



Center for Advancing Research in Transportation Emissions, Energy, and Health

A USDOT University Transportation Center

CARTEEH – Tier 1 University Transportation Center



Agenda



Welcome and Introduction

Ben Ettelman, Texas A&M Transportation Institute

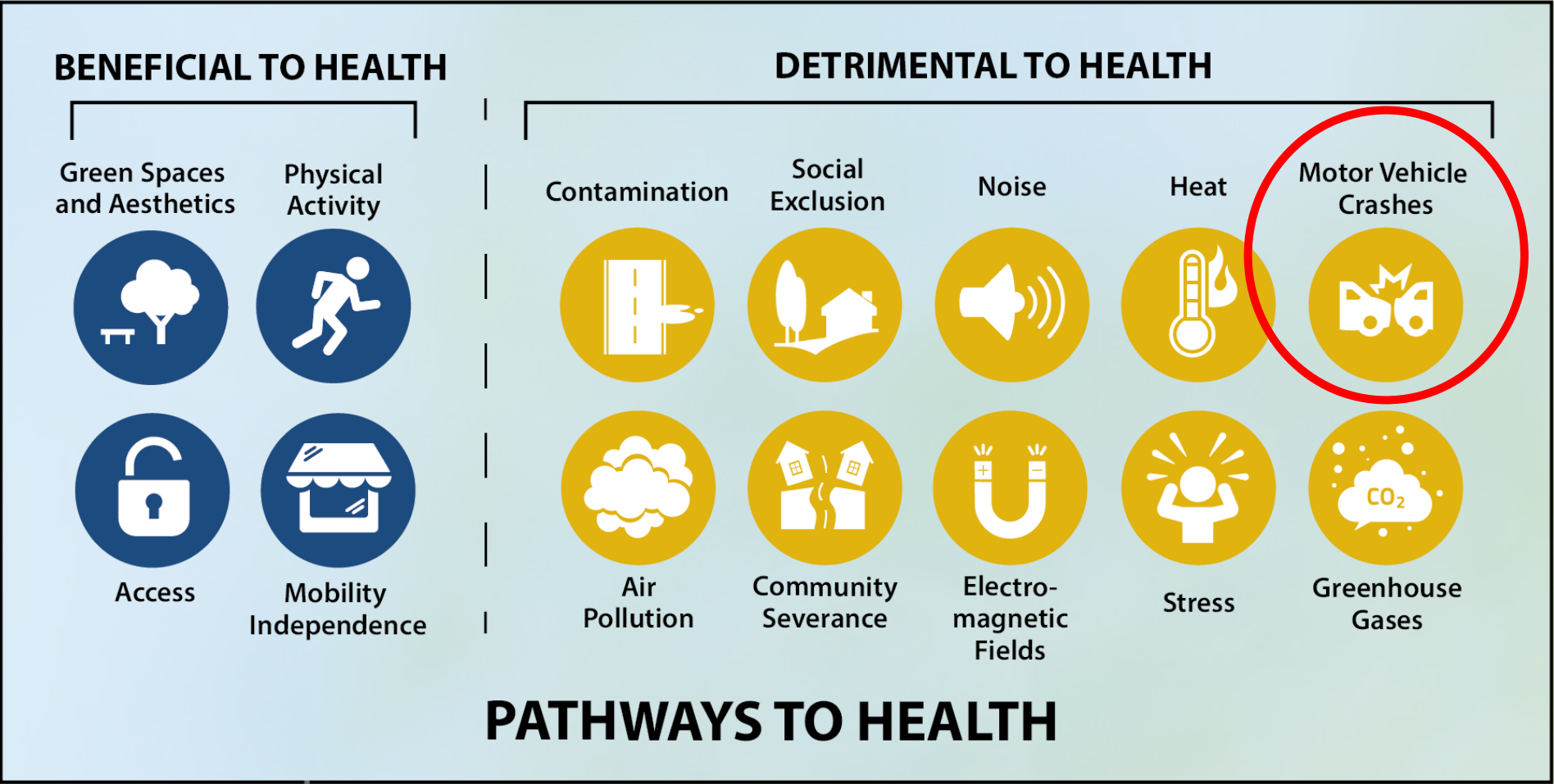
Exploring the Intersection of Policy and Health: The Role of Perceived Safety on Bicycling Behavior

Michelle Duren, John Hopkins Bloomberg School of Public Health



Questions, Answers, and Discussion Session

Holistic Approach to Understanding Impacts of Transportation on Human Health



The context

- Pandemic-induced travel **behavior** changes
 - *Decreased overall mobility*
 - *Increased bicycling*
- Pandemic-induced **environmental** changes
 - *Reimagined streetscapes*
 - *Policy experimentation*



Research question

- **To what extent did policy changes impact pandemic bicycling?**
 - *What role did changes in perceived safety play in determining the effect of transportation policies implemented during the pandemic?*

The data

- **Target population:** U.S. adults (18+)
- **Timeframe:** May 4 –June 10, 2022
- **Final sample:** 6,735 U.S. adults
 - **4,973 U.S. adults residing in urban and suburban communities**

Table 1. Sample characteristics for urban and suburban respondents

| Characteristic | Frequency [percent] |
|----------------------|---------------------|
| Sex | |
| Male | 2,473 [49.7] |
| Female | 2,500 [50.3] |
| Race | |
| White, non-Hispanic | 2,864 [57.6] |
| Black, non-Hispanic | 660 [13.3] |
| Asian, non-Hispanic | 288 [5.8] |
| Hispanic | 972 [19.5] |
| Other | 190 [3.9] |
| Income | |
| Less than \$30,000 | 1,246 [25.0] |
| \$30,000 to \$59,999 | 1,238 [24.9] |
| \$60,000 to \$99,999 | 1,155 [23.2] |
| \$100,000 and higher | 1,335 [26.8] |
| Age | |
| 18-29 years | 1,011 [20.3] |
| 30-44 years | 1,333 [26.8] |
| 45-59 years | 1,167 [23.5] |
| 60 years and older | 1,463 [29.4] |
| Total | 4,973 [100] |

The policies

- (1) extra street space for bicycling,
- (2) extended or new bicycle lanes,
- (3) reduced speed limits for motorized traffic, and
- (4) certain residential streets limited to local traffic only.

Other variables

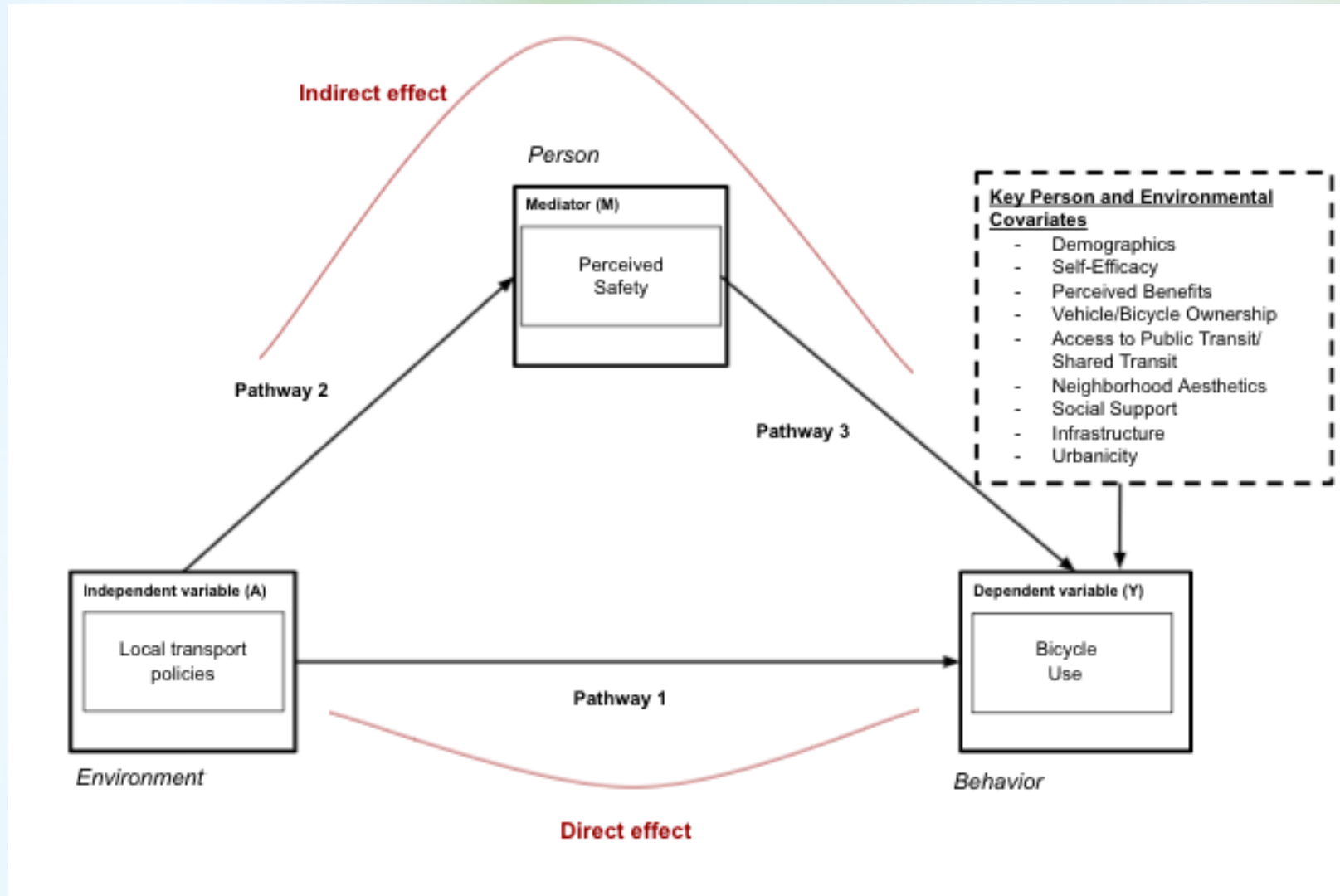
- **Mediator:** change in perceived bicycle safety (*during first year of pandemic*)
- **Outcome:** increased bicycling (*compared to pre-pandemic*)
- **Controls:**
 - *Individual:* age, sex, health status, income, employment status, access to a vehicle, access to a bicycle, license status, perceived benefits, self-efficacy, normative beliefs, and social support.
 - *Environmental:* presence of bicycling infrastructure in local community, connectivity of bicycling infrastructure, and neighborhood aesthetics.

Mediation analysis

A series of logistic regression models were used to determine the:

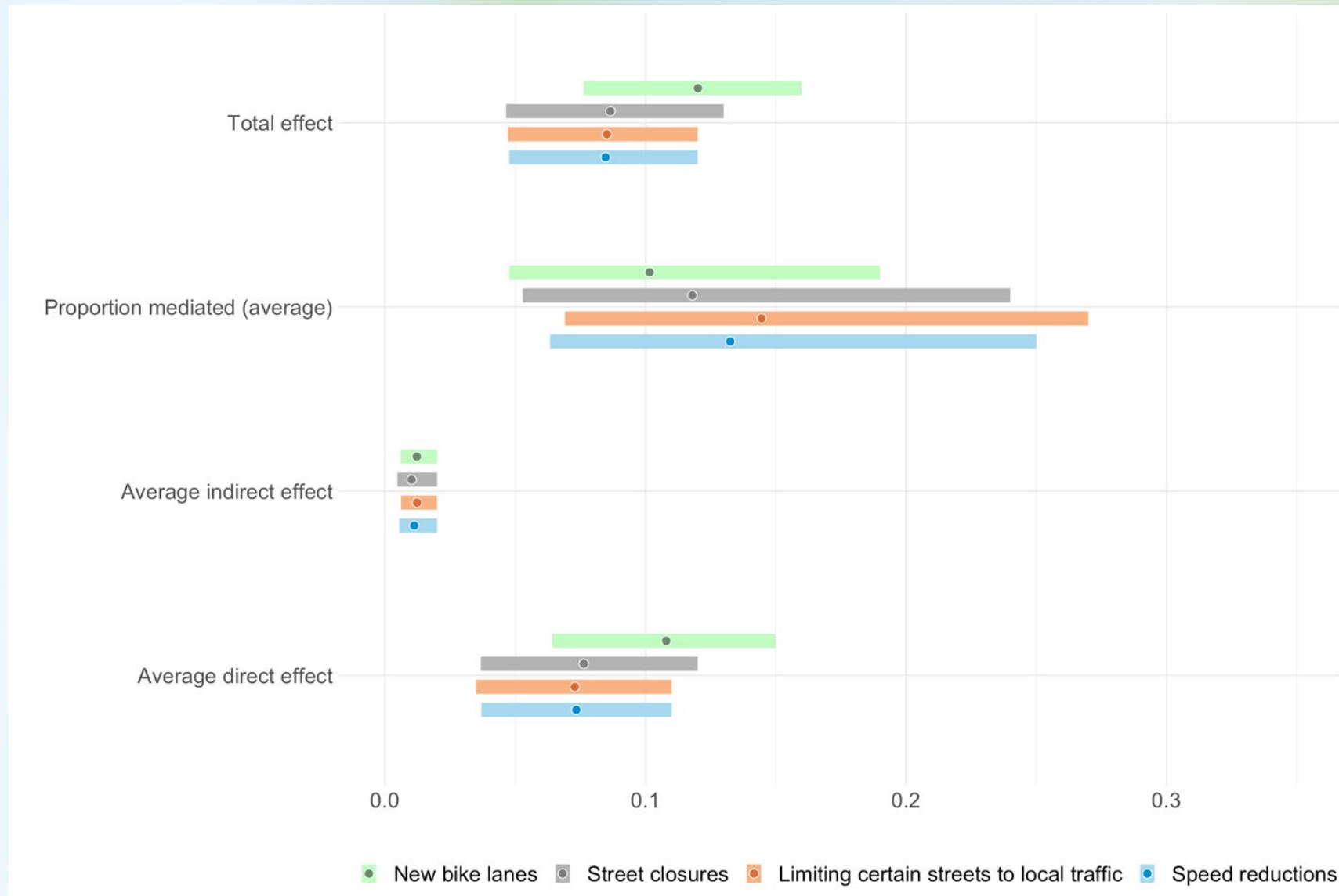
- (1) **total effect** that each policy of interest has on bicycling behavior,
- (2) the **direct effect** that each policy has on bicycling after accounting for potential mediation,
- (3) the **indirect effect** that each policy has on bicycling through how the policy changes safety perceptions, and
- (4) the **percent** of the effect of each policy that is **mediated** by changes in the perceived safety of bicycling.

Conceptual framework



Adapted from Social Cognitive Theory: Bandura, A. (1989). Human agency in social cognitive theory. *Am Psychology* (44) 1175-84.

Mediating effects of local transport policies



Implications

- **Safety** identified as a **key pathway** through which transportation policy impacts bicycling.
- Reducing traffic flow and speed were the policies whose effect was **most filtered** by perceived safety.
- Establishing (or extending) bicycle lanes had the **largest effect** on bicycling behavior.
- Suggests a need for **safety improvements** and **highlighting safety effects** in promotional activities to encourage bicycling.

Future work

- Conduct longitudinal analysis to confirm findings.
- Extend mediation analysis to rural areas.
- Investigate presence of additional mediators.



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