

Informed Consent

Thank you for volunteering to participate in this study.

1. WHO IS DOING THE STUDY?

John Paul F. Mintz, School of Advanced Air and Space Studies (SAASS), 901-800-7613
Dr. David C. Benson, SAASS, 334-953-9485

2. WHAT IS THE PURPOSE OF THE STUDY? To study decision-making against various opponents in a strategic game environment.

3. WHAT WILL YOU BE ASKED TO DO? On this computer, you will be asked to: a) conduct a background questionnaire, b) play a few rounds in simple games, and c) answer a post-game questionnaire. No one other than the research team will be observing your responses and there is no video or audio recording. You will play by yourself.

If you volunteer to take part in this study, you will be one of about 50 people to do so. After playing the game, you will be asked to answer a few questions about your experience.

4. HOW LONG WILL IT LAST? Approximately ten minutes.

5. WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS? To the best of our knowledge, the things you will be doing have no more risk of harm than you would experience in everyday life. Your answers will not be personally identifiable, so there is no risk of personal embarrassment or harm. During your participation in the game, you may not have full and accurate access to all information you would like to make your decisions. Upon completion of your participation, you will be debriefed on these items as they apply to this study.

6. DO YOU HAVE TO TAKE PART IN THE STUDY? No

7. CAN YOUR TAKING PART IN THE STUDY END EARLY? Yes, you may decide at any time that you no longer want to continue.

8. IF YOU DON'T WANT TO TAKE PART IN THE STUDY, ARE THERE OTHER CHOICES? You may choose not to participate.

9. WILL YOU RECEIVE ANY REWARDS OR PAYMENT FOR TAKING PART IN THIS STUDY? No

10. WHO WILL SEE THE INFORMATION THAT YOU GIVE? This study is anonymous. That means that no one, not even members of the research team, will know which information you give came from you. USAF Surgeon General’s Research Oversight and Compliance Division (AFMSA/SGE-C) and other DoD personnel may inspect the study's records, but will not be able to identify you.

11. WHAT IF YOU HAVE QUESTIONS, SUGGESTIONS, CONCERNS OR COMPLAINTS? Before you decide whether to continue, please ask any questions you have. Later, if you have questions, suggestions, concerns, or complaints about the study, you can contact the investigator, Lt Col Mintz at 901-800-7613 or johnpaul.mintz@us.af.mil. If you have questions about your rights as a volunteer in this research or believe you were harmed as a result of participation, contact the AFRL IRB Administrator at (937) 904-8100 (DSN: 312-674-8100) or at AFRL.IR.ProtocolManagement@us.af.mil.

Please click continue to indicate your willingness to participate in this research study.



I wish to participate in this study



I do **NOT** wish to participate in this study.

Pre-game Questionnaire (Page 1 of 2)

In what year were you born?

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other

Which AU school are you attending?

- ☐ SOS
- ☐ ACSC
- ☐ SAASS
- ☐ AWC
- ☐ Other

What service are you a part of?

- ☐ Air Force
- ☐ Army
- ☐ Navy
- ☐ Marine
- ☐ Other

What is your rank?

What was/is your undergraduate major? (list all separated by comma):

What was/is your undergraduate minor? (list all separated by comma, or "none"):

What post-graduate degrees do you have? (list all separated by comma, or "none". Ex. MS in Computer Engineering, MA in Military and Strategic Studies, PhD in English Literature):

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Pre-game Questionnaire (Page 2 of 2)

Please answer the following questions.

How many years of military experience do you have? (include time in a military academy or ROTC):

On a scale of 1-5 with 1 being little to none, and 5 being "I understand terms such as Nash equilibria and Pareto Optimal", what level of understanding do you have with Game Theory or Prisoners Dilemma?

- ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

On a scale of 1-5 with 1 being little to none, and 5 being "I can code an AI using tensorflow", what level of understanding do you have with machine learning and/or artificial intelligence?

- ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

What state is Atlanta in?

- ☐ Texas
☐ Austria
☐ Tennessee
☐ Georgia
☐ Other

What have you heard about this experiment from other participants, if anything? If nothing, write "nothing".

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Welcome to the Strategic Decision-Making Experiment.

Overview: Pre-Experiment Questionnaire, Game 1, Game 2, Game 3, Post-Experiment Questionnaire

Player types:

- You
- Other human players
- Human players who have artificial intelligence advisors
- Artificial intelligence players

In at least one game, you will have access to a human expert advisor and an artificial intelligence advisor.

The human expert advisor has studied game theory and behavioral economics, and understands the nuances and optimal strategies in the kinds of games you will be playing.

The artificially intelligent players and advisors are sophisticated learning algorithms trained by playing against human players and other AI algorithms using a learning technique called recursive self-play. They use various frameworks including deep learning, neural networks, and counterfactual regret minimization.

Confidentiality: Your answers will be confidential. The researcher has no way to personally identify you.

Performance: In each game, there is a different scoring criteria which will be explained in the instructions. Your goal is to compete and make decisions such as to maximize your score as a member of your school's team - there is a side bet going between SOS, ACSC, AWC, and SAASS on which students do the best.





Good luck!



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Multiplayer Peace-War Game

Scenario: You and the other players are military-political decision-makers for your respective countries.

Players:



- You: 
- Another human decision-maker: 
- A human decision-maker who has AI to help them: 
- An AI decision-maker: 

Decisions: In each round, choose  or  with each of these competitors.



Note: You will make three decisions each round (one for each competitor).

Scoring: (in each pairing of you and one other player)



- If you both select peace, you enjoy prosperity and get 2 points.

 
Peace + Peace = 2 points each.

- If one of you chooses Peace and the other chooses War, the player who chose Peace gets defeated and gets 0 points and the player who chose War wins the spoils and gets 3 points.

 
Peace + War = Winner: 3 points, Loser: 0 points

- If both of you select War, you go to a costly war and both of you receive 1 point.

 
War + War = 1 point each.

Therefore, your best interest is based upon the combination of your choice and your adversary's choice. You will not know your adversary's choice until after you select yours, but you can see previous choices.

Goal: Maximize your score!

Good luck!



You

Current score: 0 points

Round: 1

Competitors

Icon turns green when adversary has chosen



Peace



War

0 points | Score | 0 points

Click here for history with this player.



Human



Peace



War

0 points | Score | 0 points

Click here for history with this player.



Human+AI



Peace



War

0 points | Score | 0 points

Click here for history with this player.



AI

Next

Click for Instructions

Introduction

Instructions

In this test, you will be randomly and anonymously paired with other participants. Some of these participants are other human participants, others are artificially intelligent participants.

Each of you simultaneously and privately chooses whether you want to drive Straight or Swerve to miss the other player.

If **you drive straight and your opponent swerves**, you will receive 1 point **and have no chance of dying**.
If **you drive straight and your opponent drives straight**, you have a **1 in 3 chance of dying** (-100 points) from the head-on collision.

If **you swerve and your opponent drives straight**, you will receive -1 points, unless you die in a crash into the ditch (-100 points), of which you have a **1 in 50 chance**.

Your payoffs will be determined by the choices of both as below (except for the chance of dying).

		The Other Participant's Choice	
		Straight	Swerve
Your Choice	Straight	You: -100 points Them: -100 points (Both of you: 1 in 3 chance of death (-100 pts))	You: 0 points Them: 1 point and a 1 in 50 chance of death (-100 pts))
	Swerve	You: 1 point and a 1 in 50 chance of death (-100 pts)) Them: 0 points	You: 0 points Them: 0 points (Both players: 1 in 50 chance of death (-100 pts))

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Round: 1		Competitor 1 (human)		Round	You
		Straight	Swerve		
You	<input type="radio"/> Straight	-100 points, -100 points (Both players have 1 in 3 chance of death)	0 points, 1 point (Competitor has 1 in 50 chance of death)		
	<input type="radio"/> Swerve	1 point, 0 points (You have 1 in 50 chance of death)	0 points, 0 points (Each have 1 in 50 chance of death)		

Your Payoff

Competitor

Their Payoff

Round: 1		Competitor 2 (AI)		Round	You
		Straight	Swerve		
You	<input type="radio"/> Straight	-100 points, -100 points (Both players have 1 in 3 chance of death)	0 points, 1 point (Competitor has 1 in 50 chance of death)		
	<input type="radio"/> Swerve	1 point, 0 points (You have 1 in 50 chance of death)	0 points, 0 points (Each have 1 in 50 chance of death)		

Your Payoff

Competitor

Their Payoff

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Click for a reminder on Instructions

Rock-Paper-Scissors

In this game, you are playing Rock-Paper-Scissors against another person,
but there's a twist!

Like any command situation,
you may make the choice yourself **OR** you may ask one of your trusted advisors to choose for you.

To choose for yourself, click

Rock

,

Paper

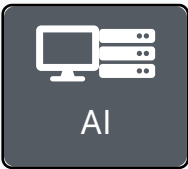
,

or

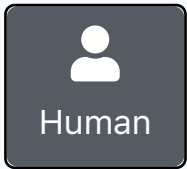
Scissors

OR

To have an expert advisor choose for you, click

AI

or


Human

Winner receives 1 point (+1). Loser loses a point (-1). In a draw, both players get zero points (0).

Rock

beats

Scissors


Scissors

beats

Paper

Paper

beats

Rock

Good luck!

Next

Round: 1

Choose wisely:



Rock



Paper


Scissors

or,

Trust one of your expert advisors:


AI


Human

Click for Results of Previous Rounds

Click for Instructions

Post-game Questionnaire (Page 1 of 2)

Please answer the following questions.

What was your strategy(ies) in the Peace-War game(i.e. "I always played Peace with the humans and War against the AI","I defected whenever the player defected in the last round," "I played essentially randomly because I did not really understand the game"):

In the Peace-War game, why did your choose differently between players (if at all)?

What was your betting strategy(ies) in the Chicken game?(i.e. "I bet on the human because he/she had something to lose. The AI didn't", "I bet on the AI because I thought it would know best.", "I bet essentially randomly because I did not really understand the game"):

In the Chicken game, why did your strategy differ between players (if at all)?

What was your strategy in the Rock-Paper-Scissors game? (i.e. "I always relied on the AI because it was best", "I chose myself because I did not trust either advisor", "I played essentially randomly because I did not really understand the game"):

In the Rock-Paper-Scissors game, why did you choose the strategy you did?

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Post-game Questionnaire (Page 2 of 2)

Please answer the following questions.

What comments do you have about the other human players who did not have AI to help them in the games?

What comments do you have about the other human advisors who did not have AI to help them in the games?

What comments do you have about the other human players who had AI to help them in the games?

What comments do you have about the AI players in the games?

What comments do you have about the AI advisors in the games?

Do you have any additional comments on what it was like to compete against both humans and artificial intelligence?

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Debrief

Thank you for your participation in this experiment.

As stated in the introduction, here's a debrief on your competitors and advisors:

- All other competitors and advisors used non-conditional strategies in order to control for variation which might have affected your decision-making in ways the experiment could not account for.
- The human players and advisors were simulated by an algorithm which used non-conditional strategies.
- The AI advisors and competitors were also algorithms which used non-conditional strategies.

Today, in real life, there ARE real artificial intelligence algorithms which can play such games very well and can advise decision-makers. In fact, they exhibit some very interesting and advanced, but very non-human, characteristics. If you are interested in learning more or playing against one of these artificial intelligence players, please let the proctor know.

Please do not share your experiences today with anyone until told by the researcher that is ok to discuss. You can understand how a participant's prior knowledge of the information on this page would corrupt the experiment.

Please select "Yes" to acknowledge you will not share information about or discuss this game with anyone until notified that it is ok to do so by the researcher.

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