

**TOMNET and D-STOP USDOT Tier 1 University Transportation Centers present  
The ABCs (Attitudes – Behaviors – Choices) of Future Mobility**

# ***Project Overview and Results from the Initial Phoenix Pilot Survey***

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**June 12, 2020**



# Full citation (APA style)

Pendyala, R.M., Capasso da Silva, D., & Khoeini, S. (2020). *Project Overview and Results from the Initial Phoenix Pilot Survey. The ABCs (Attitudes – Behaviors – Choices) of Future Mobility*. Available at <https://www.tomnet-utc.org/leadership-webinar-series.html>.

# Introduction

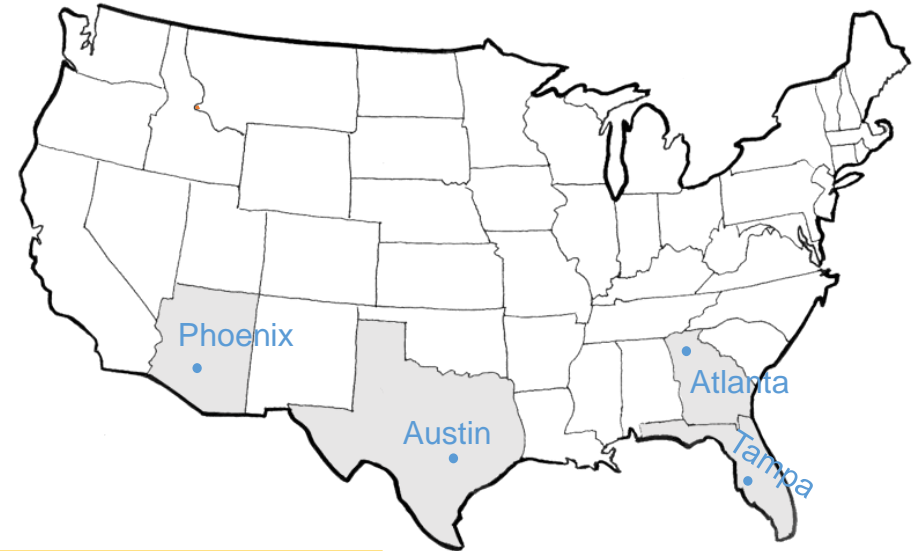
- Transformative changes in transportation
- People's attitudes towards and perceptions of these technologies and services need to be measured and understood
- Transportation models should account for attitudes and perceptions, adoption pathways, and adaptation mechanisms

# Study Purpose

Collect a rich set of data across multiple jurisdictions that includes information about people's travel behavior, and attitudes towards and perceptions of advanced transportation technologies and mobility options such as AVs, MaaS, Micromobility, and Shared Modes

# TOMNET D-STOP Transformative Technologies in Transportation Survey (T<sup>4</sup> Survey)

- Phoenix, Atlanta, Austin, and Tampa metro areas
- Summer and Fall 2019
- Random address-based sample with online instrument
- Comprehensive attitudinal survey on MaaS and AV
- Weighted to better represent Census distributions



	Phoenix, AZ	Atlanta, GA	Austin, TX	Tampa, FL	Total
<b>Sample Size</b>	1,027	944	1,127	260	<b>3,358</b>
<b>%</b>	30.6%	28.1%	33.6%	7.8%	100%

# Comprehensive Survey Instrument



Attitudes and Preferences



Vehicles You Have and Where You Live



Current Travel Patterns



Mobility on Demand and Shared Mobility Services



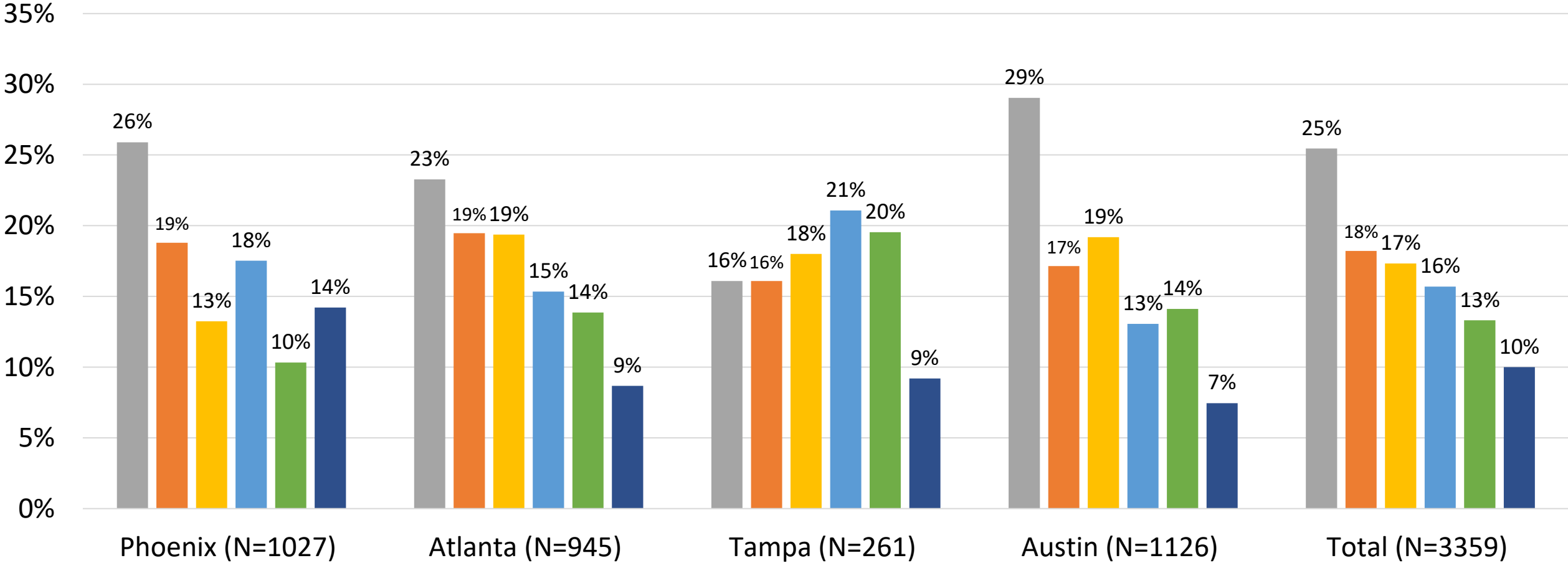
Autonomous Vehicles



Background Information

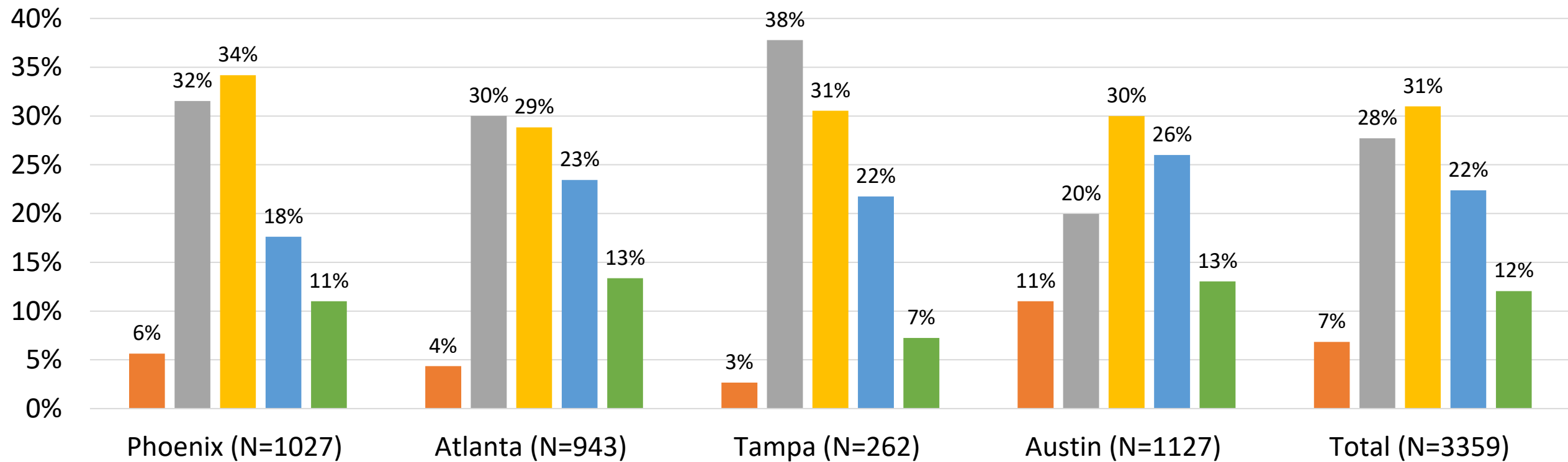
# Age Distribution - Weighted

■ 18-30 years  
 ■ 31-40 years  
 ■ 41-50 years  
 ■ 51-60 years  
 ■ 61-70 years  
 ■ 71+ years



# Highest Education Attained - Weighted

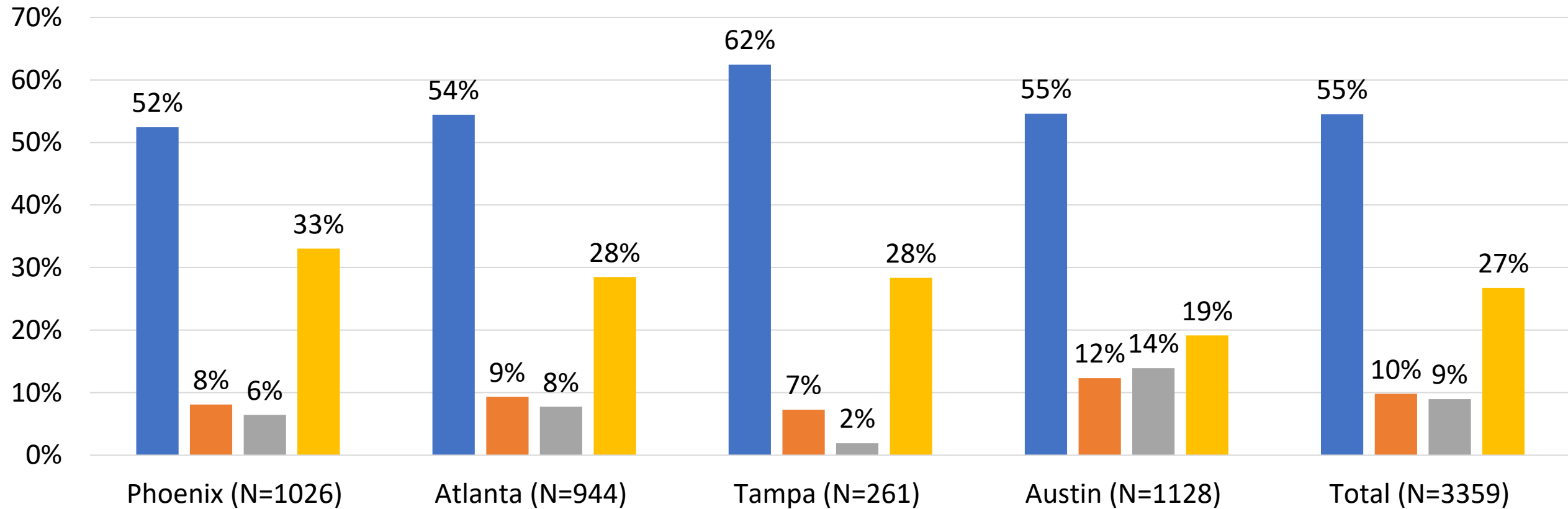
- Some grade/high school
- Some college or technical school
- Completed graduate degree(s)
- Completed high school or GED
- Bachelor's degree(s) or some graduate school





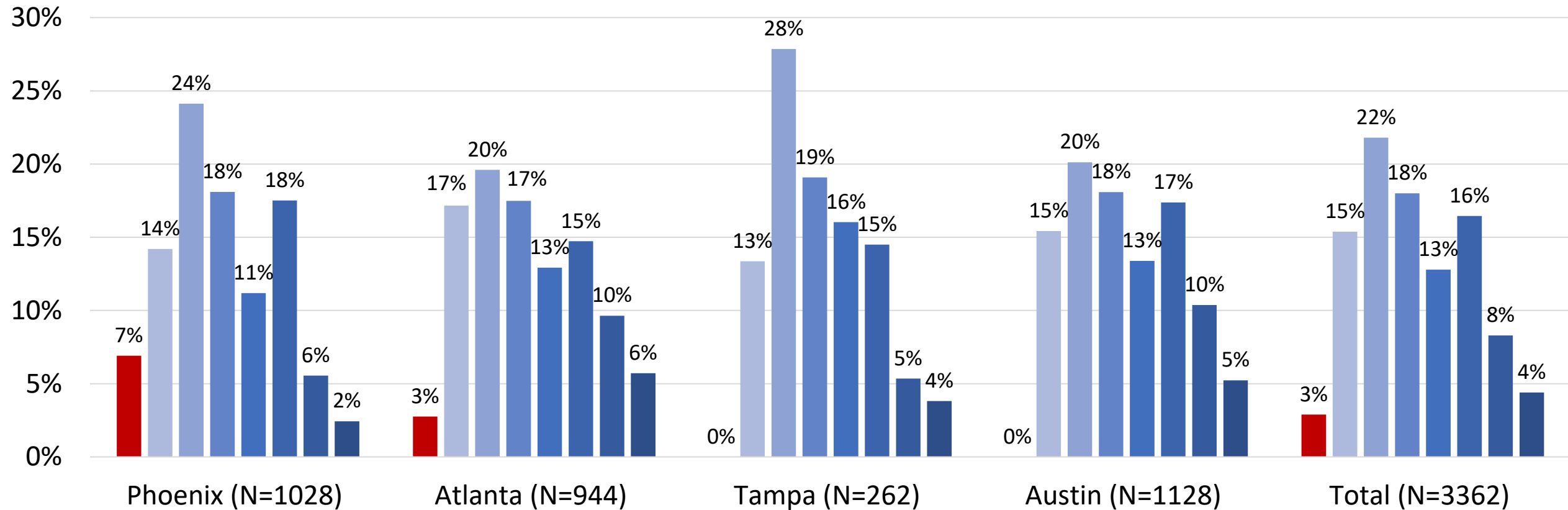
# Employment/Student Status - Weighted

■ A worker (part-time or full-time) ■ Both a worker and a student  
■ A student (part-time or full-time) ■ Neither a worker nor a student



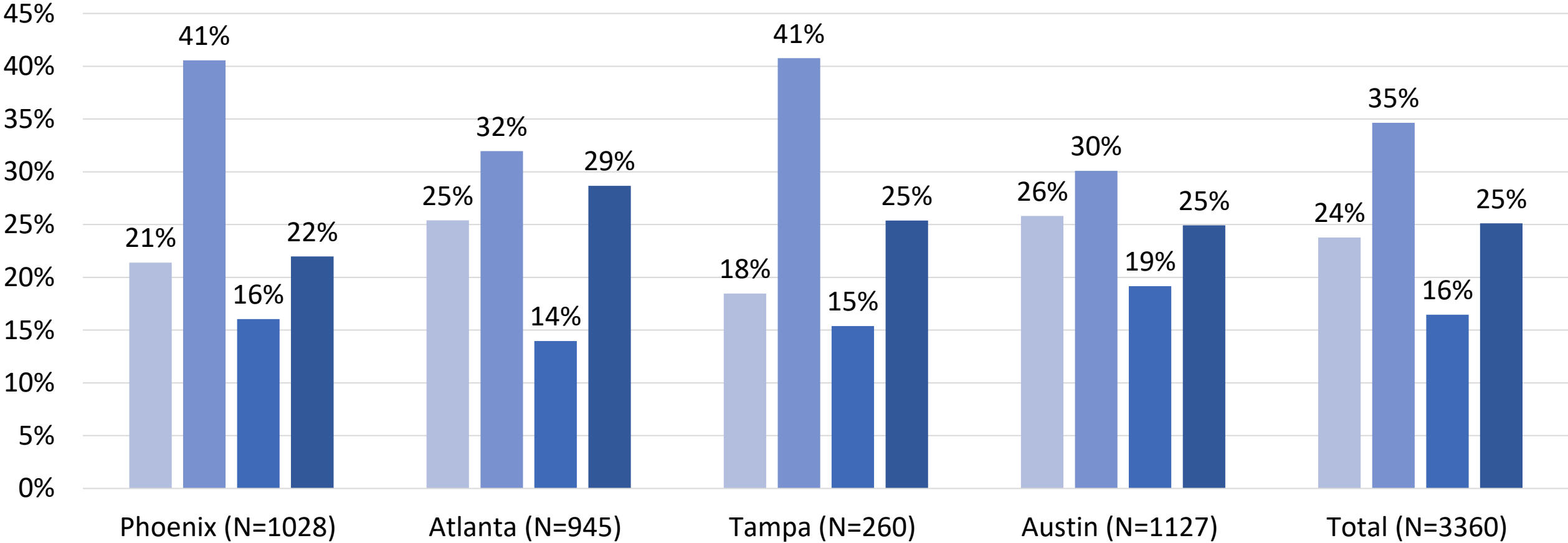
# Household Income - Weighted

■ Missing     
 ■ Less than \$25,000     
 ■ \$25,000 to \$49,999     
 ■ \$50,000 to \$74,999  
■ \$75,000 to \$99,999     
 ■ \$100,000 to \$149,999     
 ■ \$150,000 to \$249,999     
 ■ \$250,000 or more



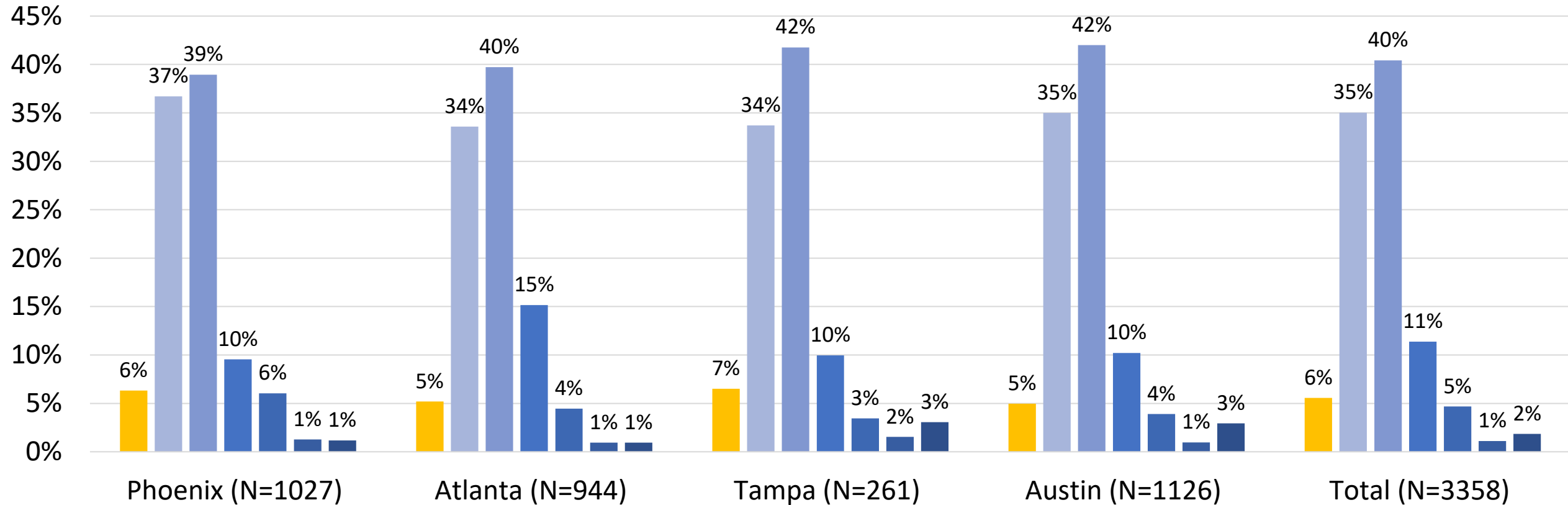
# Household Size - Weighted

■ 1 ■ 2 ■ 3 ■ 4 or more



# Household Vehicles - Weighted

0 1 2 3 4 5 6+



# Pilot Survey Deployment

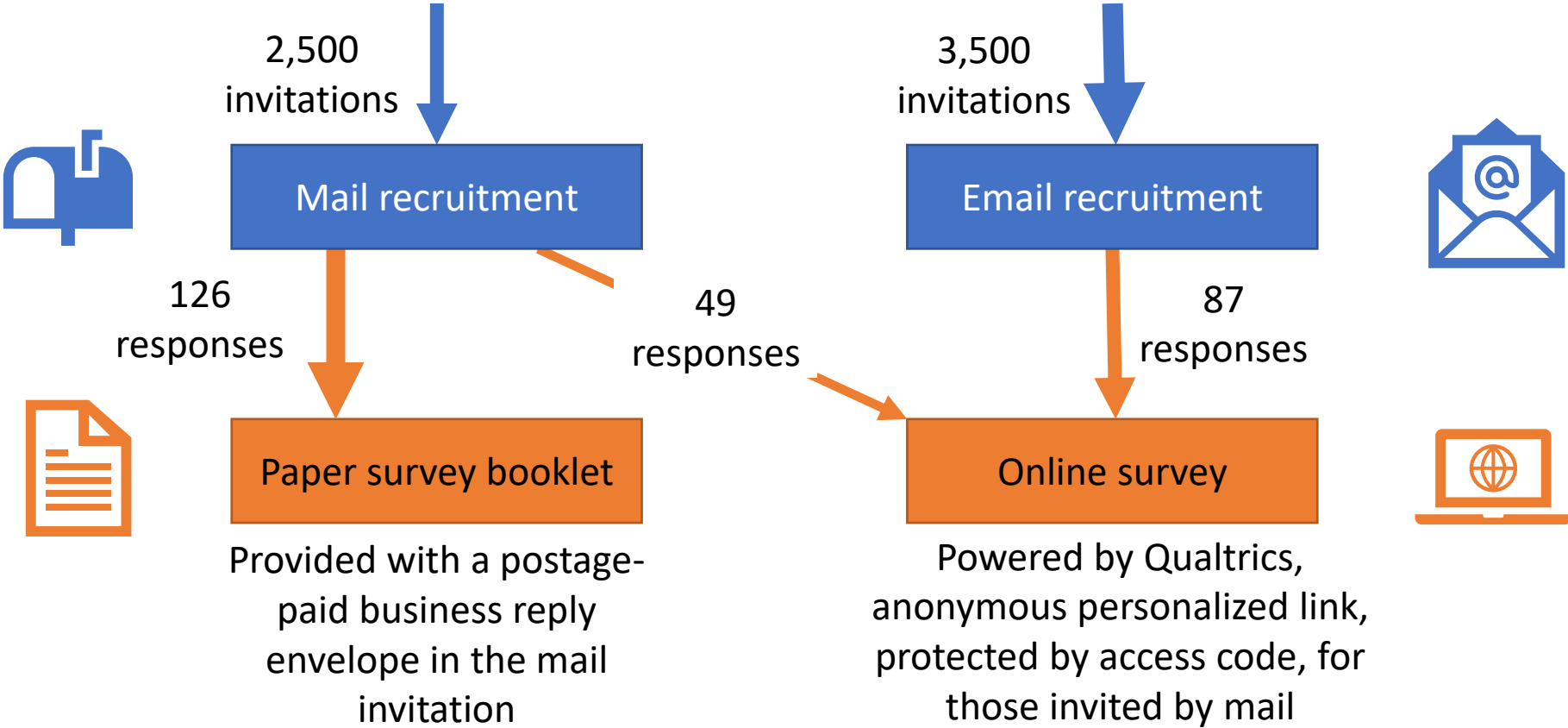
- Question: How should the survey be administered?
  - Is single mode OK?
- Test survey questionnaire
- Structure and Format
  - Phoenix Metropolitan area only
  - **Fall 2018**
  - Random address-based sample
  - Rewards: \$10 for each of the first 100 respondents

**SAMPLE SIZE:** 262 responses

# Objectives of Pilot Survey

- Study the impact of the recruitment/administration method on representativeness of the sample and quality of responses.
- Identify **differences in attitudes between ONLINE respondents and PAPER-MAIL respondents.**
- If we adopt a pure online survey methodology, are we missing key sub-populations in terms of their ***attitudes***?
- Not as concerned about socio-economic differences because we can potentially correct for those through post-weighting procedures

# Pilot Survey Data Collection



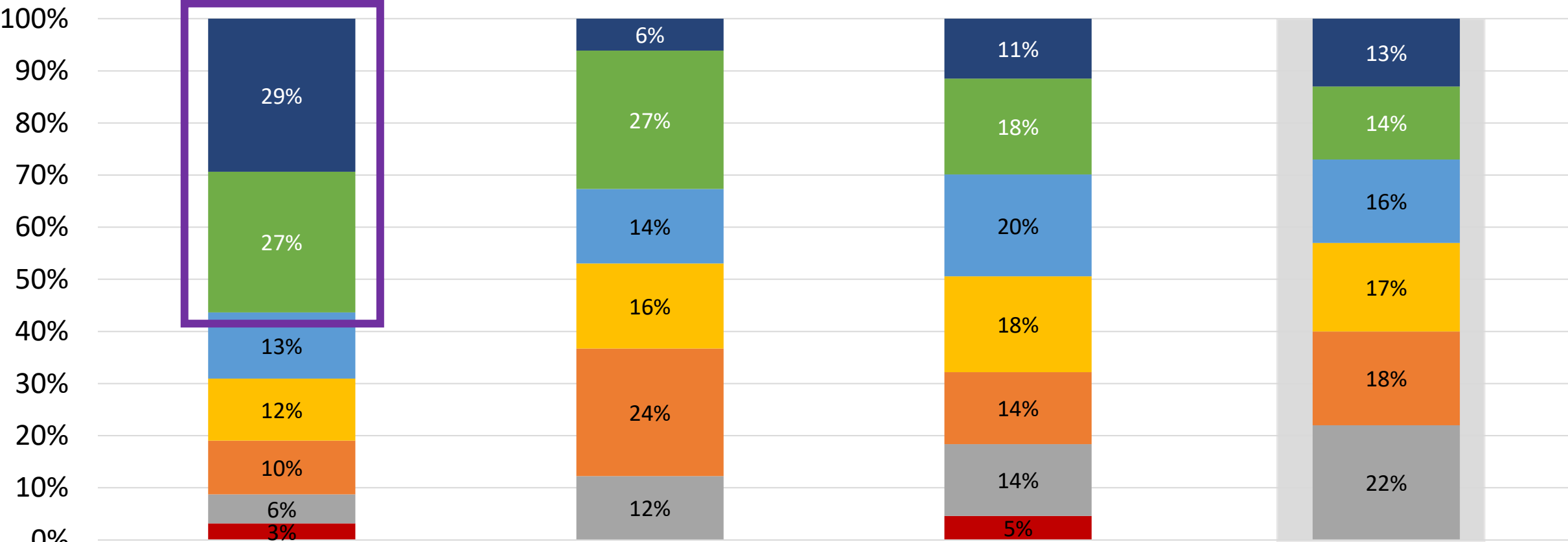
# Comparison Between Recruitment/Survey Methods

*Demographic and Socio-economic characteristics*



# Age Distribution

■ Missing  
 ■ 18-29 years  
 ■ 30-39 years  
 ■ 40-49 years  
 ■ 50-59 years  
 ■ 60-69 years  
 ■ 70+ years



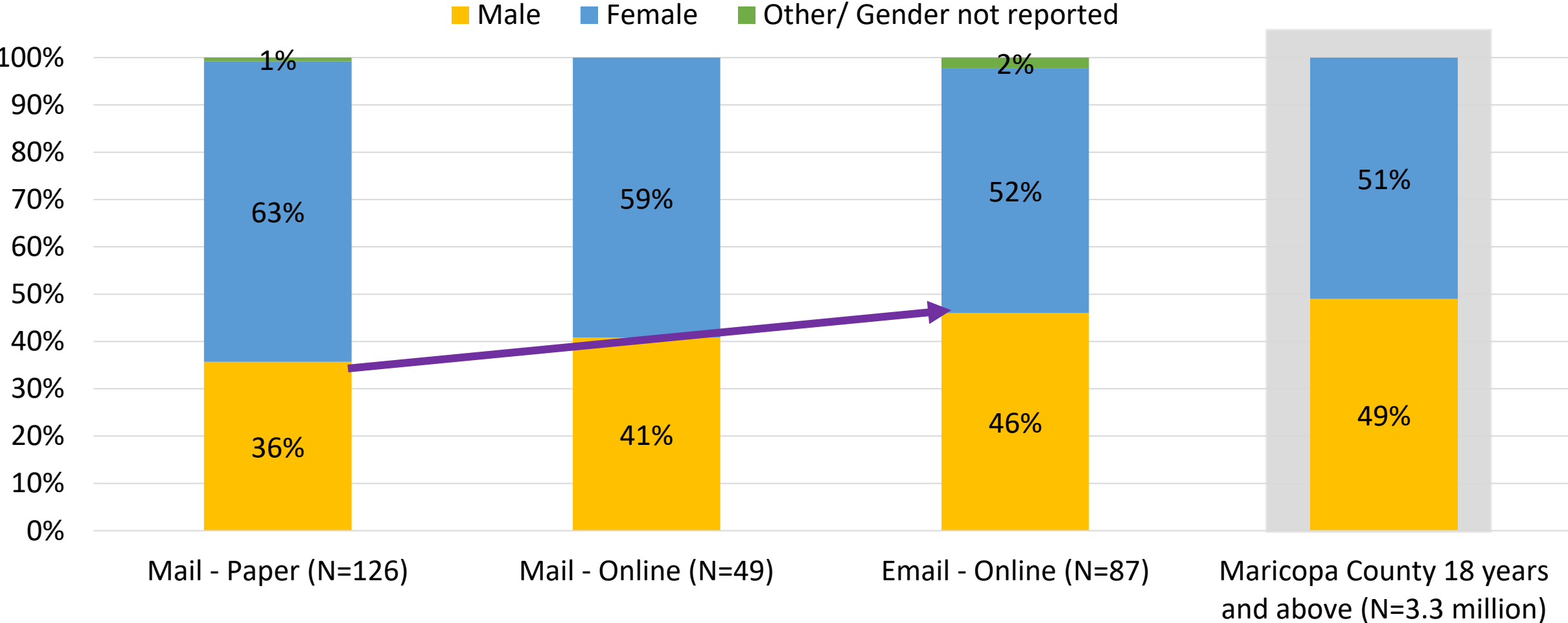
Mail - Paper (N=126)

Mail - Online (N=49)

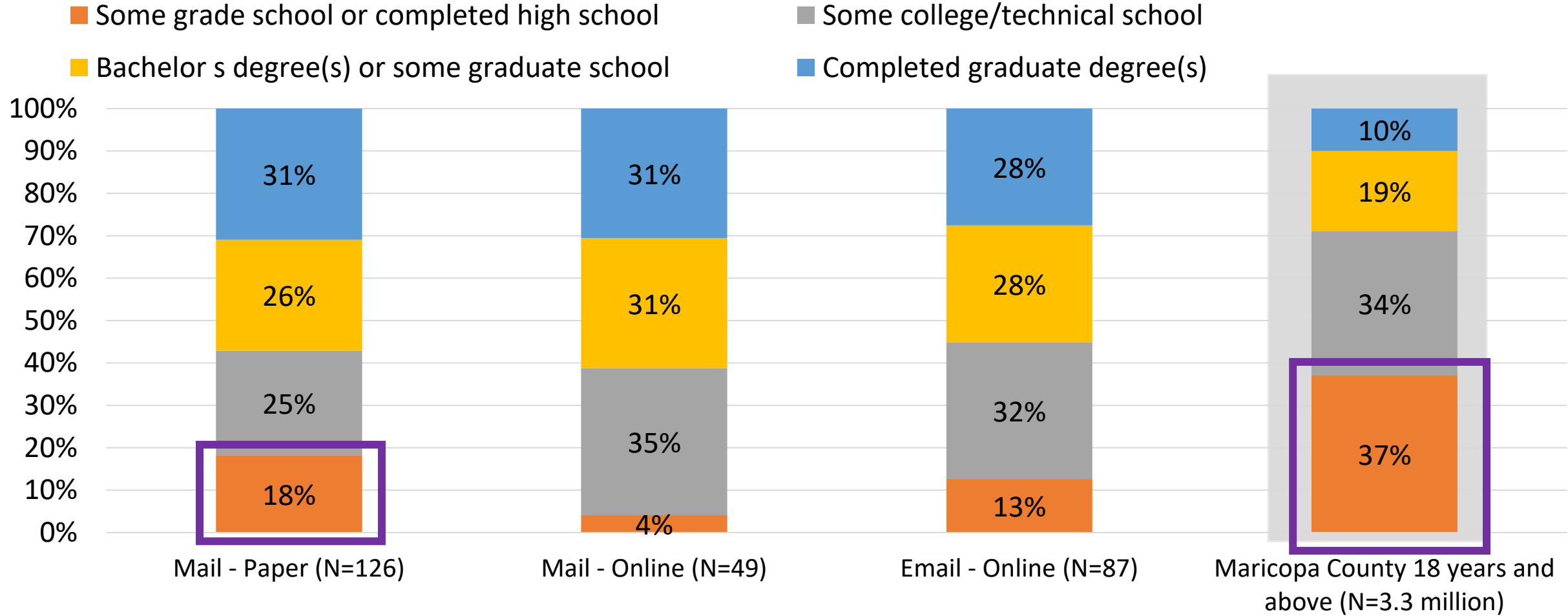
Email - Online (N=87)

Maricopa County 18 years and above (N=3.3 million)

# Gender Distribution

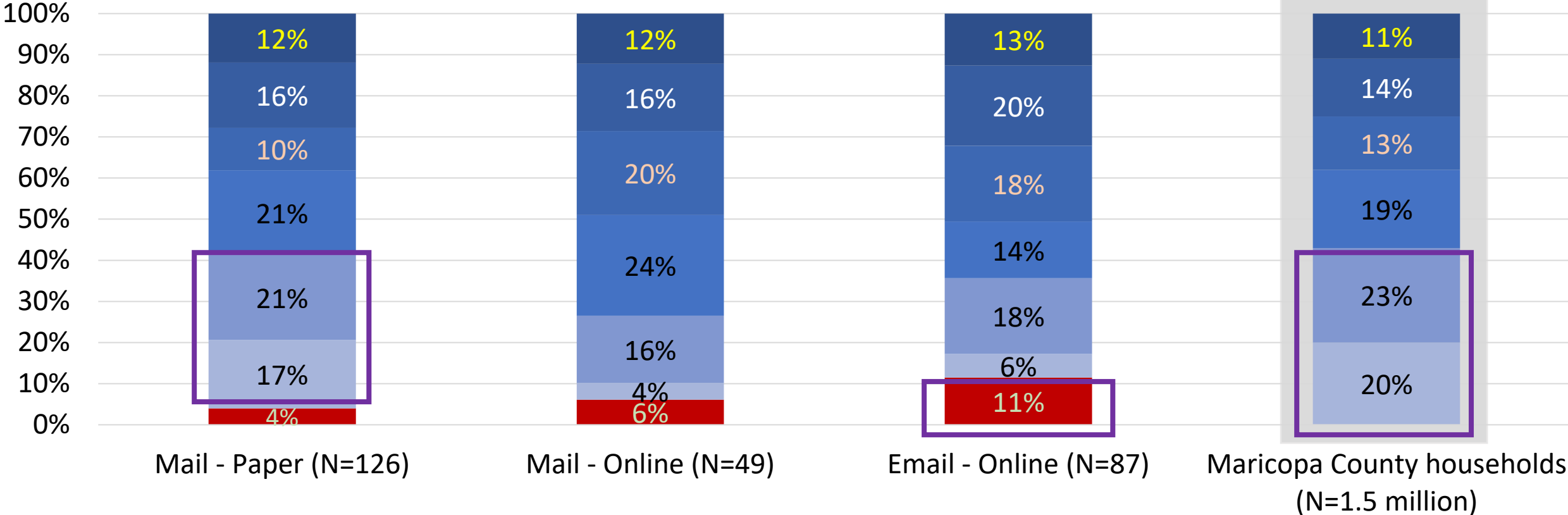


# Highest Education Attained



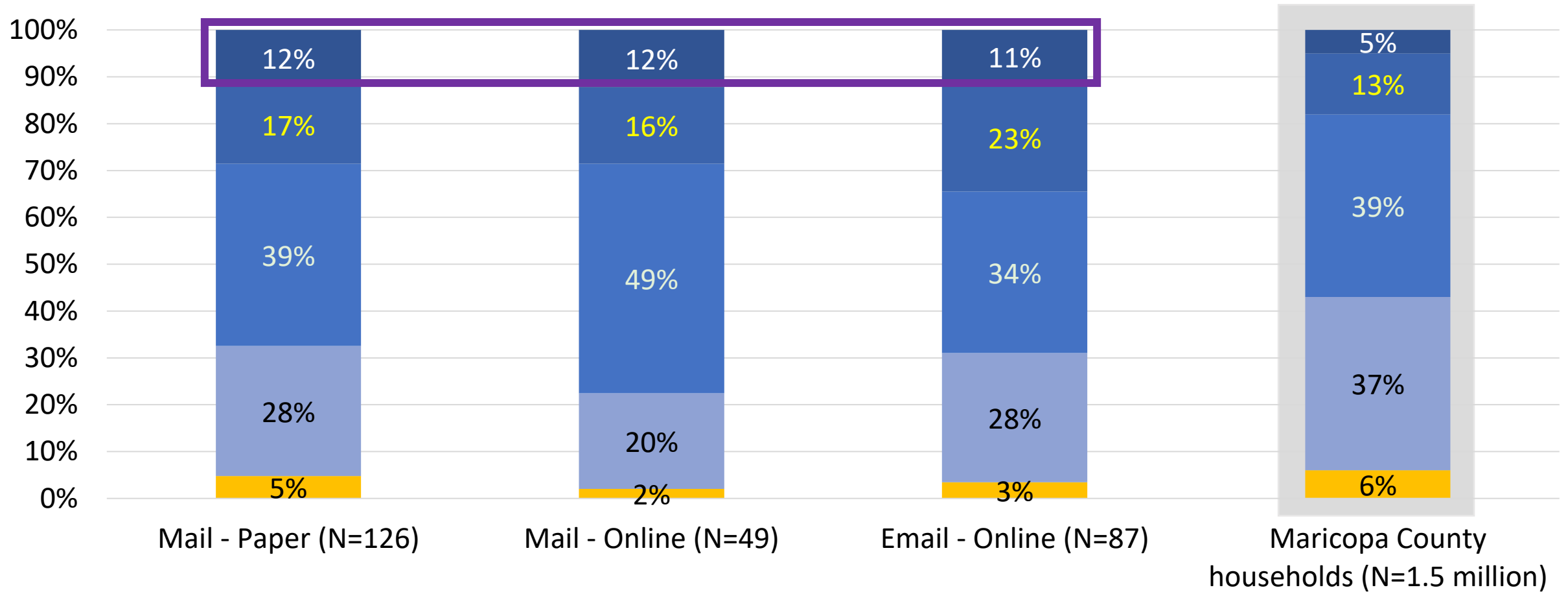
# Household Income

- Missing
- Less than \$25,000
- \$25,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 or more



# Household Vehicle Ownership

■ No vehicles available 
 ■ 1 vehicle available 
 ■ 2 vehicles available 
 ■ 3 vehicles available 
 ■ 4 or more vehicles available



# Survey Method

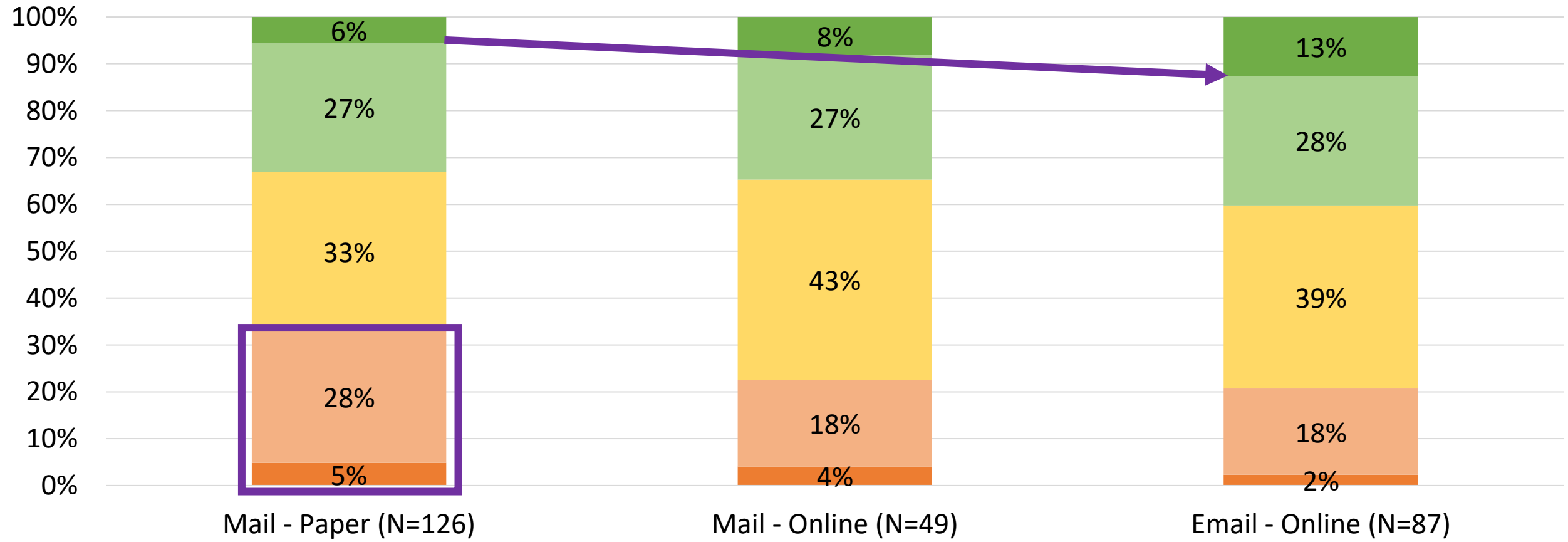
- Regardless of survey administration method, respondent sample will be biased
- As expected, Paper-Mail respondents are (dis)proportionately **women, older, less educated, and lower income** than the rest of the sample
- But going with one survey recruitment/administration method may be fine from a **demographics** perspective – we can ***weight***

# Comparison Between Recruitment/Survey Methods

## *General Attitudes*

# I am committed to using less polluting means of transportation as much as possible.

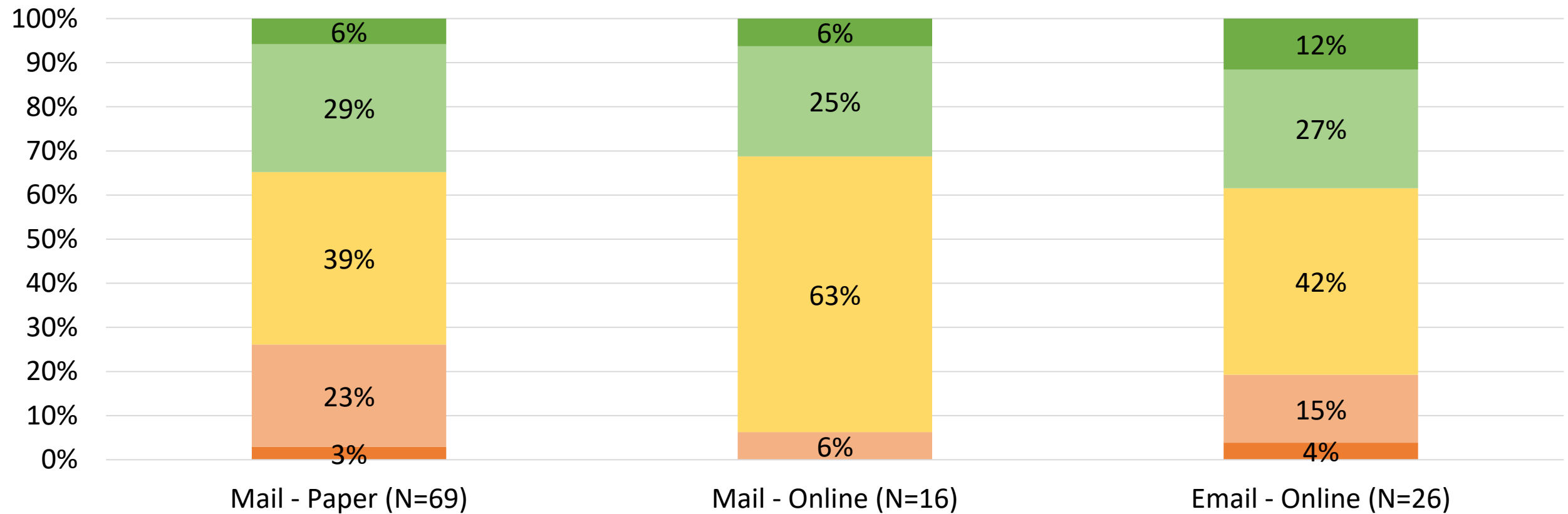
Strongly disagree Disagree Neutral Agree Strongly agree





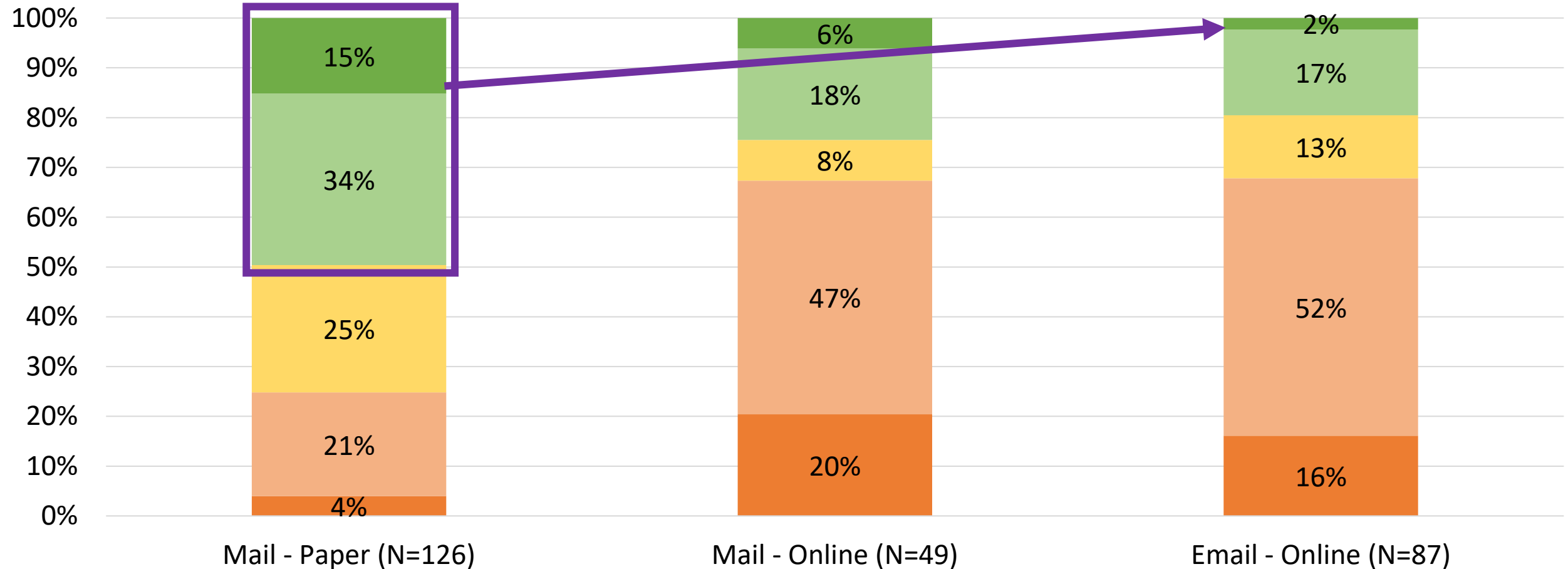
# I am committed to using less polluting means of transportation as much as possible. >60 year-old Subsample

Strongly disagree Disagree Neutral Agree Strongly agree



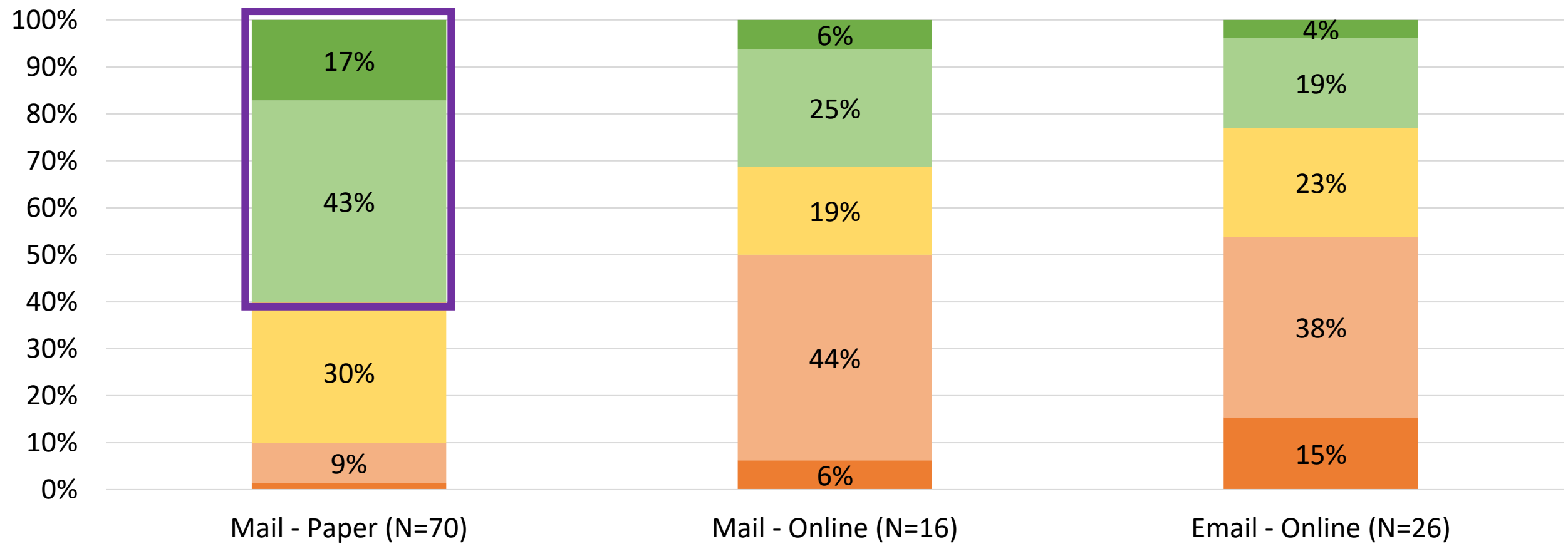
# Learning how to use new technologies is often frustrating for me.

Strongly disagree Disagree Neutral Agree Strongly agree



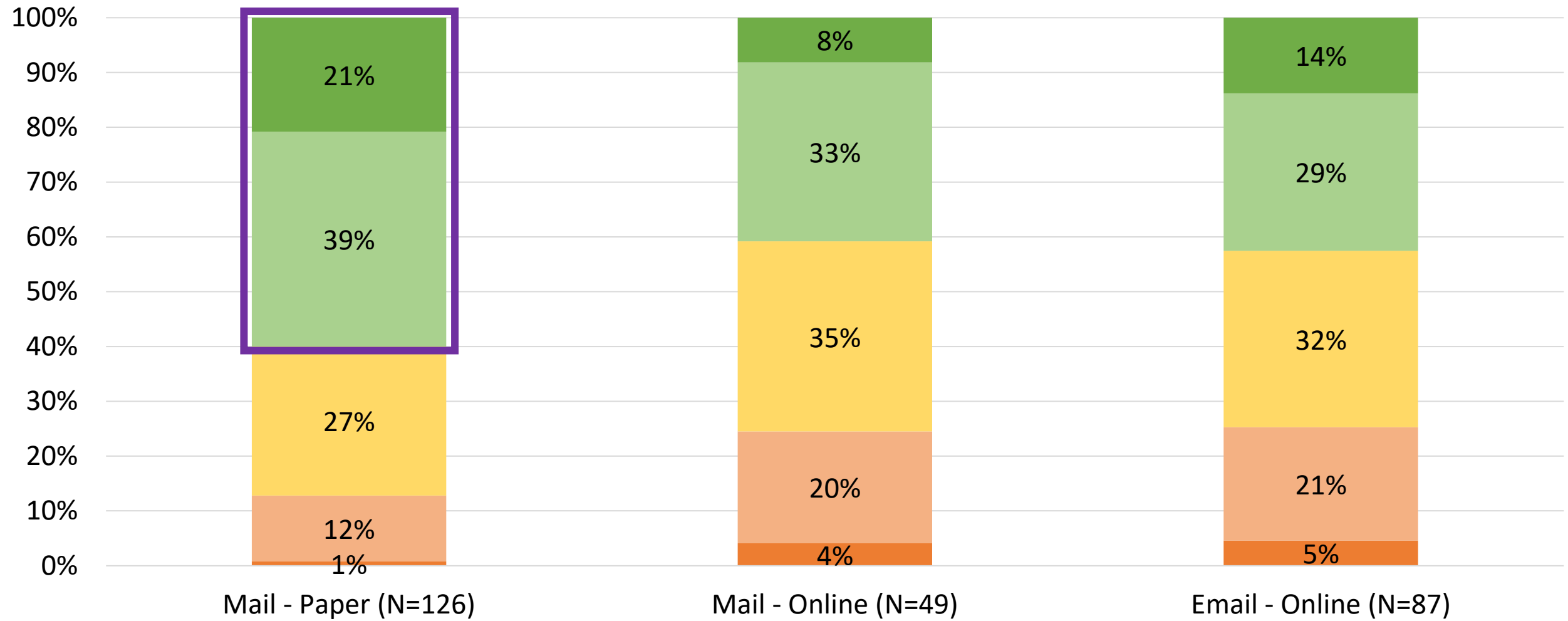
# Learning how to use new technologies is often frustrating for me. **>60 year-old Subsample**

Strongly disagree Disagree Neutral Agree Strongly agree



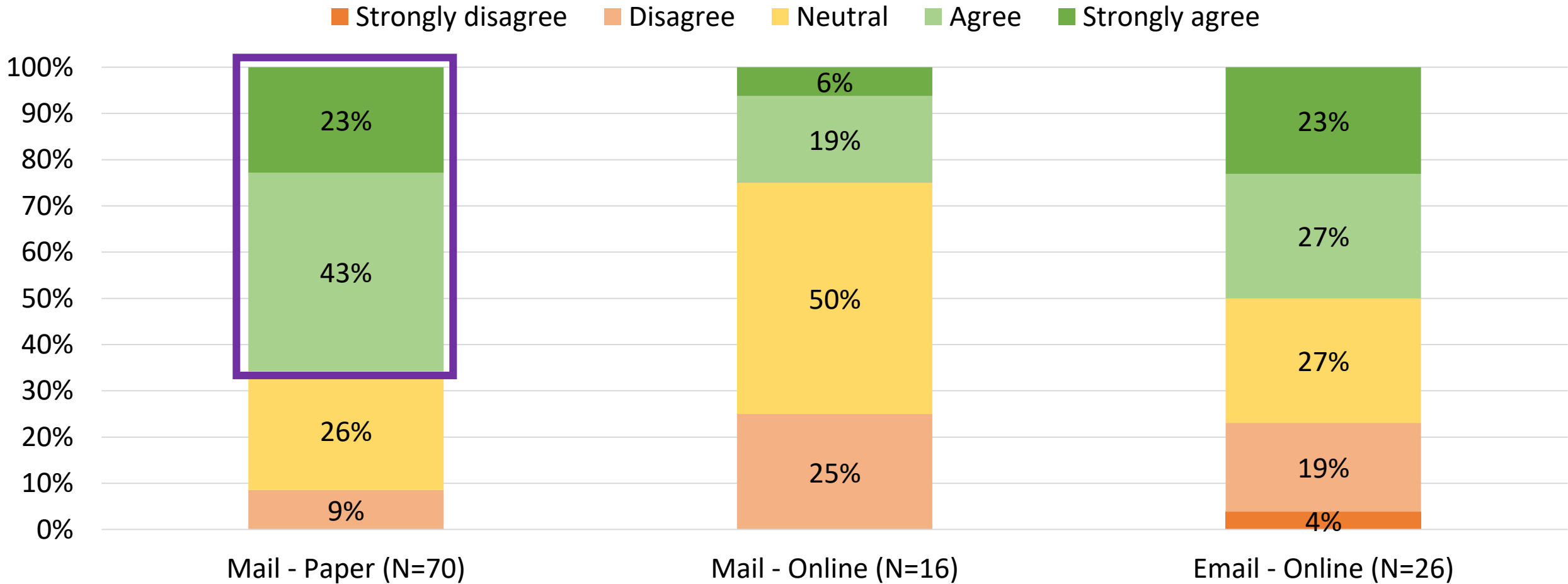
# I prefer to shop in a store in person rather than online.

Strongly disagree Disagree Neutral Agree Strongly agree



# I prefer to shop in a store in person rather than online.

## >60 year-old Subsample



# Trends in Attitudes

People responding using **different survey modes**

**differ with respect to their attitudes** and lifestyle

preferences, **even after controlling for a key**

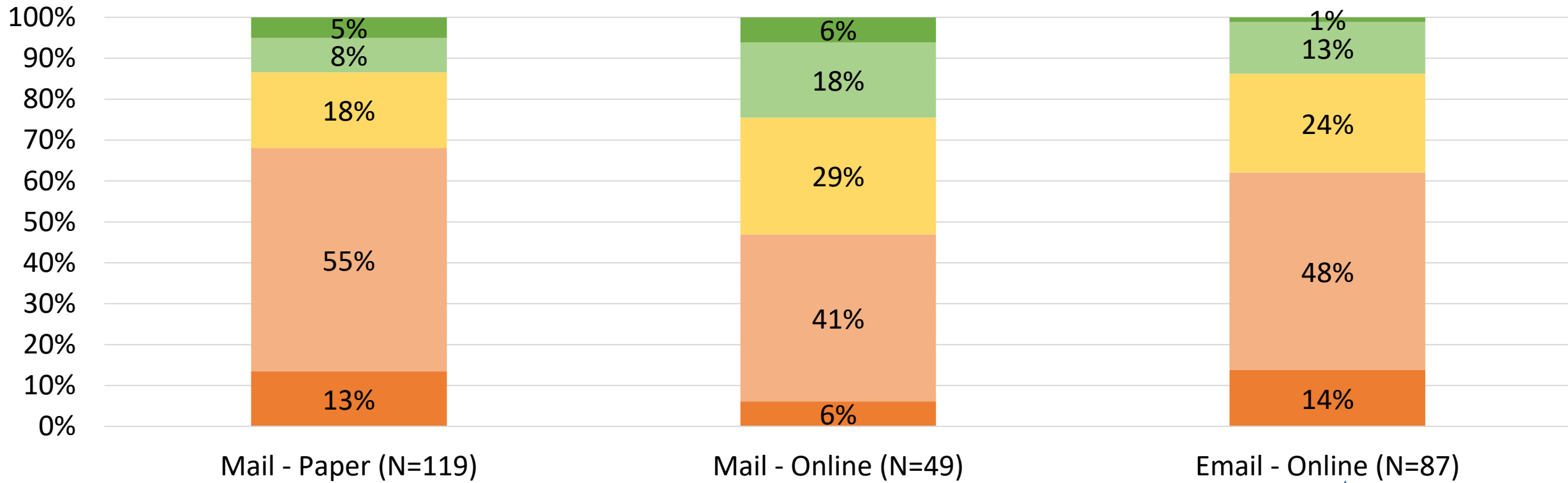
**demographic variable.**

# Comparison Between Recruitment/Survey Methods

## *Emerging Mobility Options*

# Familiarity and Frequency of Use of Ridehailing Services

■ Not familiar with it  
 ■ Familiar, but not a current user  
 ■ Use it less than once a month  
 ■ Use it monthly  
 ■ Use it weekly

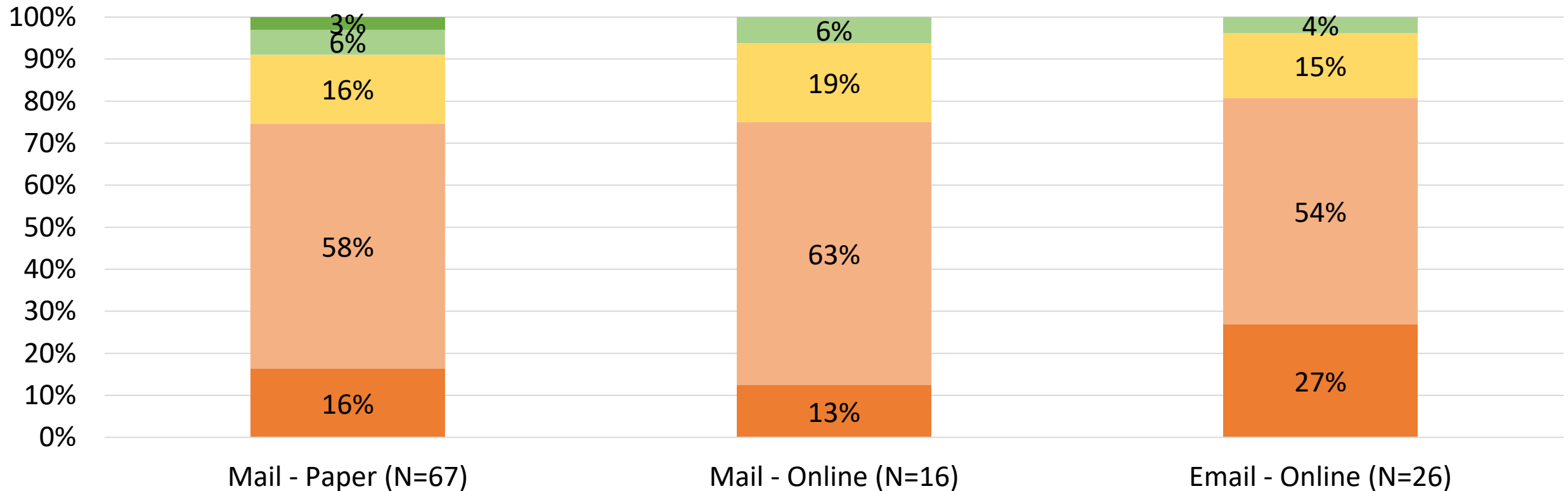




# Familiarity and Frequency of Use of Private Ridehailing Services

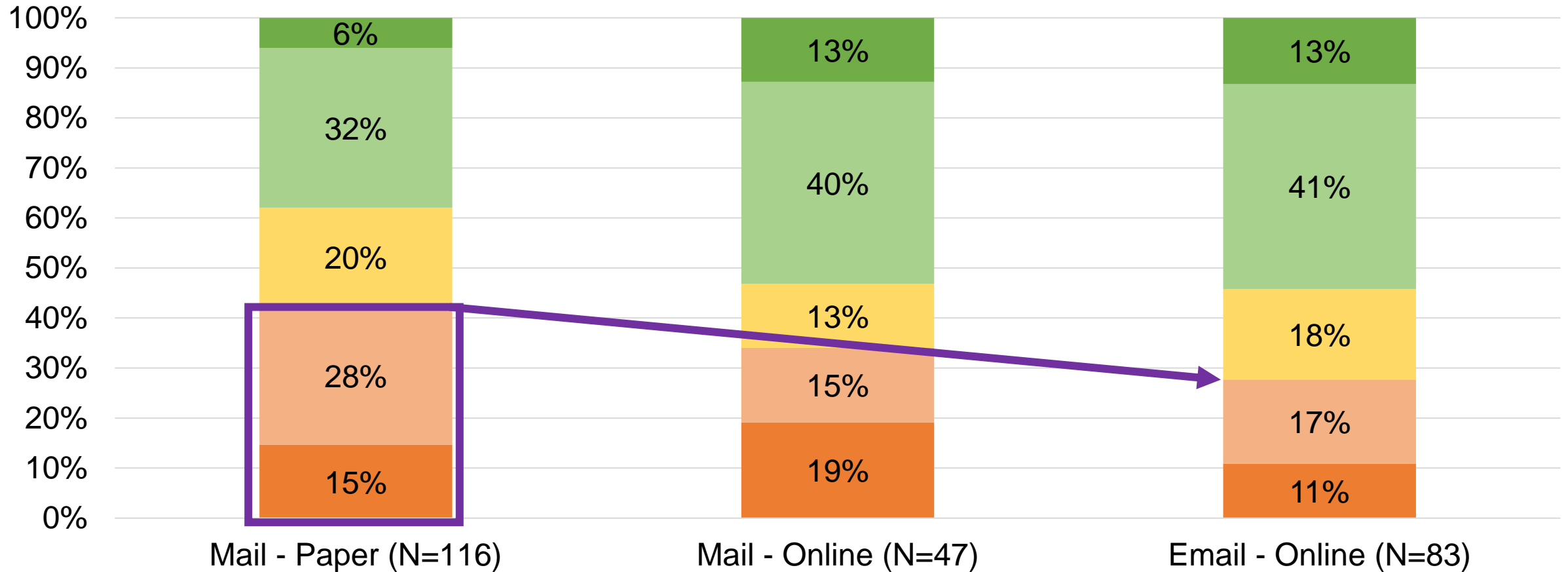
## >60 year-old Subsample

■ Not familiar with it   
 ■ Familiar, but not a current user   
 ■ Use it less than once a month   
 ■ Use it monthly   
 ■ Use it weekly



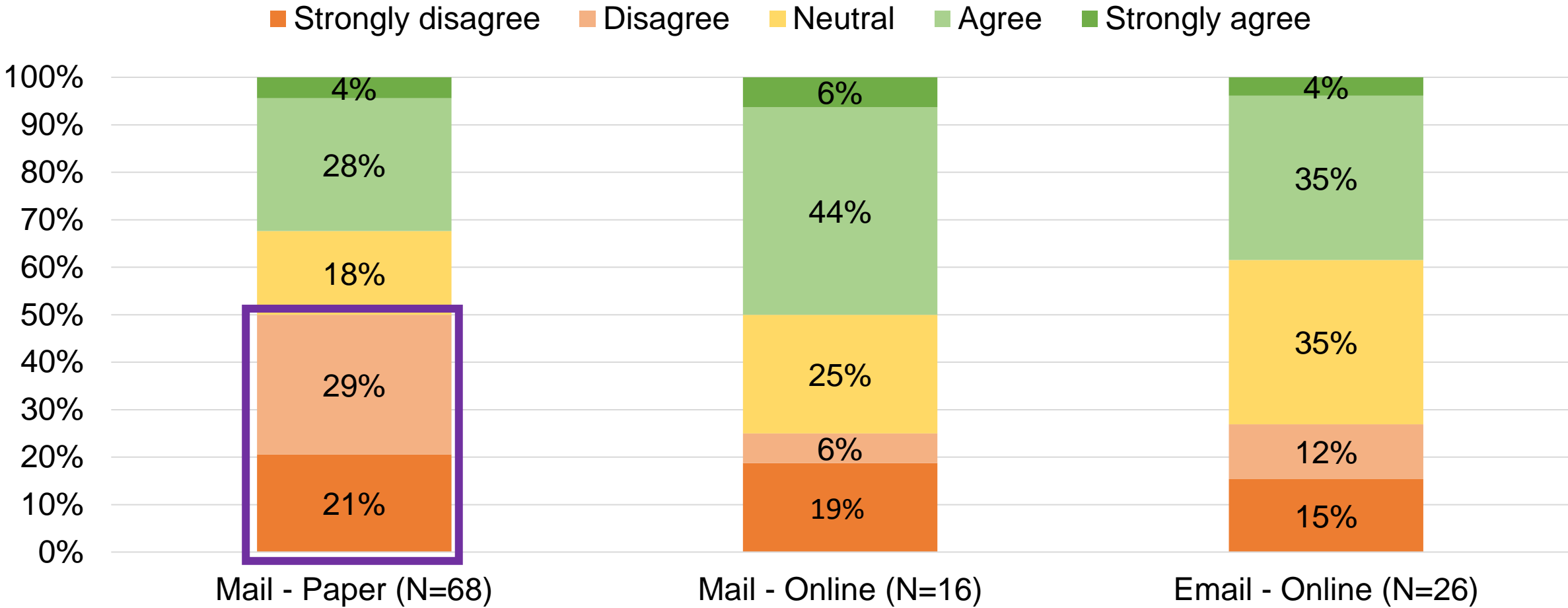
# I would ride in an AV alone or with others I know.

Strongly disagree Disagree Neutral Agree Strongly agree

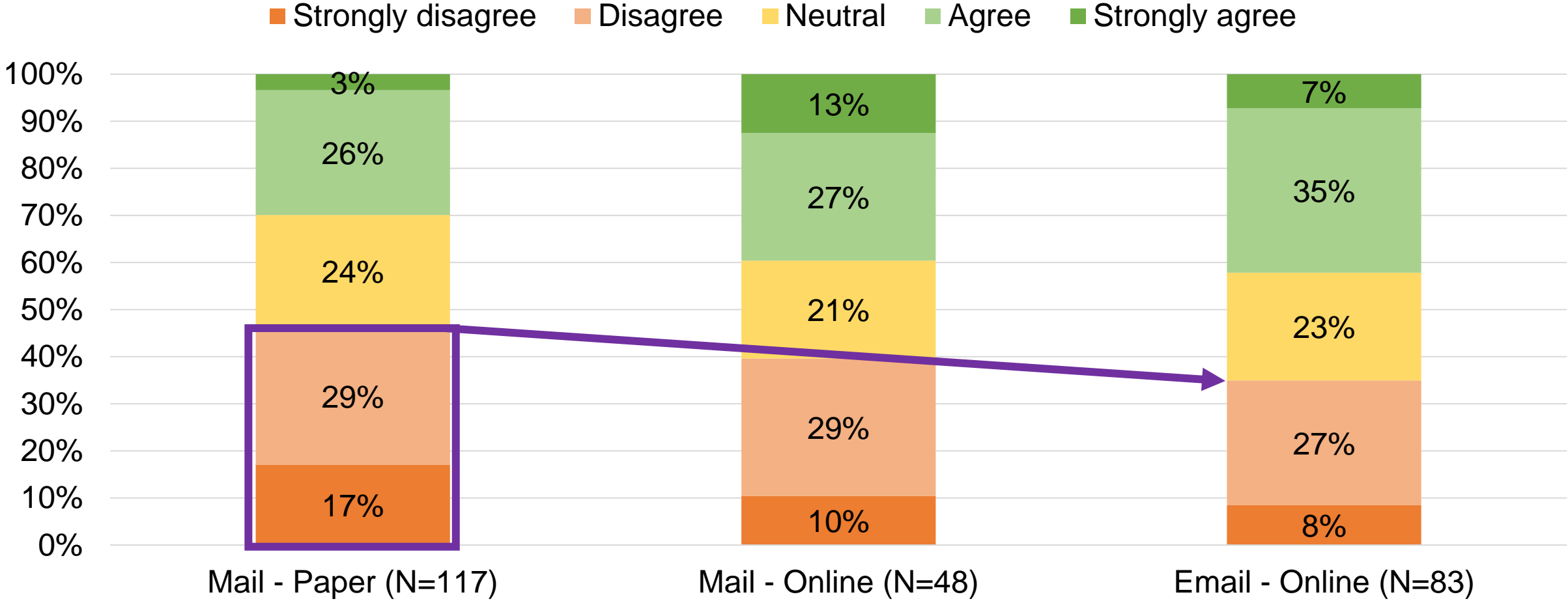


# I would ride in an AV alone or with others I know.

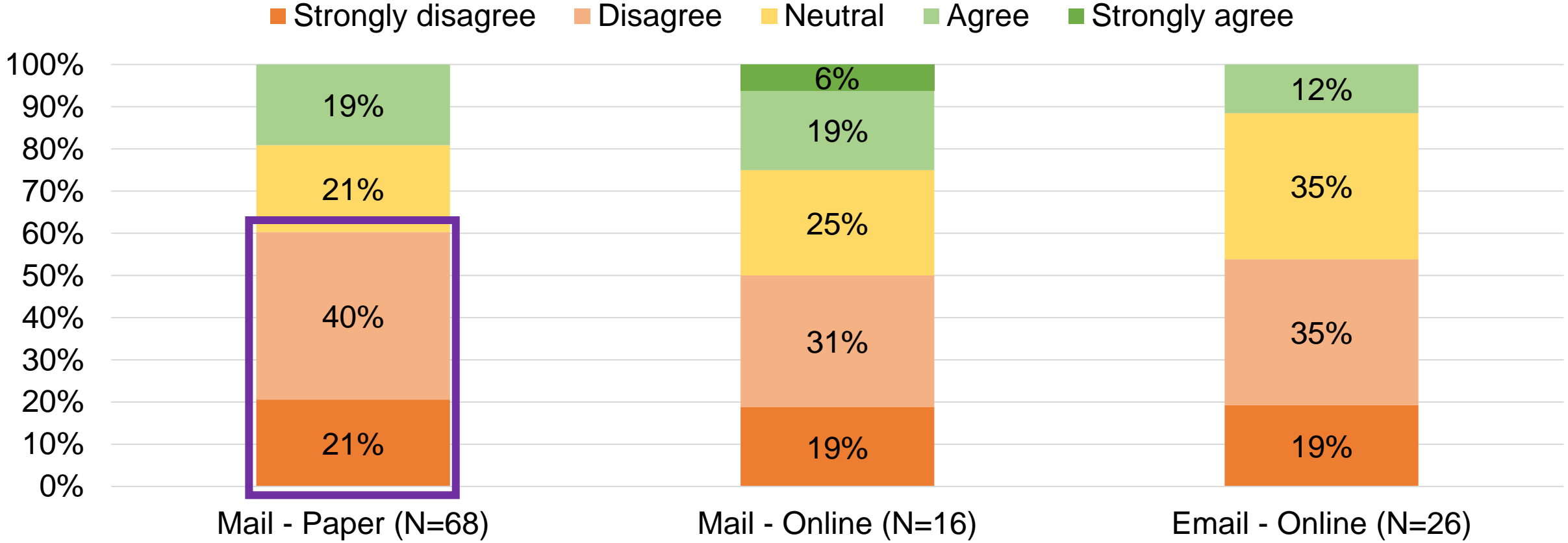
## >60 year-old Subsample



# I would send an AV to pick up groceries/ laundry/ food orders by itself.

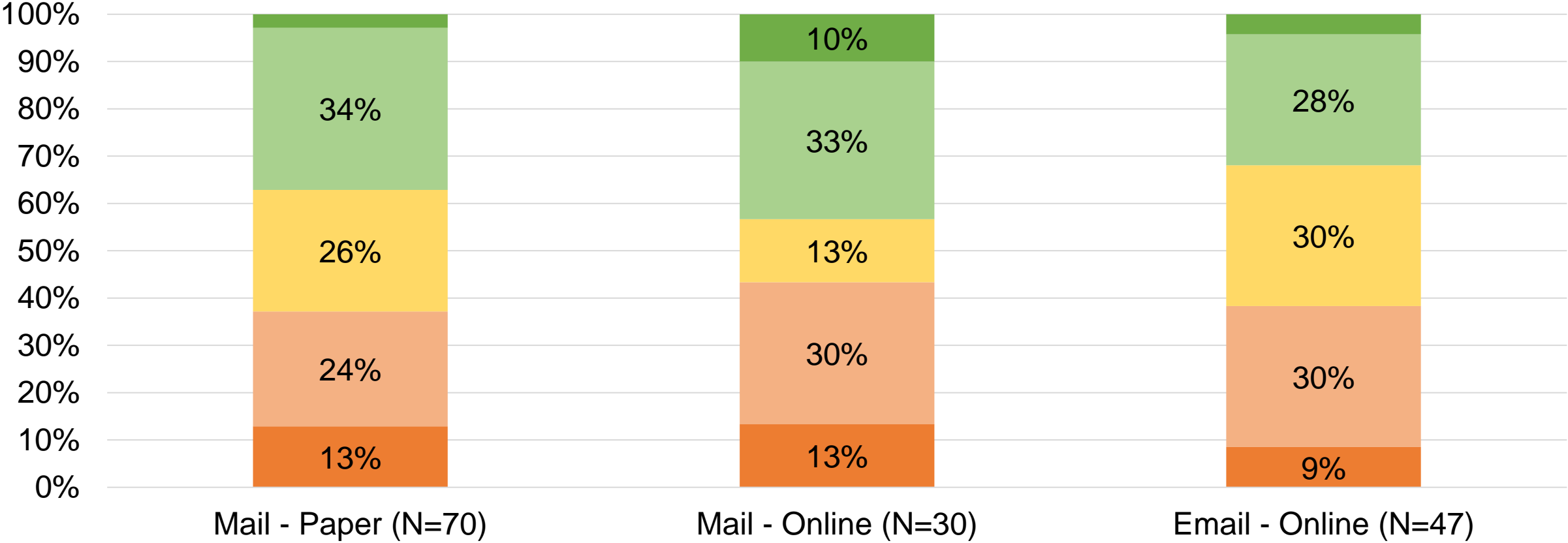


# I would send an AV to pick up groceries/laundry/food orders by itself. >60 year-old Subsample



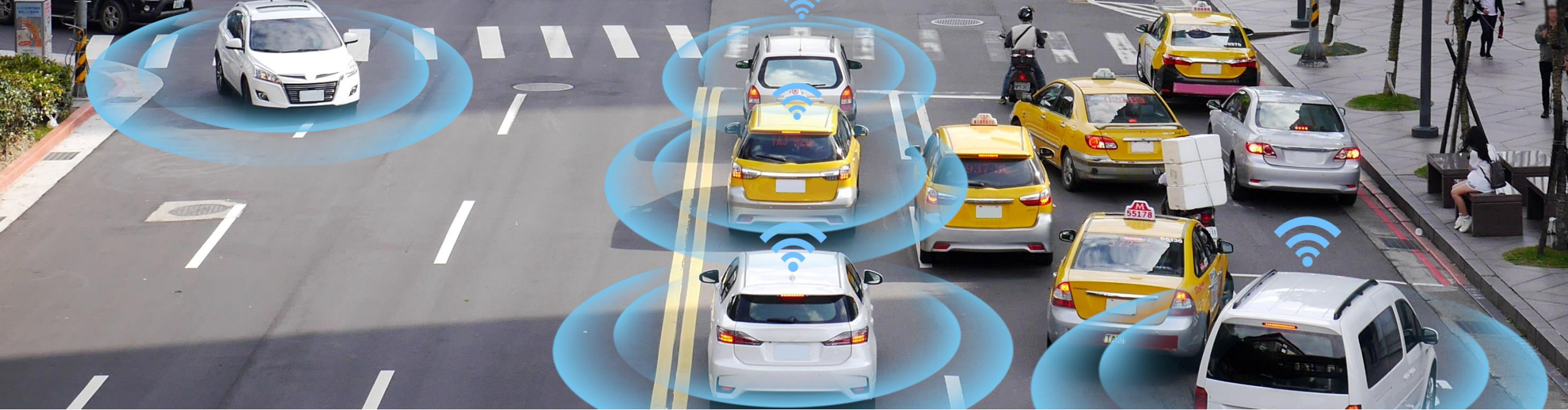
# I would send an AV to pick up groceries/ laundry/ food orders by itself. **College Educated Subsample**

Strongly disagree Disagree Neutral Agree Strongly agree



# Conclusions

- Those who answer survey using different modes have different characteristics and attitudes
- Differences in demographics can be handled through weighting
- Differences in attitudes across survey modes appear to persist even after controlling for a key demographic (age)
  - But will differences fade once ***all demographics are controlled, thus rendering choice of survey method/mode largely irrelevant?***
  - Ongoing research to quantify/model residual influence of survey mode
- In the end, we adopted **Mail – Online** and **Email – Online** for full deployment in the interest of efficiency and resource constraints



**Thank you!**

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