Welcome!

This is a study being conducted by researchers from Northwestern University. The purpose is to study how people make decisions from information displays. All the information you provide will be used only for scientific study and will also remain anonymous in any publications.

Expected time to complete: You will answer two questions on each of 15 screens (rounds). Completing the study should take **no more than 20 minutes**.

Reward: You will start with a base pay of **$2**, and receive up to another **$3** bonus depending on the outcome of your responses in rounds. **You are guaranteed to receive $4 for completing the study.**

Getting started: Please enter your Prolific ID and click the "Start" button to begin. You will be first directed to instruction pages that explain the tasks in detail.

Browser recommendation: To avoid problems, we suggest completing the study **in a single session** using Google Chrome. **This study is not intended to be done on a mobile device.** Please use a tablet, laptop, or desktop monitor for better experience.

Notice: If you are currently in countries with restricted access to Google services, you might not be able to proceed to the next screen.

Thank you very much for your participation in this research. If you have any questions, please do not hesitate to contact us at dzhang@u.northwestern.edu.

> Enter your Prolific ID

Start

Instruction Part 1

Scenario

In each round, you will play the role of a taxi driver deciding where to go in the next 15 minutes to search for rides. Your goal is to get your next ride as quickly as possible.

To help you make decisions, the taxi company provides you with a display of their best predictions of what other drivers will do in the next 15 minutes, based on the GPS information they have about each taxi driver's past driving experiences, **including successful and unsuccessful attempts**.

Your task in each round is to use the display and decide where to search for pickups. On the next screen, you will get detailed information about your decision and the display of predictions.

☐ Check the box to confirm that you have read the instructions.

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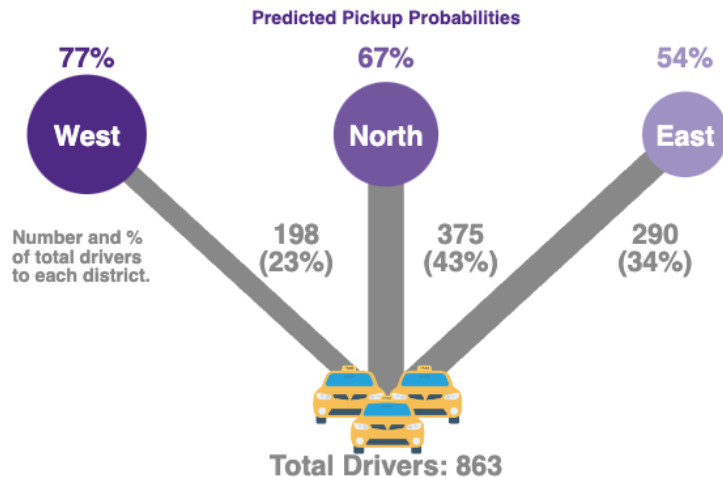
Instruction Part 2

You will complete a total of 15 rounds (screens). For each round you will make a decision about where to search for rides.

Specifically, our tasks ask you to imagine that it's around **9 AM on a weekday**. You are currently cruising in the downtown region of your city. This region is formed by three unique districts (1) **West** Side, (2) **North** Side, and (3) **East** Side. You will choose which of these three districts to search for a ride in.

Prediction Display

To help you make your choice, you have access to a display showing the taxi company's prediction of how many drivers will go to each of the three districts to search for rides over the next 15 minutes, **assuming no one consults the display and everyone drives based on their past driving experiences.**

How are the prediction displays created? The taxi company can tell which drivers are on the road using GPS in the taxis. The taxi company creates the display by first predicting where each driver on the road is likely to go, based on how successful they were at getting pickups in each district according to their past driving experiences. The more successfully a driver got pickups in a district, the more likely they choose to search there again. The taxi company then uses a statistical model to predict how many riders are likely to be looking for taxis in districts, informed by past data. This leads to an estimated probability, expressed as a percentage, that a driver who goes to that district will get a pickup.

Predicted Pickup Probabilities

77% 67% 54%

West   North   East

Number and %
of total drivers
to each district.

198   375   290
(23%)   (43%)   (34%)

Total Drivers: 863

How to read the prediction display?

In this display, **circles represent districts** and **lines represent drivers traveling to each district**. The thicker the line, the more drivers who are predicted to go to that district. Similarly, the larger and darker the circle for a district, the higher the predicted chance of getting a pickup.

How to read the labels?

The labels next to the lines show **the predicted numbers of drivers (counts and percentages) headed to each district**. **The numbers are the expected values (i.e., average) of the predictions.** Similarly, the label above the circle shows **the expected pickup probability** of that district.

Notice that **when more drivers choose to search in a district, the predicted chance of getting a pickup in that district gets lower on average.**

Quick Question:

What is the <u>predicted pickup probability</u> of **East** District?

○ 77%
○ 67%
○ 54%

☐ Check the box to confirm that you have read the instructions.

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Instruction Part 3

Tasks

In each round, you need to answer **2** tasks while viewing the prediction display.

The task prompt informs you of **the total number of drivers** that you are competing against. In all 15 scenarios, <u>**none of the other drivers will consult the display except for you**</u>, all other drivers <u>**will drive according to their past driving experiences**</u>.

Use the display below along with what you know about the other drivers' beliefs to answer 2 task questions:

1. You need to <u>"Guess What Other Drivers Will Do"</u> by thinking about how many drivers would choose to search in the 3 districts.

2. You need to <u>"Decide Where to Search"</u> by selecting the location that you think would give you the best chance of getting a pickup.

Please keep in mind that your goal is to select a district that maximizes your chance of pickup. **When more drivers choose to search in a district, the predicted chance of getting a pickup in that district gets lower on average.** Your answers need not be perfect, and there is no need to use any outside materials. We are interested in how well you can make strategic decisions using the display for a few minutes per round.

You will see an example task screen below. This practice round is to help you get comfortable with the tasks before you start the actual rounds. **Your answers will NOT count toward your bonus.** Please answer both questions before you proceed. The format of the tasks will be similar for all 15 rounds of the study.

Example Task Screen

Please read through the descriptions carefully, especially **the bolded numbers**, which indicate the total number of drivers in each scenarios.

➡️

Recall: You are a taxi driver, it's around 9 AM on a weekday, and you are currently cruising in the downtown region of your city. You need to consider what other drivers would do, and then choose a district from (1) **West** Side, (2) **North** Side, and (3) **East** Side as your search strategy that can maximize your chance of pickup.
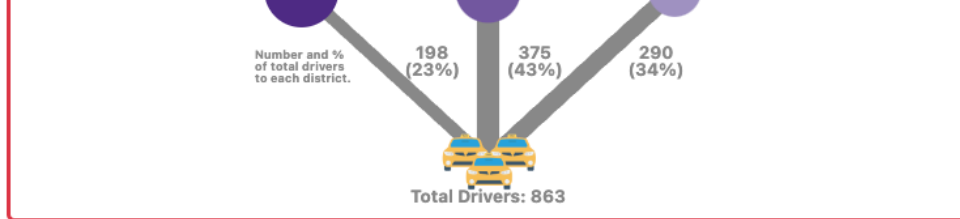
In this round, there are a total of **863** drivers competing for pickup with you. All other drivers will **NOT** consult the display and do **NOT** know the exact number of competitors in the region. They will drive according to their past driving experiences, which the taxi company has used to create the prediction display below. Please use the display to answer the 2 task questions.

The three numbers you provide in the form must add to **863**.

The display shows the taxi company's prediction of how many drivers will go to each district to search for rides over the next 15 minutes using a statistical model. The display visualizes predictions and shows (1) the expected number and percentage of drivers who will go to each district, and (2) the predicted pickup probabilities.

➡️

Predicted Pickup Probabilities

77%
West

67%
North

54%
East

Number and % of total drivers to each district.

198 (23%)

375 (43%)

290 (34%)

Total Drivers: 863

over the next 15 minutes using a statistical model. The display visualizes predictions and shows (1) the expected number and percentage of drivers who will go to each district, and (2) the predicted pickup probabilities.

Number and % of total drivers to each district.

| | 198 (23%) | 375 (43%) | 290 (34%) |

Total Drivers: 863
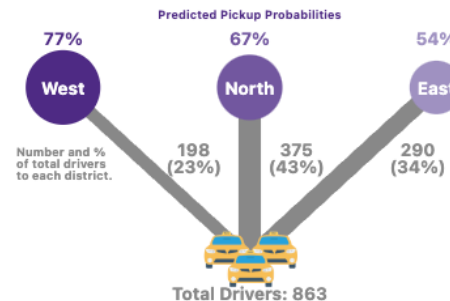
This is an instructional question **unique to this practice round**. The goal of this question is to help you to reason what other drivers' would do based on the task prompt. Please take the time to think about other drivers' possible choices before proceeding to complete the 2 task questions below.

Instructional Question:

In this scenario, **which district do you think most drivers will go to search for pickups in?**

○ West Side
○ North Side
○ East Side

Keep in mind:
All other drivers will NOT consult the display and do NOT know the exact number of competitors in the region. They will drive according to their past driving experiences, which the taxi company has used to create the prediction display.

You need to complete 2 task questions in any order you want to proceed to the next round.

To **"Decide Where to Search"**, you need to choose a district as your strategy.

To **"Guess What Other Drivers Will Do"**, after you input 2 guesses, the system will fill in the remaining driver count. **Please adjust your responses until all the numbers reflect your belief**.

Decide Where To Search

Where will you search for pickups?

○ West Side
○ North Side
○ East Side

Guess What Other Drivers Will Do

[answer] How many drivers out of **863** do you think will search **West Side**?

[answer] How many drivers out of **863** do you think will search **North Side**?

[answer] How many drivers out of **863** do you think will search **East Side**?

Your responses must add up to **863**
The current sum is **0**
You need to allocate an additional **863**
Adjust your responses until all the numbers reflect your beliefs.

☐ Check the box if you have read the instructions and **have completed the practice round.**
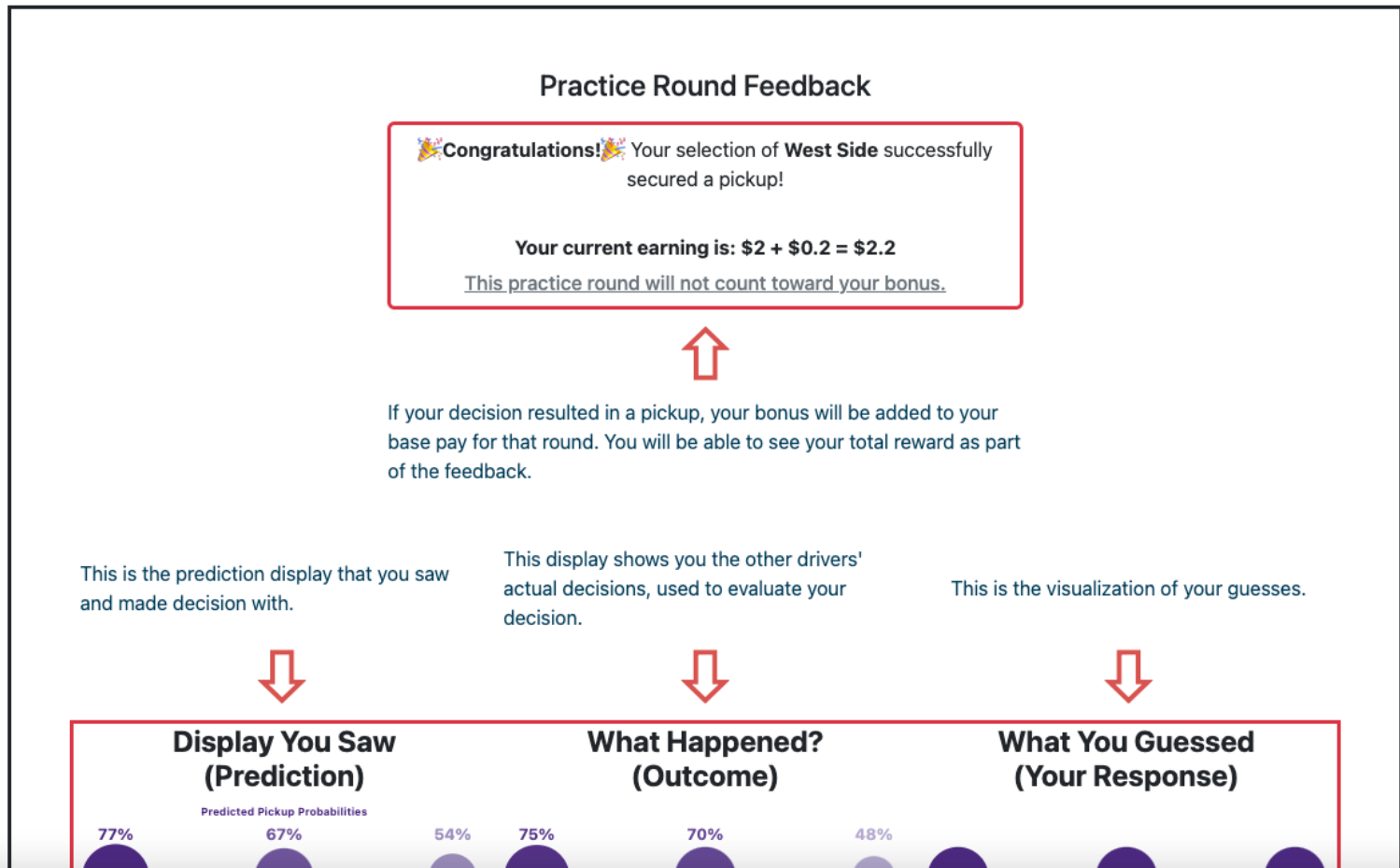
[Previous] [Next]

Instruction Part 4

Feedback

For each of the 15 rounds, you will receive immediate feedback on your decision. You receive a bonus of **$0.2** if your decision resulted in a pickup. Otherwise, you receive no bonus for that round. Bonuses accumulate across trials with a maximum bonus of **$3**.

You will also receive several visualizations showing additional feedback to help you improve your performance over time. These feedback visualizations show you

1. The realized outcome we used to evaluate your decisions

2. The difference between **the realized outcome** and **the predictions you used** to make decisions.

3. The difference between **the realized outcome** and **your guesses**.

You will see an example feedback screen below, which shows you the results of the practice round that you just completed. The format of the feedback pages will be similar for all 15 rounds of the study.

Example Feedback Screen

Practice Round Feedback

🎉**Congratulations!**🎉 Your selection of **West Side** successfully secured a pickup!

Your current earning is: $2 + $0.2 = $2.2
This practice round will not count toward your bonus.

⇧

If your decision resulted in a pickup, your bonus will be added to your base pay for that round. You will be able to see your total reward as part of the feedback.

This is the prediction display that you saw and made decision with.

This display shows you the other drivers' actual decisions, used to evaluate your decision.

This is the visualization of your guesses.

⇩ ⇩ ⇩

Display You Saw (Prediction)

What Happened? (Outcome)

What You Guessed (Your Response)

Predicted Pickup Probabilities

77%   67%   54%   75%   70%   48%

Practice Round Feedback

🎉**Congratulations!**🎉 Your selection of **West Side** successfully secured a pickup!

Your current earning is: $2 + $0.2 = $2.2

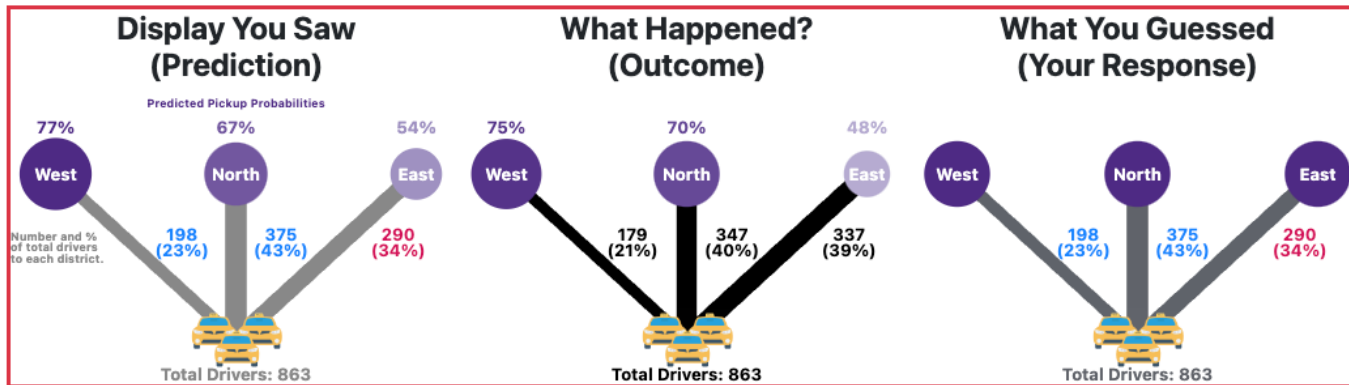This practice round will not count toward your bonus.

⇧

If your decision resulted in a pickup, your bonus will be added to your base pay for that round. You will be able to see your total reward as part of the feedback.

This is the prediction display that you saw and made decision with.

This display shows you the other drivers' actual decisions, used to evaluate your decision.

This is the visualization of your guesses.

⇩ ⇩ ⇩

Display You Saw (Prediction)	What Happened? (Outcome)	What You Guessed (Your Response)

Predicted Pickup Probabilities

	Display You Saw	What Happened	What You Guessed
West	77%	75%	West
North	67%	70%	North
East	54%	48%	East

Number and % of total drivers to each district.

	198 (23%)	375 (43%)	290 (34%)
Outcome	179 (21%)	347 (40%)	337 (39%)
Guessed	198 (23%)	375 (43%)	290 (34%)

Total Drivers: 863   Total Drivers: 863   Total Drivers: 863

- The display over-estimated drivers to **West Side** by 19 on average.
- The display over-estimated drivers to **North Side** by 28 on average.
- The display under-estimated drivers to **East Side** by 47 on average.

- You over-estimated drivers to **West Side** by 19
- You over-estimated drivers to **North Side** by 28
- You under-estimated drivers to **East Side** by 47

⇧ ⇧

The bullet points above summarize **the difference between the drivers' actual decisions and the predictions you used to make decisions.**
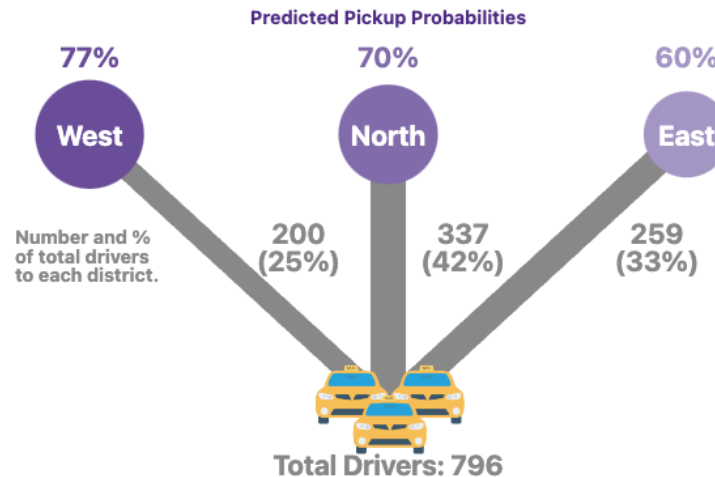
The bullet points above summarize **the difference between the drivers' actual decisions and your guesses.**

Round 1

Recall: You are a taxi driver, it's around 9 AM on a weekday, and you are currently cruising in the downtown region of your city. You need to consider what other drivers would do, and then choose a district from (1) **West** Side, (2) **North** Side, and (3) **East** Side as your search strategy that can maximize your chance of pickup.

In this round, there are a total of **796** drivers competing for pickup with you. All other drivers will **NOT** consult the display and do **NOT** know the exact number of competitors in the region. They will drive according to their past driving experiences, which the taxi company has used to create the prediction display below. Please use the display to answer the 2 task questions.

The three numbers you provide in the form must add to **796**.

Predicted Pickup Probabilities

| **77%** | **70%** | **60%** |
| West | North | East |

Number and % of total drivers to each district.

200 (25%)   **337 (42%)**   **259 (33%)**

Total Drivers: 796

Decide Where To Search

Where will you search for pickups?

○ West Side

○ North Side

○ East Side

Guess What Other Drivers Will Do

[answer] How many drivers out of **796** do you think will search **West Side**?

[answer] How many drivers out of **796** do you think will search **North Side**?

[answer] How many drivers out of **796** do you think will search **East Side**?

Your responses must add up to **796**
The current sum is **0**
You need to allocate an additional **796**
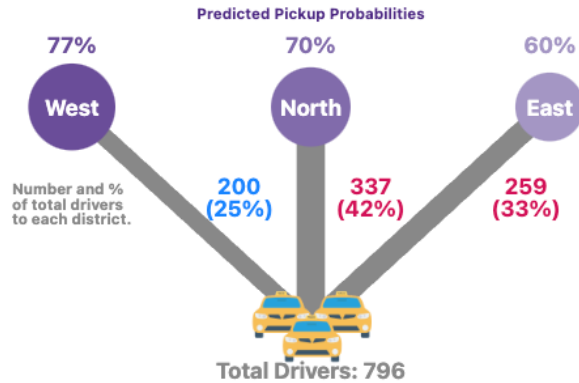**Adjust your responses until all the numbers reflect your beliefs.**

Next

Round 1 Feedback

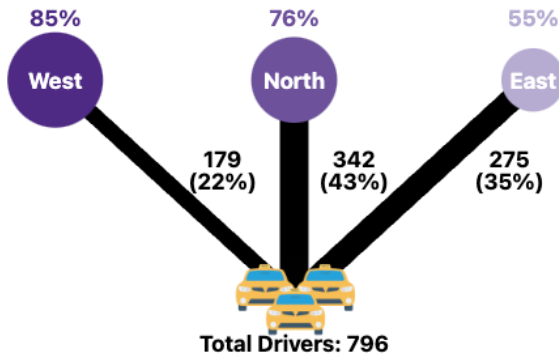🎉**Congratulations!**🎉 Your selection of **West Side** successfully secured a pickup!

Your current earning is: $0 + $0.2 = $0.2

Display You Saw (Prediction)

Predicted Pickup Probabilities

77% **West**

70% **North**

60% **East**

Number and % of total drivers to each district.

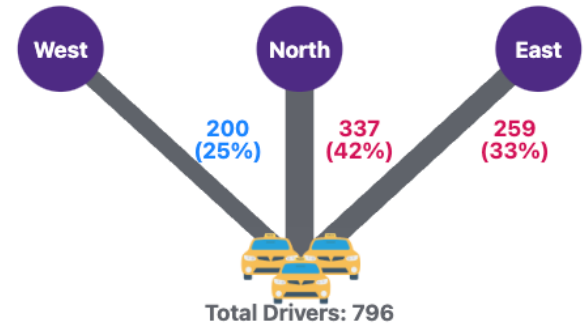200 (25%)   337 (42%)   259 (33%)

Total Drivers: 796

- The display over-estimated drivers to **West Side** by <u>21</u> on average
- The display under-estimated drivers to **North Side** by <u>5</u> on average
- The display under-estimated drivers to **East Side** by <u>16</u> on average

What Happened? (Outcome)

85% **West**

76% **North**

55% **East**

179 (22%)   342 (43%)   275 (35%)

Total Drivers: 796

What You Guessed (Your Response)

West   **North**   **East**

200 (25%)   337 (42%)   259 (33%)

Total Drivers: 796

- You over-estimated drivers to **West Side** by <u>21</u>
- You under-estimated drivers to **North Side** by <u>5</u>
- You under-estimated drivers to **East Side** by <u>16</u>

If you are ready, please click the "Next" button and proceed to the next round.

Next

Conclusion

Congratulations on finishing all 15 rounds of the study! Please share with us your strategy of deciding a search district, including **how you used the visualization displays**. Please be as specific as you can be.

Submit