MTurk Experiment instruction and quiz

Instruction-Background Information

This is an experiment in ransomware and protection investment. If you follow the instructions carefully and make good decisions, you may earn a considerable amount of money that will be paid to you in cash at the end of the experiment. You have already earned US$1 show-up fee for participating. You will earn *experimental dollars* during the experiments, and experimental dollars will be converted to US dollars at the end of the experiment with the following exchange rate.

1,000 experimental dollars = US$1

You will receive the show up fee ($1) and any additional earnings ONLY if you finish the experiment.

In this experiment, there are three players: Attacker, Defender 1, and Defender 2. During the experiment, you will be randomly assigned to be the Attacker, the Defender 1, or the Defender 2. You will play the same role for the entire experiment. In total, you are going to play 30 rounds. In the first round, you will be randomly paired up with other players to form a 1 attacker- 2 Defenders group to play the game. You will stay in the same group for the entire experiment.

Data Value

In each round, each Defender is given a "data value" of 100 experimental dollars. The defender will receive these 100 experimental dollars at the end of each period if this data value is not lost.

Ransomware Attack

In each round, the Attacker chooses one of three options: (a) attack Defender 1; (b) attack Defender 2; (c) do not attack. If the Attacker chooses to attack a Defender, he/she also decides a ransom to ask.

The Attacker's probability of being successful is 80%. A defender can reduce the probability to 30% by spending 30 experimental dollars to make a protection investment.

If the attack is successful, the affected Defender chooses whether to pay the ransom. If the Defender decides to pay, he/she will not lose his/her data value and the Attacker receives the ransom for the round. If the Defender decides NOT to pay the ransom, the Defender loses his/her data value and the Attacker receives nothing for the round.

If the Attacker decides not to attack, the Attacker receives a fixed payment of 40 experimental dollars for the round.

Protection Investment

Protection Investment can reduce the Attacker's probability of being successful from 80% to 30%. That is, if a Defender who made protection investment is attacked, the Attacker's probability of being successful is 30%. If a Defender who did not make protection investment is attacked, the Attacker's probability of being successful is 80%. If a Defender decides to invest, a cost of 30 experimental dollars will occur for the round.

You will be allowed to continue only if you pass the following quizzes.

Quiz Question 1

Pretending the following scenario happened for a particular round in the experiment:
Defender 1 decided not to make the protection investment.
Defender 2 decided to make the protection investment.
Attacker decided not to attack.
What is the experiment dollar payoff for the Defender 1? Answer: 100
What is the experiment dollar payoff for the Attacker? Answer: 40

Quiz Question 2

Pretending the following scenario happened for a particular round in the experiment:
Defender 1 decided not to make the protection investment.
Defender 2 decided to make the protection investment.
Attacker decided to attack Defender 1 and asked 55 as ransom.
It was a successful attack, and Defender 1 decided to pay the ransom.
What is the experiment dollar payoff for the Defender 1? Answer: 45
What is the experiment dollar payoff for the Attacker? Answer: 55

Quiz Question 3

Pretending the following scenario happened for a particular round in the experiment:
Defender 1 decided not to make the protection investment.
Defender 2 decided not to make the protection investment.
Attacker decided to attack Defender 2 and asked 60 as ransom.

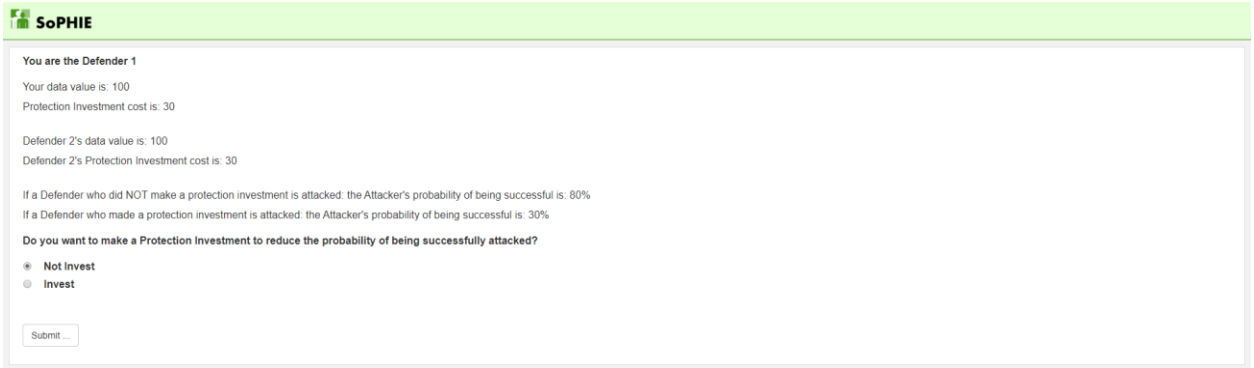
It was an unsuccessful attack.

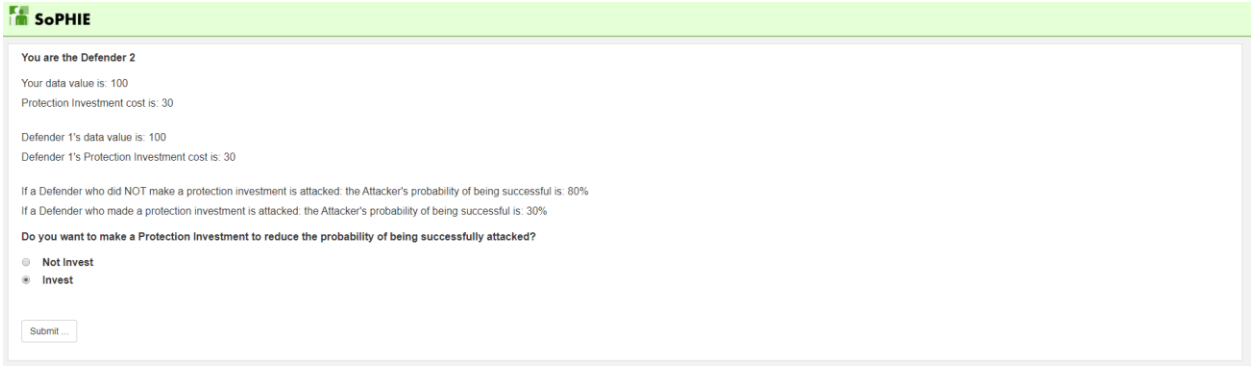
What is the experiment dollar payoff for the Defender 2? Answer: 100

What is the experiment dollar payoff for the Attacker? Answer: 0

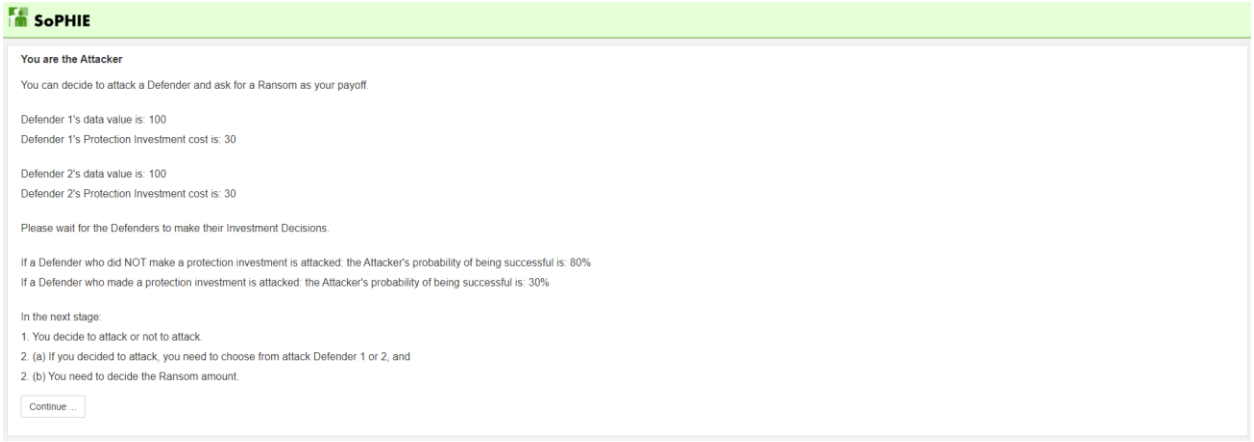
Appendix D. SoPHIE Screenshot (Baseline Treatment)

Defenders make investment decisions

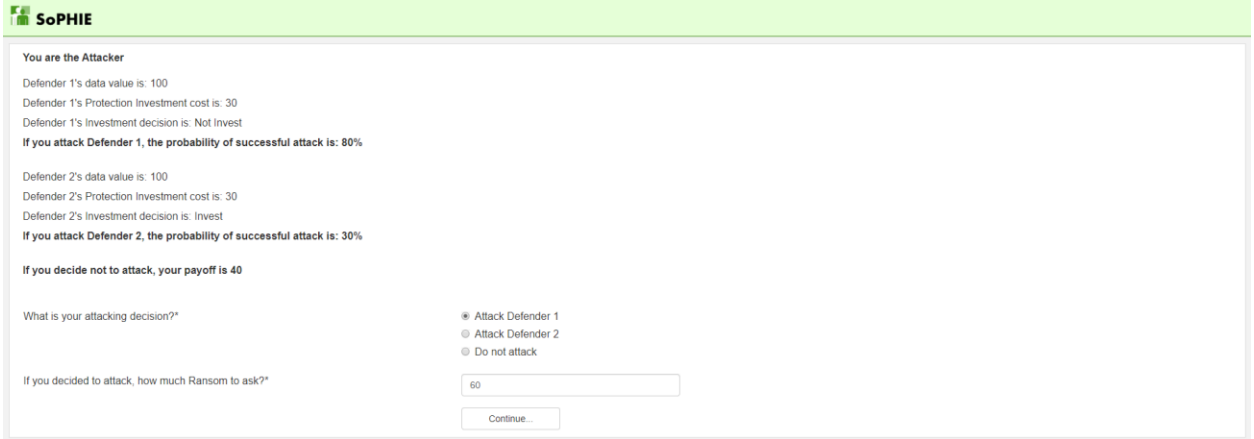




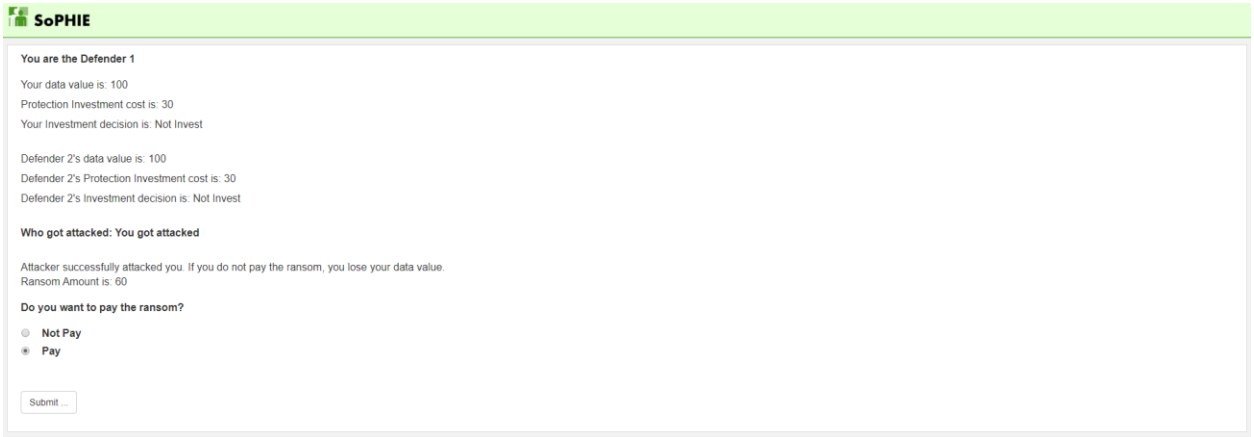
Attacker waits for defenders



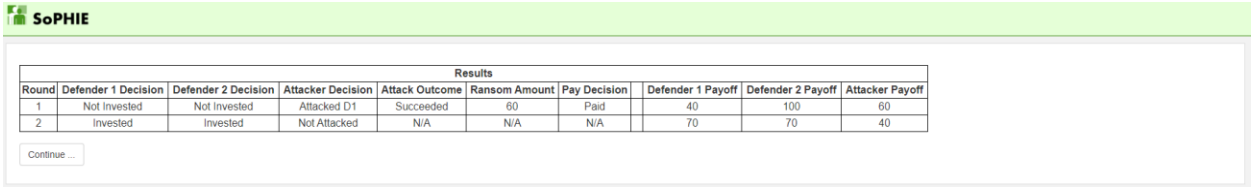
Attacker makes attack and ransom decisions



Affected defender makes payment decision



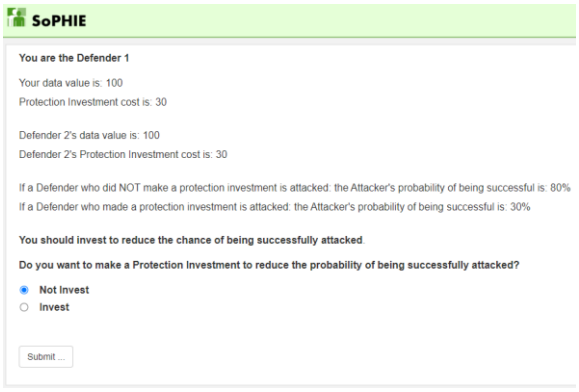
End of a round: show profit

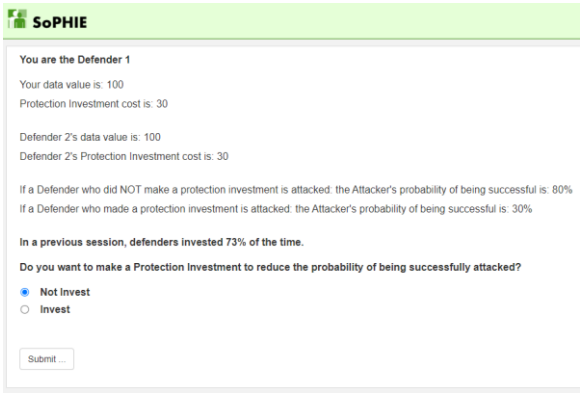


Results									
Round	Defender 1 Decision	Defender 2 Decision	Attacker Decision	Attack Outcome	Ransom Amount	Pay Decision	Defender 1 Payoff	Defender 2 Payoff	Attacker Payoff
1	Not Invested	Not Invested	Attacked D1	Succeeded	60	Paid	40	100	60
2	Invested	Invested	Not Attacked	N/A	N/A	N/A	70	70	40

Benefit Appeals: Should Invest **Descriptive Appeals: 73% Invest**

Defenders make investment decisions





Benefit Appeals: Should Not Pay **Descriptive Appeals: 62% Not Pay**

Affected defender makes payment decision