Mobile Ad Effectiveness: Hyper-Contextual Targeting with Crowdednes

FOX | GLOBAL CENTER FOR BIG DATA IN MOBILE ANALYTICS


STANDING IN AN ELEVATOR WITH A STRANGER
TAKE OUT YOUR PHONE AND PRETEND TO TEXT SOMEONE

Mobile Targeting Motivation

- Ad spending: $100B by 2018

- Key: reach consumers when and where most receptive

Mobile Technology

- Portability = Real-time Targeting

- GPS, Wi-Fi, Bluetooth, iBeacon = Geo-Targeting

Mobile Targeting with Crowdedness

- Mobile technology can gauge crowdedness on-the-go

Research Objective

(1) How does crowdedness affect consumer response to mobile targeting?

(2) What drives the results?

Research Design

- **Ideal** test of crowding effects:
  - randomize crowdedness

- **Our** test:
  - field data measuring crowdedness with mobile technology

Measuring Crowdedness

Passengers/m²: mobile users connect to subway-specific cellular line

Overview of Results

- Crowding positively affects mobile ad purchase
  - Crowding invades space so people turn inwards

- Results opposite of crowding literature
  - Crowding in retail stores *decreases* purchases
  - May be a different manifestation of avoidance

Harrel et al. 1980; Zhang et al. 2014

Overview of Results

- Paradox of crowded environment
  - Noise *distracts* consumer attention to ads
  - But, crowding *boosts* attention to signal of mobile ads

Bart et al. 2014; Ghose and Han 2014

Prior Research

Mobile Marketing

Crowdedness

Mobile Research

- Mobile internet search behavior
- Coupon redemption rates
- Time and location
  (*my forthcoming *Management Science* paper)
- Geographic mobility

Ghose et al. 2013; Molitor et al. 2014; Luo et al. 2014; Ghose and Han 2011

Mobile Research

- In-store mobile promotions
- Product characteristics
- Cross-platform synergies
- Environmental factors

Hui et al. 2013; Bart et al. 2014; Ghose et al. 2014; Molitor et al. 2013

Crowdedness Research

- Disease and juvenile delinquency
- Stress, frustration, hostility
- Felt loss of control

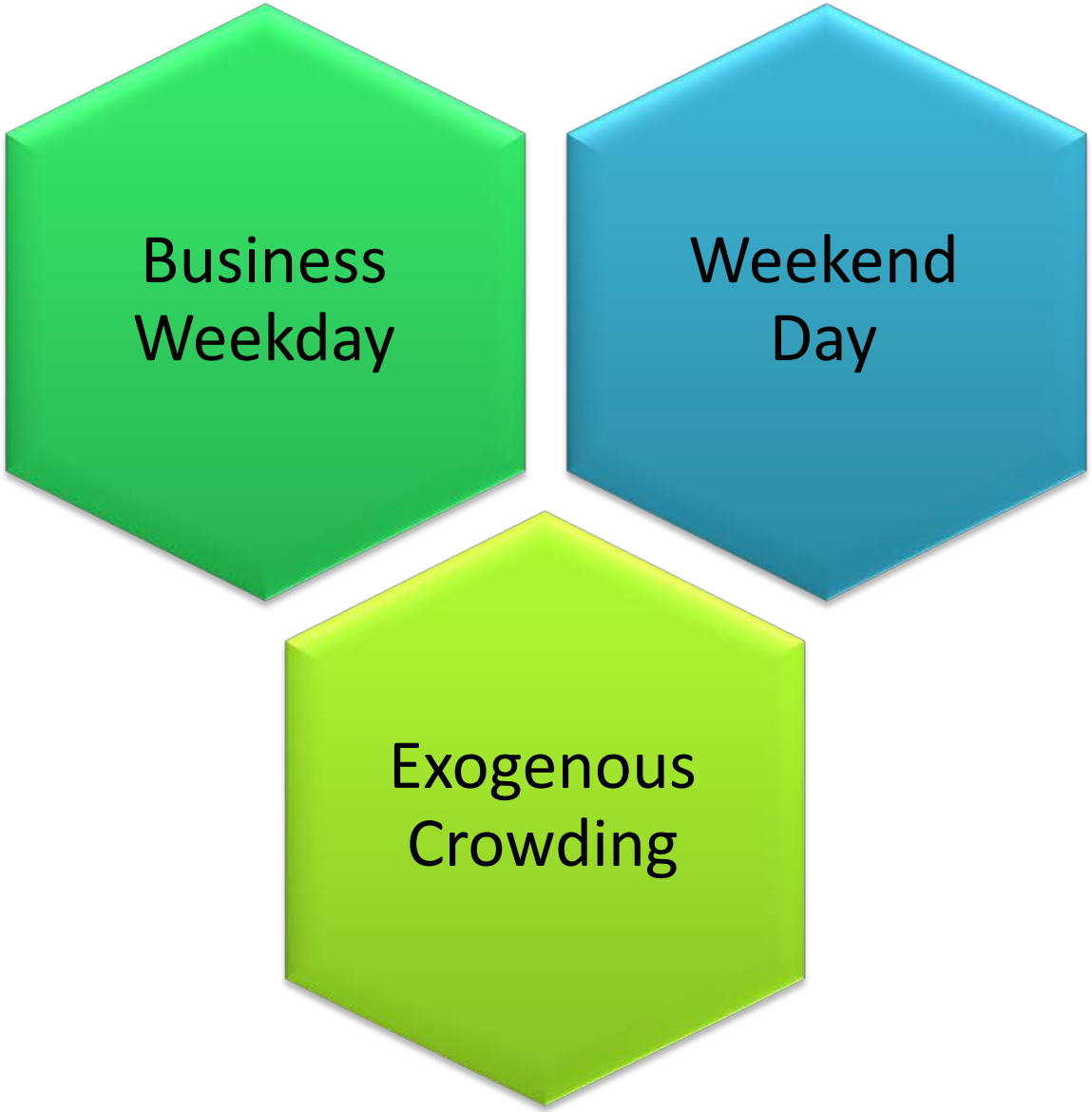
Schmitt 1966; Collette and Webb 1976; Zimbardo 1969

Crowdedness Research

- Avoidance behaviors
- Threatened sense of uniqueness
- Risk aversion

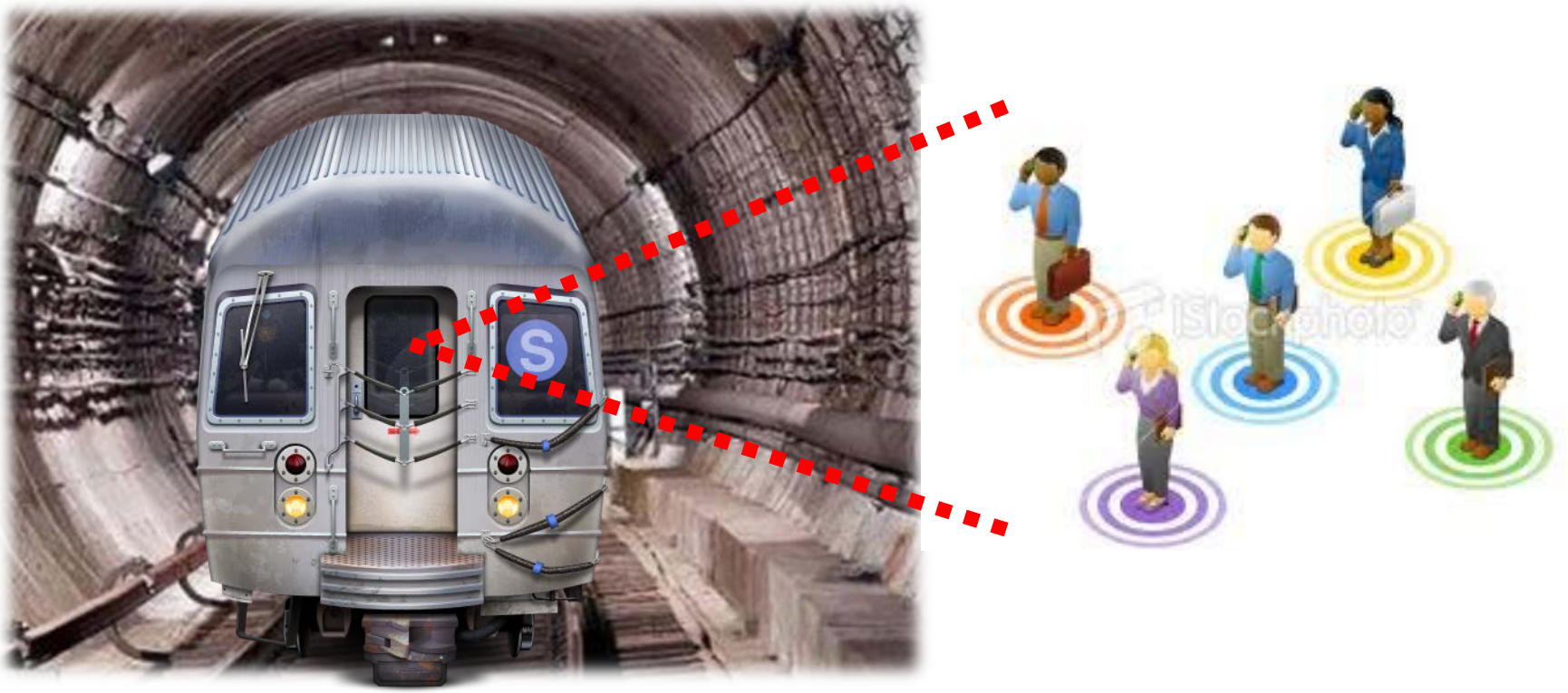
Harrell et al. 1980; Xu et al. 2012; Meang et al. 2013

Field Data (Quasi-field experiments)



Measuring Crowdedness

- **passengers/m²:** Subway mobile users connect to subway-specific cellular line



Parts 1 & 2

- Targeted subway population: 2 million commuters

- **Sample size:** pushed to 10,360 mobiles
  - Weekday and weekend

Mobile Message

- **20 Minute Expiration**

- **Promotional Discount**

Self-Selection Threats

(1) Peak hours vs. non-peak hours of crowdedness

- 5 times (7:30-8:30, 10-12, 14-16, 17:30-18:30, 21-22 hrs)
- Subway station and direction

(2) Weekdays and weekends

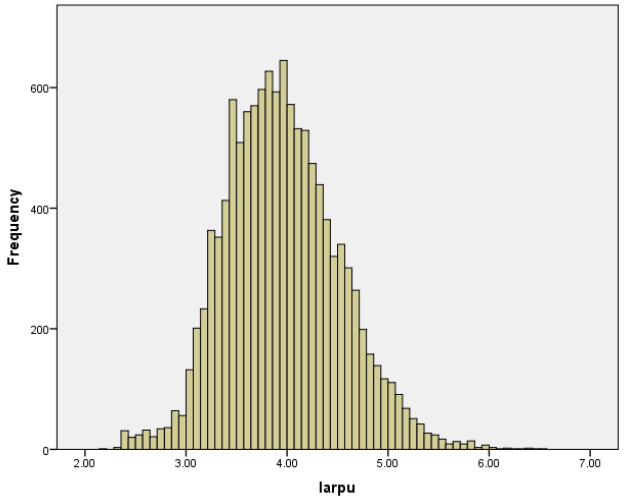
Self-Selection Threats (cont'd)

(3) Randomization

- Excluded users who had the service or received the SMS already
- *Randomized* remaining users and pushed SMS.

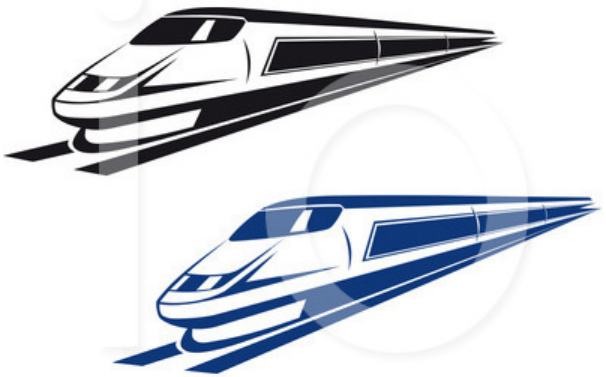
(4) Personal mobile usage habits

- ARPU
- MOU
- SMS
- GPRS



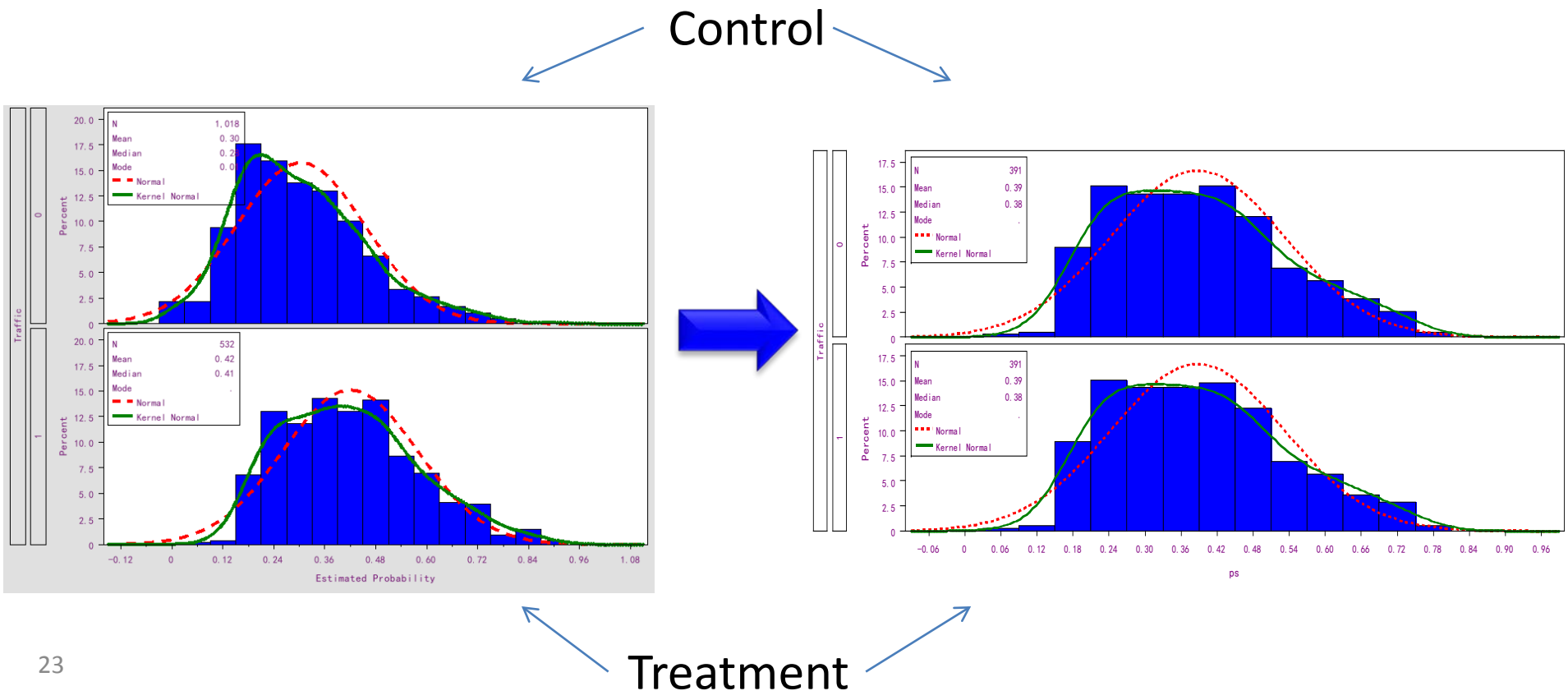
Additional Self-Selection Approaches

- Same-train-same-time subsample analysis

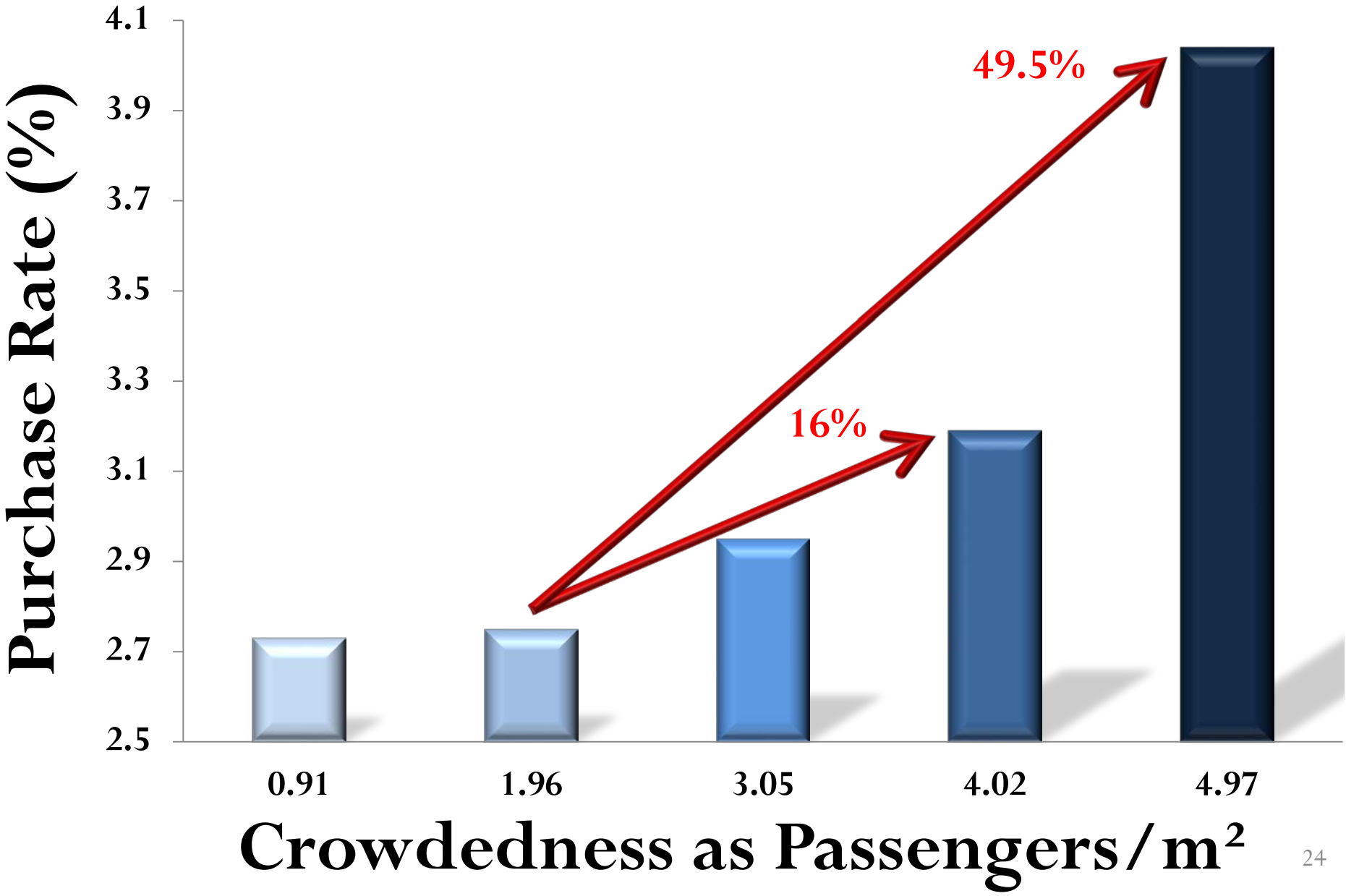


Additional Self-Selection Approaches

- Propensity score matching



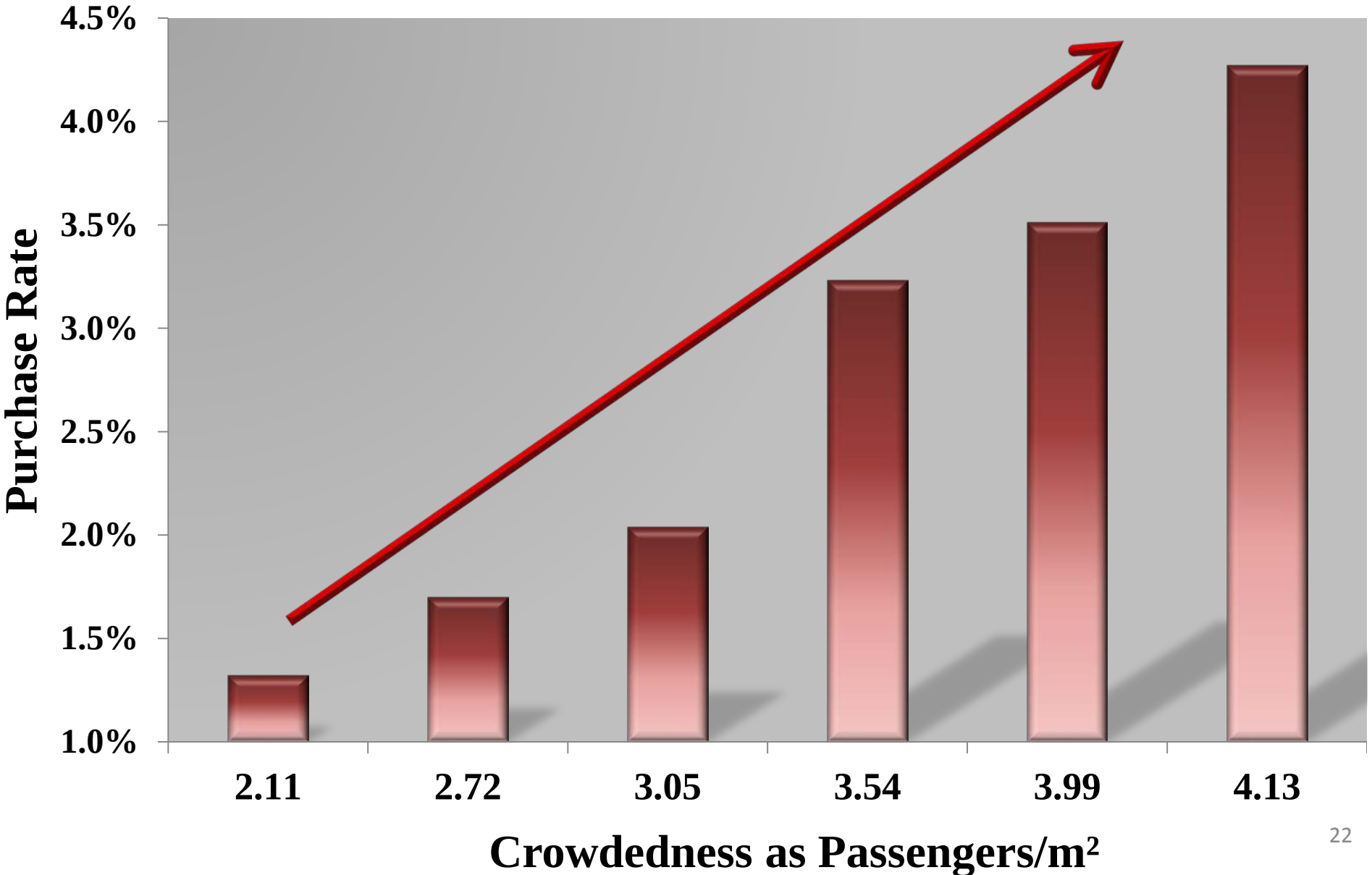
Effect of Crowdedness



Endogeneity Threat

- Identification with street closures

Street Closure Crowdedness



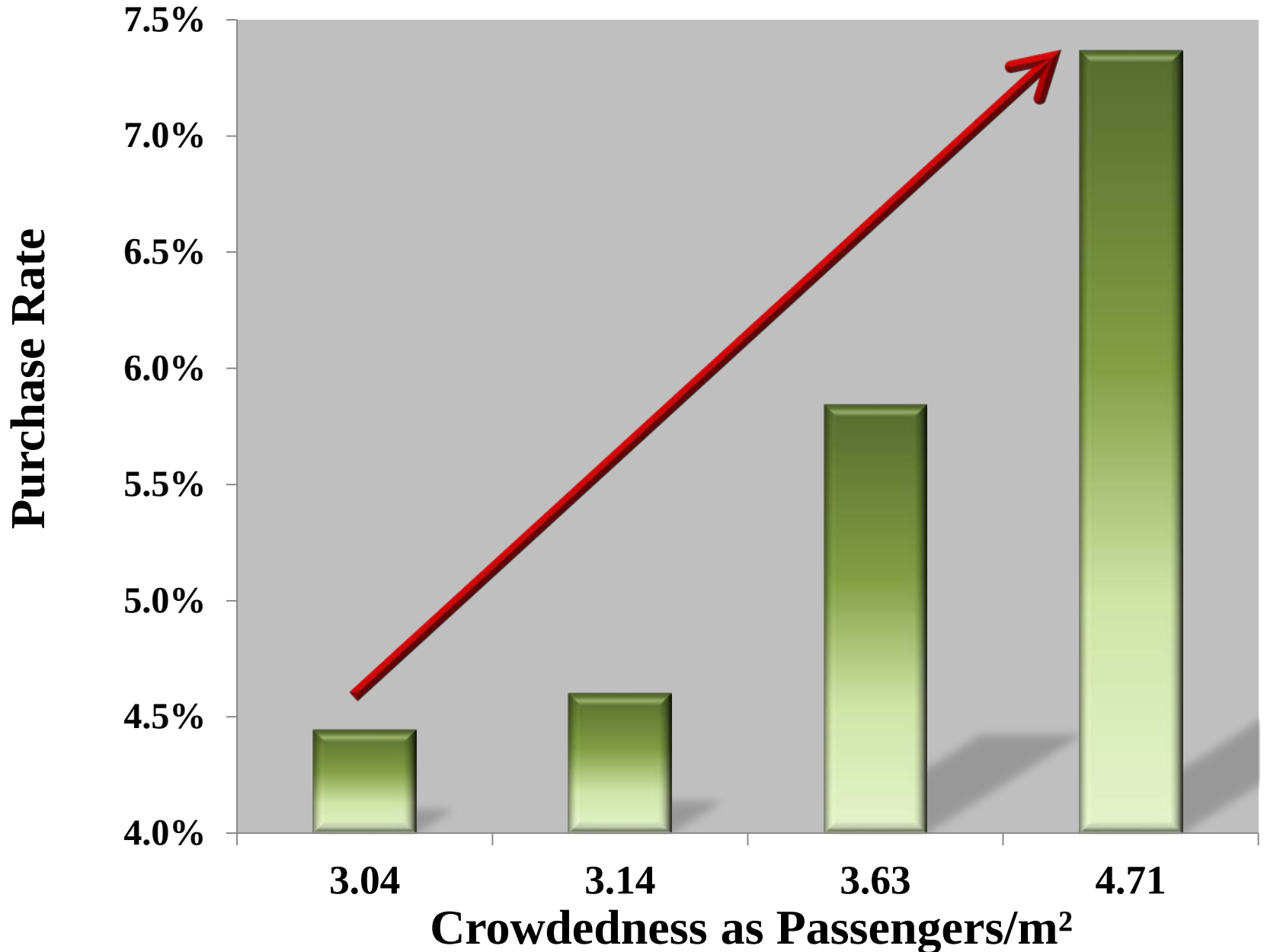
Main Evidence for Crowdedness Effect

Parameter	Model 1	Model 2	Model 3	Model 4
Crowdedness X Street Closures				**.492**** **(.187)**
Crowdedness			**.126**** **(.041)**	**.114**** **(.042)**
Street Closures		-.120 (.117)	-.142 (.177)	-1.887 (1.057)
Ln(ARPU)	.301** (.118)	.308** (.119)	.308** (.119)	.306** (.119)
Ln(MOU)	-.043 (.065)	-.043 (.065)	-.044 (.065)	-.044 (.065)
Ln(SMS)	.014 (.069)	.014 (.069)	.015 (.069)	.013 (.069)
Ln(GPRS)	-.001 (.024)	-.001 (.023)	-.001 (.023)	-.001 (.023)
Day(weekday) Effects	Yes	Yes	Yes	Yes
Train (time cycle) Effects	Yes	Yes	Yes	Yes
Observations	11,960	11,960	11,960	11,960

Endogeneity Threat

Identification with unanticipated train delays

Train Delay Crowdedness



Lower Threshold

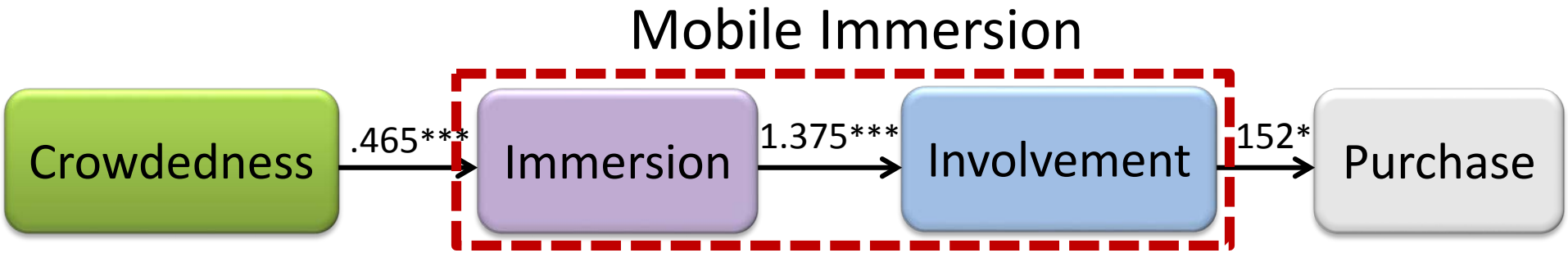
	Subsample with Low Crowdedness (under 2 passengers/m^2)
Parameter	**Model 1**
Crowdedness	**-.084 (.270)**
Mobile Behaviors	Yes
Day(weekday) Effects	Yes
Train (time cycle) Effects	Yes
Observations	2,886

Upper Threshold

More Evidence with Field Surveys

- **Participants: 300** Purchasers & non-purchasers

- **Survey Response:** 240 of 300 mobile users = 80%.



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