

# **Learning on the Go:**

## **Understanding How Gig Economy Workers Learn with Recommendation Algorithms**

**Park Sinchaisri**

UC Berkeley



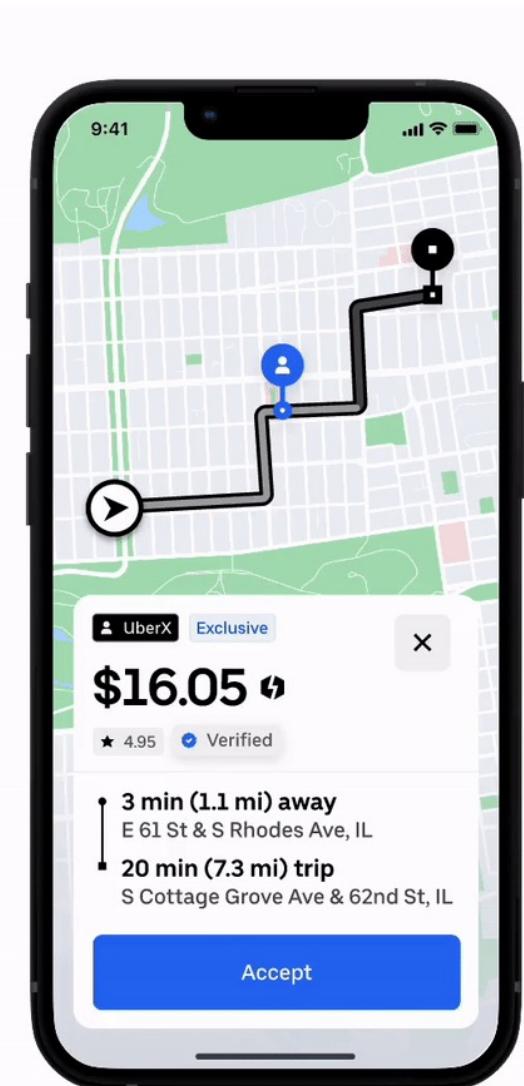
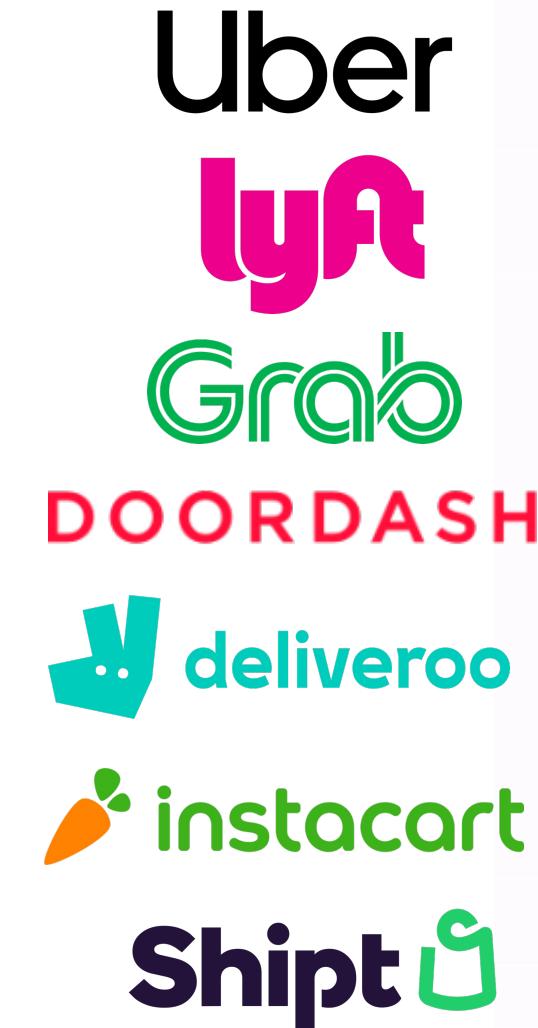
Joint work with Shunan Jiang (UC Berkeley/Google)



CSCW 2025

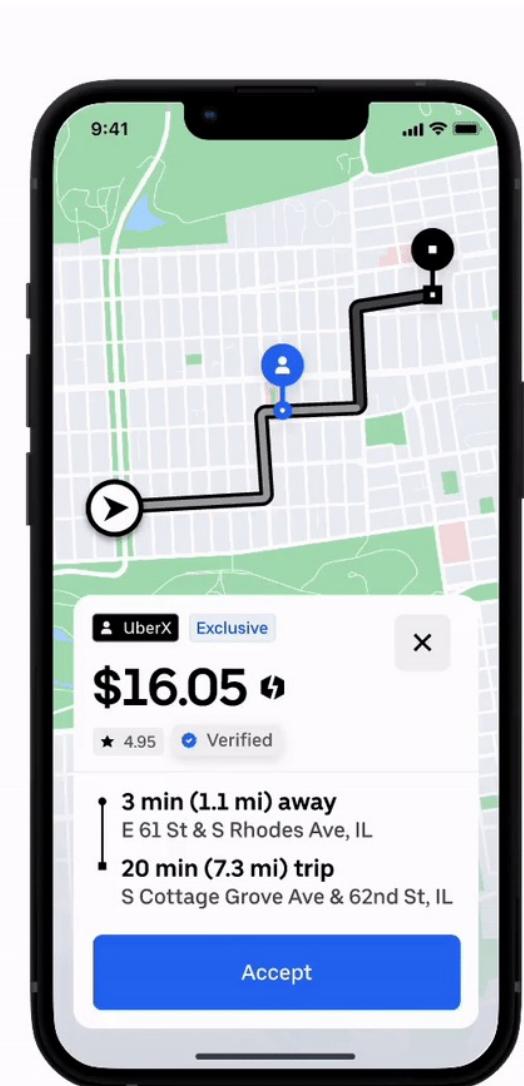
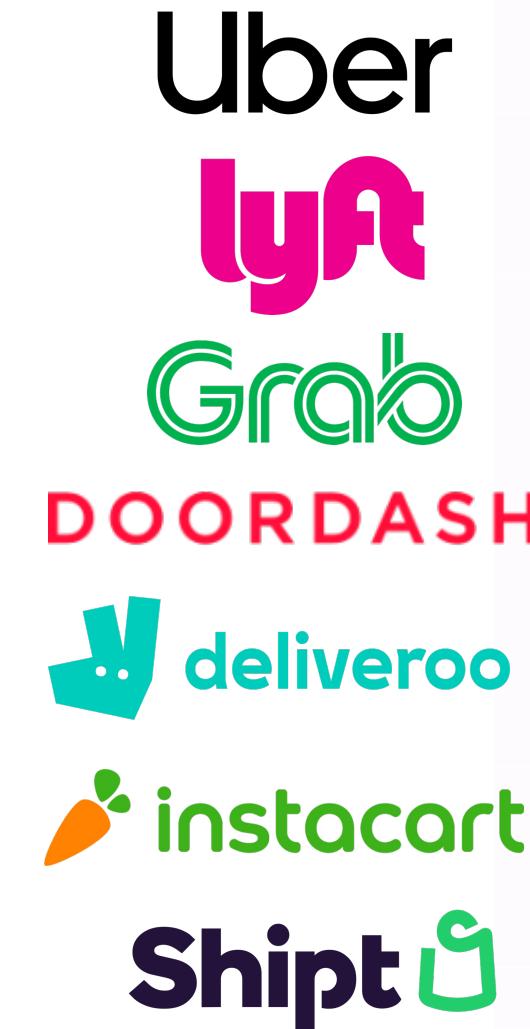
# The Rise of the Gig Economy

- Platforms now power everyday delivery and services; 16% in US adults, 12% of global labor force
- Customers are attracted by convenience, affordable options
- Workers are attracted by flexibility and autonomy to turn work on/off, choose where/job to work

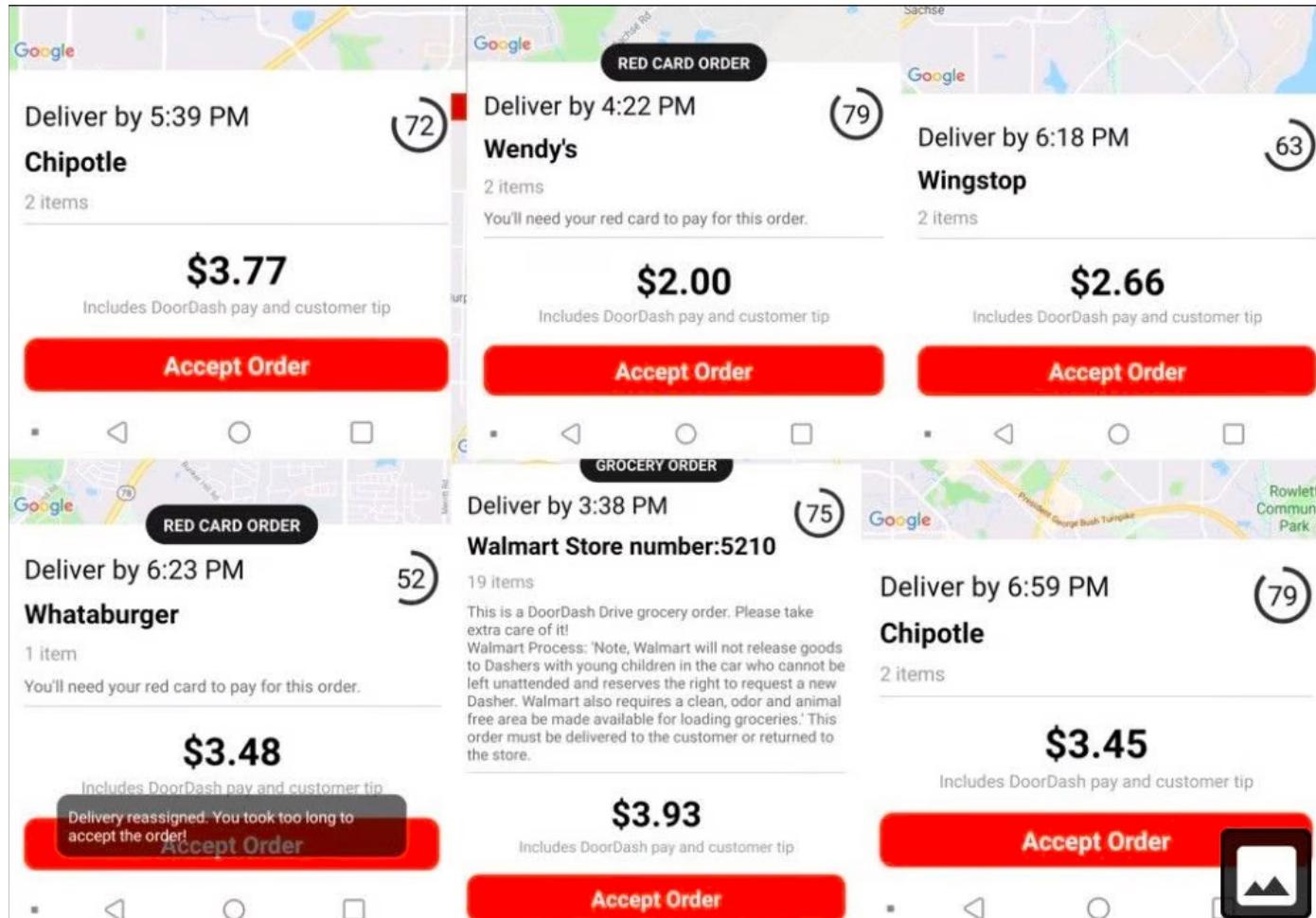


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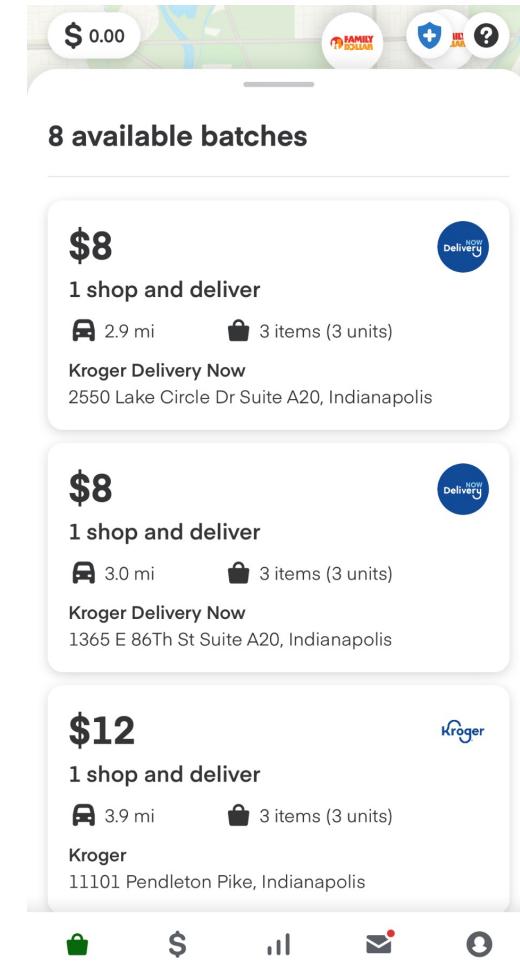
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- Customers are attracted by convenience, affordable options
- Workers are attracted by flexibility and autonomy to turn work on/off, choose where/job to work
- These choices affect service reliability + their own earnings



# Focus: When Workers Choose Tasks



 DOORDASH



 instacart

# New Workers Struggle...



# New Workers Struggle...



r/uberdrivers · Posted by u/kanyda 8 years ago

First day report

First night: 5 hours, no riders. I think I need to change my strategy.



Sometimes the store has long lines of people or the shopper has problems finding items.



# New Workers Struggle, But Get Better

(r)

r/uberdrivers · Posted by u/kanyda 8 years ago

Tuesdays are the least profitable day of the week.  
The early morning (7-10) is pretty good money.



with another 45min variable; 2) Every shopper shops at a different speed. An order that might take 3 hours for an inexperienced shopper might take me 1 hour. If your shopper is slow, your order is late or might be



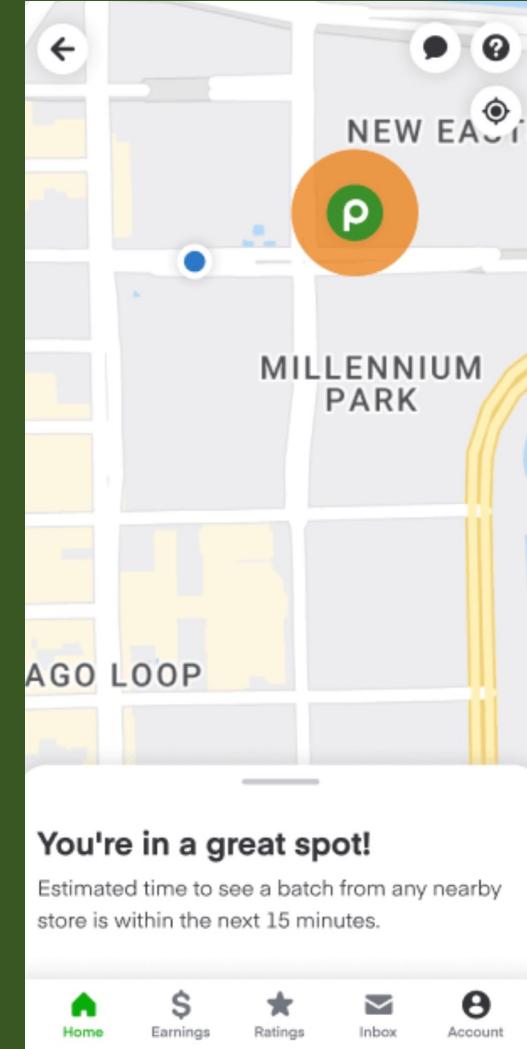
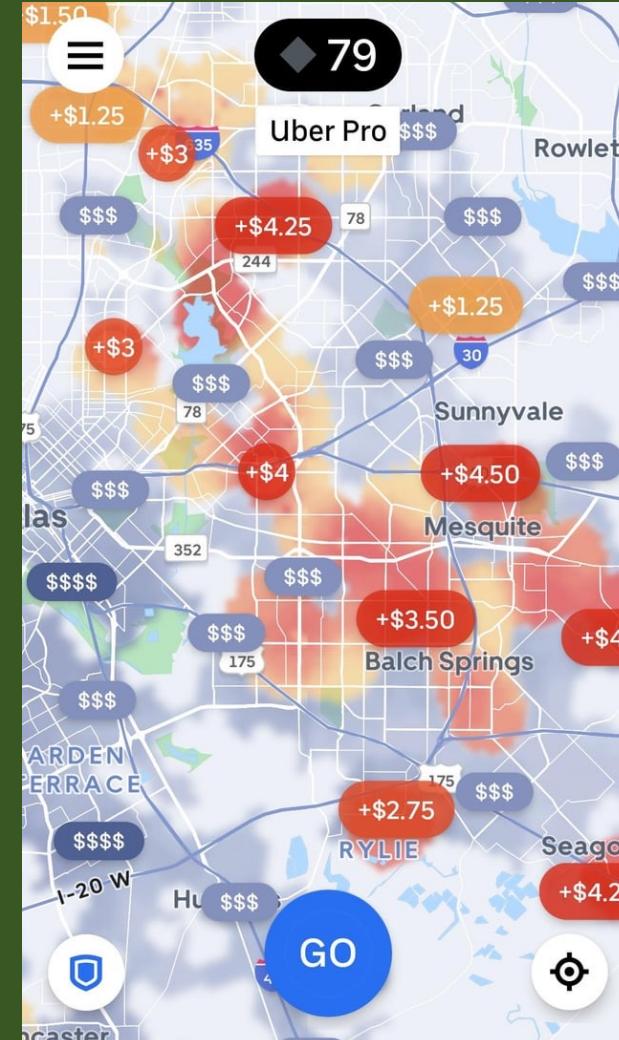
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platform's recommendation system:



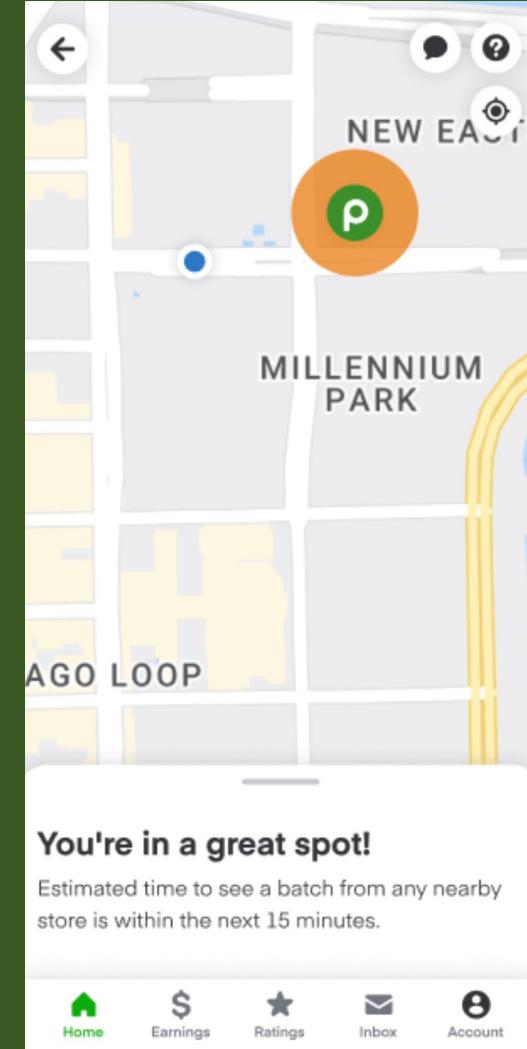
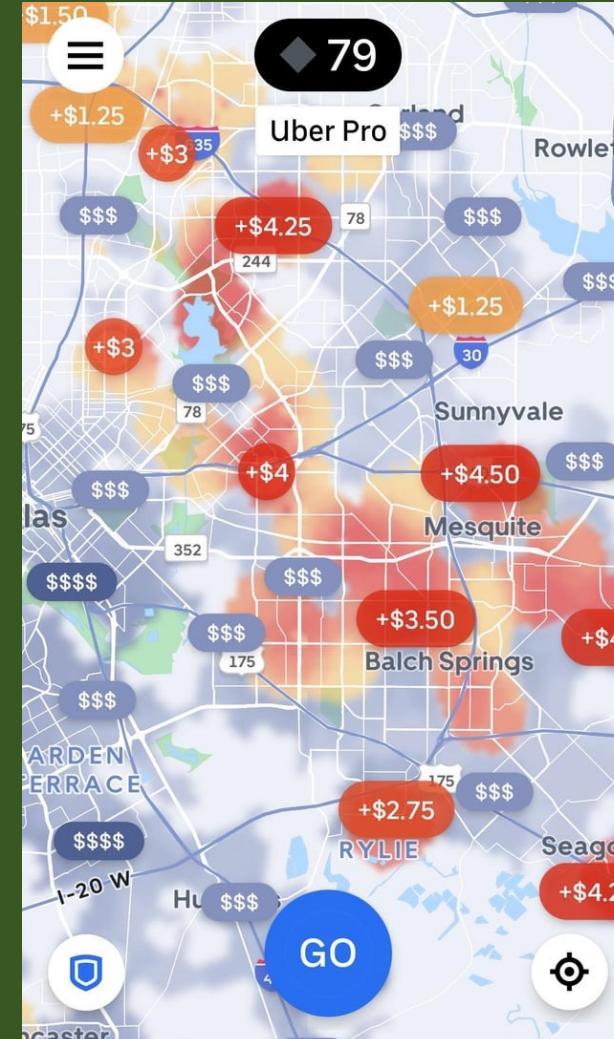
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(Knight et al 2022, Zhang et al 2022, Do et al 2024)

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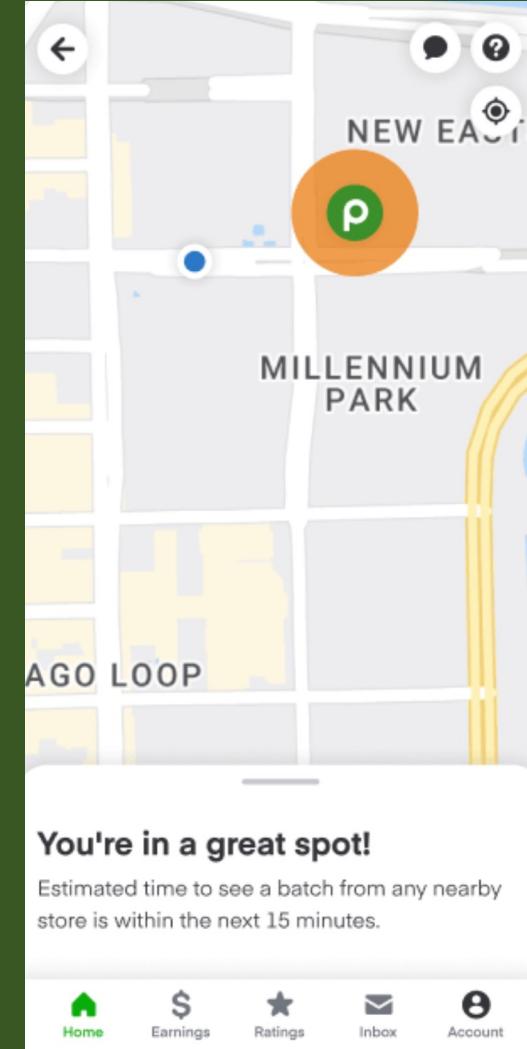
Some benefit from them...

(Knight et al 2022, Zhang et al 2022, Do et al 2024)

...but others resist

(Dietvorst et al 2015, Dietvorst et al 2018, Castelo et al 2019, Sun et al 2022, Das Swain et al 2024, Balakrishnan et al 2025, Bastani et al 2025)

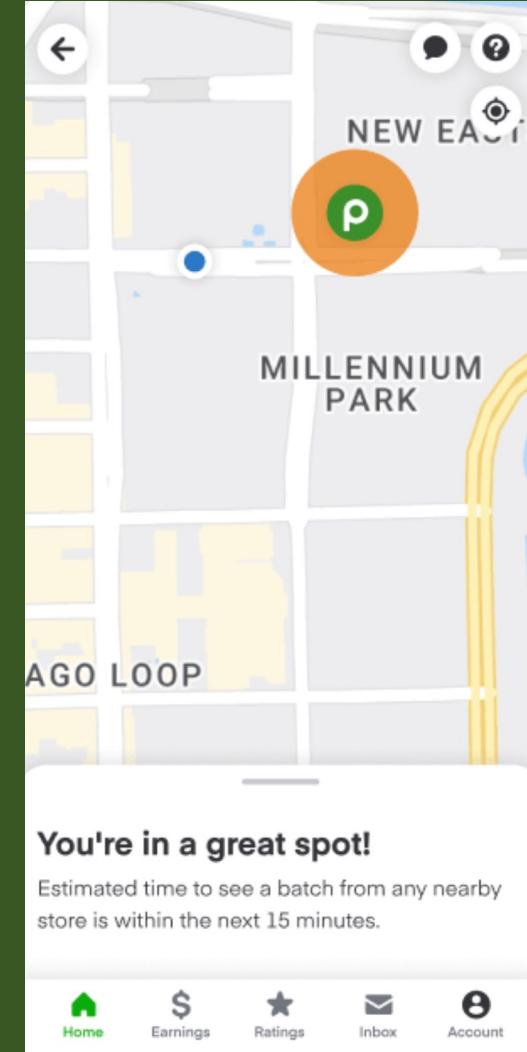
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# Research Questions:

- How do workers improve performance over time?
- How does task selection change with experience?
- How do workers respond to the platform's recommendations?

platform's recommendation system:



# Data: US Grocery Delivery Platform

- NYC orders from November 2022 to October 2023
- 1,269,815 orders across 788 stores + 5,292 shoppers (1,131 “new”)

- Orders: Store ID, # items, most common categories, distance to customers
- Workers: Signup hours, orders suggested to them daily, tenure with platform
- Performance: On-time delivery, customer ratings, amount of tips



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Shoppers can choose to browse a list of all available orders



Today: 7PM to 8PM  
Zone: Auburn Hills  
Target - Auburn Hills  
650 Brown Rd  
Auburn Hills, MI 48326  
[View Map](#)  
[Claim Order](#)



Today: 8PM to 9PM  
Zone: Auburn Hills  
Meijer - Auburn Hills  
800 Brown Rd  
Est Pay:

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Shoppers can choose to browse a list of all available orders

Sometimes, platform bundled orders from the same store with delivery windows within 1 hour difference **(Rec2)**

A screenshot of a mobile application interface showing a task card for a Target store in Auburn Hills. The card includes the store logo, delivery details (Today: 7PM to 8PM), estimated pay (\$15-\$20), estimated time (48 min), product category (15 / 6), and a green "Claim Order" button.

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**Claim Order**

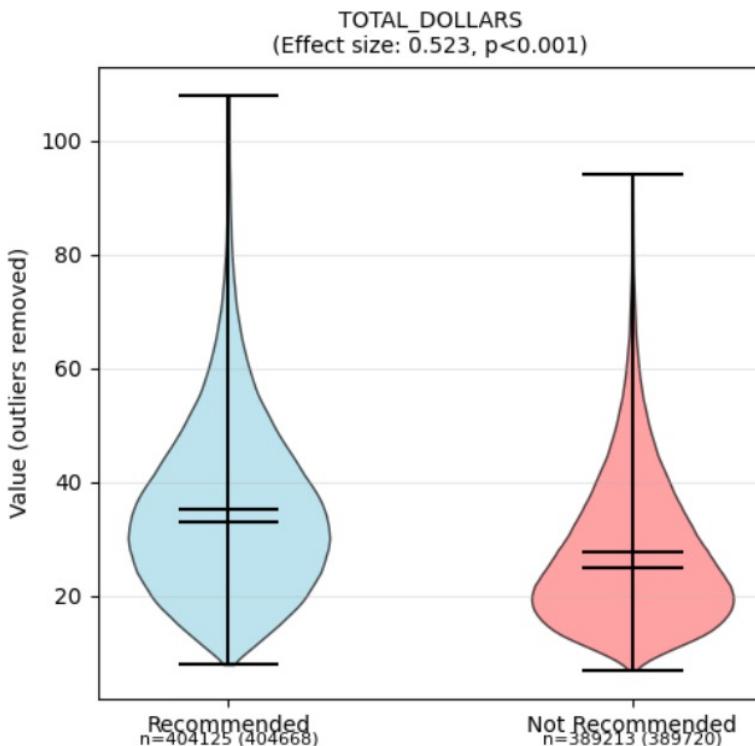
A screenshot of a mobile application interface showing a task card for a Best Buy store in Denton. The card includes the store logo, delivery details (Today, deliver by 9pm), estimated pay (\$6-\$8 est.), estimated drive time (17 min. est.), zone (Denton), and store name (Best Buy - Denton). A green "Claim orders (2)" button is at the bottom.

**2 Orders** **Delivery Only** **Drop-off** **Early OK** ...  
**BEST BUY**  
**Today, deliver by 9pm**  
Ready for pickup: Now  
Pay **\$6-\$8 est.**  
Drive 17 min. est.  
Zone Denton  
Store Best Buy - Denton  
**Claim orders (2)**

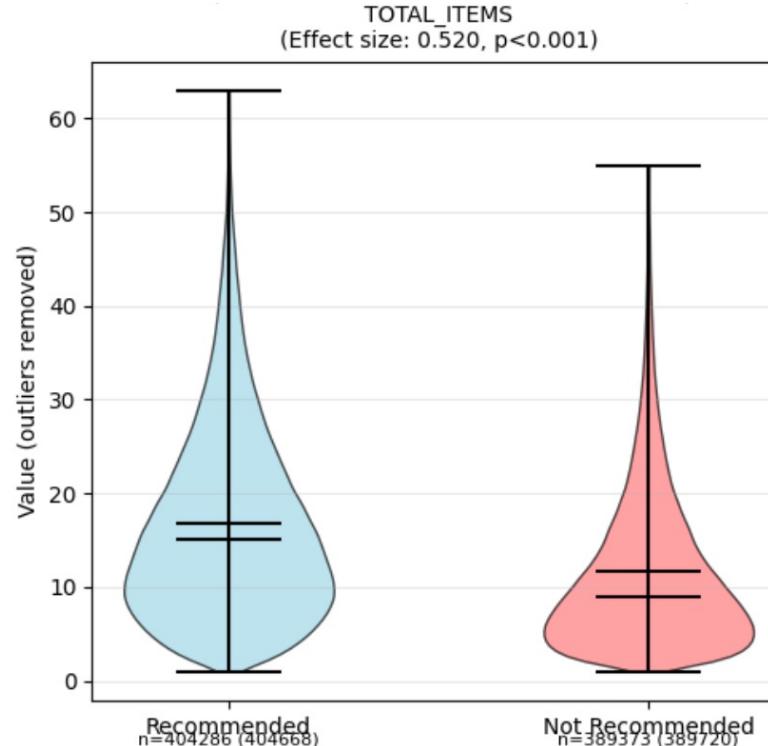
A screenshot of a mobile application interface showing a task card for a Target store in Philadelphia. The card includes the store logo, delivery details (Today, 1pm–2pm), estimated pay (\$15-\$21 est.), estimated time (1 hr 10 min est.), zone (Center City East / Southeast Philadelphia), and store name (Target - Philadelphia SE). A green "Claim orders (2)" button is at the bottom.

**2 Orders** **Prepaid** **Drop-off** ...  
**Target**  
**Today, 1pm–2pm**  
16 + 10 total items • 1 hr 10 min est  
Pay **\$15-\$21 est.**  
Zone Center City East / Southeast Philadelphia  
Store Target - Philadelphia SE  
**Claim orders (2)**

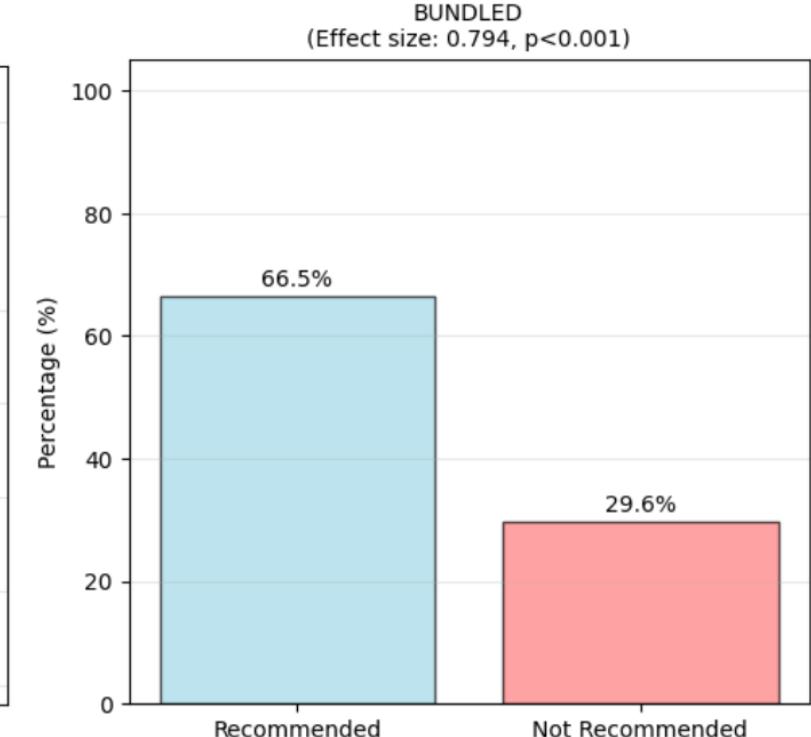
# Nature of Recommended Orders



Higher pay / order



More items (+ unique)

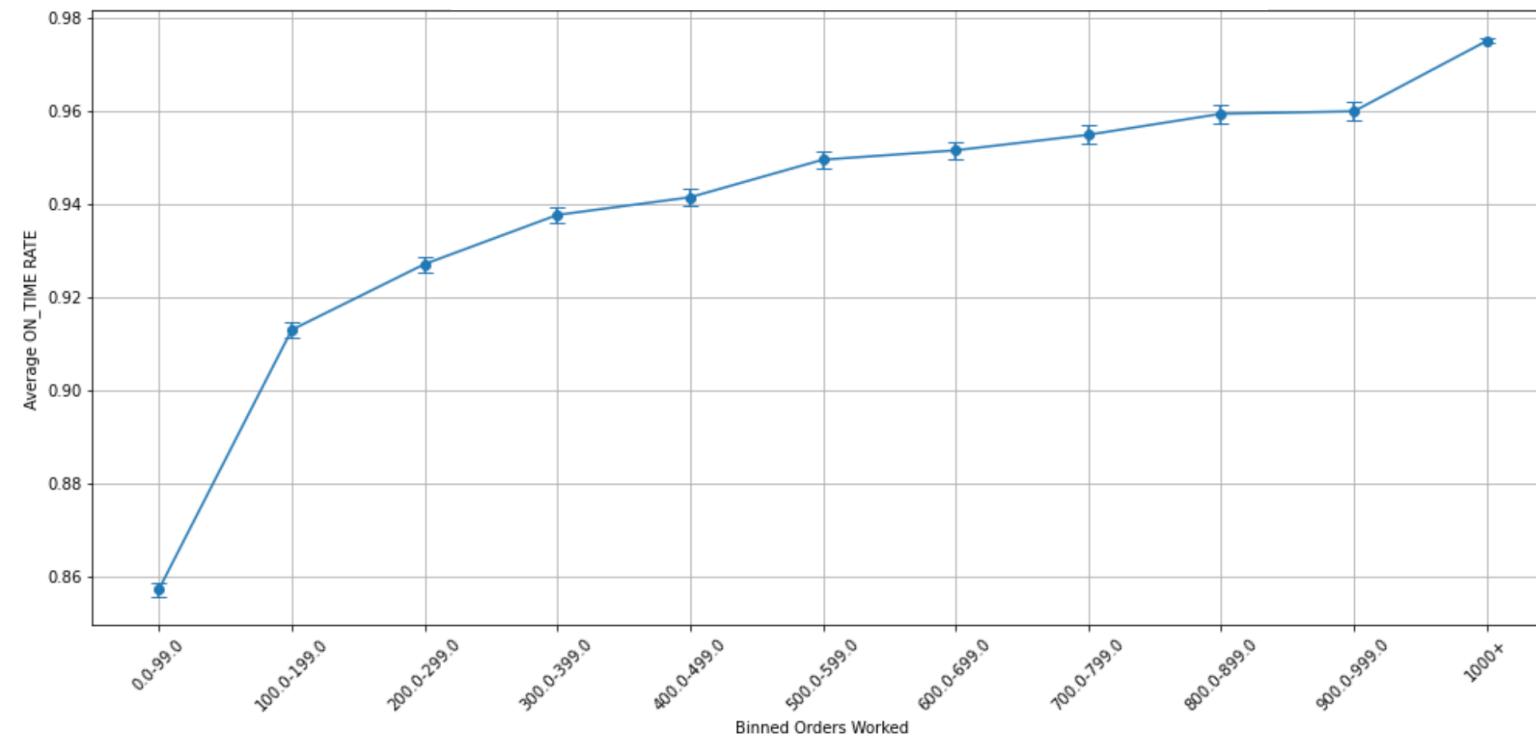


More bundled

They're quite static over time!

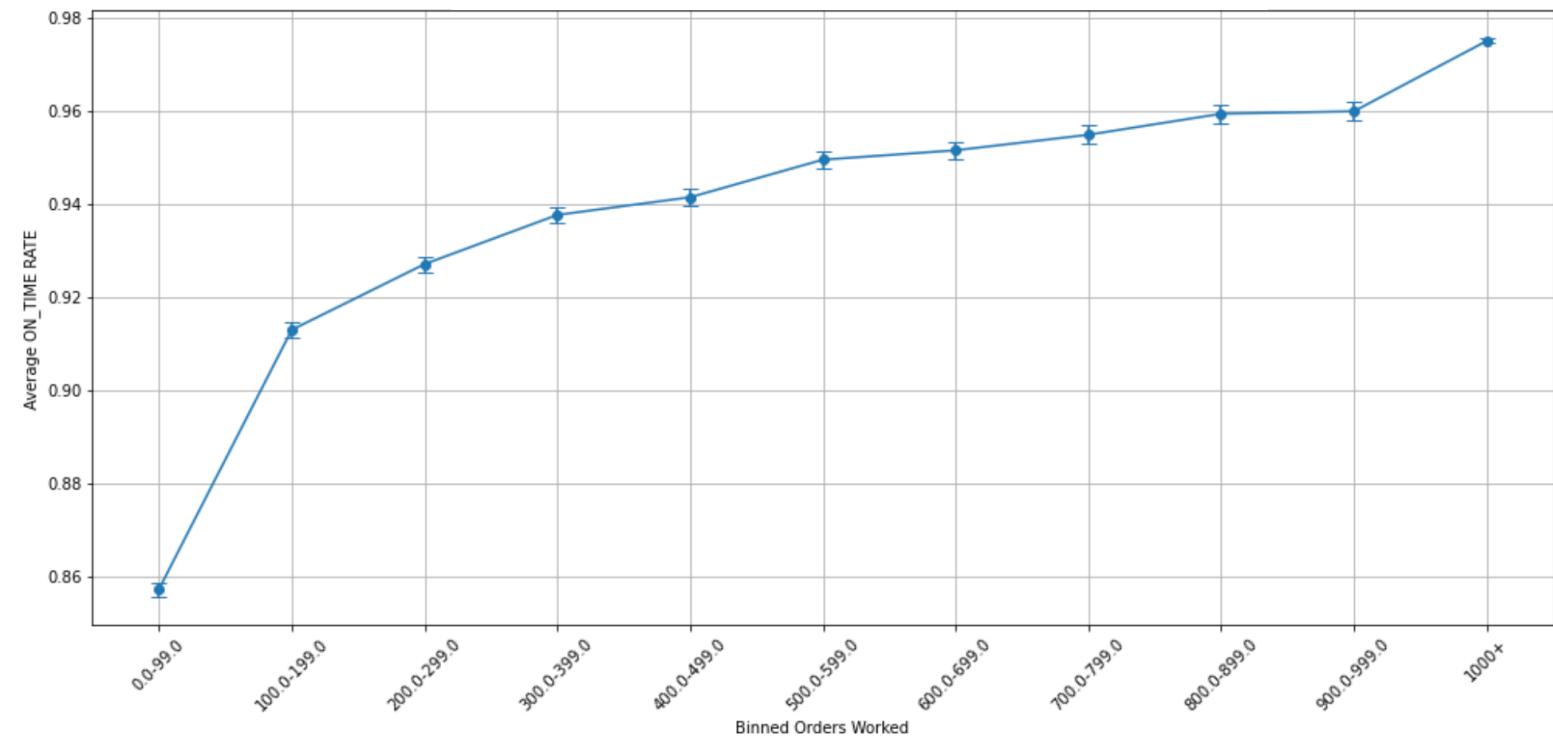
# Gig Workers Learn To Do Better

Average on-time delivery rate



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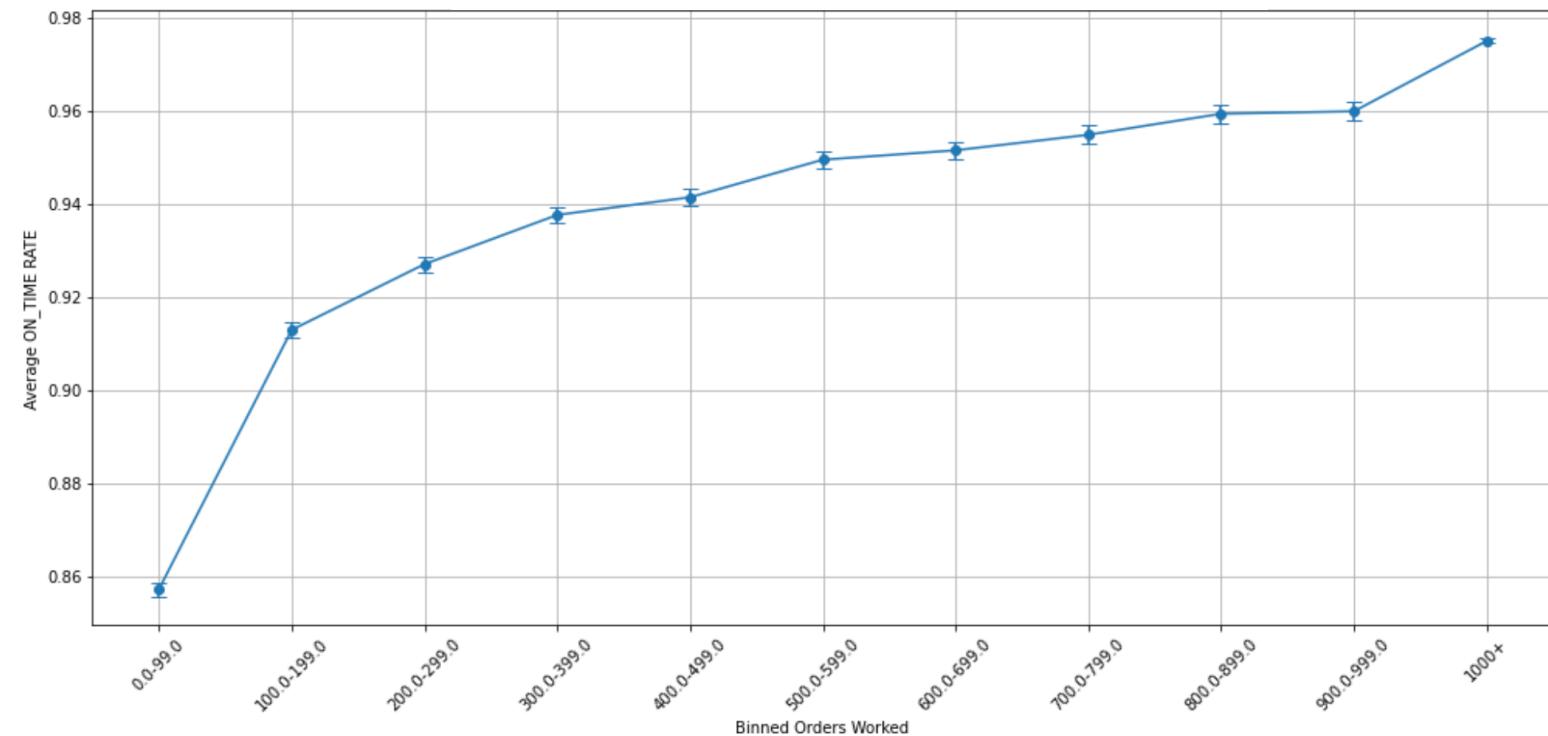
Average on-time delivery rate



Impact on on-time	Coefficient
# Orders done from the same store	6.0552e-05*** (0.0025236)
# Orders done from the same store ^2	-8.9995e-09*** (1.6775e-09)
# Orders done from other stores	5.9109e-05*** (0.0001787)
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Control Variables	Yes
Individual FE	Yes
Time FE	Yes

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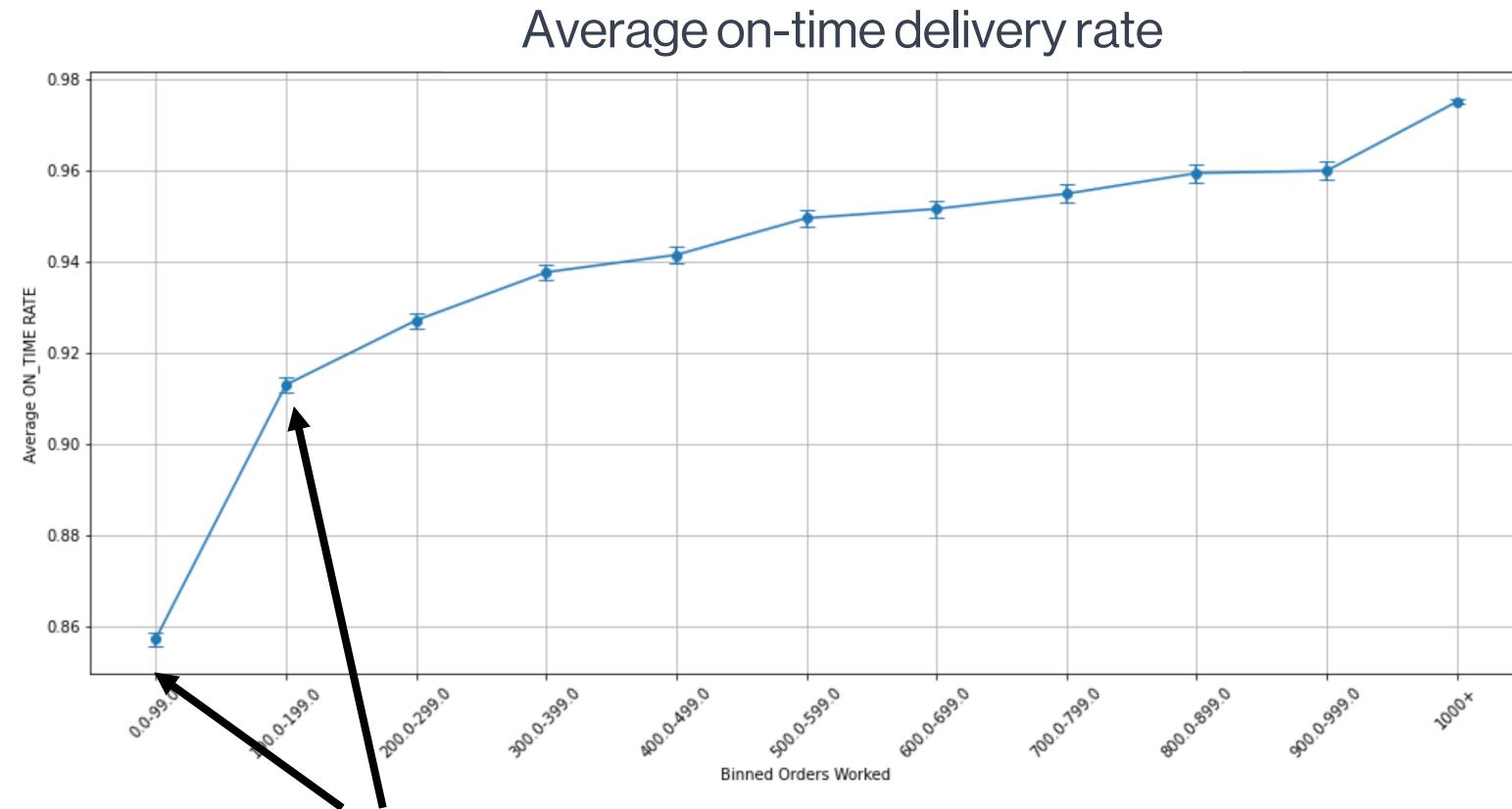
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= 1,000 orders, 6.0% ↑

# Gig Workers Learn To Do Better



We'll use the first 100 and 200 orders  
as workers' key milestones of learning

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# How Did They Improve?

Start\End	Low	Medium	High	# average concurrent orders
Low-First 100	2.223500	1.925000	2.240000	
Low-Second 100	2.632000	2.333333	2.190000	

# Bundling Early On Helps

Start\End	Low	Medium	High	# average concurrent orders
Low-First 100	2.223500	1.925000	2.240000	Initial low performers, who tried more bundling early on and adjusted down later, ended up improving performance
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# Bundling Moderately Early On Helps

Start\End	Low	Medium	High
Low-First 100	2.223500	1.925000	2.240000
Low-Second 100	2.632000	2.333333	2.190000
High-First 100	2.450000	2.745714	2.435263
High-Second 100	3.500000	3.315714	2.725789

# average concurrent orders

Initial low performers, who tried more bundling early on and adjusted down later, ended up improving performance

Those performing poorly later on tend to be those who **over-bundled**.

# What Type of Bundling?

Start\End	Low	Medium	High	P(bundling without recommendation)
Low-First 100	0.171333	0.174615	0.105000	Those doing well did <b>less self-bundling / more platform recs.</b>
Low-Second 100	0.228667	0.226923	0.135000	
Low-First 100	1.141000	1.120769	1.105000	Bundles with different stores ...did <b>less cross-store bundling</b>
Low-Second 100	1.166000	1.093846	1.090000	
Low-First 100	1.729000	1.819231	1.745000	Bundles with different top categories ...and did bundling moderately across different categories
Low-Second 100	1.852333	2.022308	1.950000	

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$$U_{nj} = \beta_1 X_{1nj} + \beta_2 X_{2nj} + \cdots + \beta_k X_{knj} + \epsilon_{nj}$$

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that were fulfilled at the same store → Higher = more exploitation of familiar stores

Dummy group indicators: most productive (129+ orders) as reference group

All the other order information workers can see while browsing

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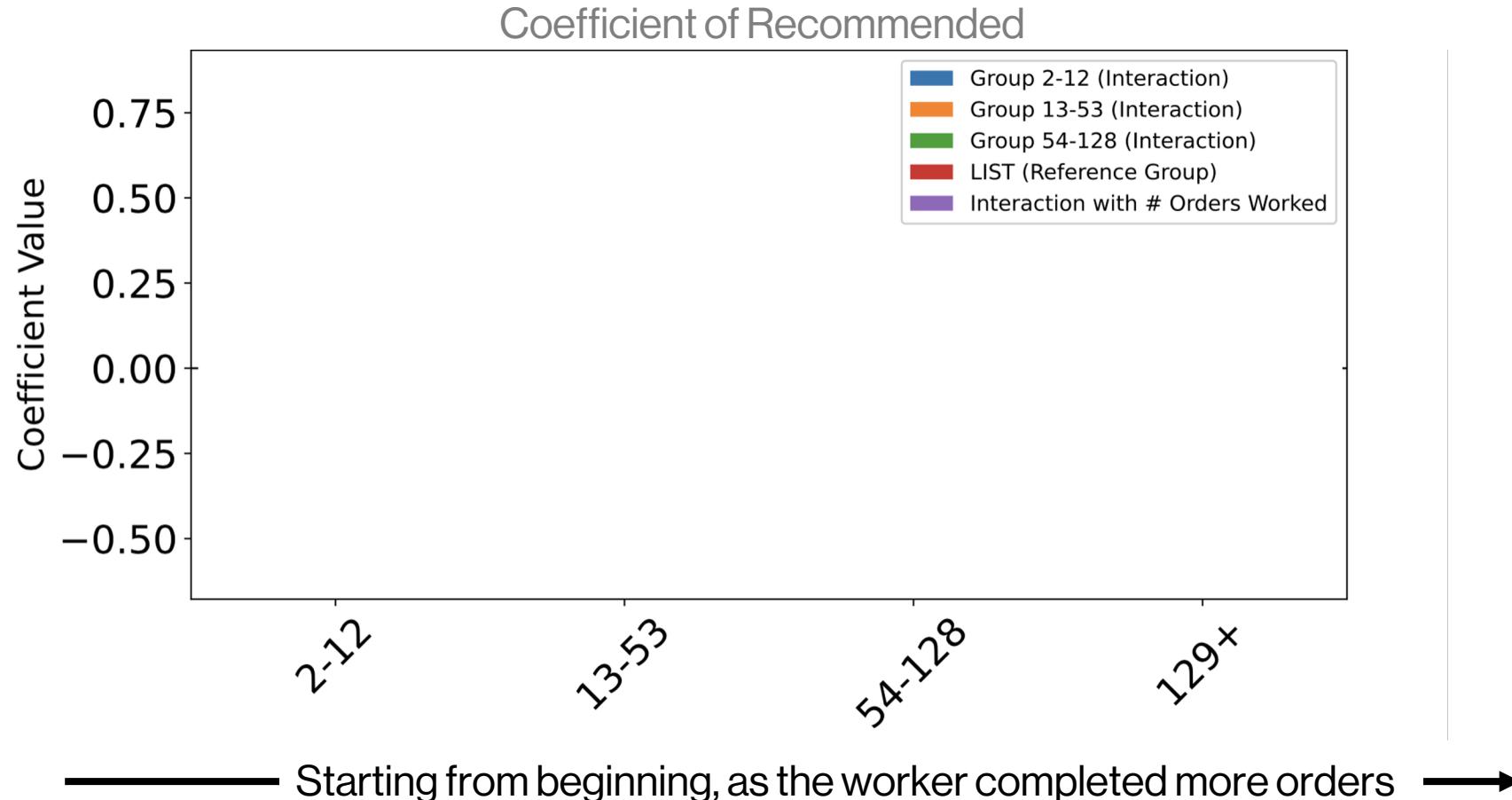
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The probability that individual  $n$  chooses alternative  $j$  is given by the softmax function:

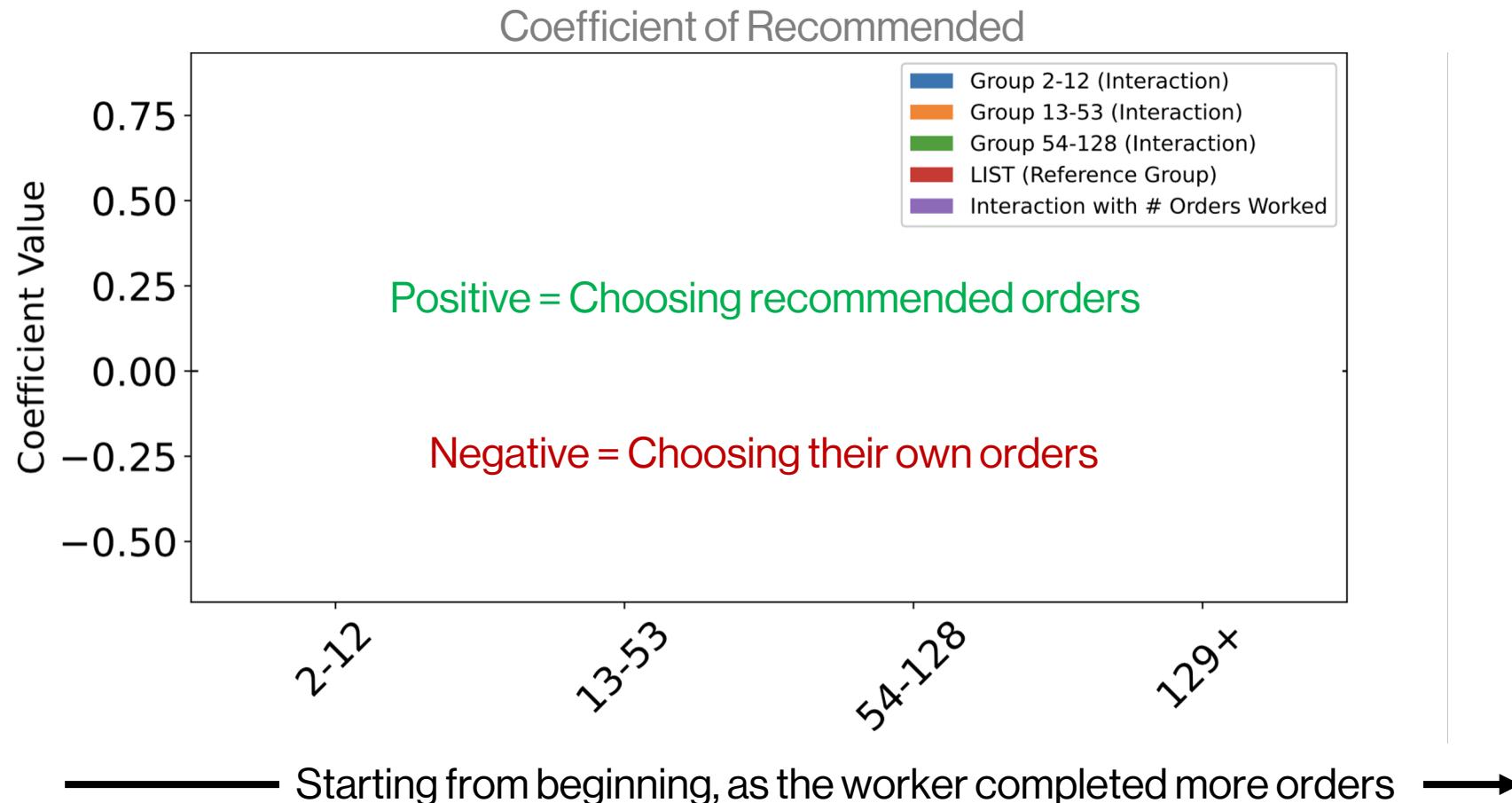
$$P(y_n = j) = \frac{e^{U_{nj}}}{\sum_{j' \in J} e^{U_{nj'}}$$

**Multinomial Logit**

# Given Recommendations...



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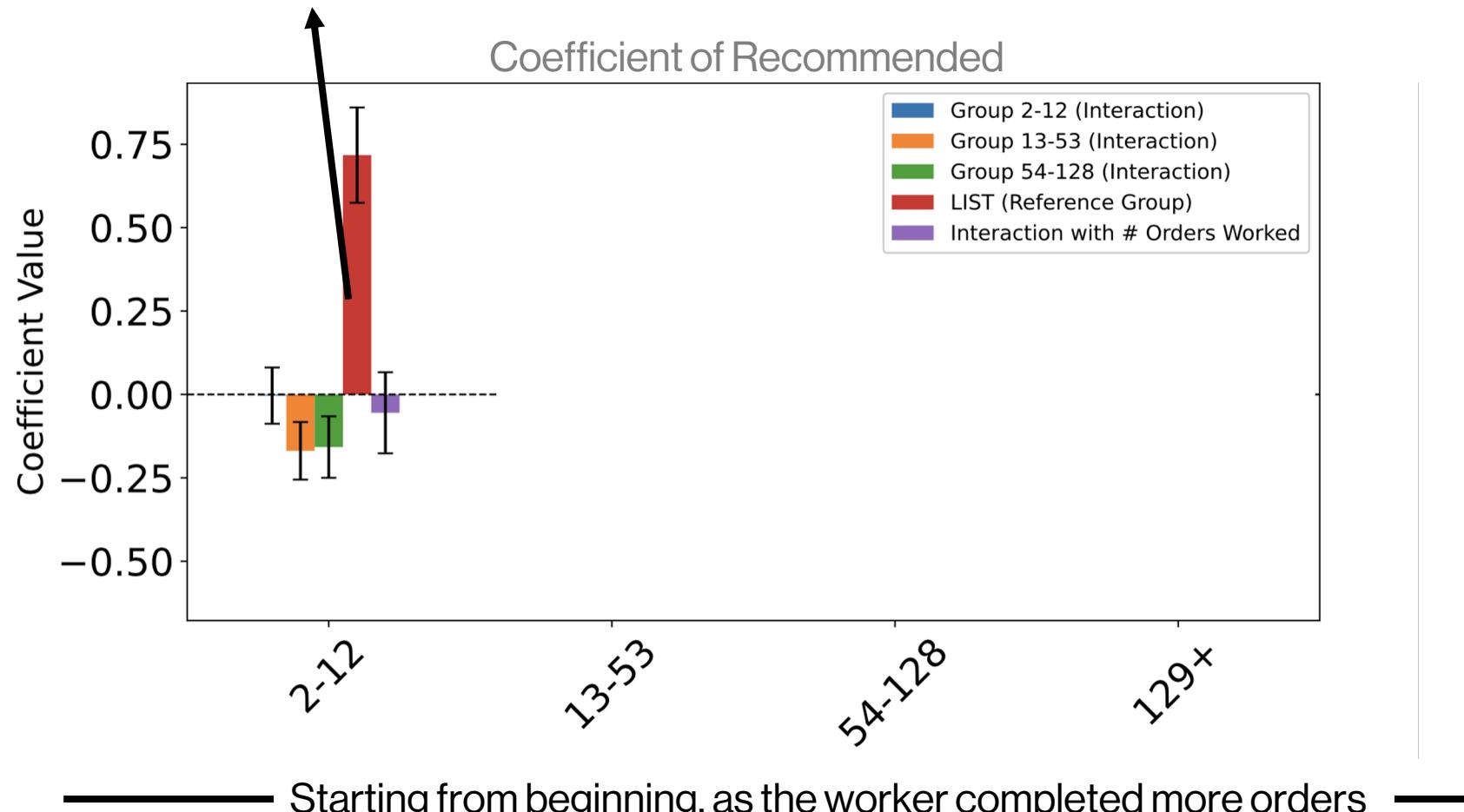


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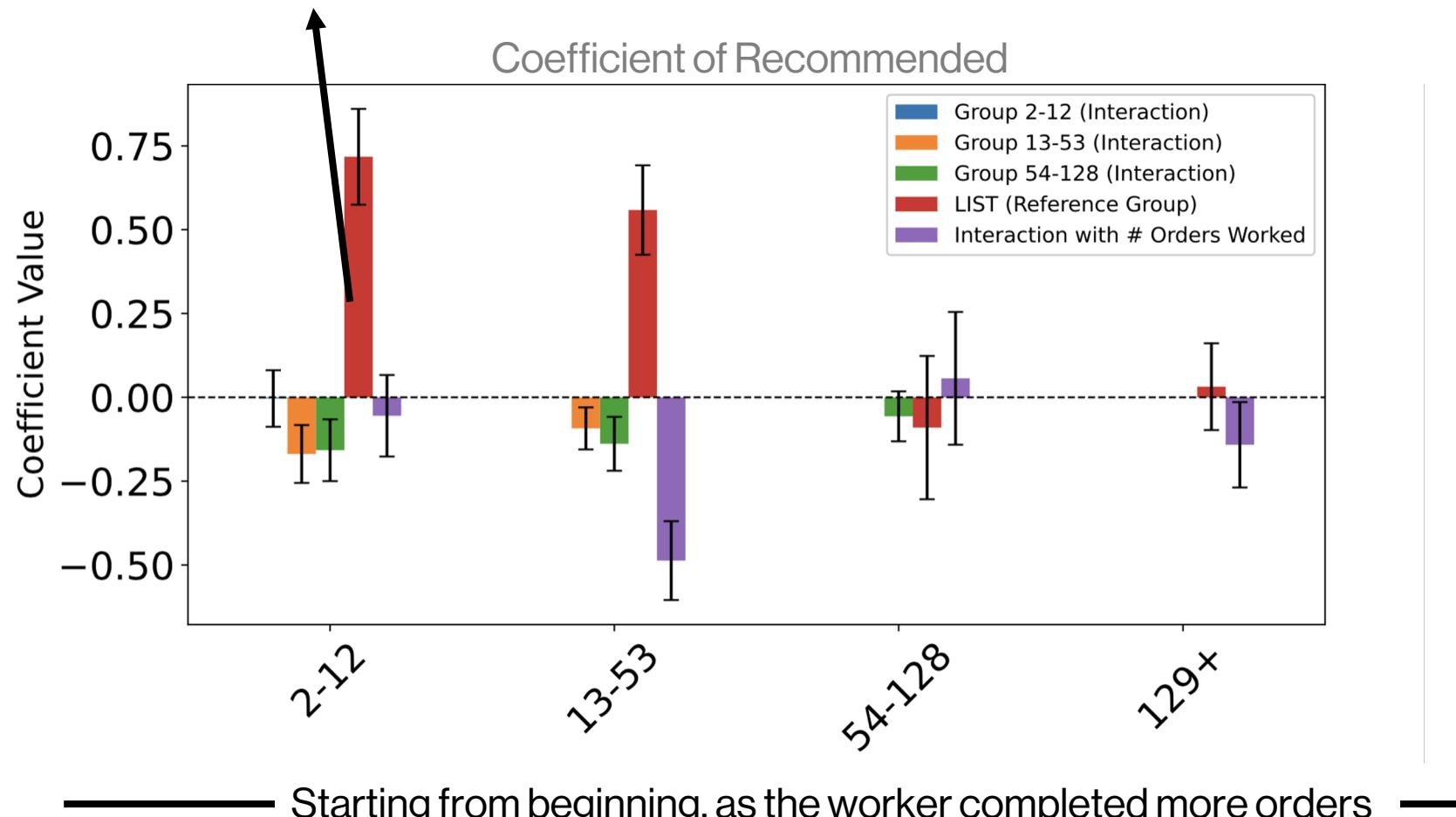
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Those doing well and staying for long **reply more** on platform recommendations in the beginning



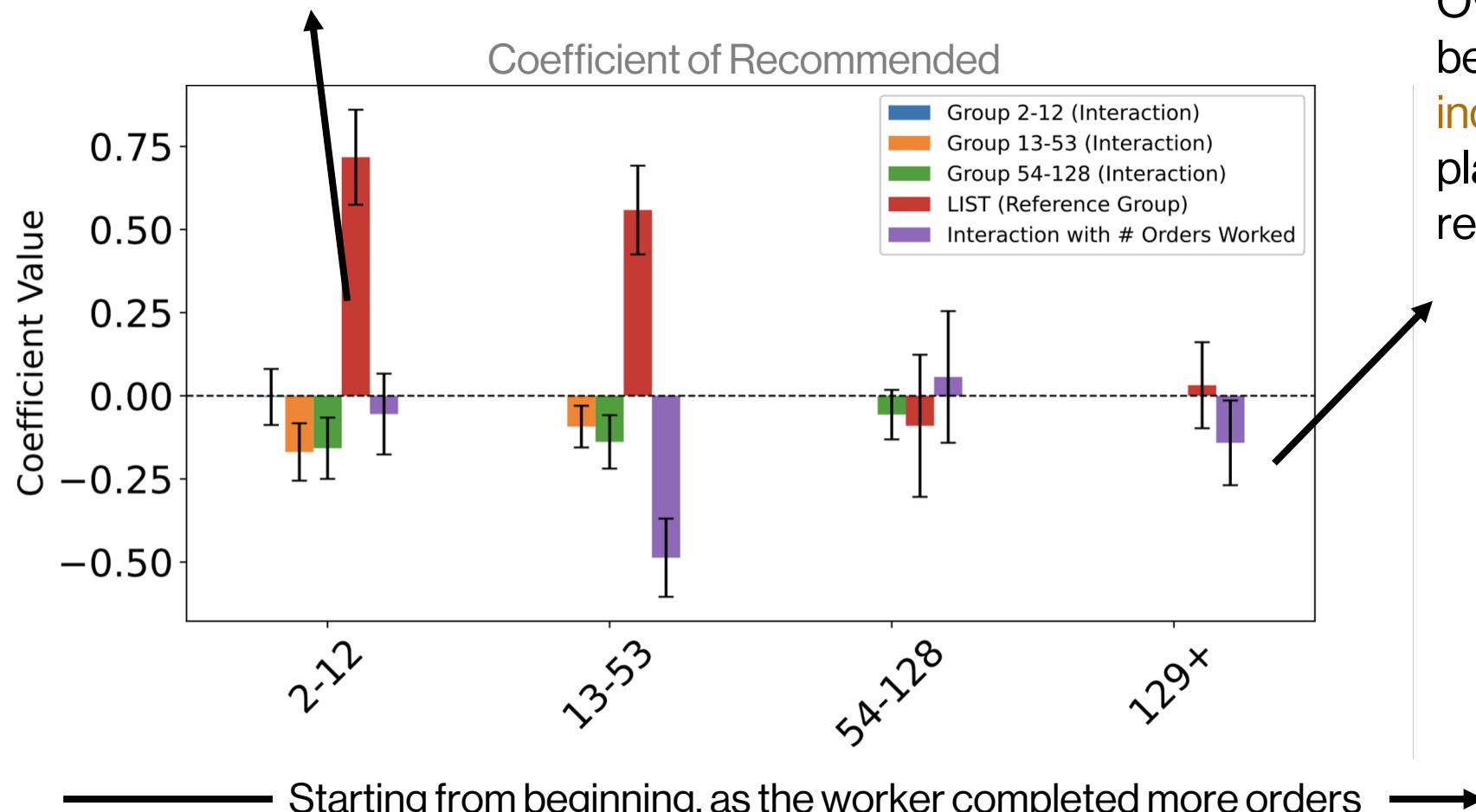
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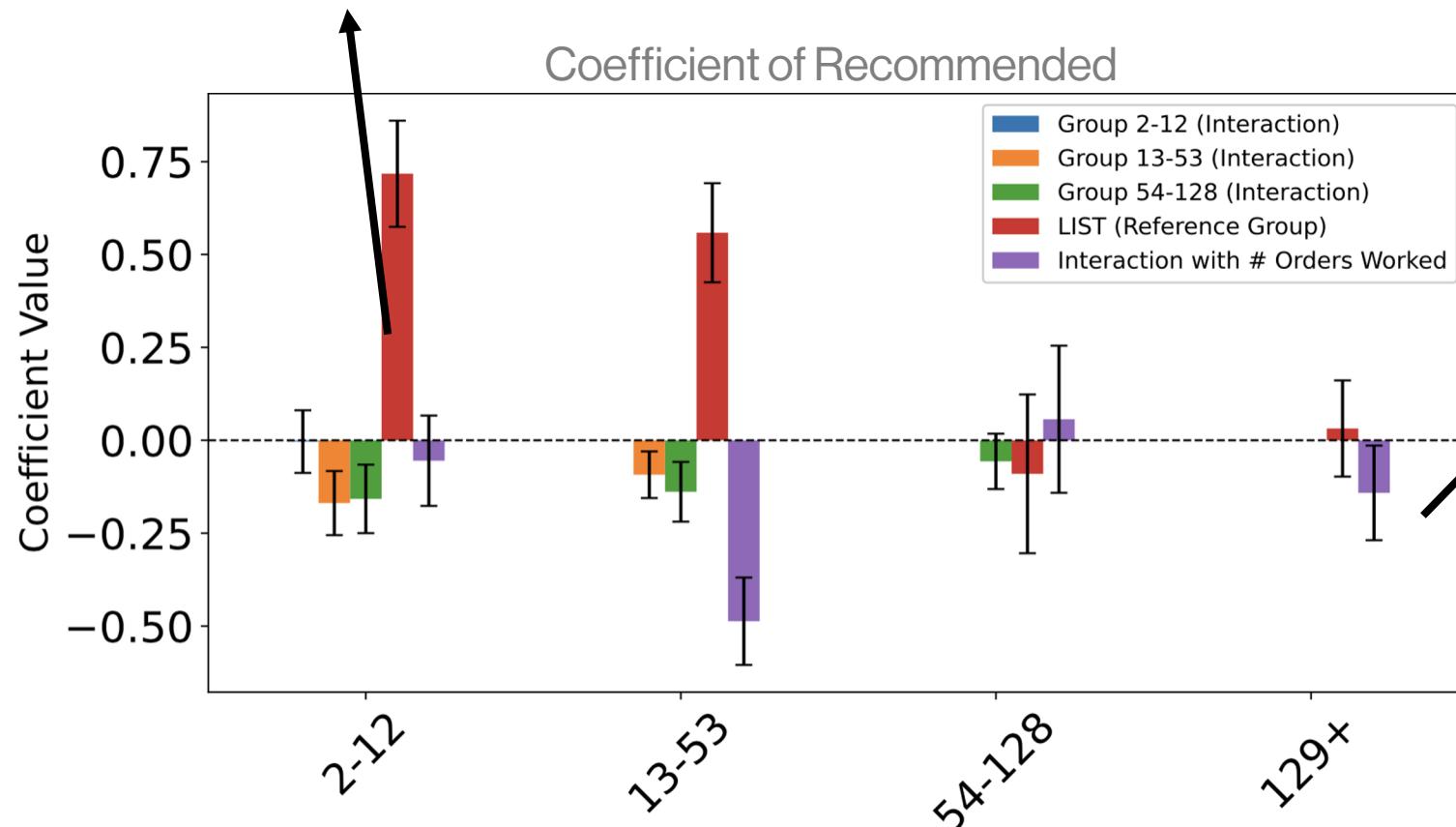
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# Given Recommendations...

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Over time workers become **more independent** of platform recommendations

We also find that those doing well started off **more exploitative**, only exploring new stores later on.

———— Starting from beginning, as the worker completed more orders ——————>

# Takeaways Learning on the Go

How gig workers choose gig tasks and learn to improve performance over time?

- Context: On-demand delivery workers in NYC, choosing own tasks, given recommendations
- Workers learn to perform better and make better decisions; workers who exploit more / rely more on platform recommendations initially improve performance the most
- Overtime workers behaviors change a lot; and they become independent of the platform's recommendation

## Next Steps:

- Online behavioral experiment
- Model human learning curve + incorporate into contextual bandits



Thank you!

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How gig workers choose gig tasks and learn to improve performance over time?

Safeway for Charlotte

\$ 20  
Piedmont

4 - apple  
3 - watermelon  
3 - orange

Safeway for James

\$ 20  
Piedmont

4 - orange  
3 - apple  
4 - watermelon

Target for Jacob

\$ 20  
Emeryville

2 - pineapple  
9 - watermelon  
2 - grape  
1 - apple  
3 - banana

Target for William

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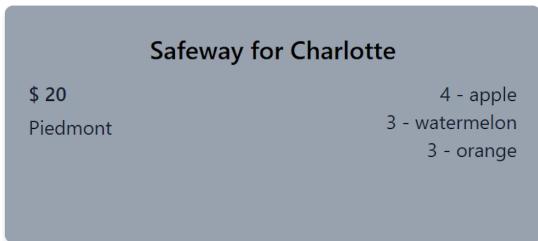
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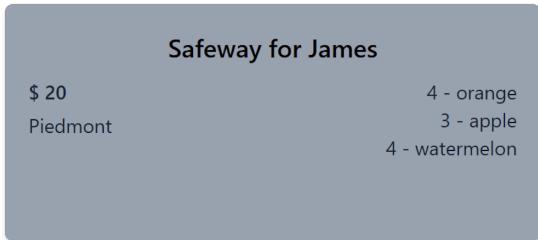
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Safeway  
Total Earnings: \$40

Order for Charlotte Earnings: 20 4 - apple 3 - watermelon 3 - orange	Order for James Earnings: 20 4 - orange 3 - apple 4 - watermelon
--	--

Time spent: 52



Current Location: Orange

Item: orange Quantities: 3 4 Add to bag

Entrance	Watermelon	
Apple	Orange	

Checkout and Exit

Bag 1 Bag2  
• apple: 4 • apple: 3



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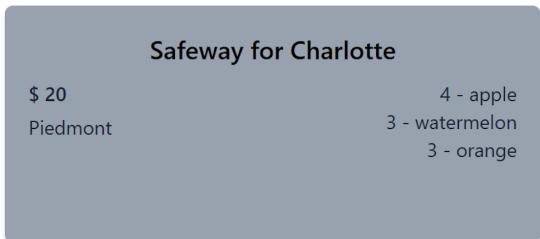
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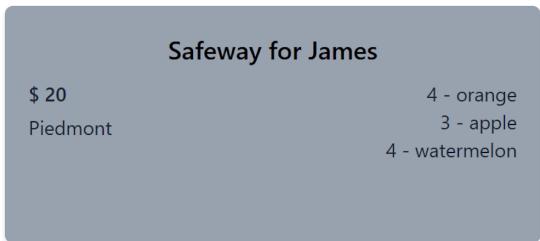
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