure
14	Draw from bag C	<input type="radio"/>	<input type="radio"/>	3.5 Tokens for sure
15	Draw from bag C	<input type="radio"/>	<input type="radio"/>	3.75 Tokens for sure
16	Draw from bag C	<input type="radio"/>	<input type="radio"/>	4 Tokens for sure
17	Draw from bag C	<input type="radio"/>	<input type="radio"/>	4.25 Tokens for sure
18	Draw from bag C	<input type="radio"/>	<input type="radio"/>	4.5 Tokens for sure
19	Draw from bag C	<input type="radio"/>	<input type="radio"/>	4.75 Tokens for sure
20	Draw from bag C	<input type="radio"/>	<input type="radio"/>	5 Tokens for sure
				<input type="button" value="Confirm"/>

In the second set of decision situations, you will make similar decisions between receiving a certain amount of money for sure and drawing a ball from a bag – but now from bag D. Bag D will consist of 10 balls, but the number of black and white balls will be a secret; otherwise the choice situations are similar to those in the first set (the amount in Taler increases in the right column).

### Payoffs

When you have made all 40 choices, one of the choices will be randomly selected to determine your payoff. If you chose to draw from the bag in the randomly selected choice, you will need to select a color. First you will be asked to indicate whether you select a black ball or a white ball in case the randomly selected choice involves a draw from bag C. Then you will be asked to do the same in case the randomly selected choice involves a draw from bag D. In the end of the experiment, one randomly selected person will draw one ball from bag C and one ball from bag D. The randomly selected choice that will determine your payoff will be shown on your screen.

Part Three [handed out after the completion of part two]

[Part Three is not used in the current paper and therefore the instructions are not included. The parts of the experiment are completely unrelated, which means that the decisions made in one part do not affect subjects' earnings in the other parts.]