Safety and User Perceptions of Auxiliary Bike Lanes
ODOT SPR 869

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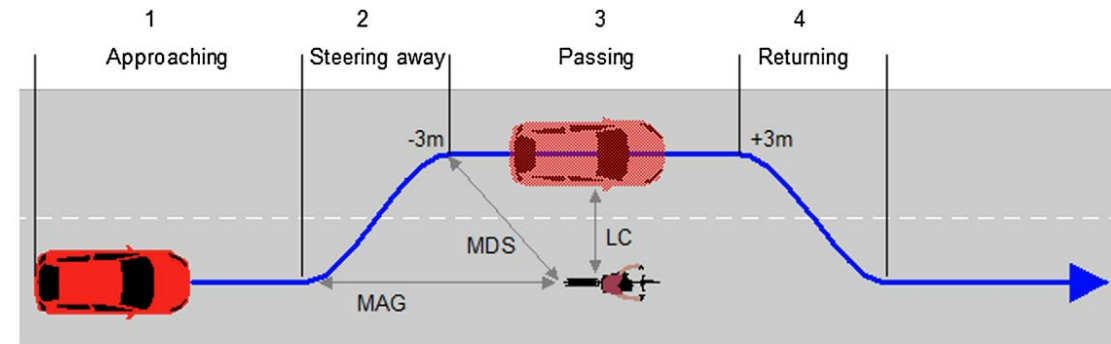
Overview

Oregon State
University

Background

Background and resulting research objectives

Background

- Overtaking maneuver
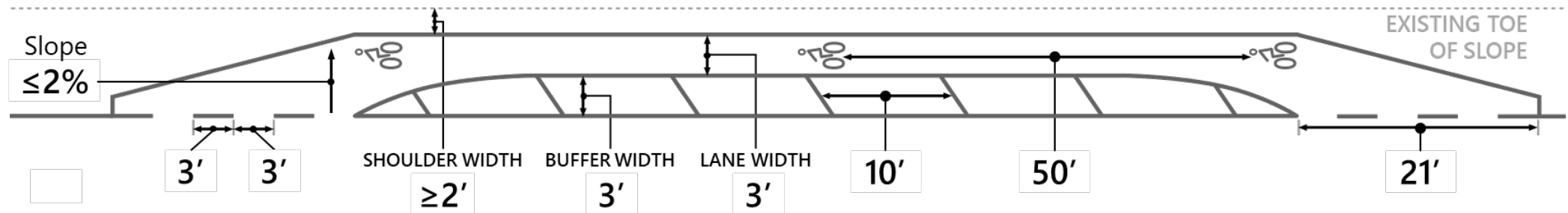- Conditions

Phasing of a motorist overtaking a cyclist (Kovaceva et al., 2019)

Background

- Mount Diablo Cyclists
- "Bike turnouts" at Mount Diablo State Park

Research Objectives
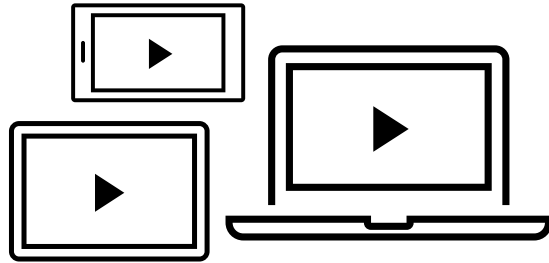
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┌─────────────┐      ┌─────────────┐      ┌─────────────┐
│  Research   │  →   │  Research   │  →   │  Research   │
│  Question   │      │  Objective  │      │  Outcomes   │
└─────────────┘      └─────────────┘      └─────────────┘
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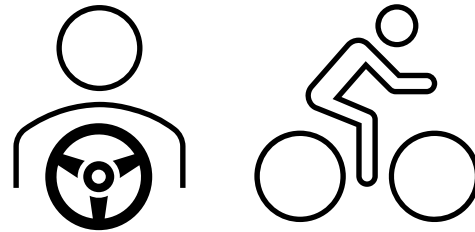
Methods

In-Survey POV Videos, Survey Design, Distribution of Survey
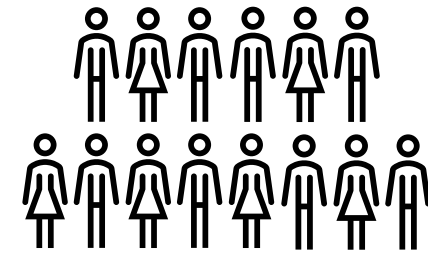
Methods

Survey Design

Target Samples

Population Distribution
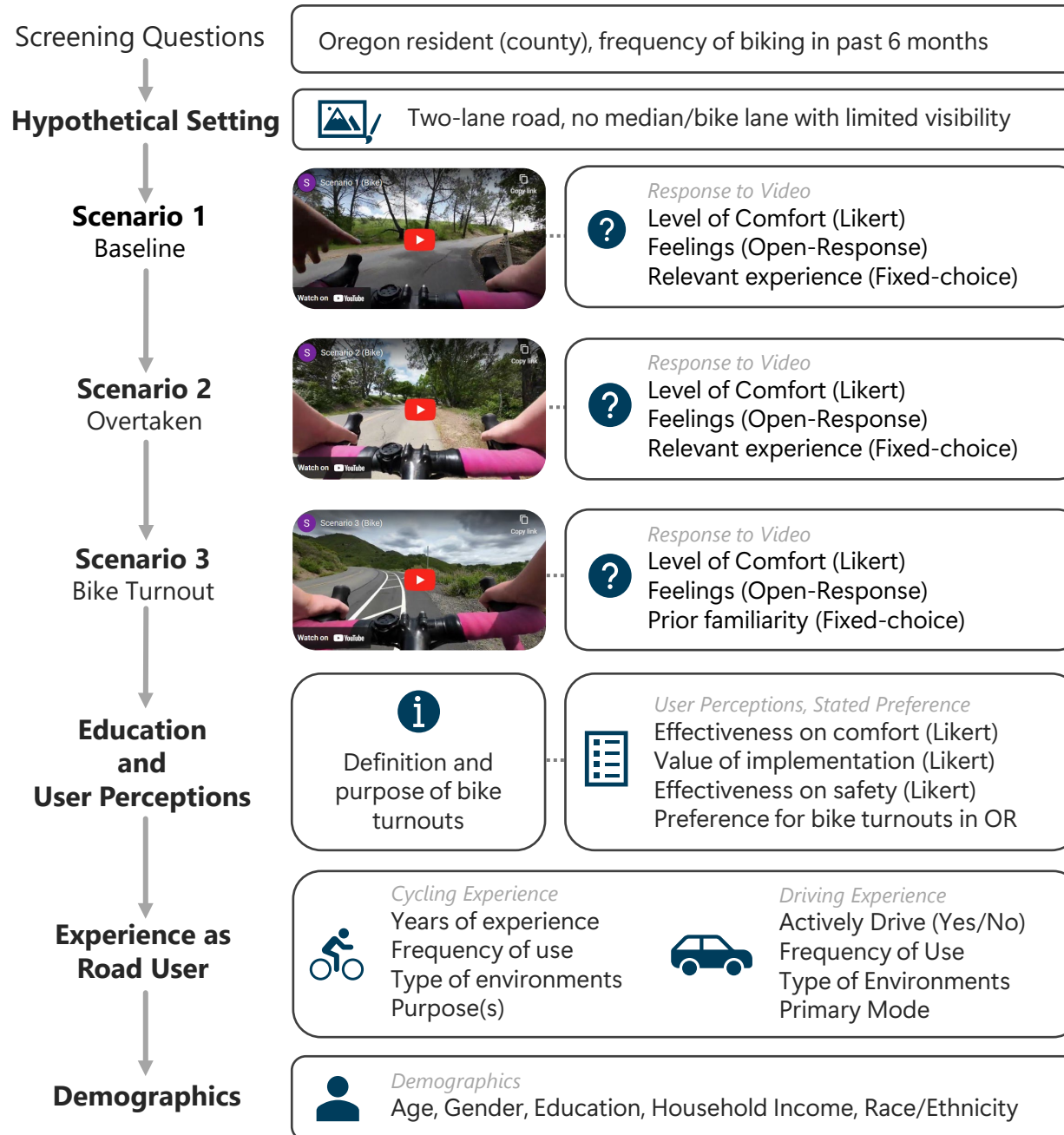
Experimental Design

① Baseline ② Existing ③ Proposed

Screening Questions — Oregon resident (county), frequency of biking in past 6 months

Hypothetical Setting — Two-lane road, no median/bike lane with limited visibility

Scenario 1
Baseline

Response to Video
Level of Comfort (Likert)
Feelings (Open-Response)
Relevant experience (Fixed-choice)

Scenario 2
Overtaken

Response to Video
Level of Comfort (Likert)
Feelings (Open-Response)
Relevant experience (Fixed-choice)

Scenario 3
Bike Turnout

Response to Video
Level of Comfort (Likert)
Feelings (Open-Response)
Prior familiarity (Fixed-choice)

Education and User Perceptions

Definition and purpose of bike turnouts

User Perceptions, Stated Preference
Effectiveness on comfort (Likert)
Value of implementation (Likert)
Effectiveness on safety (Likert)
Preference for bike turnouts in OR

Experience as Road User

Cycling Experience
Years of experience
Frequency of use
Type of environments
Purpose(s)

Driving Experience
Actively Drive (Yes/No)
Frequency of Use
Type of Environments
Primary Mode

Demographics

Demographics
Age, Gender, Education, Household Income, Race/Ethnicity

Results

Data Quality, Sample Demographics, Road User Experience, User Perceptions of Auxiliary Bike Lanes

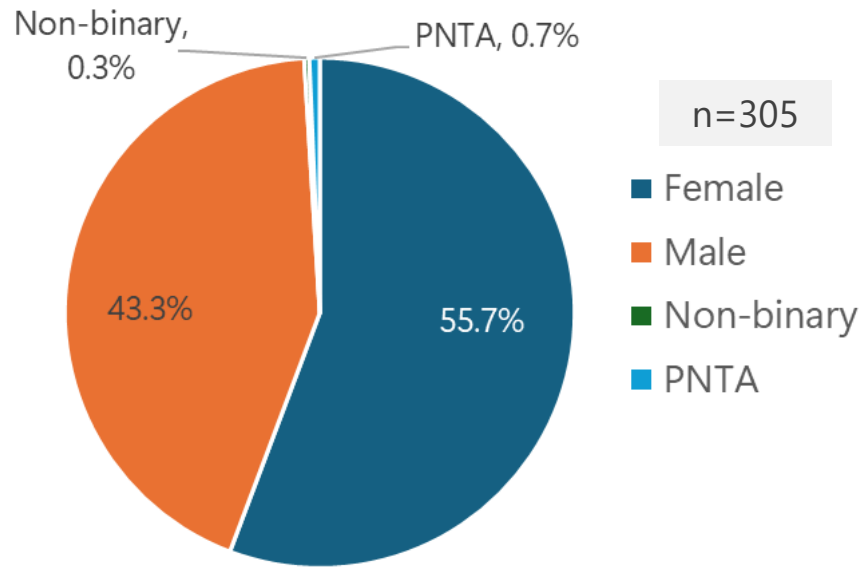# Data Quality and Quotas

Final Samples

	Driver Survey	Cyclist Survey
Initial	311	314
Excluded	6	7
Final	305	307

ODOT Region Quotas

Region	Target	Driver Survey	Cyclist Survey
1	110	108	104
2	115	119	118
3	36	39	38
4	26	27	33
5	13	12	14

Driver Sample

Gender Distribution

n=305

Non-binary, 0.3%
PNTA, 0.7%
43.3%
55.7%

- Female
- Male
- Non-binary
- PNTA

Age Distribution
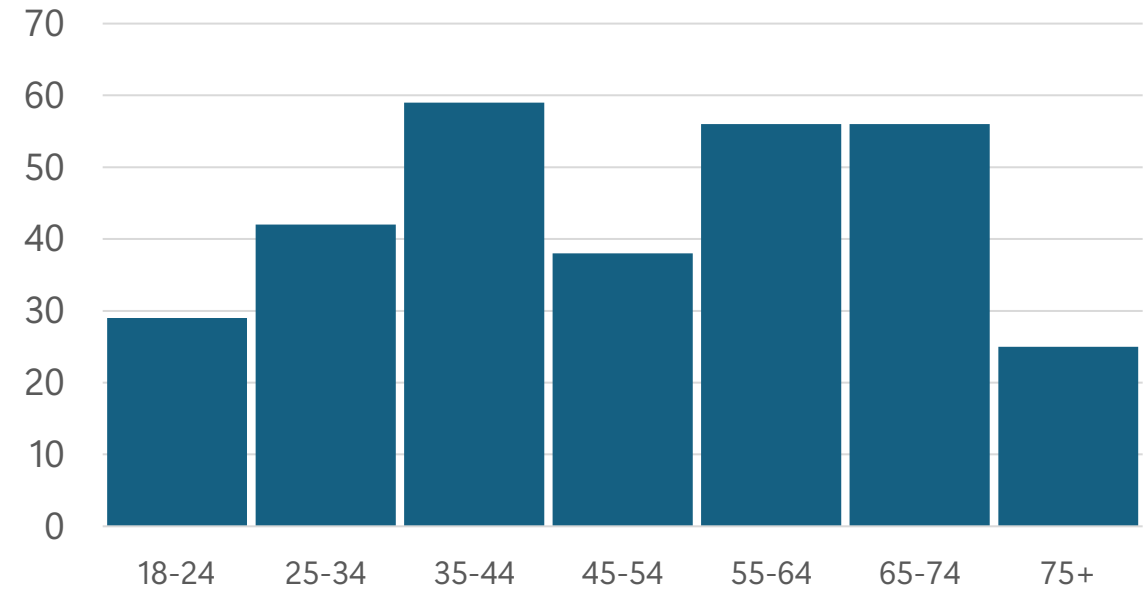
	Female	Male	Non-binary	Prefer not to answer (PNTA)
Count	170	132	1	2
Average Age	50.1	50.1	27	37.5
Std. Dev.	17.5	17.7	-	7.8
Variance	306.5	312.7	-	60.5

Cyclist Sample

Gender Distribution

n=307

- Female
- Male
- Non-binary
- Transgender
- PNTA

Transgender, 0.3%
Non-binary, 2.6%
PNTA, 1.0%
54.4%
41.4%

Age Distribution
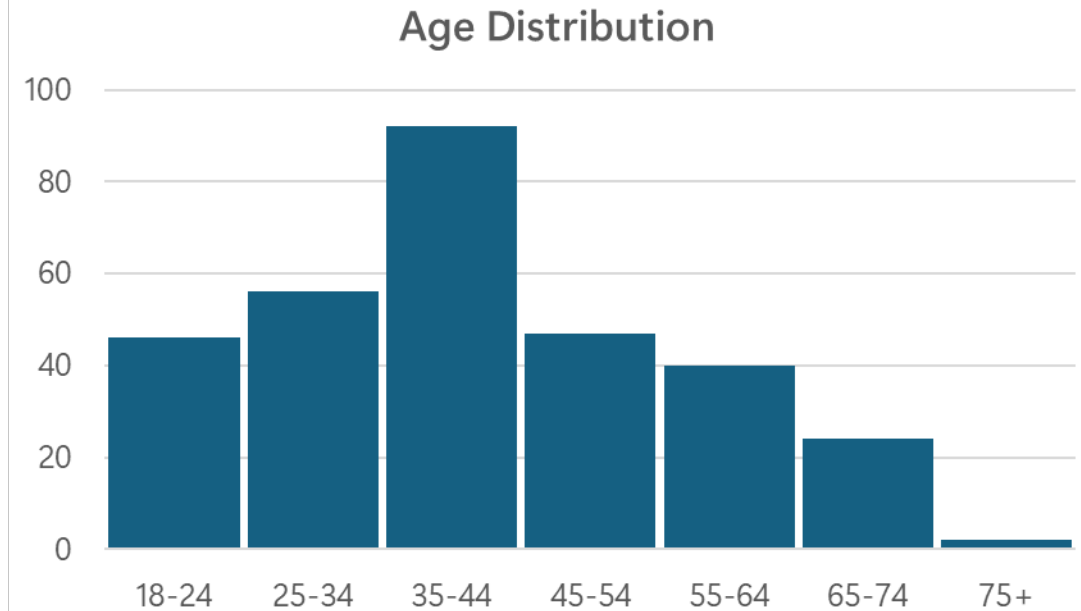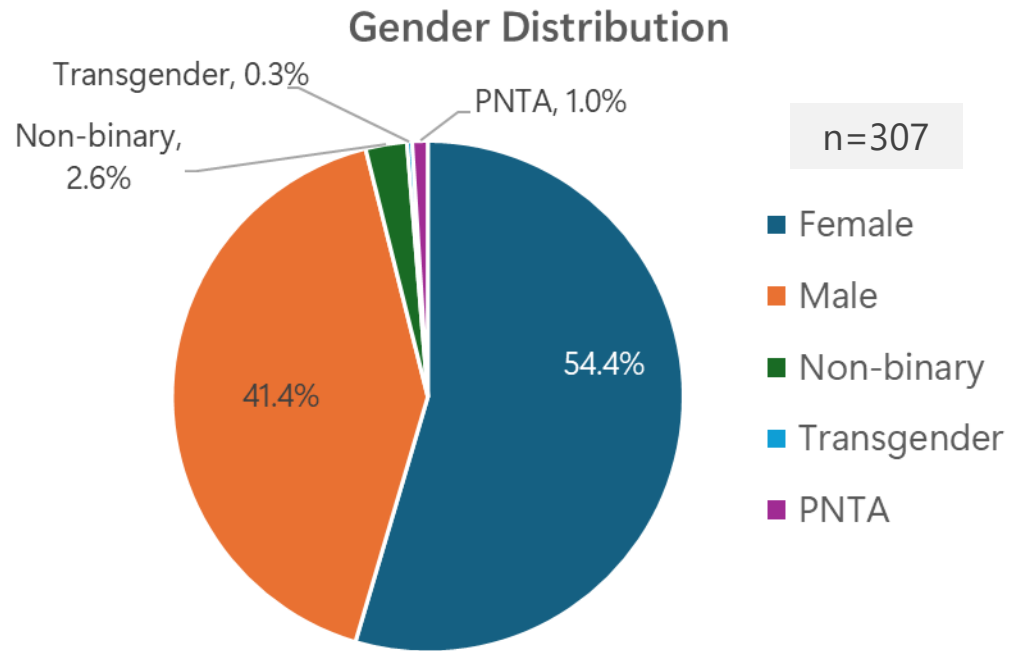
	Female	Male	Non-binary	Transgender	Prefer not to answer (PNTA)
Count	167	128	8	1	3
Average Age	41.4	43.0	29.3	18	29.7
Std. Dev.	13.3	15.6	10.0	-	5.9
Variance	176.0	243.4	99.9	-	34.3

Drivers: Road User Experience

Routine Driving Environments (bar chart, n=305): City/Urban ~152, Suburban ~117, Rural ~81.

Cycling vs. Non-Cycling Drivers (pie chart, n=305): Non-cycling drivers (n=234) 77%, Cycling drivers (n=71) 23%.
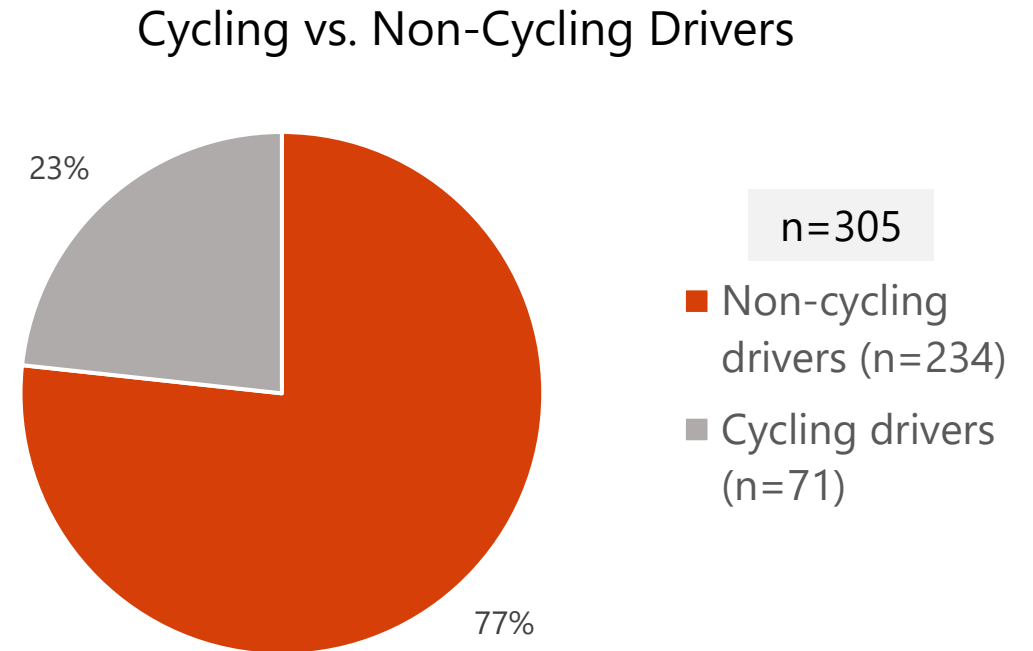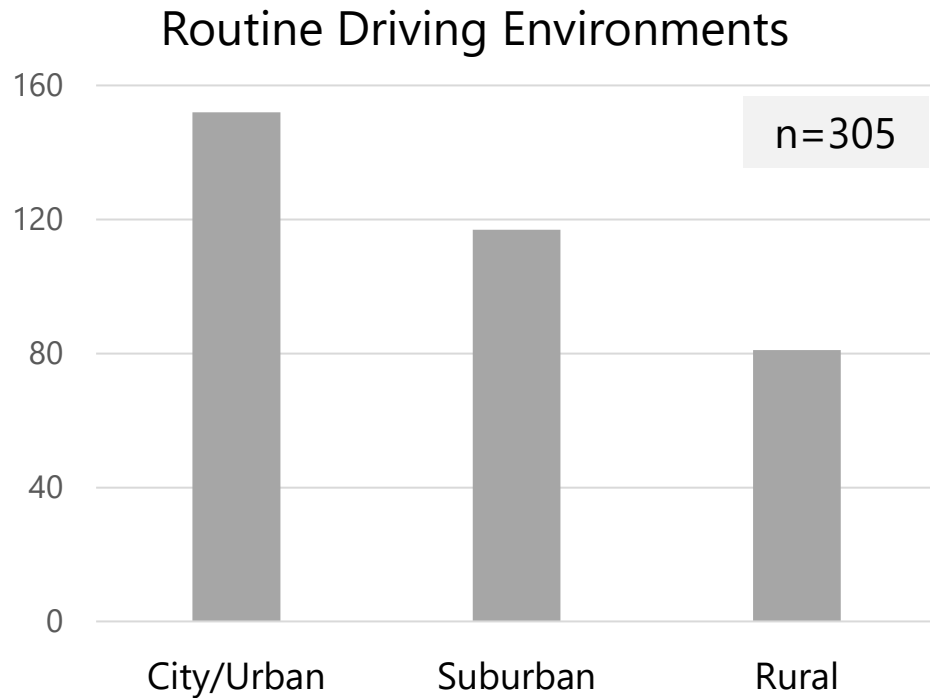
Cyclists: Road User Experience

Types of Cyclists (Geller Scale)

n=307

- Strong and Fearless
- Enthused and Confident
- Interested but Concerned
- No Way, No How
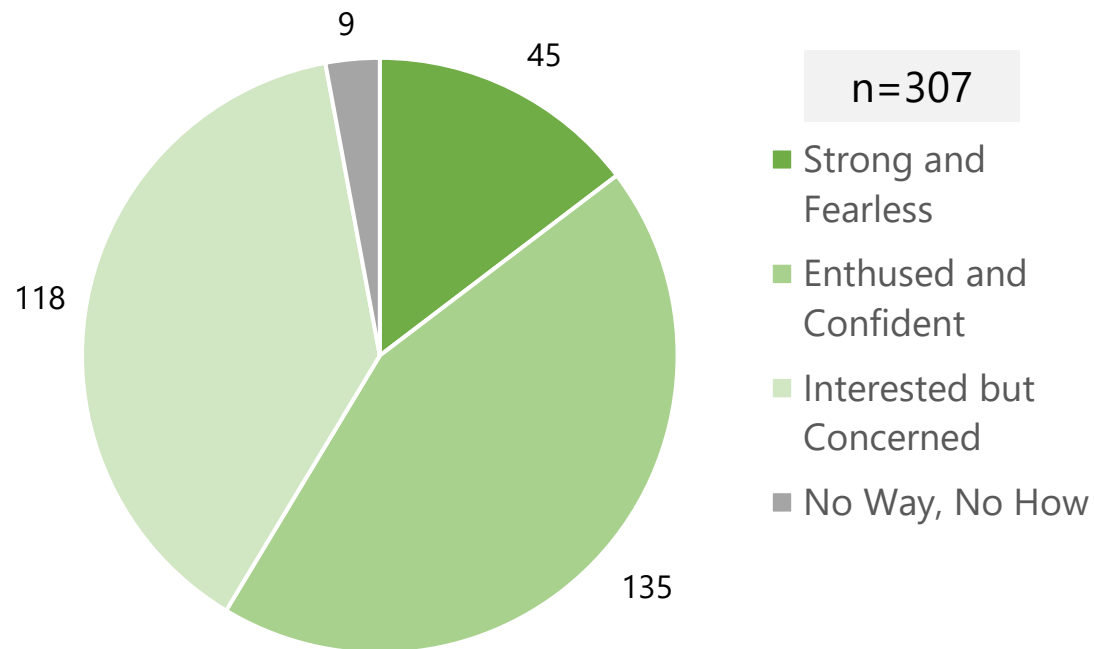
Routine Cycling Environments

- City/Urban = 44.0% (n=135)
- Suburban = 45.0% (n=138)
- Rural = 37.8% (n=116)

Experience

- <5 years = 30.3% (n=93)
- 5-10 years = 20.5% (n=63)
- >10 years = 49.2% (n=151)

Primary Mode

- Car = 63.2% (n=194)
- Bike = 17.3% (n=53)

Methods: Analysis of Open-Ended Responses

- Analyses
- OER Usable Samples
- Data Reduction

Open-Ended Response Codes (per user, per scenario)

Scenario	Driver Survey		Cyclist Survey	
	Code Name	Value Type	Code Name	Value Type
1	General Sentiment	Multiple	Level of Comfort	Multiple
	Comfort	Binary	Cautious	Binary
	Discomfort	Binary		
	Safety	Binary		
2	Disposition to Overtake	Multiple	Discomfort	Binary
	Comfort	Binary	Tolerant/Complacent	Binary
	Discomfort	Binary	Comfortable/Confident	Binary
	Unsafe	Binary		
3	General Sentiment	Multiple	Receptivity	Multiple
	Receptivity	Multiple	Safety	Binary
	Safety	Binary	Lingering Concerns	Binary

Baseline Conditions

User on segment absent of other road users

Cyclist Comfort in Baseline Conditions

Reported Level of Comfort/Discomfort in Response to Scenario Video
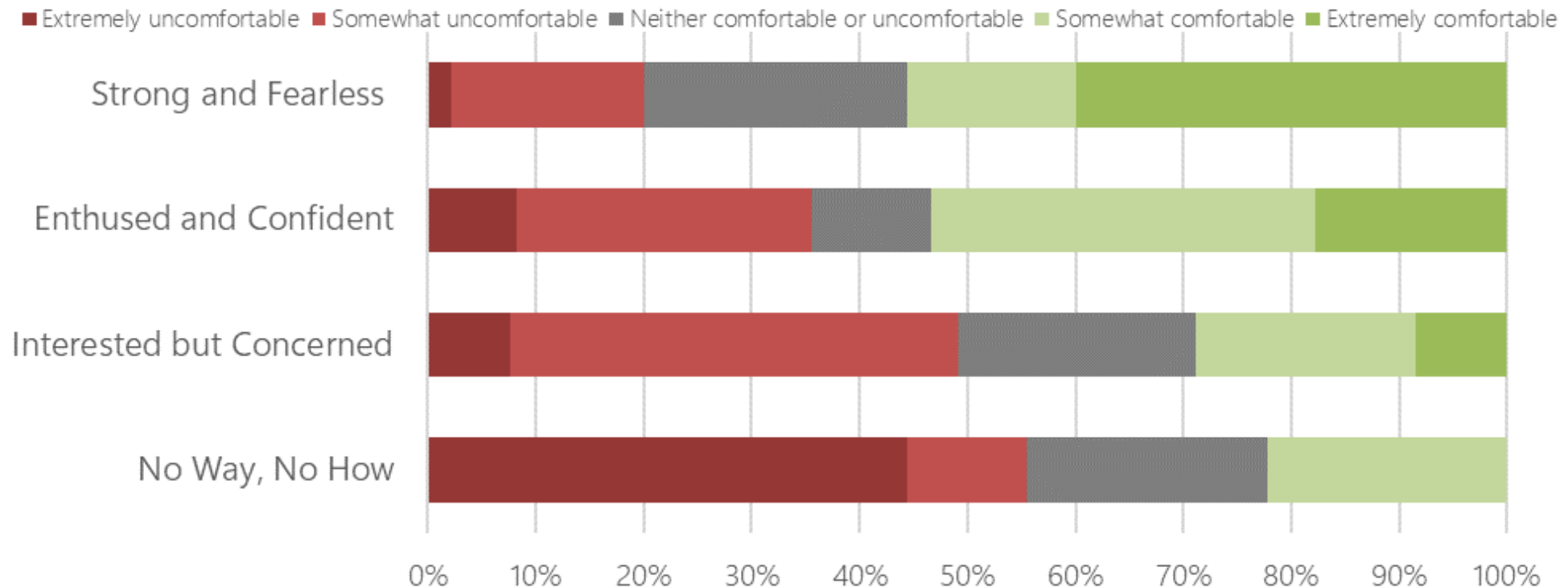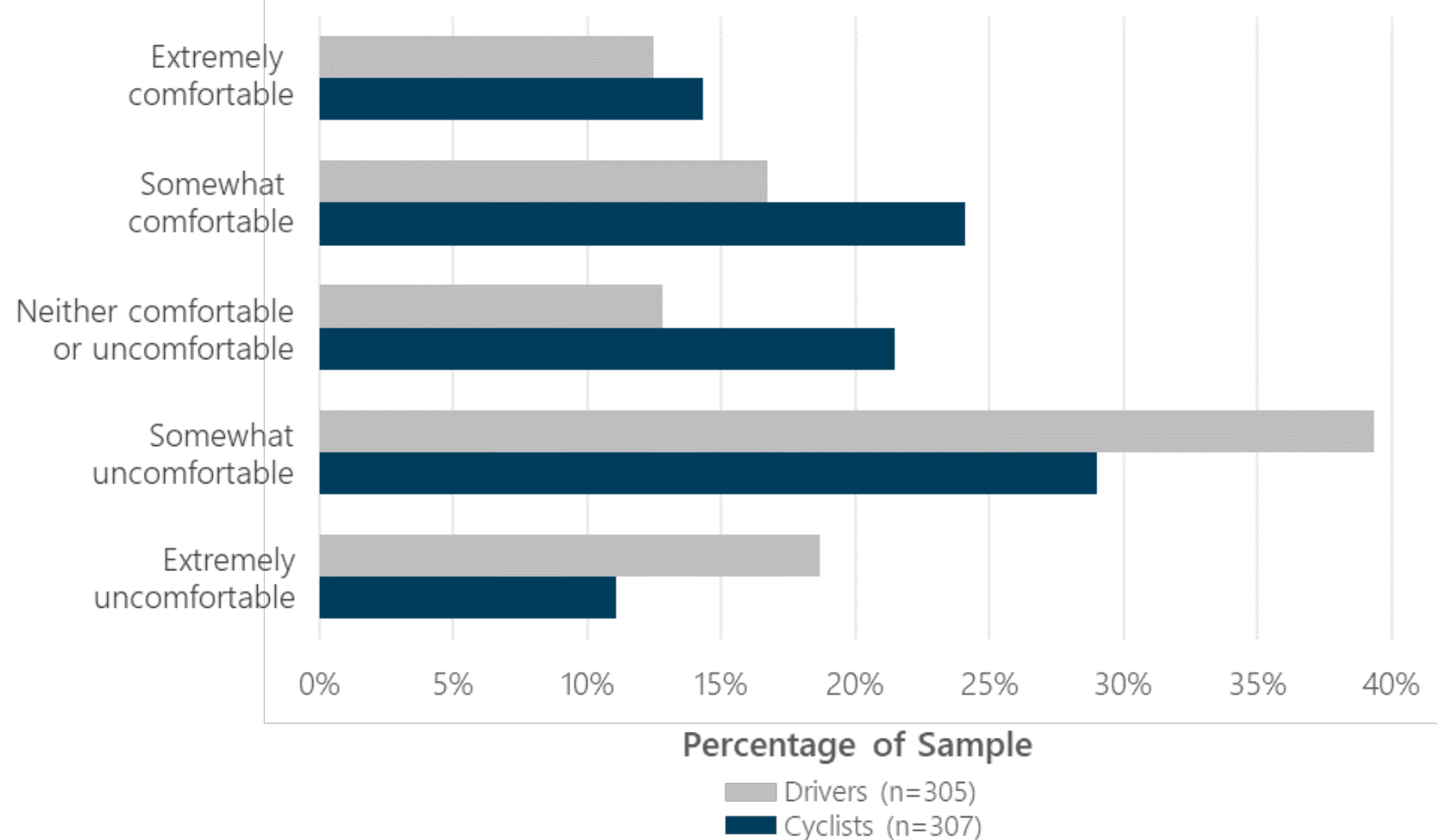
Existing Conditions

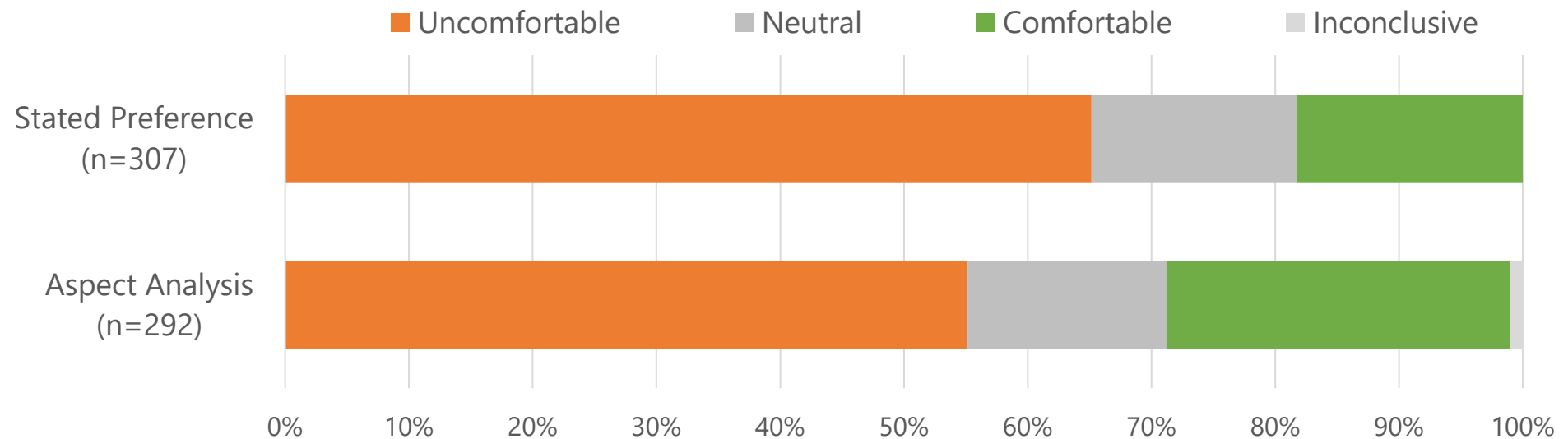Vehicle-overtaking-cyclist Maneuver

Overall Level of Comfort

Drivers' and Cyclists' Levels of Comfort during Existing Condition Video (Overtaking Maneuver)

Cyclists' Comfort & Being Overtaken

### Cyclists' Levels of Comfort with Being Overtaken on Roadway of Interest

Legend: ■ Uncomfortable ■ Neutral ■ Comfortable ■ Inconclusive

Category	
Stated Preference (n=307)	
Aspect Analysis (n=292)	

X-axis: 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%

- Cyclists familiar with roadway (n=225)
- Cyclists familiar with roadway and stated uncomfortable with being overtaken (n=145)

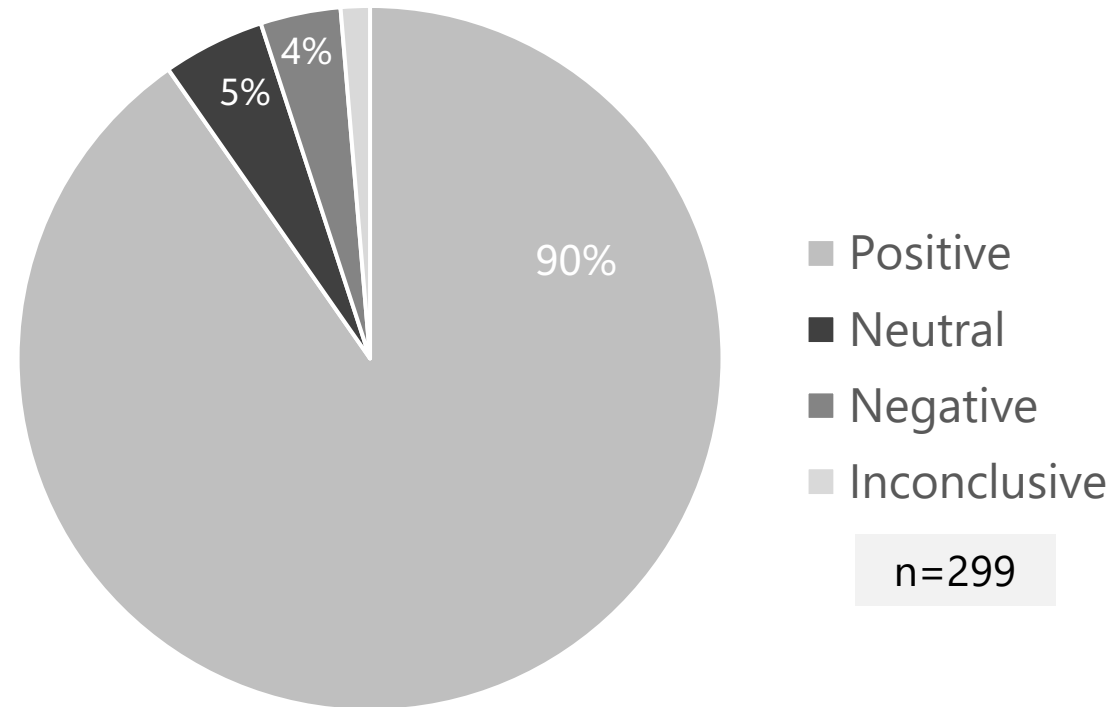# Proposed Conditions

Auxiliary Bike Lane

Overall Level of Comfort

Drivers' and Cyclists' Levels of Comfort during Proposed Conditions Video (with Auxiliary Bike Lane)

Percentage of Sample

Drivers (n=305)
Cyclists (n=307)
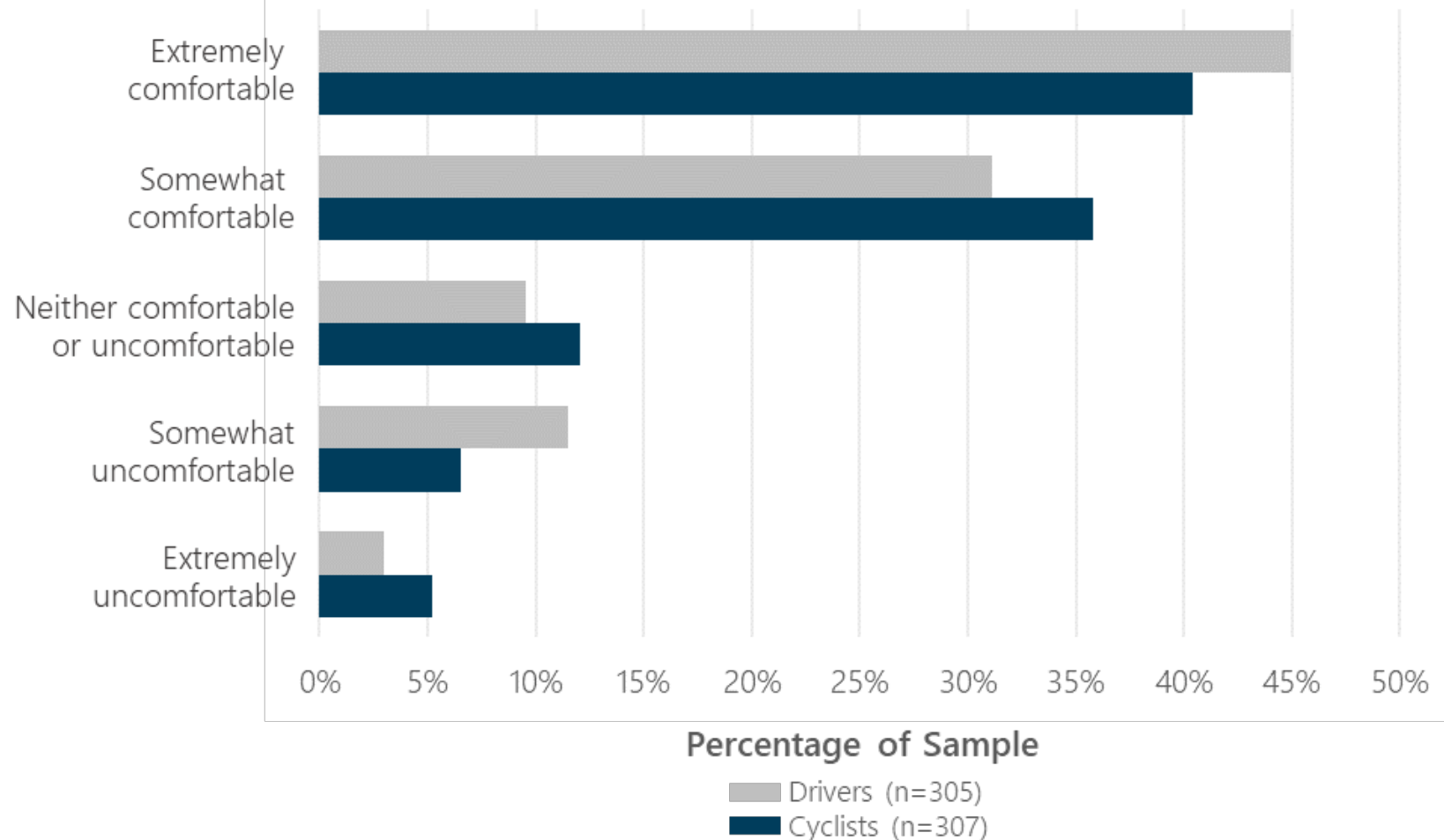
Drivers OER: Sentiment Analysis

Sentiment Analysis of Drivers' OERs in Response to Auxiliary Bike Lane Video

Cyclists Familiar with Roadway Segment

Who? Cyclists who stated they are familiar with biking on roadway of interest (n=225)

98%

Make them feel more comfortable

99%
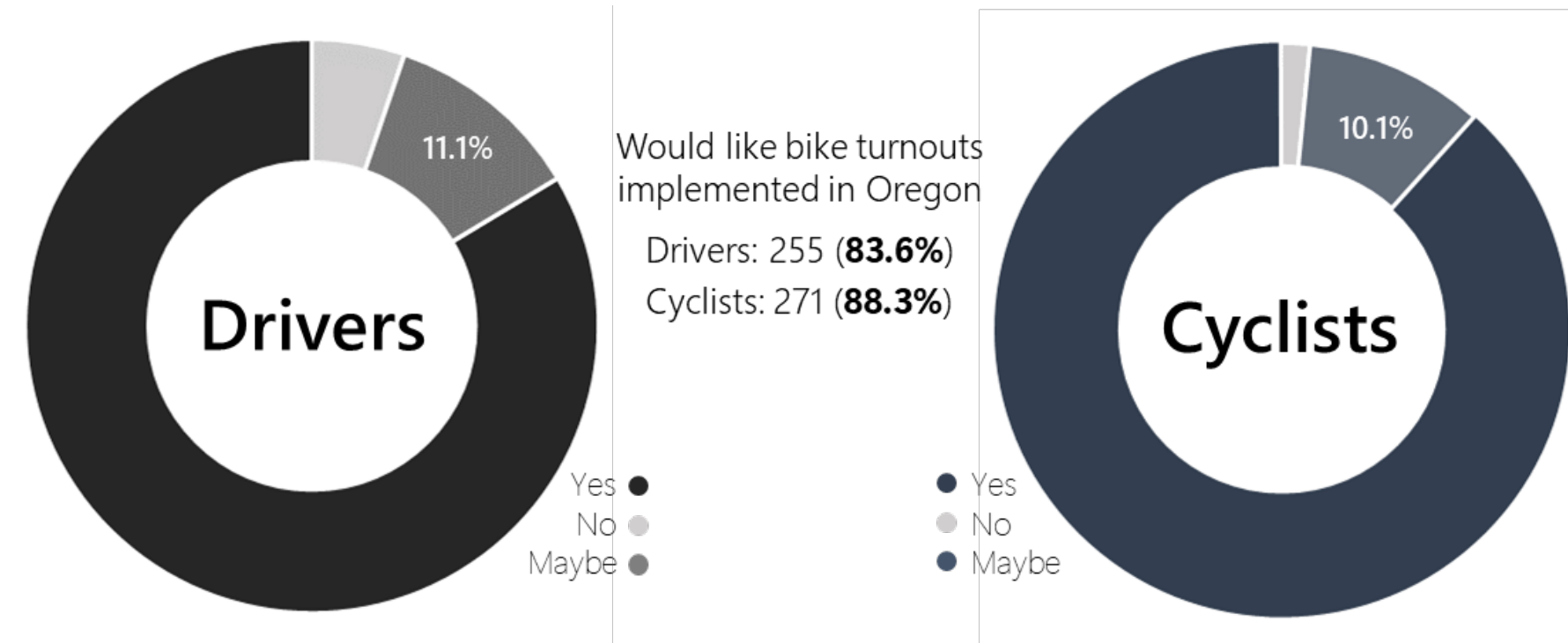
Will be valuable to them as a cyclist
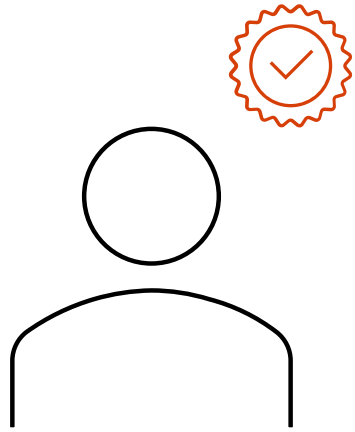
98%

Will improve their safety as a cyclist

Oregon State University

Receptivity to Implementation (Stated Pref.)

Would like bike turnouts implemented in Oregon

Drivers: 255 (**83.6%**)
Cyclists: 271 (**88.3%**)

Drivers — 11.1%
Yes ●
No ●
Maybe ●

Cyclists — 10.1%
● Yes
● No
● Maybe

Limitations and Conclusions

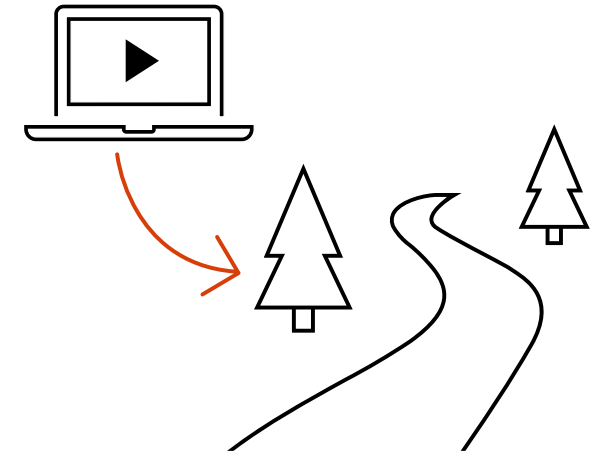Limitations of work, general and focused conclusions

Limitations

Self-reporting methods

Quantity and quality exposure

Degree of simulation

Conclusions

- Receptivity

- Perceived improvement on their level of comfort

- Perceived value

- Perceived safety

Design Considerations

- Where to implement?

- Additional signage alert drivers / bicyclists of downstream auxiliary bike lanes

- Both drivers' and cyclists' expressed concerns regarding cyclist compliance with use of auxiliary bike lanes

Thank you!

At this time, we are open to take questions and comments