Observed Customer Standing Behaviours and Seat Preferences on Board Subway Cars in New York City

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Diverse Seating Layouts in Subways

U.S. Subway Systems

- New York City
  - Mainly longitudinal seating
  - All cars built after 2000 are longitudinal
  - Except extra large (75') cars
- Chicago
  - Traditionally followed other cities
  - New 5000-series has modified longitudinal layout
  - Older cars retrofitted
- Other U.S. Cities
  - Mostly transverse seating (similar to commuter rail cars)
  - Longitudinal seats near doors

New York

Chicago

Atlanta

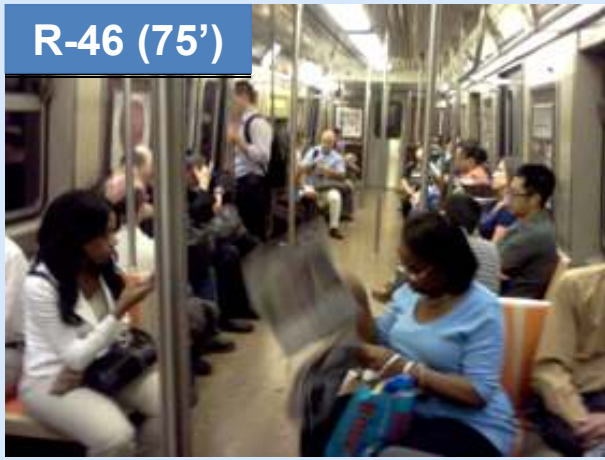
New York City Fleet

- Asymmetric door arrangement
  - System's oldest fleet (R-32)
  - Recently retired fleet from 1960s
  - Half of numbered-line fleet (non-cab R-142/R-142A)
  - Concept is largely unique to NYC
- Symmetric door arrangement
  - Majority of current NYC cars
  - Prevalent elsewhere in the world
- Combination of transverse and longitudinal seats
  - Only on 75-foot-long cars
  - Only 40% of seats are transverse

R-32

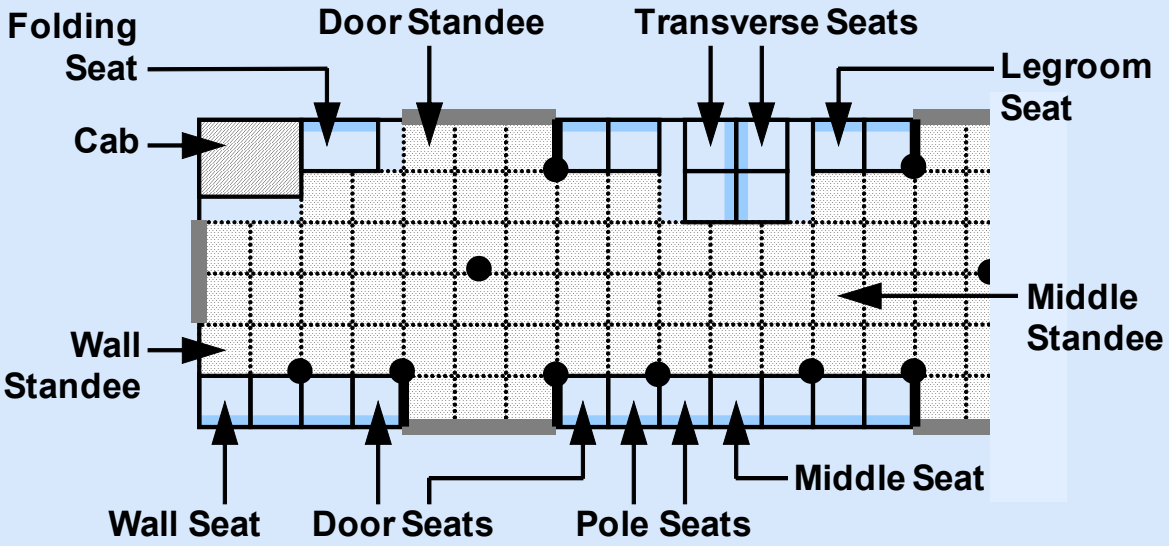
R-160

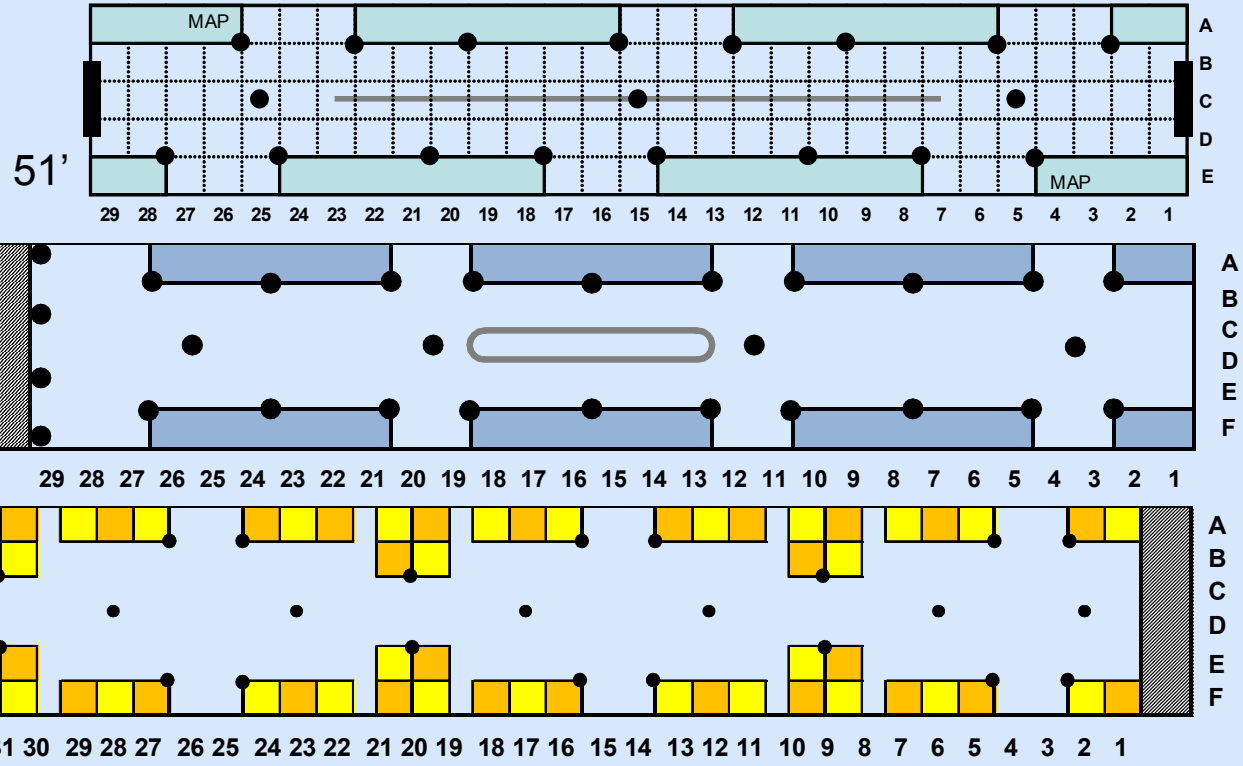
R-46 (75')



Study Methodology

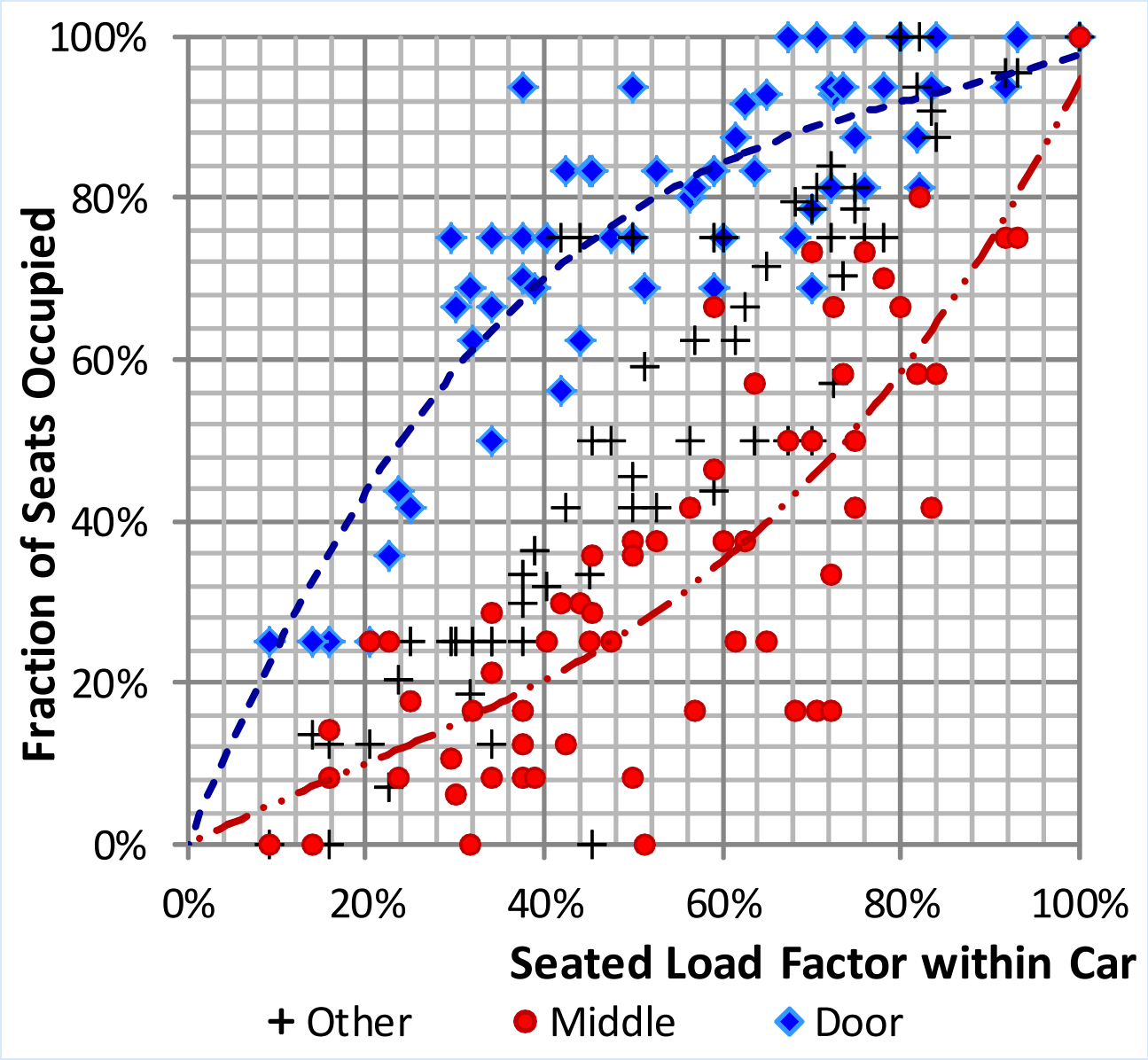
- Over 60 samples recorded
- Each sample is one car traveling non-stop between two adjacent stations
- Customers classified by gender and age group





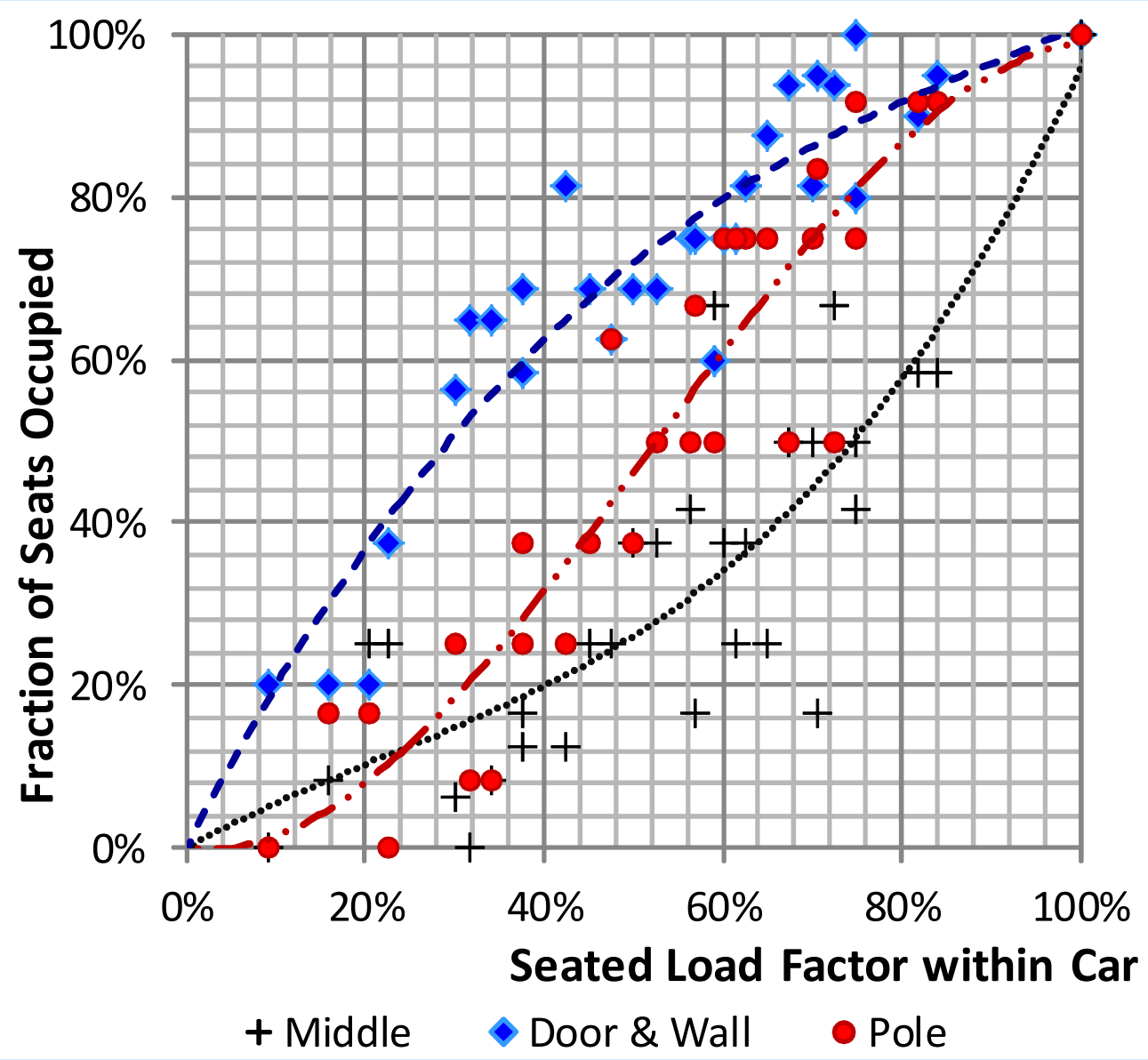
Probability Snapshots: Seating

Door, Middle, Other



Probability Snapshots: Seating

Door/Wall, Middle, Pole

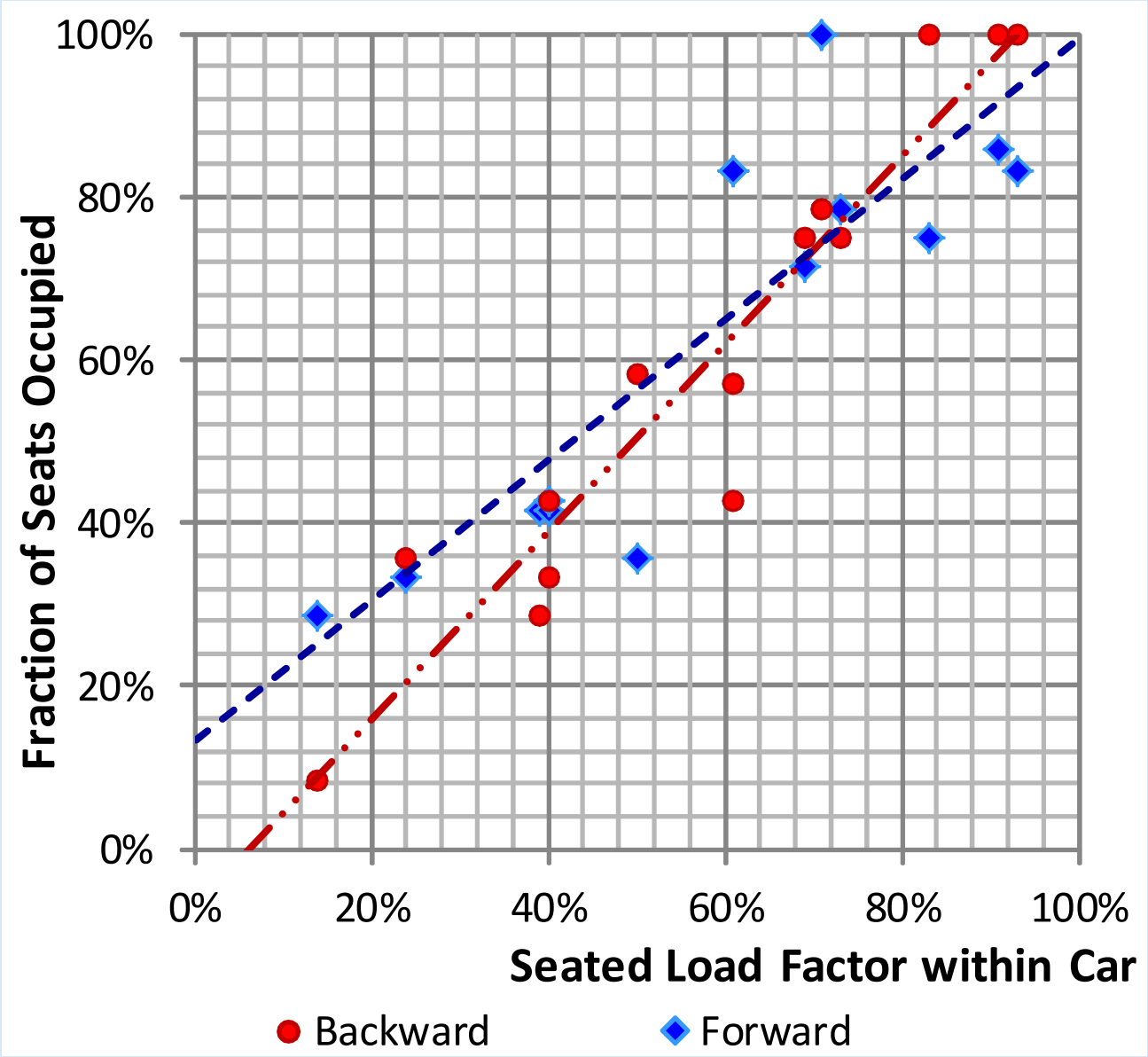


Probability Snapshots: Seating

Forward, Backward*

(75’ cars)

* Data collected is not sufficient to make a definitive conclusion. Further study is recommended.



Probability Snapshots: Seating

Window, Aisle, Longitudinal

(75’ cars)

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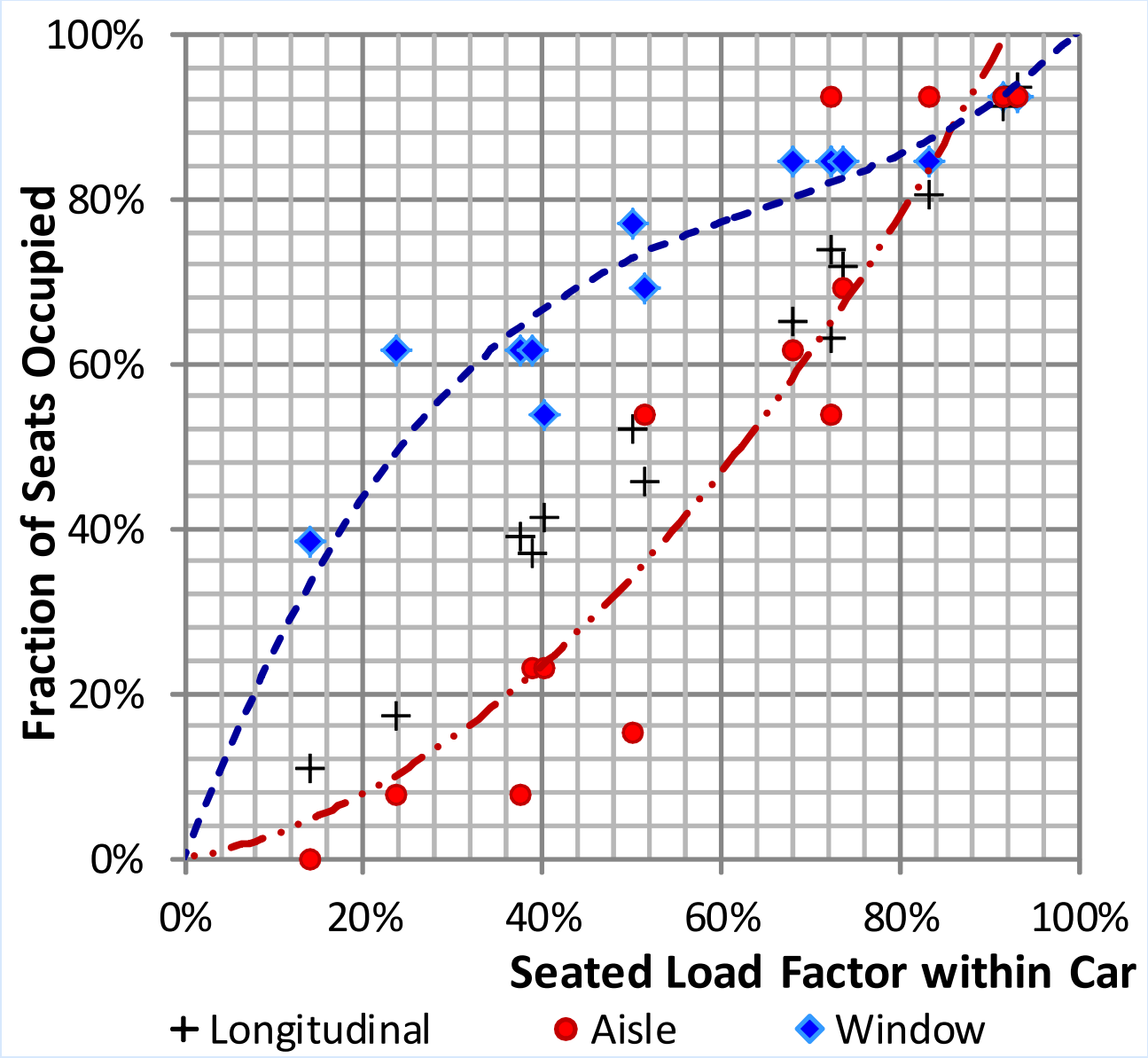
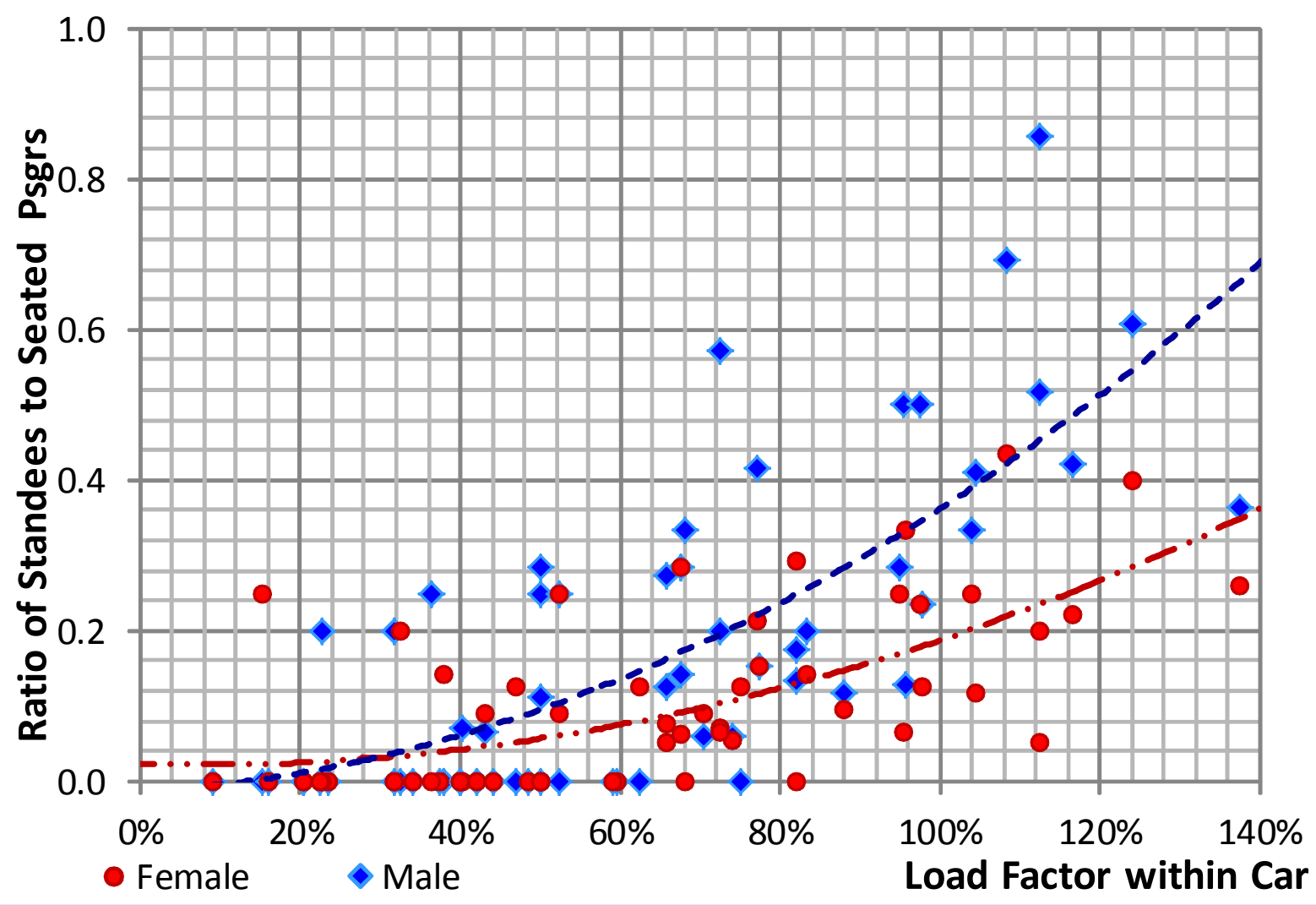
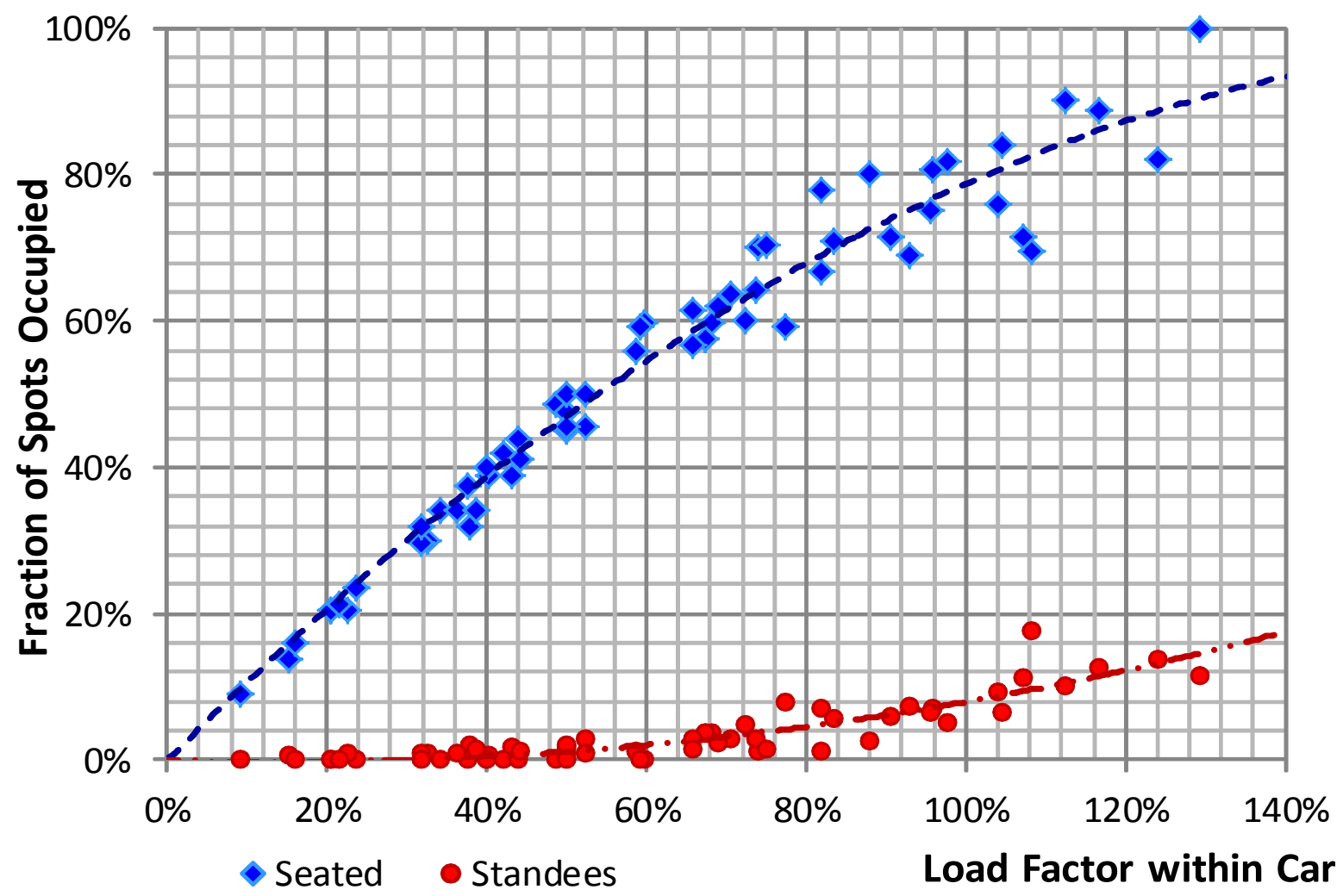


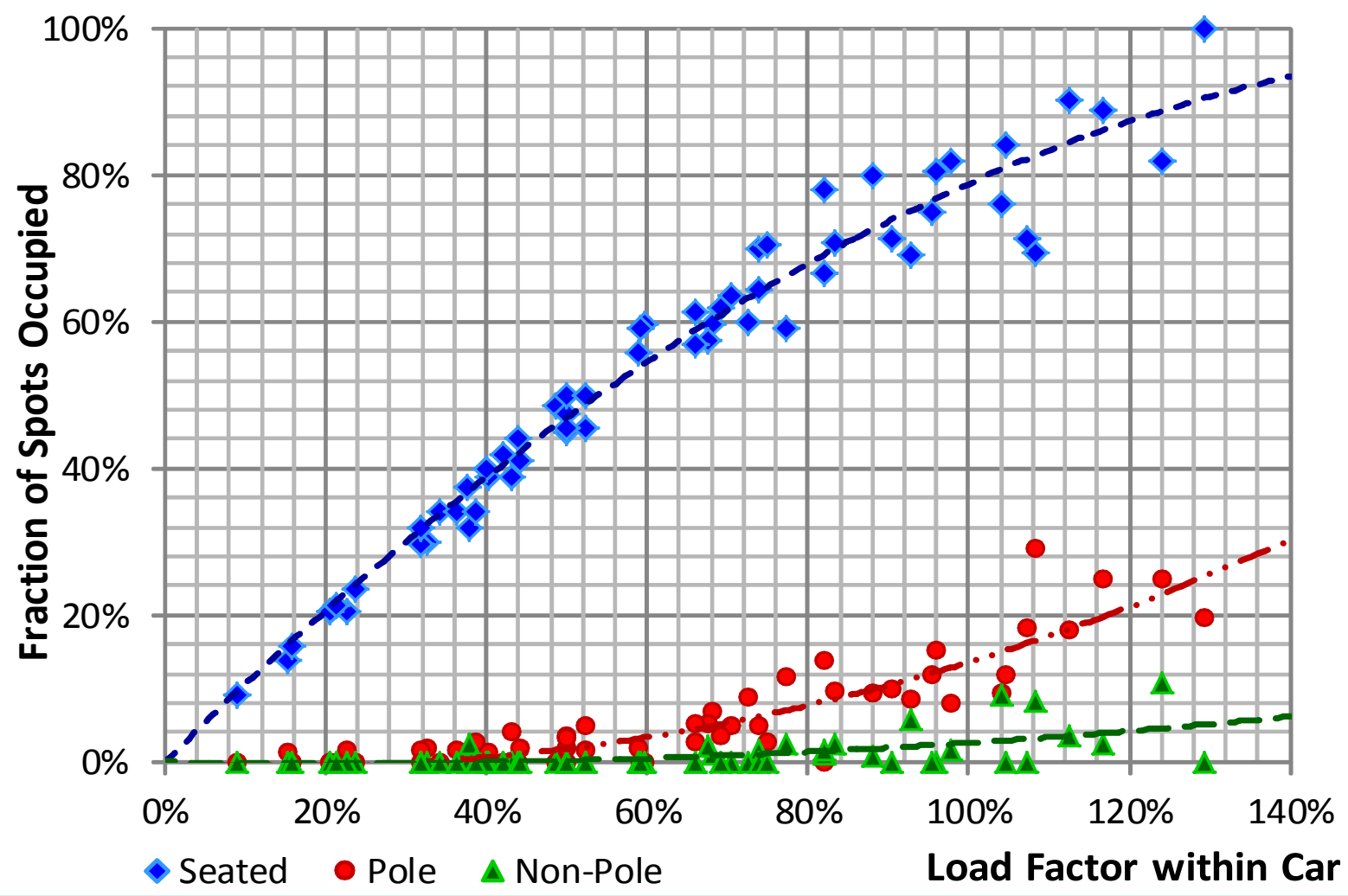
Gender Ratio, Standees to Seated: Male versus Female



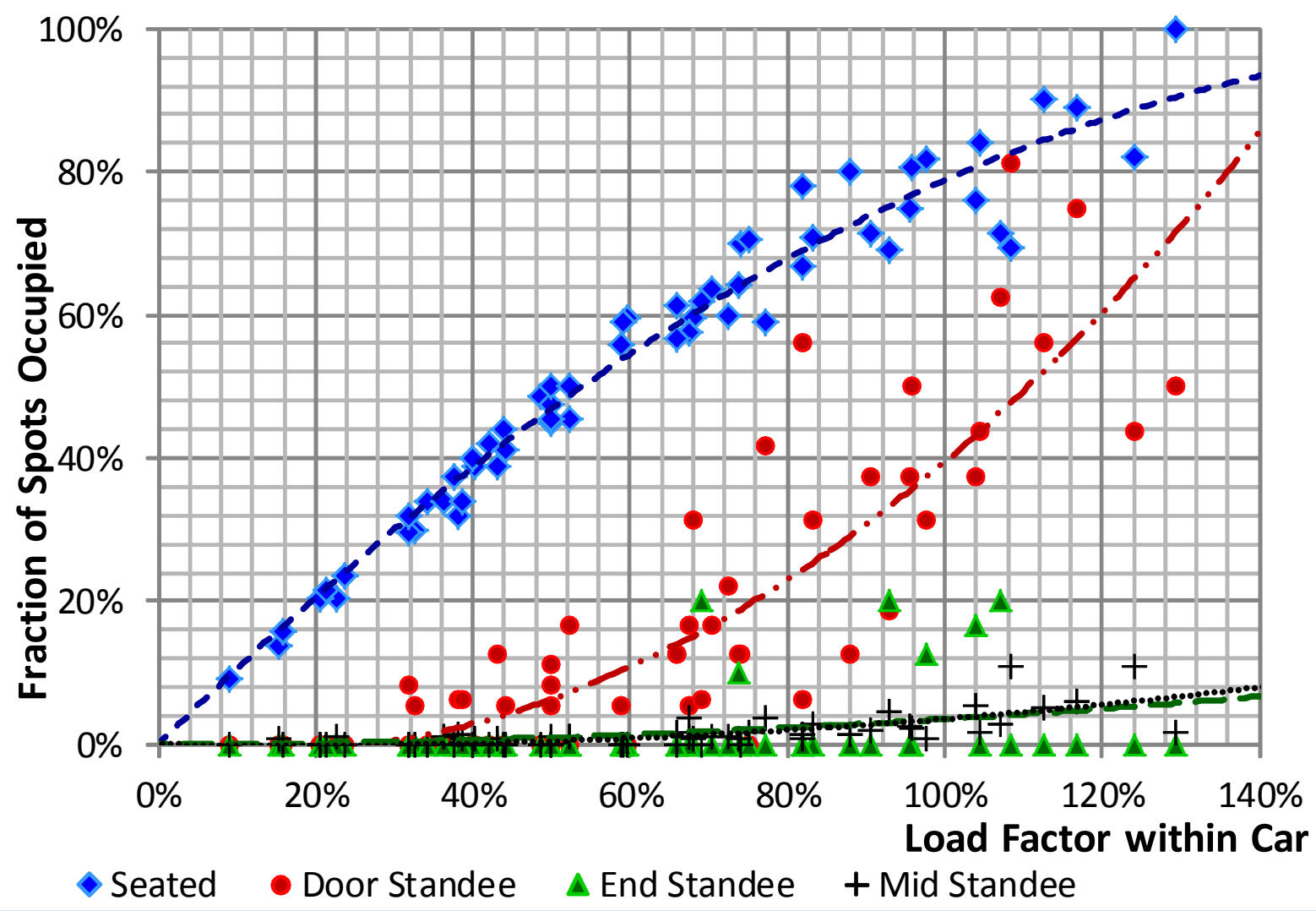
Probability Snapshots: Seated versus Standees



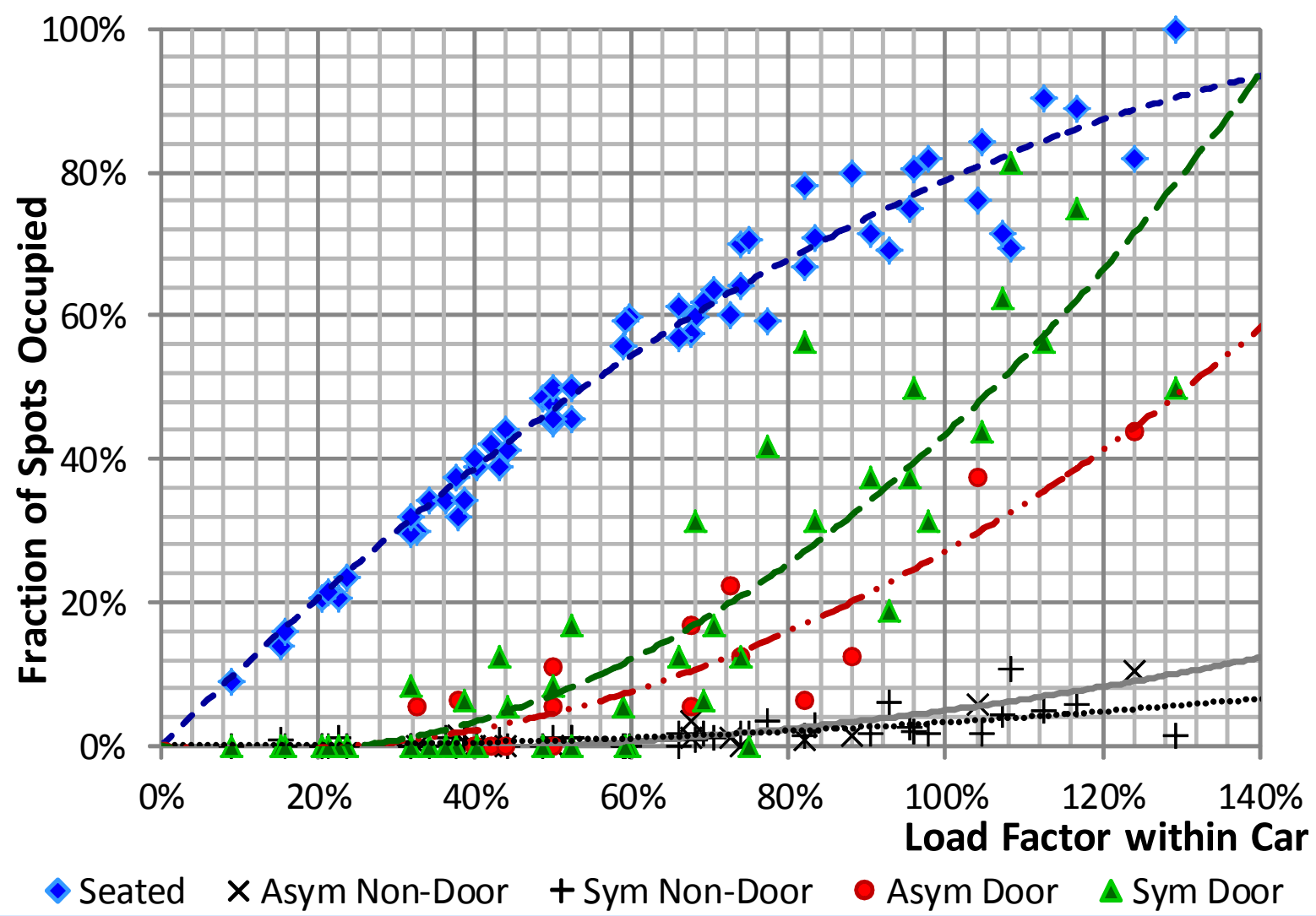
Probability Snapshots: Pole versus No Pole



Probability Snapshots: Standees Door, End, and Middle



Probability Snapshots: Doors in Symmetrical versus Asymmetrical

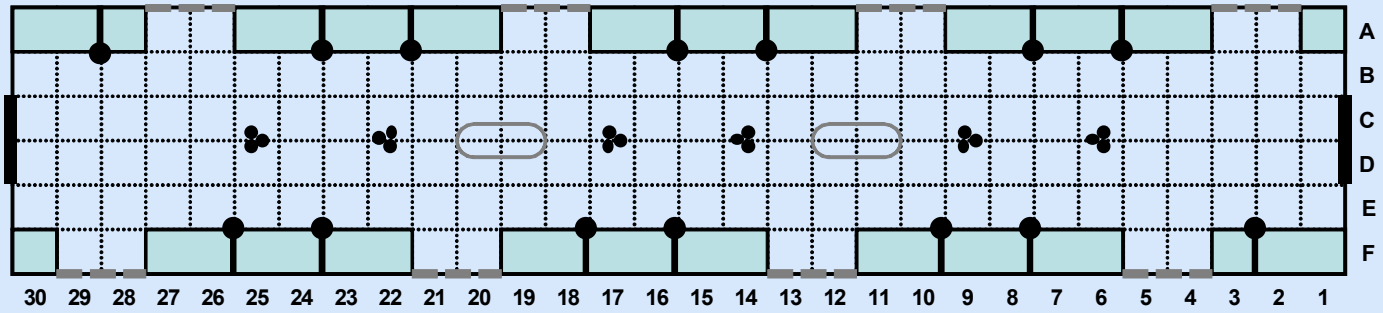


Conclusions: New York

- Preference for seats next to doors
- No real preference for seats adjacent to stanchions
- Disdain for spots between two seats
- Window transverse seats are preferred where available, regardless of travel direction*
- Standees crowd door areas, especially with symmetric doors
- Standees prefer spots where they can hold on to vertical poles

* Data collected is not sufficient to make a definitive conclusion regarding forward- vs. backward-facing seat preference. Further study is recommended.

Talking About Car Design…



- Longitudinal seats maximize overall car capacity
- Transverse seats provide customer-preferred windows
- 2+2, even 2+1 transverse seats should be avoided in urban areas (aisle seats create blocking and circulation problems)
- Partition on long benches avoids appearance of “middle” seat, and discourages lying down
- Because poles attract standees, they should be moved away from doors, to reduce congestion
- Customers tend to especially crowd symmetric door areas, so asymmetric arrangement could reduce crowding by the doors.
- Areas that become crowded during crush load should have overhead supports

Open Research Questions

- In subway cars, how does the ratio of transverse/longitudinal seats relate to ridership, crowding, and station spacing?
- Should seats be homogenous or should options be provided within a train or even a single car?
- Stated preference surveys could determine perceptions; customers could rank renderings
- Individual hardware items (e.g. poles) could be tested in existing cars to determine effects
- On commuter trains, what is a good ratio of airline-style versus booth seating?
- In cars with fixed forward- and backward-facing seats, should seats face towards door or away?





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All photos by Aaron Berkovich unless otherwise stated.

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