

# Field Testing the Transferability of Behavioral Interventions

Silvia Saccardo

*Carnegie Mellon University*

Joint work with Hengchen Dai\*, Maria Han, Sitaram Vangala, Juyea Hoo and Jeffrey Fujimoto

Society for Judgment and Decision Making, November 18<sup>th</sup>, 2023

**Carnegie  
Mellon  
University**



# Behavioral Science and Public Policy

Behavioral Science has the potential to inform public policy

## Financial Security



e.g., Thaler and Benartzi, 2004; Karlan et al., 2016

## Health & Well-being



e.g., Chapman et al., 2010, Milkman et al., 2011

## Energy consumption & sustainability



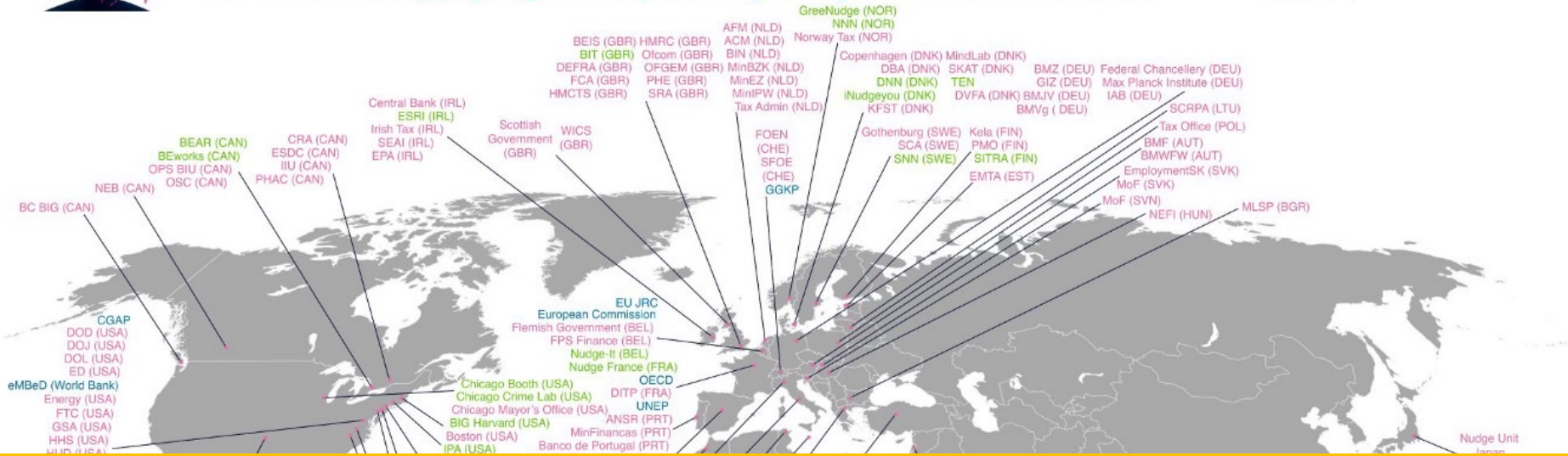
e.g., Alcott, 2011; Goldstein et al, 2008



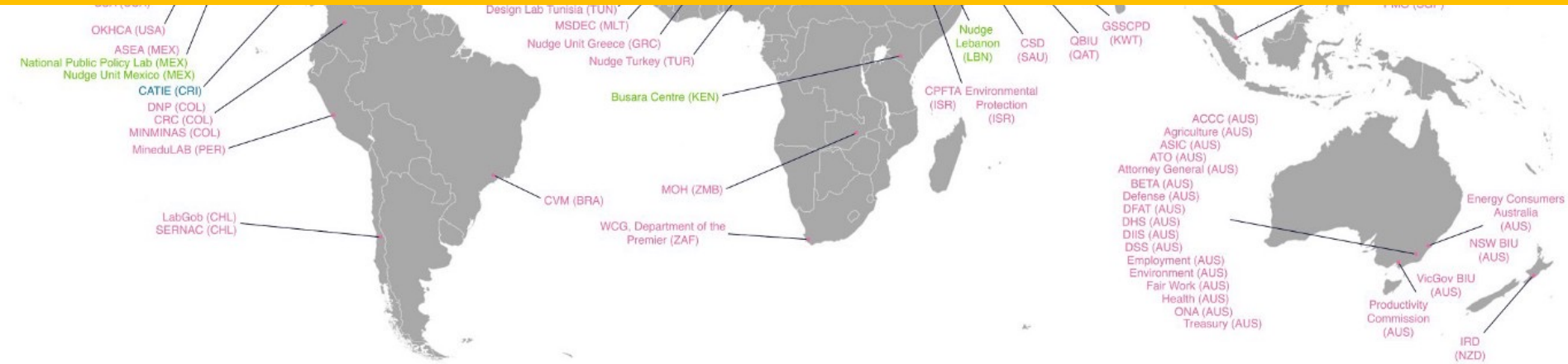


# Behavioural Insights and Public Policy

## Institutions applying BI to public policy around the world



Hundreds of units around the world incorporate behavioral science in governments, non-profits and businesses



Institutions inside government

Institutions outside government

Multi-national organisations





# Behavioural Insights and Public Policy

## Institutions applying BI to public policy around the world



Perspective | [Published: 30 April 2020](#)

## Using social and behavioural science to support COVID-19 pandemic response

[Jay J. Van Bavel](#) , [Katherine Baicker](#), [Paulo S. Boggio](#), [Valerio Capraro](#), [Aleksandra Cichocka](#), [Mina Cikara](#), [Molly J. Crockett](#), [Alia J. Crum](#), [Karen M. Douglas](#), [James N. Druckman](#), [John Drury](#), [Oeindrila Dube](#), [Naomi Ellemers](#), [Eli J. Finkel](#), [James H. Fowler](#), [Michele Gelfand](#), [Shihui Han](#), [S. Alexander Haslam](#), [Jolanda Jetten](#), [Shinobu Kitayama](#), [Dean Mobbs](#), [Lucy E. Napper](#), [Dominic J. Packer](#), [Gordon Pennycook](#), ... [Robb Willer](#)  [+ Show authors](#)

[Nature Human Behaviour](#) **4**, 460–471 (2020) | [Cite this article](#)

**570k** Accesses | **1916** Citations | **3206** Altmetric | [Metrics](#)

beh

nesses

SERNAC (CHL)

WZL, Department of the Premier (ZAF)

DIIS (AUS)  
DSS (AUS)  
Employment (AUS)  
Environment (AUS)  
Fair Work (AUS)  
Health (AUS)  
ONA (AUS)  
Treasury (AUS)

Energy Consumers Australia (AUS)  
NSW BIU (AUS)  
VicGov BIU (AUS)  
Productivity Commission (AUS)  
IRD (NZD)

Institutions inside government

Institutions outside government

Multi-national organisations

When scientists and practitioners leverage behavioral science to solve specific problems, they may deploy:



When scientists and practitioners leverage behavioral science to solve specific problems, they may deploy:



New interventions based  
on **expert intuition** &  
**theoretical insights**

When scientists and practitioners leverage behavioral science to solve specific problems, they may deploy:



New interventions based on **expert intuition** & **theoretical insights**



Interventions with empirical support in **hypothetical studies**



When scientists and practitioners leverage behavioral science to solve specific problems, they may deploy:



New interventions based on **expert intuition** & **theoretical insights**



Interventions with empirical support in **hypothetical studies**



Interventions that worked in **prior field experiments**

When scientists and practitioners leverage behavioral science to solve specific problems, they may deploy:



New interventions based on **expert intuition** & **theoretical insights**



Interventions with empirical support in **hypothetical studies**



Interventions that worked in **prior field experiments**

**In all cases, they must assess whether relevant scientific knowledge can effectively **translate** to their context** (see. e.g., Linos, 2023).



When scientists and practitioners leverage behavioral science to solve specific problems, they may deploy:



New interventions based on **expert intuition** & **theoretical insights**



Interventions with empirical support in **hypothetical studies**



Interventions that worked in **prior field experiments**

**In all cases, they must assess whether relevant scientific knowledge can effectively **translate** to their context** (see. e.g., Linos, 2023).

**This is challenging!** Expert expectations often do not match what works in a given **setting** (e.g., Della Vigna & Pope, 2018; Della Vigna & Linos, 2022; Jung et al., 2023)

# nature human behaviour

Comment | [Published: 09 October 2020](#)

## Use caution when applying behavioural science to policy

[Hans IJzerman](#) , [Neil A. Lewis Jr.](#), [Andrew K. Przybylski](#), [Netta Weinstein](#), [Lisa DeBruine](#), [Stuart J. Ritchie](#), [Simine Vazire](#), [Patrick S. Forscher](#), [Richard D. Morey](#), [James D. Ivory](#) & [Farid Anvari](#)

*Nature Human Behaviour* **4**, 1092–1094 (2020) | [Cite this article](#)

19k Accesses | 82 Citations | 190 Altmetric | [Metrics](#)

**Social and behavioural scientists have attempted to speak to the COVID-19 crisis. But is behavioural research on COVID-19 suitable for making policy decisions? We offer a taxonomy that lets our science advance in ‘evidence readiness levels’ to be suitable for policy. We caution practitioners to take extreme care translating our findings to applications.**

The Economist

Menu Weekly edition The world in brief Search

Science & technology | Nudge factor

## Evidence for behavioural interventions looks increasingly shaky

LETTER | PSYCHOLOGICAL AND COGNITIVE SCIENCES | 



## No reason to expect large and consistent effects of nudge interventions

[Barnabas Szasz](#) , [Anthony Higney](#) , [Aaron Charlton](#) , [+5](#), and [Elizabeth Tipton](#)  [Authors Info & Affiliations](#)

14 October 2020 | 110 (24) 2200–2214 | [https://doi.org/10.1038/s41586-020-2311-0](#)



panel discussion: putting nudges in perspective: making sense of the “do nudges work?” debate

This panel discussion draws on evidence from recent meta-analyses to analyze the conditions under which nudges work and to identify key issues for the next generation of research on nudges to address.

Accepted manuscript

## The i-frame and the s-frame: How focusing on individual-level solutions has led behavioral public policy astray

Published online by Cambridge University Press: 05 September 2022

[Nick Chater](#)  and [George Loewenstein](#) 

Show author details

Increased recognition of the value of accumulating knowledge about the **reliability, reproducibility** and **scalability** of behavioral science research

---

# Our study

- We provide some evidence on the **transferability** of behavioral insights in three RCTs and companion surveys.

# Our study

- We provide some evidence on the **transferability** of behavioral insights in three RCTs and companion surveys.
  - Considering the different ways interventions are often selected in research and practice we field-test interventions selected based on:
-

# Our study

- We provide some evidence on the **transferability** of behavioral insights in three RCTs and companion surveys.
- Considering the different ways interventions are often selected in research and practice we field-test interventions selected based on:
  - ✓ their effectiveness in prior **field experiments**



# Our study

- We provide some evidence on the **transferability** of behavioral insights in three RCTs and companion surveys.
  - Considering the different ways interventions are often selected in research and practice we field-test interventions selected based on:
    - ✓ their effectiveness in prior **field experiments**
    - ✓ promising results in **online studies** measuring behavior intentions
-

# Our study

- We provide some evidence on the **transferability** of behavioral insights in three RCTs and companion surveys.
  - Considering the different ways interventions are often selected in research and practice we field-test interventions selected based on:
    - ✓ their effectiveness in prior **field experiments**
    - ✓ promising results in **online studies** measuring behavior intentions
    - ✓ insights **expected to be effective** by behavioral science experts and laypeople.
-

# Context: COVID-19 Booster uptake

## Important policy challenge

- ✓ Uptake of boosters has stalled at 20% of US adults
- ✓ Only 3% this Fall



# Context: COVID-19 Booster uptake

Interesting environment for **field-testing** interventions developed based on:

---

# Context: COVID-19 Booster uptake

Interesting environment for **field-testing** interventions developed based on:



✓ **Field exp evidence**: Do interventions that worked in motivating uptake early  
Ideal on continue to be effective under changing circumstances?

# Context: COVID-19 Booster uptake

Interesting environment for **field-testing** interventions developed based on:



✓ **Field exp evidence:** Do interventions that worked in motivating uptake early  
Ideal on continue to be effective under changing circumstances?



✓ **Hypothetical exp evidence:** Large evidence on COVID-19 interventions has relied  
on hypothetical measures, calling for more field evaluations (Ruggieri et al., 2023)

# Context: COVID-19 Booster uptake

Interesting environment for **field-testing** interventions developed based on:



✓ **Field exp evidence:** Do interventions that worked in motivating uptake early  
Ideal on continue to be effective under changing circumstances?



✓ **Hypothetical exp evidence:** Large evidence on COVID-19 interventions has relied  
on hypothetical measures, calling for more field evaluations (Ruggieri et al., 2023)



✓ **Literature & Intuition:** Context where more broadly, behavioral scientists have offered  
intuition to inform government agencies' guidelines (e.g., CDC vaccine guidelines)

Design: 3 RCTs at **UCLA** Health





# Design: 3 RCTs at **UCLA** Health

Text reminders sent to N= 314, 824 patients



# Design: 3 RCTs at **UCLA** Health

Text reminders sent to N= 314, 824 patients

- Effective for initial covid vax (Dai et al. 2021; Santos et al., 2021)



# Design: 3 RCTs at **UCLA** Health

## Text reminders sent to N= 314, 824 patients

- Effective for initial covid vax (Dai et al. 2021; Santos et al., 2021)
- But not all reminders are created equal (Rabb et al., 2022; Jacobson et al., 2022 Milkman et al., 2021; Ruggieri et al, 2020)



# Design: 3 RCTs at **UCLA** Health

## Text reminders sent to N= 314, 824 patients

- Effective for initial covid vax (Dai et al. 2021; Santos et al., 2021)
- But not all reminders are created equal (Rabb et al., 2022; Jacobson et al., 2022 Milkman et al., 2021; Ruggieri et al, 2020)



## 3 pre-reg RCTs conducted simultaneously



# Design: 3 RCTs at **UCLA** Health

## Text reminders sent to N= 314, 824 patients

- Effective for initial covid vax (Dai et al. 2021; Santos et al., 2021)
- But not all reminders are created equal (Rabb et al., 2022; Jacobson et al., 2022 Milkman et al., 2021; Ruggieri et al, 2020)



## 3 pre-reg RCTs conducted simultaneously

- Each RCT focuses on its own set of pre-reg questions



# Design: 3 RCTs at **UCLA** Health

## Text reminders sent to N= 314, 824 patients

- Effective for initial covid vax (Dai et al. 2021; Santos et al., 2021)
- But not all reminders are created equal (Rabb et al., 2022; Jacobson et al., 2022 Milkman et al., 2021; Ruggieri et al, 2020)

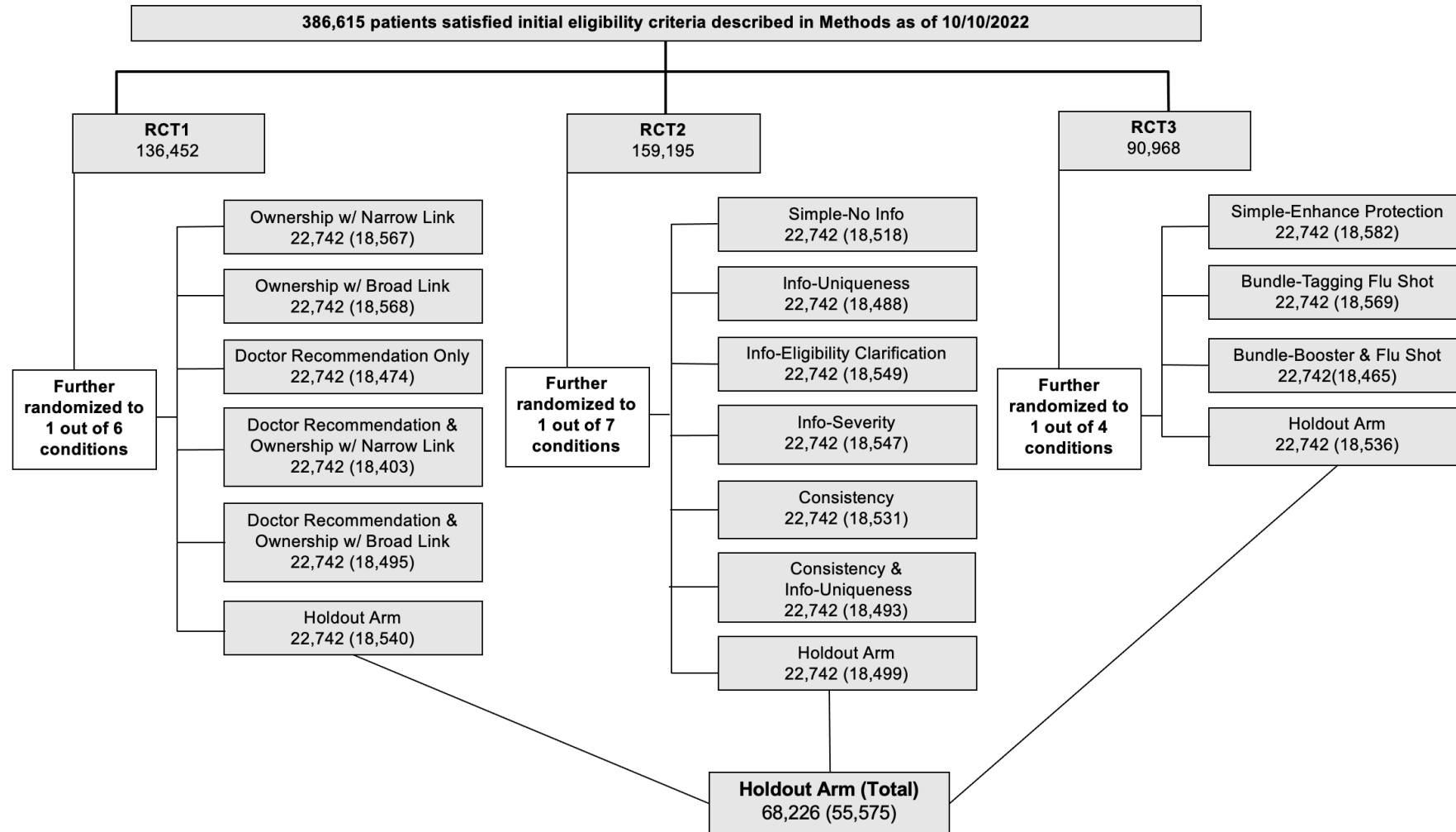


## 3 pre-reg RCTs conducted simultaneously

- Each RCT focuses on its own set of pre-reg questions
- Match patient data to California Immunization Registry records to capture vax obtained at any location (see Saccardo et al., 2023)



# Design: 3 RCTs at Health



# RCT #1: From field to field

Test the independent and joint impact of reminders with:



# RCT #1: From field to field

Test the independent and joint impact of reminders with:

## **Claim your dose language**

(Dai et al., 2021, Milkman et al., 2022)

UCLA Health: [Patient name], your medical records indicate that you are now eligible for the new bivalent COVID-19 booster. UCLA Health has limited booster appointments available on MyChart. To enhance your protection against COVID-19 **claim your dose today** by booking an appointment at CVS Pharmacy (more availability) [CVS\\_link](#)

# RCT #1: From field to field

Test the independent and joint impact of reminders with:

## **Claim your dose language**

(Dai et al., 2021, Milkman et al., 2022)

UCLA Health: [Patient name], your medical records indicate that you are now eligible for the new bivalent COVID-19 booster. UCLA Health has limited booster appointments available on MyChart. To enhance your protection against COVID-19, **claim your dose today** by booking an appointment at CVS Pharmacy (more availability) [CVS\\_link](#)

## **Doctor's endorsement language**

(Bartoš et al., 2022)

UCLA Health: [Patient name], your medical records indicate that you are now eligible for the new bivalent COVID-19 booster. **Doctors at UCLA Health strongly recommend that you get this updated booster, as it is designed to extend your protection against COVID-19 by targeting the most contagious, dominant variants of the virus.**

# RCT #1: From field to field

Test the independent and joint impact of reminders with:

## **Claim your dose language**

(Dai et al., 2021, Milkman et al., 2022)

UCLA Health: [Patient name], your medical records indicate that you are now eligible for the new bivalent COVID-19 booster. UCLA Health has limited booster appointments available on MyChart. To enhance your protection against COVID-19, **claim your dose today** by booking an appointment at CVS Pharmacy (more availability) [CVS\\_link](#)

## **Doctor's endorsement language**

(Bartoš et al., 2022)

UCLA Health: [Patient name], your medical records indicate that you are now eligible for the new bivalent COVID-19 booster. **Doctors at UCLA Health strongly recommend that you get this updated booster, as it is designed to extend your protection against COVID-19 by targeting the most contagious, dominant variants of the virus.**

*\*RCT1 also varies whether the appointment links directed patients to a single pharmacy (Dai et al., 2021) or to a website listing all pharmacies (Rabb et al., 2022)*

# RCT #2: From hypothetical to field

- Compares a simple reminder to reminders that include **information interventions** to correct misconceptions
  - ✓ Build on a survey of misconceptions about COVID-19 and the bivalent booster (N=500)
  - ✓ E.g., Clarify eligibility regardless of high-risk status; highlight impact on COVID-19 severity & long COVID-19 symptoms; clarify difference between bivalent booster and prior vaccine doses

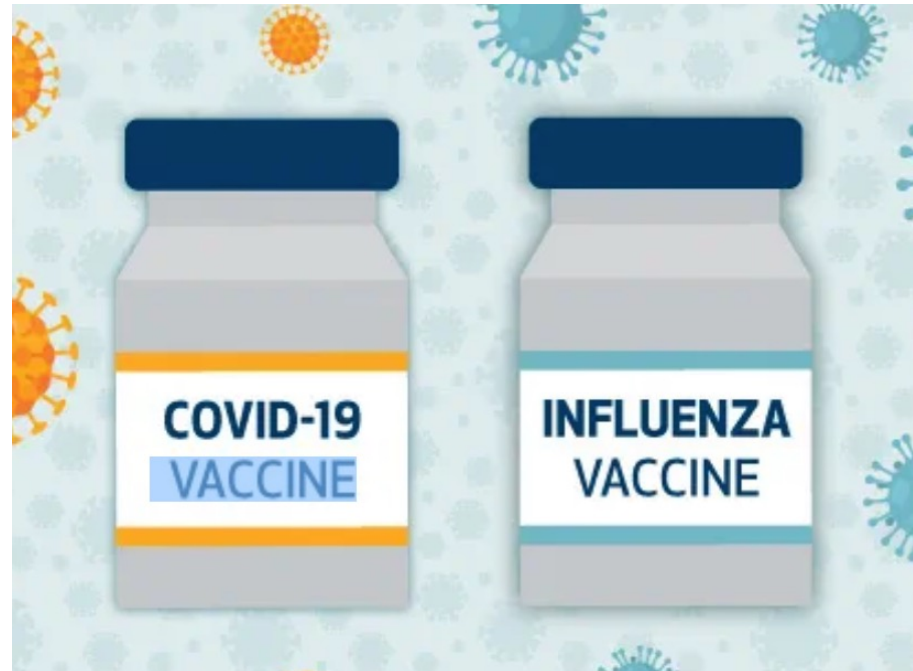
# RCT #2: From hypothetical to field

- Compares a simple reminder to reminders that include **information interventions** to correct misconceptions
  - ✓ Build on a survey of misconceptions about COVID-19 and the bivalent booster (N=500)
  - ✓ E.g., Clarify eligibility regardless of high-risk status; highlight impact on COVID-19 severity & long COVID-19 symptoms; clarify difference between bivalent booster and prior vaccine doses
- & and reminders that **leverage consistency**

UCLA Health: [Patient name], based on your medical records, you have completed a COVID-19 vaccine primary series. Great job protecting your health! Now, you can get the new bivalent COVID-19 booster.

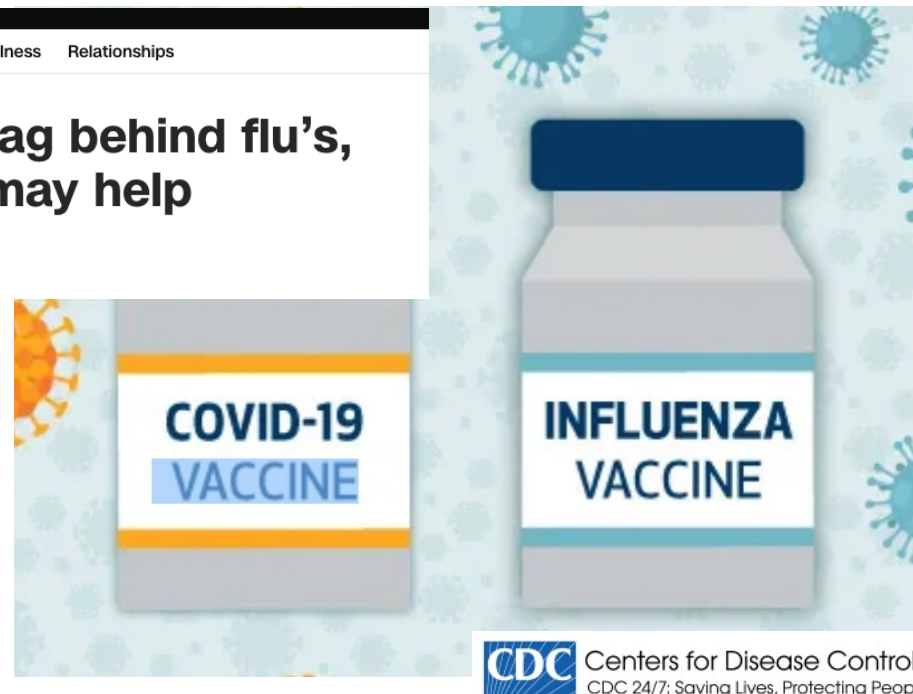
# RCT #3: From intuition to field

- Test the impact of prompting patients to bundle COVID-19 and Flu vaccines at the same appointment



# RCT #3: From intuition to field

- Test the impact of prompting patients to bundle COVID-19 and Flu vaccines at the same appointment



 Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives. Protecting People™

Getting a Flu Vaccine and a COVID-19 Vaccine at the Same Time

# RCT #3: From intuition to field

- Test the impact of prompting patients to bundle COVID-19 and Flu vaccines at the same appointment

The image shows two overlapping screenshots. The top one is a CNN health article titled "Covid-19 vaccination rates lag behind flu's, but getting shots together may help" by Meg Tirrell, CNN, published on September 19, 2023. The bottom screenshot is from the CVS pharmacy website, showing a prompt to "Add flu vaccine?" with a "Continue scheduling" button.

CNN health Life, But Better Fitness Food Sleep Mindfulness Relationships

## Covid-19 vaccination rates lag behind flu's, but getting shots together may help

By Meg Tirrell, CNN  
Published 6:40 AM EDT, Tue September 19, 2023

< CVS.com Home

CVS pharmacy

### Add flu vaccine?

Save time by easily adding a flu vaccine to this appointment. Based on our records and guidelines from the Centers for Disease Control and Prevention (CDC), adding this vaccine is completely safe and compatible with the other vaccine you've selected to schedule.

Add flu vaccine to this appointment? (optional)

Yes

No

Continue scheduling

Cancel

The image shows a dark overlay with white text. At the top, it says "CDC recommends 1 dose of the updated booster shot 2 months after". Below that, it asks "Are you ready for flu season?" and provides information about adding a flu shot to an appointment. It includes a promotional banner for Walgreens rewards and two buttons: "No Thanks" and "Add my annual flu shot".

CDC recommends 1 dose of the updated booster shot 2 months after

### Are you ready for flu season?

Protect you and your family by adding your annual **flu shot** to this appointment. According to the CDC, it's safe to receive your flu shot with other vaccinations.

PLUS: Get your vaccine at Walgreens and **earn \$5 Walgreens Cash Rewards** on your next purchase of \$1+ in store.<sup>1</sup>

myWalgreens

No Thanks Add my annual flu shot

1 Offer valid 10/01 thru 12/31/22. Not valid in NY, NJ, and AR. Must be a myWalgreens® member. Other restrictions apply.

 Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives. Protecting People™

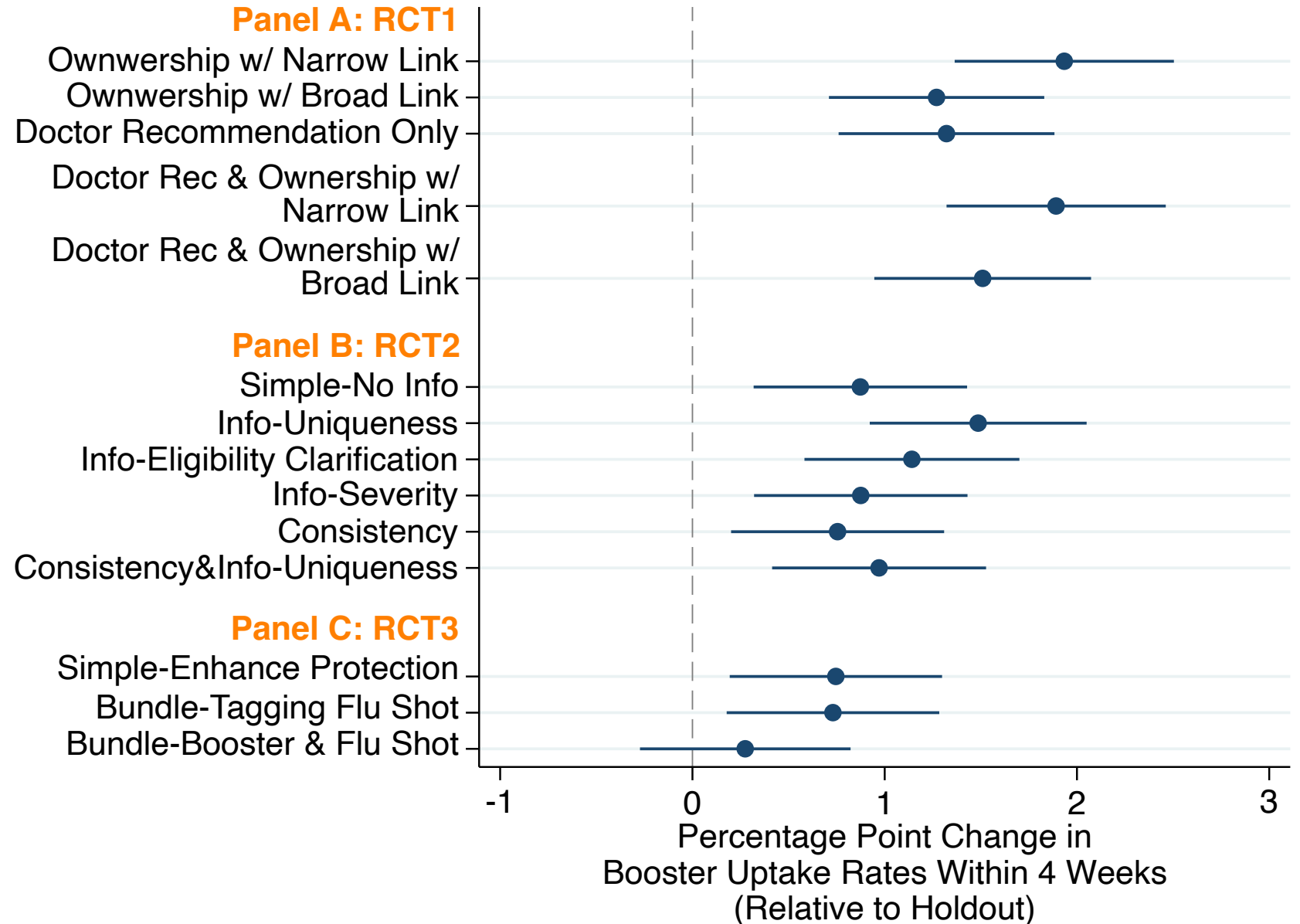
## Getting a Flu Vaccine and a COVID-19 Vaccine at the Same Time



# RCT #3: From intuition to field

- Test the impact of prompting patients to bundle COVID-19 and Flu vaccines at the same appointment
  - Compare a simple message to 2 messages that encourage patients to get the COVID-19 booster and the flu vaccine at the same time
  - *E.g., “You can now save time by bundling two vaccines (the bivalent COVID-19 booster and flu vaccine) at once”*
-

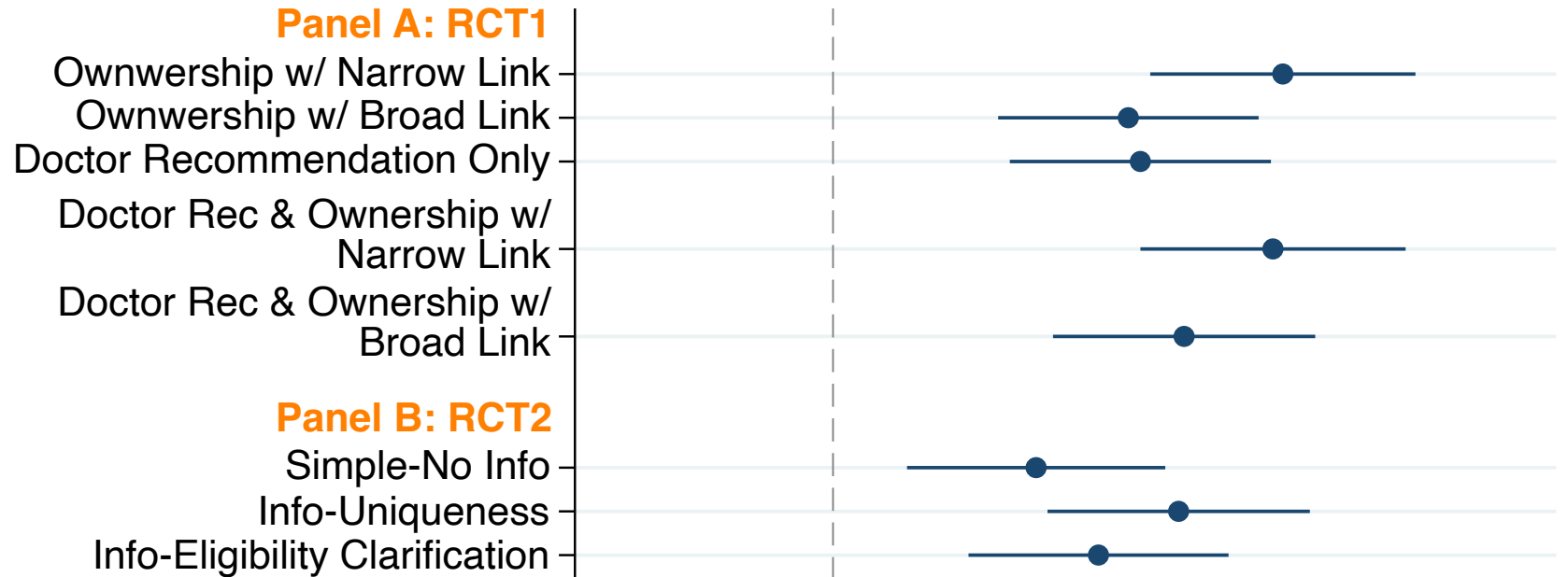
# Results



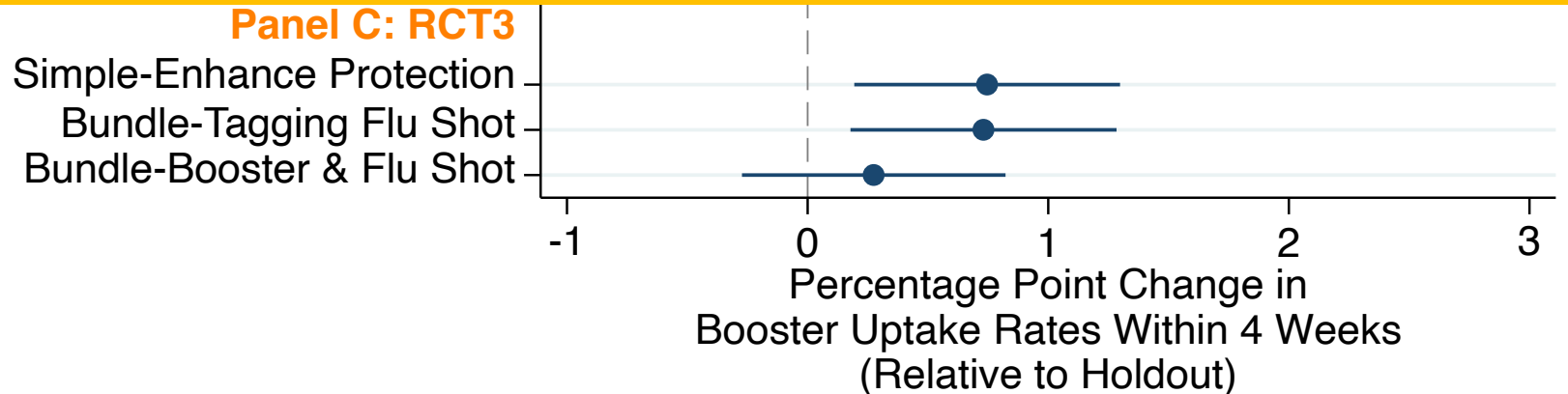
Uptake in holdout: 12.39%

N= 314,824

# Results



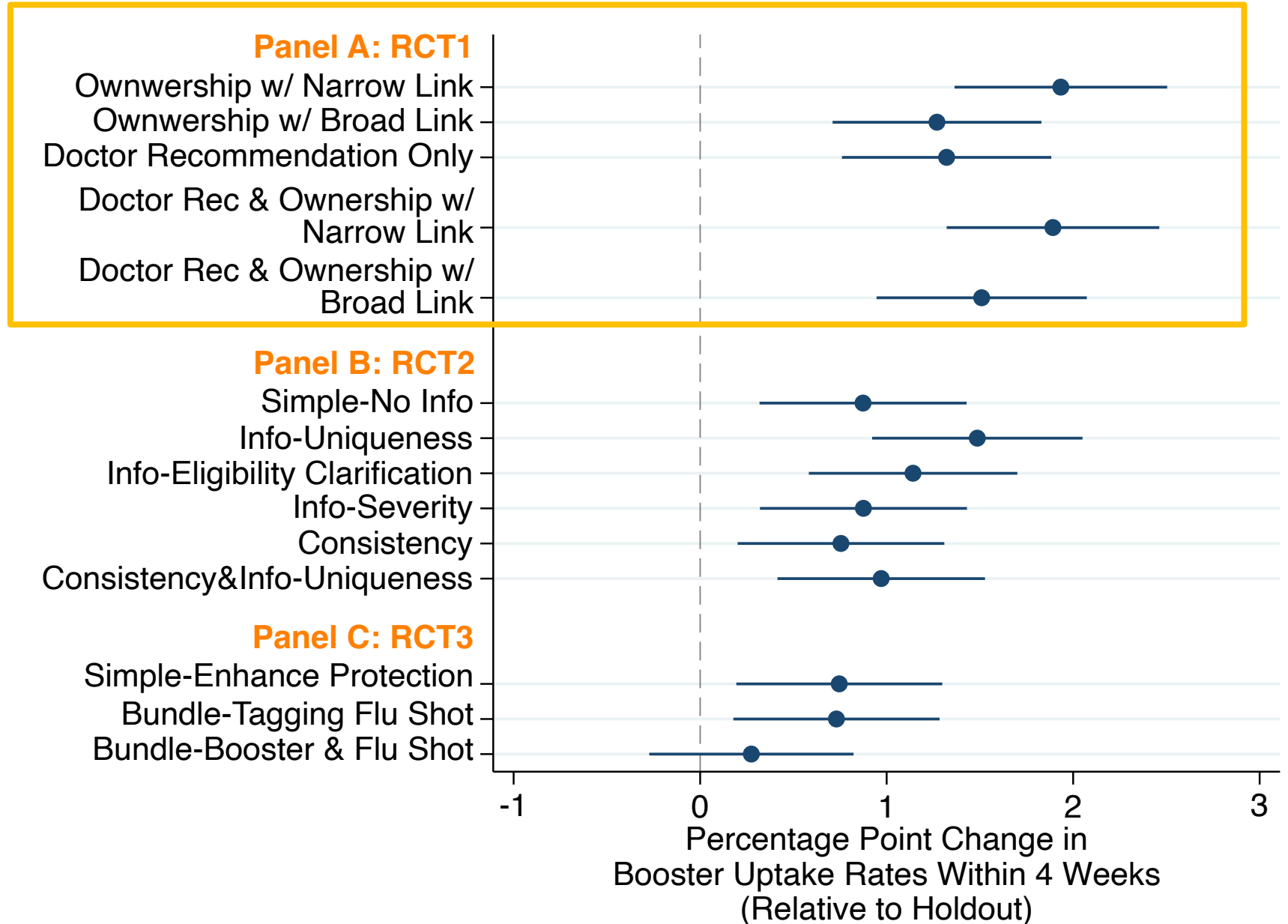
**Average impact of sending a reminder on booster uptake is 1.13pp,  $p < .001$ , 95% CI= [0.0083, 0.0143], a 9.10% relative increase**



Uptake in holdout: 12.39%

N= 314,824

# Results



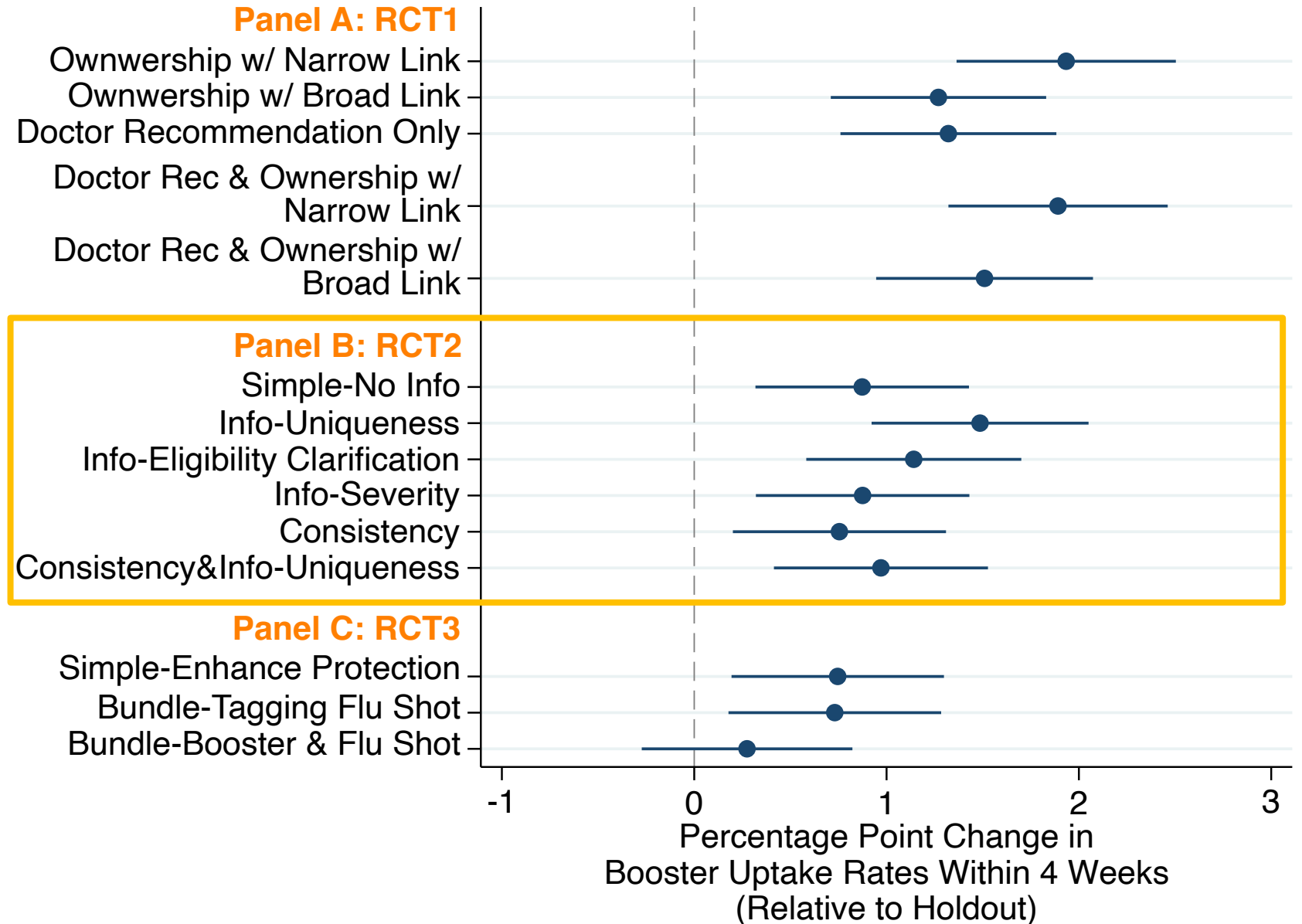
Uptake in holdout: 12.39%

N= 314,824

# Results: From field to field

- Both reminders with ownership (“claim your dose”) language and reminders with doctor recommendation language increase take up with respect to holdout
  - Messages that include ownership language **increased booster uptake by 0.79 pp** as compared to messages with no ownership ( $p < .001$ )
  - Adding ownership language to doctor recommendation language does not further boost uptake ( $B = .0009$ ,  $p = .072$ )
-

# Results



Uptake in holdout: 12.39%

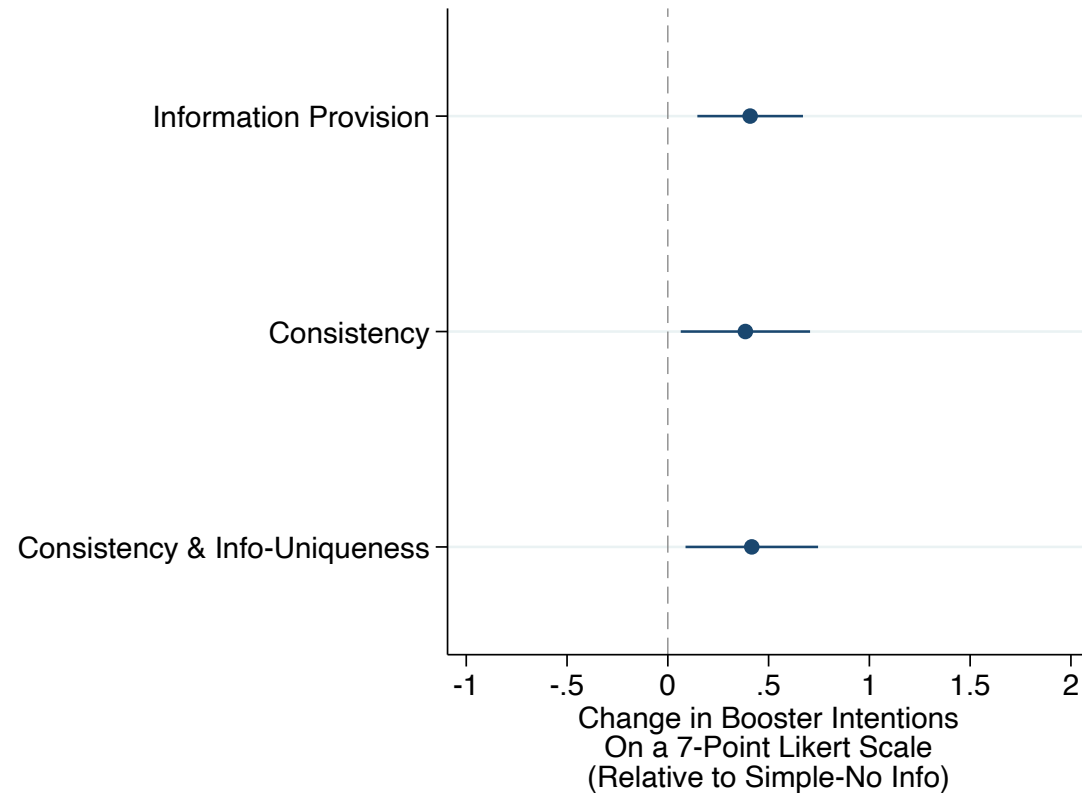
N= 314,824

# Results: From hypothetical to field

- In a pre-reg online study (N=1774), the three information interventions and the consistency-based interventions outperformed the simple reminder
  - on both **persuasiveness** and **intentions** to get the COVID-19 boosters  
( $M_{\text{SimpleReminder}}=3.99$ ,  $B=0.385$  to  $0.417$ ,  $p<.002$ )
- In the field, **none of these interventions outperforms the simple reminder**  
(B ranged from  $-0.0012$  to  $0.0030$ , all p-values  $>.30$ )

# Results: From hypothetical to field

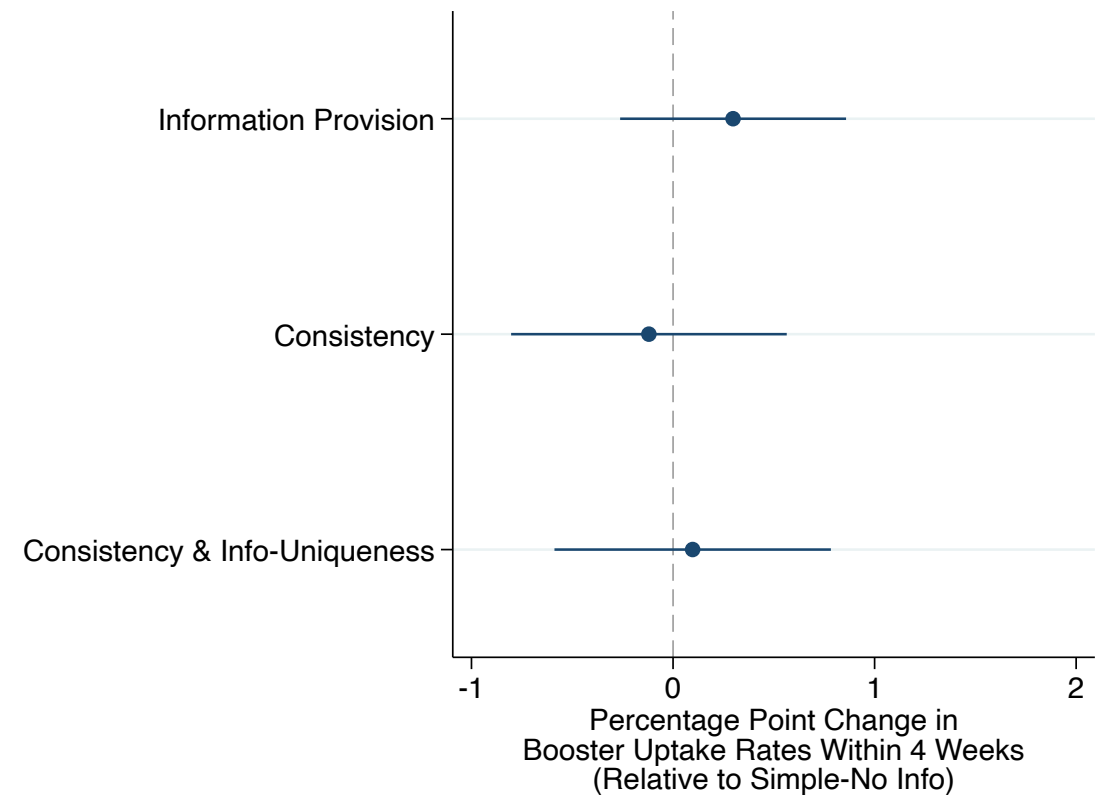
Panel A: Online experiment testing RCT2 messages



Online Studies, N=1,774

Mean in simple reminder = 3.99, SD=1.99

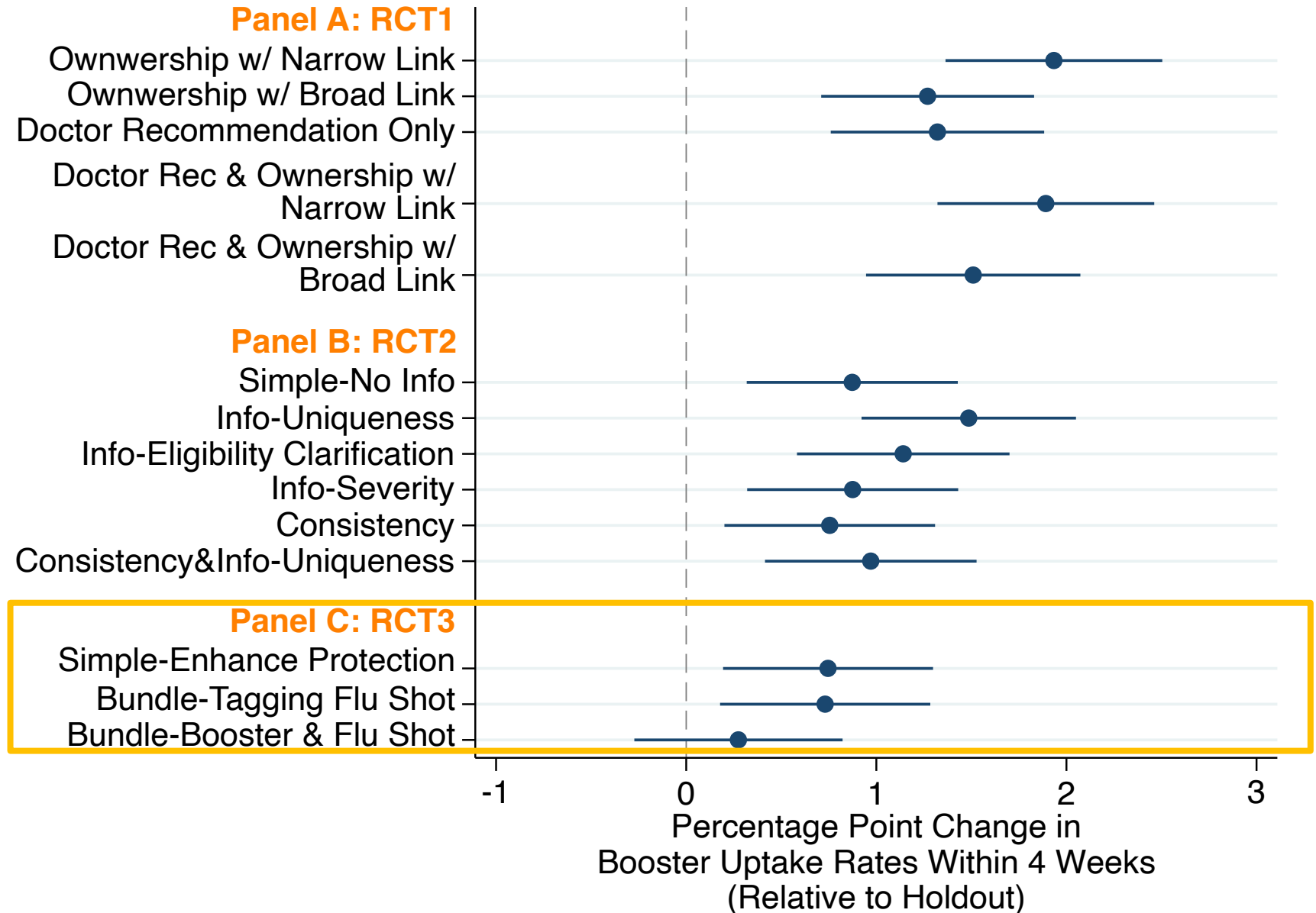
Panel B: RCT2



RCT2



# Results



Uptake in holdout: 12.39%

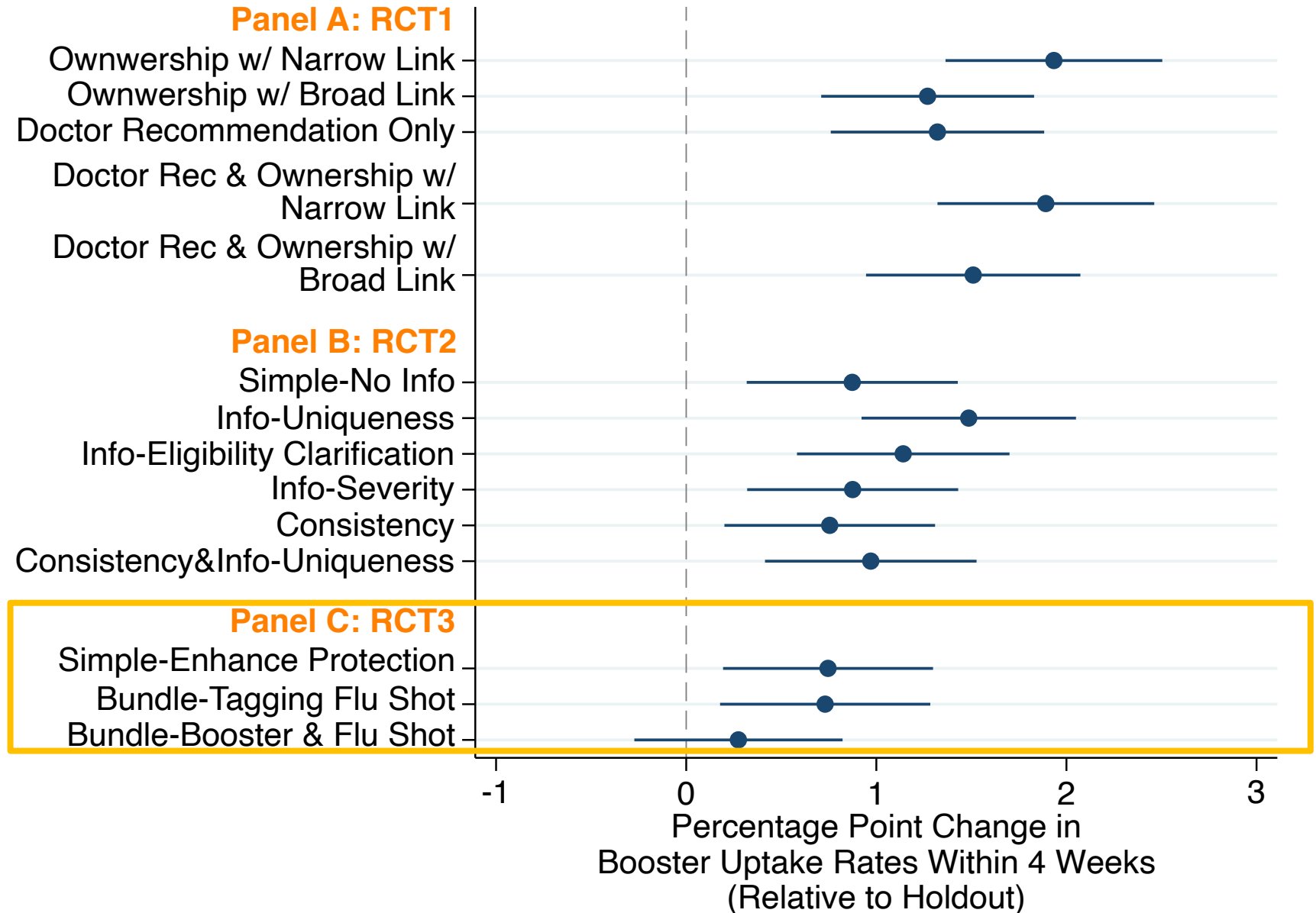
N= 314,824

# Results: From intuition to field

- 85% of behavioral scientists\* (N=40) and 93% of laypeople (N=498) **expected the bundle COVID-19 + flu messages to be more effective than the simple reminder**
  - 60% and 71% choose the Bundle-Booster & Flu Message
- However, these messages **did not outperform the simple reminder in the field** (b=-0.0025, p=<.041, 95% CI [-0.0083, 0.0034])

*\* A big thanks to all the behavioral scientists who have taken our survey at SJDM 2022!*

# Results






Uptake in holdout: 12.39%

N= 314,824

# Conclusion

- Recent calls for more work aimed at understanding **whether** and **when** the evidence scientists and practitioners rely on is **sound and transferable**
-

# Conclusion

- Recent calls for more work aimed at understanding **whether** and **when** the evidence scientists and practitioners rely on is **sound and transferable**
- We take a step in this direction, assessing the **transferability of findings**
  - ✓ Field to field 
  - ✓ Hypothetical to field 
  - ✓ Expert to field 

Co-PI & main  
Collaborator



Hengchen Dai

Field partner



Funder



Thank you!  
ssaccard@andrew.cmu.edu